Advanced Solutions
for Advanced Pathology

ImPath

Molecular Morphology
Reference Guide 2014

A.MENARINI diagnostics

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Active
Immunostainer

A.MENARINI diagnostics

Active
Immunostainer

The importance of **Molecular Morphology** to achieve precise diagnoses and Patient's stratification in oncology is constantly evolving.

This has an impact on the anatomic pathology lab requiring broader, optimised and more standardised Molecular Morphology tests.

Today the main **challenge** is to expand the **standardisation** achieved in immunohistochemistry, extending automation of more **complex tests**, while optimising workflow.

I'm

ImPath36 is the Advanced Solution for molecular morphology. A unique and complete system combining a next generation instrument with a world class range of antibodies and probes.

The Advanced Solution is a breakthroughfor the pathology lab.

I'm Flexibility
optimising the workload based on needs

I'm Relief
standardising the workflow through automation

I'm Efficiency
accelerating processes without shortcuts

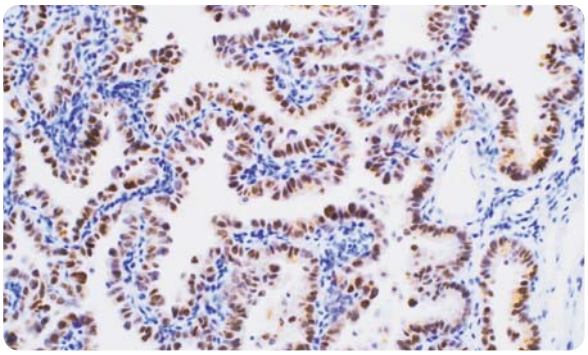
I'm Environmentally Friendly
reducing waste impact and optimising the work space.

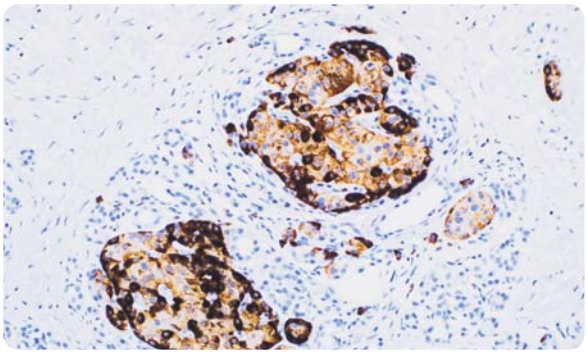
A.MENARINI diagnostics

I'm Flexibility

- Protocol flexibility slide by slide. No more boundaries
- Different applications per single run (Immunocytochemistry tests. FISH/CISH tests, Immunohistochemistry long/short protocols)

ImPath36



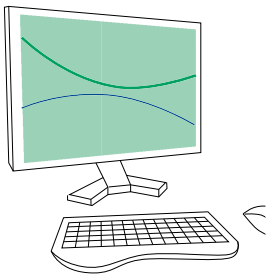


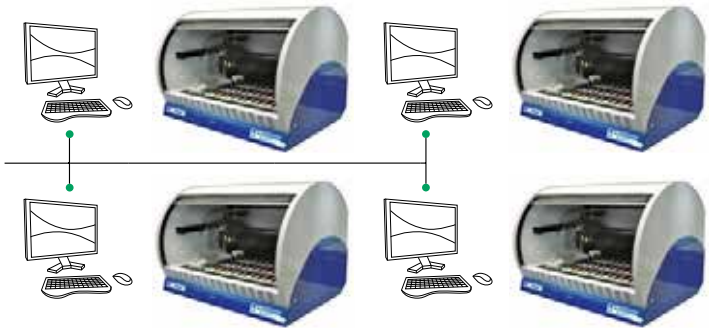
Flexibility

I'm Relief

- **Standardising** the workflow thanks to complete automation, from dewax to counterstain, allowing full walk-away capabilities
- **Ensuring an efficient** use of reagents by the Plug-n-Play Radio Frequency Identification (PnP RFID) tracking system
- **Sharing information** by a multi platform network, connected to a Laboratory Interface Management System (LIMS)

ImPath36





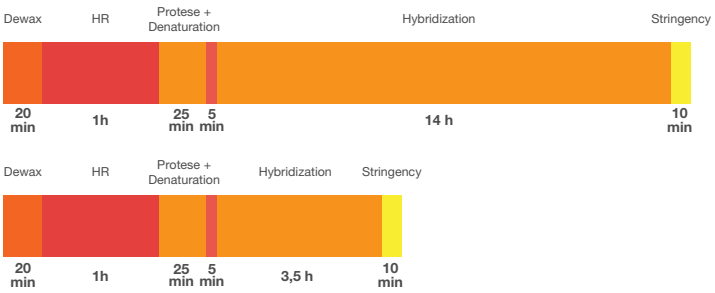
Relief

A.MENARINI diagnostics

I'm Efficiency

- **Delivering** same day diagnosis by performing enhanced FISH protocols in less than 5 hours

ImPath36



FISH Protocol < 5H

- Providing Clinicians with fast, reliable reports

Efficiency

I'm Environmental friendly

- Reducing waste generation considerably with separate toxic waste
- Being a '*bench-system*' that optimises the workspace thanks to its reduced dimensions

ImPath36

ImPath36 Competitor 1 Competitor 2

Environmental friendly

A.MENARINI diagnostics

I'm

Flexibility Relief Efficiency

FR

Environmental friendly

A.MENARINI diagnostics

ImPath36

Reference	43965
Dimensions	91.44 cm x 60.96 cm x 53.34 cm
Weight	49.9 kg
Electrical requirements	220V 220/240V (±10%) 50Hz (±2Hz) 700
Normal operating temperature	18°C-26°C
Slide capacity	1-36 glass slides
Reagent capacity	40 different reagents (15 mL/reagent vial)
Reagent dispense volumes	85-400 µL
Reagent probe volume capacity	20 µL minimum, 4500µL maximum
Printer	Zebra TLP 3844-Z or Zebra GX430t
Computer controller requirements A. Menarini Diagnostics reserves the right to change the computer controller specifications at any time	1.2GHz Intel Pentium® processor, 4 MB RAM, 320 GB hard drive, USB 2.0 Communications Port
Compliance	CE IVD Directive 98/79/EC

ImPath RFID Antibodies

45122 IMPATH A-1-Antichymotrypsin RTU R (Poly)
45123 IMPATH A-1-Antitrypsin RTU R (Poly)
45161 IMPATH ACTH RTU R (Poly)
45235 IMPATH Actin Muscle Specific RTU M (HHF35)
45121 IMPATH Actin Smooth Muscle RTU M (1A4)
45162 IMPATH ALK Protein RTU M (ALK-1)
45163 IMPATH Alpha-Fetoprotein RTU R (Poly)
45164 IMPATH Androgen Receptor RTU M (SP107)
45290 IMPATH Annexin A1 RTU M (MRQ-3)
45291 IMPATH Arginase-1 RTU R (SP156)
45293 IMPATH BCA-225 RTU M (Cu-18)
45165 IMPATH BCL2 RTU M (E17)
45166 IMPATH BCL6 RTU M (GI191E/A8)
45167 IMPATH Beta-Catenin RTU M (14)
45294 IMPATH BG8 RTU M (F3)
45124 IMPATH BOB-1 RTU R (SP92)
45295 IMPATH C3d RTU R (Poly)
45296 IMPATH C4d RTU R (SP91)
45168 IMPATH CA-125 RTU M (OC125)
45692 IMPATH CA19-9 RTU M (121SLE)
45645 IMPATH Cadherin-17 RTU R (SP183)
45170 IMPATH Calcitonin RTU R (Poly)
45272 IMPATH Caldesmon RTU R (E89)
45171 IMPATH Calponin-1 RTU R (EP798Y)
45172 IMPATH Calretinin RTU R (Poly)
45176 IMPATH CD1A RTU R (EP3622)
45177 IMPATH CD2 RTU M (MRQ-11)
45179 IMPATH CD3 (MRQ-39)
45277 IMPATH CD4 RTU R (EP204)
45133 IMPATH CD5 RTU R (EP77)
45188 IMPATH CD7 RTU M (MRQ-56)
45191 IMPATH CD8 RTU M (C8/144B)
45125 IMPATH CD10 RTU M (56C6)
45126 IMPATH CD11c RTU M (5D11)
45646 IMPATH CD13 RTU R (SP187)
45274 IMPATH CD14 RTU R (EPR3653)
45174 IMPATH CD15 RTU M (MMA)
45647 IMPATH CD16 RTU R (SP175)
45175 IMPATH CD19 RTU M (MRQ-36)
45128 IMPATH CD20 RTU M (L26)
45275 IMPATH CD21 RTU R (EP3093)
45178 IMPATH CD23 RTU M (1B12)
45129 IMPATH CD25 RTU M (4C9)
45180 IMPATH CD30 RTU M (Ber-H2)
45181 IMPATH CD31 RTU M (JC70)
45130 IMPATH CD33 RTU M (PWS44)

ImPath RFID Antibodies

45131 IMPATH CD34 RTU M (QBEnd/10)
45182 IMPATH CD35 RTU M (RLB25)
45276 IMPATH CD38 RTU R (SP149)
45183 IMPATH CD43 RTU M (MT1)
45184 IMPATH CD44 RTU M (MRQ-13)
45185 IMPATH CD45 RTU M (2B11 & PD7/26)
45297 IMPATH CD45R RTU M (MB1)
45132 IMPATH CD45RO RTU M (UCHL-1)
45186 IMPATH CD56 RTU R (MRQ-42)
45134 IMPATH CD57 RTU M (NK-1)
45135 IMPATH CD61 RTU M (2f2)
45136 IMPATH CD63 RTU M (NKI/C3)
45187 IMPATH CD68 RTU M (Kp-1)
45189 IMPATH CD71 RTU M (MRQ-48)
45137 IMPATH CD74 RTU M (LN2)
45190 IMPATH CD79a RTU M (JCB117)
45192 IMPATH CD99 RTU R (EPR3097Y)
45273 IMPATH CD117 RTU R (YR145)
45173 IMPATH CD138 RTU M (B-A38)
45127 IMPATH CD163 RTU M (MRQ-26)
45278 IMPATH CDX-2 RTU R (EPR2764Y)
45194 IMPATH CEA RTU M (CEA31)
45193 IMPATH CEA RTU R (Poly)
45195 IMPATH Chromogranin A RTU M (LK2H10)
45298 IMPATH Claudin 1 RTU R (Poly)
45203 IMPATH CMV RTU M (8B1.2,1G5.2&2D4.2)
45196 IMPATH Collagen Type IV RTU M (CIV22)
45279 IMPATH COX-2 RTU R (SP21)
45280 IMPATH Cyclin D1 RTU R (EP12)
45138 IMPATH Cytokeratin RTU M (34betaE12)
45201 IMPATH Cytokeratin 8 RTU M (35betaH11)
45299 IMPATH Cytokeratin RTU M (OSCAR)
45197 IMPATH Cytokeratin 14 RTU M (LL002)
45198 IMPATH Cytokeratin 17 RTU M (Ks 17.E3)
45199 IMPATH Cytokeratin 19 RTU M (A53-B/A2.26)
45139 IMPATH Cytokeratin 20 RTU M (Ks20.8)
45300 IMPATH Cytokeratin 5&6 RTU M (D5 & 16B4)
45281 IMPATH Cytokeratin 5 RTU R (EP1601Y)
45693 IMPATH CK5 + CK14 RTU M (EP1601Y & LL002)
45200 IMPATH Cytokeratin 7 RTU M (OV-TL 12/30)
45202 IMPATH Cytokeratin 8 & 18 RTU M (B22.1 & B2)
45140 IMPATH Cytokeratin Cocktail RTU M (AE1 & AE3)
45301 IMPATH Cytokeratin HMW RTU M (AE3)
45302 IMPATH Cytokeratin LMW RTU M (AE1)
45204 IMPATH Desmin RTU M (D33)
45283 IMPATH E-cadherin RTU R (EP700Y)
45205 IMPATH EMA RTU M (E29)
45648 IMPATH Ep-CAM RTU M (Ber-EP4)
45141 IMPATH EP-CAM RTU M (MOC-31)
45206 IMPATH Epstein-Barr Virus RTU M (MRQ-47)
45284 IMPATH Estrogen Receptor RTU R (EP1)
45207 IMPATH Factor VIII RTU R (Poly)
45208 IMPATH Factor XIIIa RTU R (EP3372)
45209 IMPATH Fascin RTU M (55k-2)
45303 IMPATH FLI-1 RTU M (MRQ-1)
45216 IMPATH FSH RTU R (Poly)
45142 IMPATH Galectin-3 RTU M (9C4)
45143 IMPATH Gastrin RTU R (Poly)
45652 IMPATH GATA3 RTU M (L50-823)
45285 IMPATH GCDFP-15 RTU R (EP1582Y)
45210 IMPATH GH RTU R (Poly)
45144 IMPATH GFAP RTU R (EP672Y)
45145 IMPATH Glucagon RTU R (Poly)
45305 IMPATH GLUT1 RTU R (Poly)
45306 IMPATH Glycophorin A RTU M (GA-R2)
45307 IMPATH Glypican-3 RTU M (1G12)
45211 IMPATH Granzyme B RTU R (Poly)
45148 IMPATH Hcg RTU R (Poly)
45146 IMPATH Helicobacter pylori RTU R (Poly)
45286 IMPATH HEMOGLOBIN A RTU R (EPR3608)
45212 IMPATH Hepatitis B Virus Core RTU R (Poly) RUO
45213 IMPATH Hepatitis B Virus Surface RTU M (S1-210) RUO
45147 IMPATH Hepatocyte Specific Antigen RTU M (OCH1E5)
45649 IMPATH Her2/Neu RTU R (EP3)
45214 IMPATH Herpes Simplex Virus I RTU R (PolY)
45215 IMPATH Herpes Simplex Virus II RTU R (Poly)
45311 IMPATH HGAL RTU M (MRQ-49)
45153 IMPATH HMB-45 RTU M (HMB-45)
45318 IMPATH HMB-45&MART-1 RTU M (HMB-45&MelanA)
45312 IMPATH Hpl RTU R (Poly)
45217 IMPATH IgA RTU R (Poly)
45218 IMPATH IgD RTU R (Poly)
45219 IMPATH IgG RTU R (Poly)
45313 IMPATH IgG4 RTU M (MRQ-44)
45220 IMPATH IgM RTU R (Poly)
45221 IMPATH Inhibin alpha RTU M (R1)
45314 IMPATH INI-1 RTU M (MRQ-27)
45222 IMPATH Insulin RTU G (Poly)
45150 IMPATH Kappa RTU M (L1C1)
45319 IMPATH KBA.62 RTU M (KBA.62)
45287 IMPATH Ki-67 RTU R (EP5)
45315 IMPATH Ksp-cadherin RTU M (MRQ-33)
45223 IMPATH Lambda Light Chain RTU M (Lamb14)
45224 IMPATH LH RTU R (Poly)

ImPath RFID Antibodies

45316 IMPATH LMO2 RTU R (SP51)
45151 IMPATH Lysozyme RTU R (Poly)
45225 IMPATH Macrophage RTU M (HAM-56)
45317 IMPATH Mammaglobin RTU R (31A5)
45152 IMPATH MART-1 (Melan A) RTU M (A103)
45226 IMPATH MITF RTU M (C5/D5)
45227 IMPATH MLH1 RTU M (G168-728)
45228 IMPATH MSH2 RTU M (G219-1129)
45229 IMPATH MSH6 RTU M (44)
45230 IMPATH MUC1 RTU M (MRQ-17)
45231 IMPATH MUC2 RTU M (MRQ-18)
45232 IMPATH MUC5AC RTU M (MRQ-19)
45233 IMPATH MUC6 RTU M (MRQ-20)
45234 IMPATH MUM1 RTU R (MRQ-43)
45236 IMPATH Myelin Basic Protein RTU R (Poly)
45237 IMPATH Myeloperoxidase RTU R (Poly)
45651 IMPATH MyoD1 RTU R (EPR6653)
45238 IMPATH Myogenin RTU M (F5D)
45239 IMPATH Myoglobin RTU R (Poly)
45240 IMPATH Myosin Smooth Muscle RTU M (SMMS-1)
45241 IMPATH Napsin A RTU M (MRQ-60)
45244 IMPATH NGFR RTU M (MRQ-21)
45653 IMPATH Nestin RTU M (10C2)
45242 IMPATH Neurofilament RTU M (2F11)
45243 IMPATH NSE RTU M (MRQ-55)
45160 IMPATH Oct-2 RTU M (MRQ-2)
45245 IMPATH OCT-4 RTU M (MRQ-10)
45654 IMPATH OLIG2 RTU M (211F1.1)
45320 IMPATH p120 Catenin RTU M (MRQ-5)
45246 IMPATH p21 RTU M (DCS-60.2)
45247 IMPATH p27 RTU M (SX53G8)
45288 IMPATH P504s RTU R (13H4) RUO
45154 IMPATH p53 RTU M (DO7)
45248 IMPATH P57 RTU M (Kp10)
45249 IMPATH PTH RTU M (MRQ-31)
45250 IMPATH Parvovirus RTU M (R92F6)
45321 IMPATH PAX-2 RTU R (Poly)
45251 IMPATH PAX-5 RTU M (EP156)
45322 IMPATH PAX-8 RTU M (MRQ-50)
45323 IMPATH PD1 RTU M (NAT105)
45155 IMPATH Perforin RTU M (MRQ-23)
45256 IMPATH PGP9.5 RTU R (Poly)
45324 IMPATH Phosphohistone H3 RTU R (PHH3)
45252 IMPATH PLAP RTU M (NB10)
45253 IMPATH PMS2 RTU M (MRQ-28)
45325 IMPATH Pneumocystis jirovecci RTU M (3F6)
45326 IMPATH PNL2 RTU M (PNL2)
45327 IMPATH Podoplanin RTU M (D2-40)
45289 IMPATH Progesterone Receptor RTU R (Y85)
45328 IMPATH Prolactin RTU R (Poly)
45254 IMPATH PSA RTU M (ER-PR8) RUO
45255 IMPATH PSAP RTU M (PASE/4LJ)
45329 IMPATH PU.1 RTU R (EPR3158Y)
45257 IMPATH Renal Cell Carcinoma RTU M (PN-15)
45258 IMPATH S-100 RTU M (4C4.9)
45690 IMPATH SALL4 RTU M (6E3)
45331 IMPATH Smoothelin RTU M (R4A)
45259 IMPATH Somatostatin RTU R (Poly)
45334 IMPATH SOX-2 RTU R (SP76)
45332 IMPATH SOX-10 RTU R (Poly)
45333 IMPATH SOX-11 RTU M (MRQ-58)
45156 IMPATH Spectrin RTU M (RBC2/3D5)
45335 IMPATH SV-40 RTU M (MRQ-4)
45260 IMPATH Synaptophysin RTU R (MRQ40)
45336 IMPATH TAG-72 RTU M (B72.3)
45337 IMPATH T-bet RTU R (MRQ-46)
45338 IMPATH TCL1 RTU M (MRQ-7)
45261 IMPATH TdT RTU R (Poly)
45339 IMPATH TFE3 RTU R (MRQ-37)
45262 IMPATH Thrombomodulin RTU M (1009)
45263 IMPATH Thyroglobulin RTU M (MRQ-41)
45266 IMPATH Toxoplasma Gondii RTU R (Poly) RUO
45267 IMPATH TRAcP RTU M (9C5)
45268 IMPATH Tryptase RTU M (G3)
45264 IMPATH TSH RTU R (Poly)
45265 IMPATH TTF-1 RTU M (8G7G3/1)
45157 IMPATH Tyrosinase RTU M (T311)
45691 IMPATH Uroplakin III RTU M (AU-1)
45269 IMPATH Varicella Zoster Virus RTU M (Monocl CKT)
45158 IMPATH Villin RTU M (CWWB1)
45159 IMPATH Vimentin RTU M (V9)
45270 IMPATH WT-1 RTU M (6F-H2)
45271 IMPATH ZAP-70 RTU M (2F3.2)

Antibodies for Immunohistochemistry

A.MENARINI diagnostics

Categorical Index

Breast Markers

Estrogen Receptor (ER) 115
Her2/Neu 138
Progesterone Receptor (PR) 207

Carcinoma Markers

Arginase-1 28
BCA-225 29
BG8, Lewis^{Y} 33
CA-125 37
CA19-9 38
Cadherin-17 39
Caldesmon 41
Calponin-1 42
CD13 53
CD44 69
CDX-2 85
CEA 86, 87
Claudin 1 89
Collagen Type IV 91
Cytokeratin (34betaE12) 94
Cytokeratin (35betaH11) 95
Cytokeratin (OSCAR) 96
Cytokeratin 5 97
Cytokeratin 5 & 6 98
Cytokeratin 5 + Cytokeratin 14 99
Cytokeratin 7 100
Cytokeratin 8 & 18 101
Cytokeratin 14 102
Cytokeratin 17 103
Cytokeratin 19 104
Cytokeratin 20 105
Cytokeratin Cocktail 106
Cytokeratin, HMW 107
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GATA3 123
GCDFP-15 124
GLUT1 128
Glypican-3 130
Human Placental Lactogen (hPL) 144
Inhibin, alpha 150
Ksp-cadherin 156
Mammaglobin 162
MUC1 168
MUC2 169
MUC5AC 170
MUC6 171
MyoD1 175
Napsin A 179
Nerve Growth Factor Receptor (NGFR) 180
Nestin 181
p120 Catenin 191
P504s 192
PAX-2 195
PAX-8 197
Renal Cell Carcinoma 212
SOX-2 217
TAG-72 224
TFE3 227
Thyroglobulin 229
TTF-1 234
Uroplakin III 236
Villin 238
WT1 240

Endothelial Markers

CD31 63
CD34 65
Factor VIII-R Ag 116
FLI-1 119
Podoplanin (D2-40) 206

Germ Cell Tumor

Alpha-Fetoprotein 25
Human Chorionic Gonadotropin (hCG) 132
Human Placental Lactogen (hPL) 144
Oct-4 185
p57^{Kip2} 190
PLAP 202
SALL4 214

Hematolymphoid Markers

A-1-Antichymotrypsin 19
A-1-Antitrypsin 20
ALK Protein 24
Annexin A1 27
BCL2 30
BCL6 31
BOB.1 34
CD1a 44
CD2 45
CD3 46
CD4 47

Categorical Index

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CD7 49
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CD68 77
CD71 78
CD74 79
CD79a 80
CD138/syndecan-1 83
CD163 84
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Factor XIIIa 117
Fascin 118
Glycophorin A 129
Granzyme B 131
Hemoglobin A 134
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Oct-2 184
PAX-5 196
PD-1 198
Perforin 199
PU.1 211
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KBA.62 154
MART-1 (Melan A) 163
Microphthalmia Transcription Factor (MiTF) 164
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Actin, Smooth Muscle 23
Caldesmon 41
Calponin-1 42
CD34 65

Categorical Index

CD99 81
CD117, c-kit 82
Desmin 109
Factor VIII-R Ag. 116
FLI-1 119
INI-1 151
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Myoglobin. 177
Myosin, Smooth Muscle. 178
Smoothelin 215
TFE3 227
Vimentin 239

Mesothelioma Markers

Calretinin 43
Cytokeratin 5 & 6 98
Podoplanin (D2-40) 206
Thrombomodulin 228
WT1 240

Microsatellite Instability

MLH1 165
MSH2 166
MSH6 167
PMS2 203

Neural & Neuroendocrine

Calcitonin 40
CD56 73
Chromogranin A 88
Gastrin (Polyclonal). 122
Glial Fibrillary Acidic Protein (GFAP). 126
Glucagon 127
Insulin 152
Myelin Basic Protein. 173
Neurofilament 182
Neuron Specific Enolase (NSE) 183
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PGP 9.5 200
Somatostatin 216
Synaptophysin 222

Pituitary Markers

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FSH. 120
GH (Growth Hormone) 125
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Ki-67. 155
Phosphohistone H3 (PHH3) 201

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Cytokeratin 5 97
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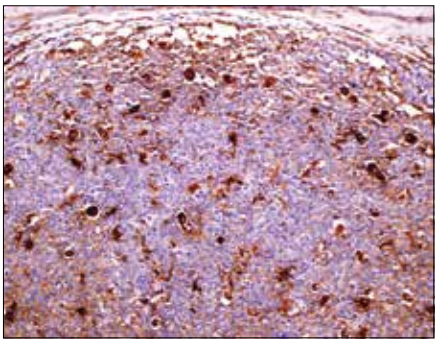
Collagen Type IV. 91
COX-2. 92
Hepatocyte Specific Antigen (Hep Par-1). 137
$p21^{WAF1}$ 187
$p27^{Kip1}$ 188
p53 189



A-1-Antichymotrypsin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45122	IMPATH A-1-Antichymotrypsin RTU R (Poly)	50 Tests
44197	Alpha-1-Antichymotrypsin RTU R (Poly)	7 ml Ready To Use
44421	Alpha-1-Antichymotrypsin 0,1 R (Poly)	100 µl liquid Concentrated
44422	Alpha-1-Antichymotrypsin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

The alpha-1-antichymotrypsin primary antibody reacts with histiocytes and histiocytic neoplasms. Its major application is defining the presence of alpha-1-antichymotrypsin in histiocytes and tumors derived from them. In Langerhans cell histiocytosis, the reaction for this marker is heterogeneous in intensity and distribution. In fibrous histiocytomas on the other hand, a diffuse homogeneous reaction may be observed. Acinar tumors of the pancreas and salivary gland may also exhibit anti-alpha-1-antichymotrypsin positivity.

Liver: Malignant vs. Benign

	A1ACT	Hep-Par1	Glypican-3	CD34	p53	AFP	pCEA	mCEA	TTF-1
Hepatocellular Carcinoma	-/+	+	+	+	+	-/+	+	-	+ Cytoplasmic
Hepatoblastoma	+	+	+	-	+	+	+	-	-
Benign Liver Nodules	+/-	+	-	-	-	-	-	-	+ Cytoplasmic

Soft Tissue Tumor

	A1ACT	CK Cocktail	MS Actin	SM Actin	Desmin	A1AT	S-100	CD99	TFE-3	Calretinin
PNET/ES	-	-/+	-	-	-	-	+	+	-	-
Desmoplastic Small Round Cell	-	+	-	-	+	-	-	-	-	-
Alveolar Soft Part Sarcoma	-	-	+	+	-	-	-	-	+	-
PEComa	-	-	-	+	+/-	+	-	-	-	+
Fibrous Histiocytoma	+	-	-	-	-	+	-	-	-	-

Skin: Spindle Cell Tumors

	A1ACT	FLI-1	CD10	SM Actin	HHV-8	CD99	CD34	S-100	Collagen IV
Spindle Cell Melanoma	-	+	-	-	-	-	-	+	-
Atypical Fibroxanthomas	+	-	+	+	-	+	-	-	-
Angiosarcoma	-	+	-	-	-	-	+	-	+/-
Glomus Tumor	-	-	-	+	-	-	+/-	-	+
Hemangioma	-	+	-	+	-	-	+	-	+
Kaposi's Sarcoma	-	+	-	+	+	-	+	-	+/-

Reference

1. Isaacson P, et al. Lancet. 1979; 2:964-965.
2. Palmer PE, et al. Am J Clin Pathol. 1974; 62:350-354.

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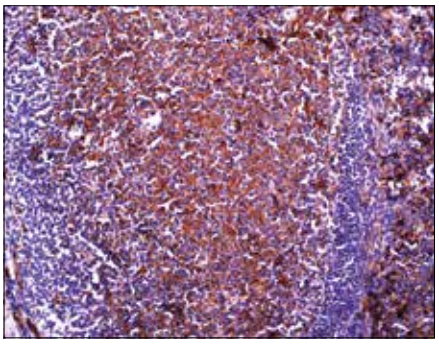


A-1-Antitrypsin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45123	IMPATH A-1-Antitrypsin RTU R (Poly)	50 Tests
44198	Alpha-1-Antitrypsin RTU R (Poly)	7 ml Ready To Use
44423	Alpha-1-Antitrypsin 0,1 R (Poly)	100 µl liquid Concentrated
44424	Alpha-1-Antitrypsin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

The immunohistochemical staining of alpha-1-antitrypsin is considered to be very useful in the study of inherited AAT deficiency, benign and malignant hepatic tumors, and yolk sac carcinomas. Positive staining for A-1-antitrypsin may also be used in detection of benign and malignant lesions of an histiocytic nature. Sensitivity and specificity of the results have made this antibody a useful tool in the screening of patients with cryptogenic cirrhosis or other forms of liver disease with portal fibrosis of uncertain etiology.

Liver: Malignant vs. Benign

	A1AT	Hep-Par1	Glypican-3	CD34	p53	AFP	pCEA	mCEA	TTF-1
Hepatocellular Carcinoma	-/+	+	+	+	+	-/+	+	-	+ Cytoplasmic
Hepatoblastoma	+	+	+	-	+	+	+	-	-
Benign Liver Nodules	+/-	+	-	-	-	-	-	-	+ Cytoplasmic

Soft Tissue Tumor

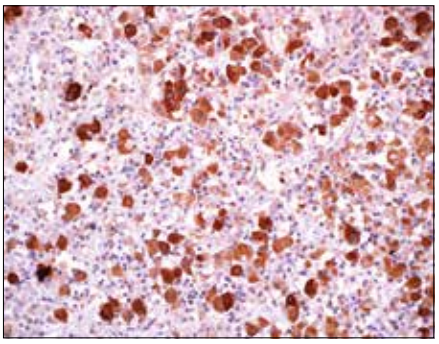
	A1AT	CK Cocktail	MS Actin	SM Actin	Desmin	A1ACT	S-100	CD99	TFE-3	Calretinin
PNET/ES	-	-/+	-	-	-	-	+	+	-	-
Desmoplastic Small Round Cell	-	+	-	-	+	-	-	-	-	-
Alveolar Soft Part Sarcoma	-	-	+	+	-	-	-	-	+	-
PEComa	+	-	-	+	+/-	-	-	-	-	+
Fibrous Histiocytoma	+	-	-	-	-	+	-	-	-	-

Skin: Spindle Cell Tumors

	A1AT	FLI-1	CD10	SM Actin	HHV-8	CD99	CD34	S-100	Collagen IV
Spindle Cell Melanoma	-	+	-	-	-	-	-	+	-
Atypical Fibroxanthomas	+	-	+	+	-	+	-	-	-
Angiosarcoma	-	+	-	-	-	-	+	-	+/-
Glomus Tumor	-	-	-	+	-	-	+/-	-	+
Hemangioma	-	+	-	+	-	-	+	-	+
Kaposi's Sarcoma	-	+	-	+	+	-	+	-	+/-

Reference

1. Isaacson P, et al. Lancet. 1979; 2:964-965.
2. Palmer PE, et al. Am J Clin Pathol. 1974; 62:350-354.



ACTH (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45161	IMPATH ACTH RTU R (Poly)	50 Tests
44193	ACTH RTU R (Poly)	7 ml Ready To Use
44413	ACTH 0,1 R (Poly)	100 µl liquid Concentrated
44414	ACTH 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pituitary
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

ACTH is synthesized from pre-pro-opiomelanocortin (pre-POMC). The removal of the single peptide during translation produces the 267 amino acid polypeptide POMC, which undergoes a series of post-translational modifications such as phosphorylation and glycosylation before it is proteolytically cleaved by endopeptidases to yield various polypeptide fragments with varying physiological activity. These fragments include ACTH, β-lipotropin, γ-lipotropin, Melanocyte Stimulating Hormone (MSH), and β-endorphin. POMC, ACTH, and β-lipotropin are secreted from corticotropes in the anterior lobe (or adenohypophysis) of the pituitary gland in response to the hormone corticotropin-releasing hormone (CRH) released by the hypothalamus. ACTH is also produced by cells of immune system (T-cells, B-cells, and macrophages) in response to stimuli associated with stress.

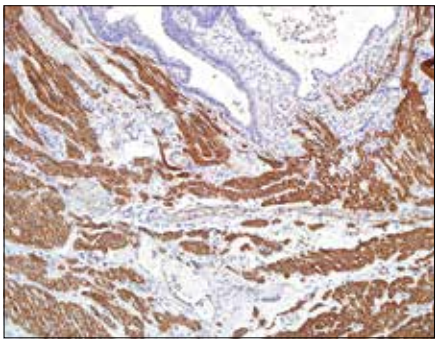
Anti-ACTH is a useful marker in classification of pituitary tumors and the study of pituitary disease. It reacts with ACTH-producing cells (corticotrophs). It also may react with other tumors (e.g. some small cell carcinomas of the lung) causing paraneoplastic syndromes by secreting ACTH.

Pituitary Panel

	ACTH	FSH	GH	LH	Prolactin	TSH
Pituitary	+	+	+	+	+	+

Reference

1. Pizarro CB, et al. Braz J Med Biol Res. 2004 Feb; 37(2):235-43.
2. Viacava P, et al. J Endocrinol Invest. 2003 Jan; 26(1):23-8.
3. Kageyama K, et al. Am J Med Sci. 2002 Dec; 324(6):326-30.
4. Fan X, et al. J Histochem Cytochem. 2002 Nov; 50(11):1509-16.
5. Japon MA, et al. J Clin Endocrinol Metab. 2002 Apr; 87(4):1879-84.



Actin, Muscle Specific (HHF35)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45235	IMPATH Actin Muscle Specific RTU M (HHF35)	50 Tests
44345	Actin Muscle Specific RTU M (HHF35)	7 ml Ready To Use
44710	Actin Muscle Specific 0,1 M (HHF35)	100 µl liquid Concentrated
45040	Actin Muscle Specific 1 M (HHF35)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Skeletal Muscle
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/K

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

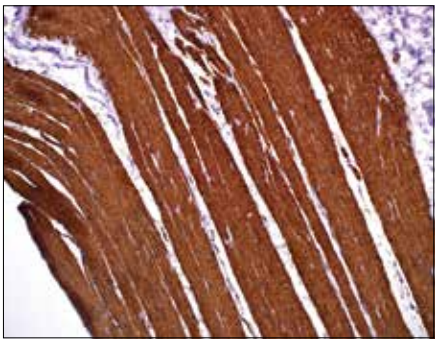
Actin is a major component of the cytoskeleton. This antibody recognizes actin of skeletal, cardiac, and smooth muscle cells. It is not reactive with other mesenchymal cells except for myoepithelium. Actin can be resolved on the basis of its isoelectric points into three distinctive components: alpha, beta, and gamma in order of increasing isoelectric point. Anti-muscle specific actin recognizes alpha and gamma isotypes of all muscle groups. Non-muscle cells such as vascular endothelial cells and connective tissues are non-reactive. Also, neoplastic cells of non-muscle-derived tissue such as carcinomas, melanomas, and lymphomas are negative. This antibody is useful in the identification of rhabdoid cellular elements.

Soft Tissue Sarcoma

	MS Actin	CK Cocktail	EMA	SM Actin	Desmin	CD56	CD34	TFE-3	Myogenin
Epithelioid Sarcoma	-/+	+	+	-	-	-	+	-	-
Alveolar Soft Part Sarcoma	+	-	-	+	-	-	-	+	-
Leiomyosarcoma	+	-/+	-/+	+	+	+	-/+	-	-
Rhabdomyosarcoma	-/+	-	-	-/+	+	+	-	-	+

Reference

1. Gown, et al. A. J. P. 1986; 125:191.
2. Schmidt R, et al. A. J. P. 1988; 131:199.
3. Azumi N, et al. Modern Pathology. 1988; 1:469-474.
4. Rangdaeng L, et al. Am J Clin Pathology. 1991; 96:32-45.
5. Tsukada T, et al. Am J Pathology. 1987; 127:389-402.



Actin, Smooth Muscle (1A4)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45121	IMPATH Actin Smooth Muscle RTU M (1A4)	50 Tests
44196	Actin Smooth Muscle RTU M (1A4)	7 ml Ready To Use
44419	Actin Smooth Muscle 0,1 M (1A4)	100 µl liquid Concentrated
44420	Actin Smooth Muscle 1 M (1A4)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Appendix, Uterus, Vessel wall
Stability Up to 36 mo. at 2-8°C
Isotype IgG/K

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Actin is a major component of the cytoskeleton and is present in most cell types. Anti-smooth muscle actin does not stain cardiac or skeletal muscle; however, it does stain myofibroblasts and myoepithelial cells. This antibody could be used together with anti-muscle specific actin in making a diagnosis of smooth muscle and skeletal muscle tumors. In most cases of rhabdomyosarcoma, this antibody yields negative results whereas anti-muscle specific actin is positive. Leiomyosarcomas are positive with both anti-muscle specific actin and anti-smooth muscle actin.

Muscle Malignant Tumors

	SM Actin	MS Actin	Myogenin	PGP 9.5	Caldesmon	Myoglobin	Calponin	CD57	Vimentin	INI-1
Leiomyosarcoma	+	+	-	-	+	-	+	+/-	+	
Rhabdomyosarcoma	-/+	-/+	+	+	-	+	-	-	+	+

Soft Tissue Neoplasms

	SM Actin	Calretinin	TFE-3	CD56	CD34	CK Cocktail	Desmin	MS Actin	S-100	HMB-45
Leiomyosarcoma	+	-	-	+	-/+	-/+	+	+	-	-
PEComa	+	+	-	+	-	-	-	-	+	+
Clear Cell Sarcoma	-	-	-	-	-	-	-	-	+	+
Alveolar Soft Part Sarcoma	+	-	+	-	-	-	-	+	-	-

Spindle Cell Tumors

	SM Actin	β-Catenin	PGP 9.5	ALK	CD56	EMA	CK Cocktail	Calponin	MS Actin	Desmin
Myofibroblastic Tumor	+	-	-	+	+	-	-	+	+	+
Endometrial Stromal Tumor	+	+/-	+	-	-	-	-	+	+	-
Smooth Muscle	+	-	-	-	-	-	-	+	+	+
Fibromatosis	+	+	+	-	-	-	-	-	-	-
Leiomyosarcoma	+	-	-	-	+	+/-	-/+	+	+	+

Reference

1. Cooke PH. J Cell Biol. 1976; 68:539-556.
2. Skalli O, et al. J Cell Biol. 1986; 103:2787-2796.
3. Gown AM, et al. J Cell Biol. 1985; 100:807-813.
4. Kuroda M. Biochem Biophys Acta. 1985; 843:20-213.
5. Lazarides E. J Histochem Cytochem. 1975; 223:507-528.

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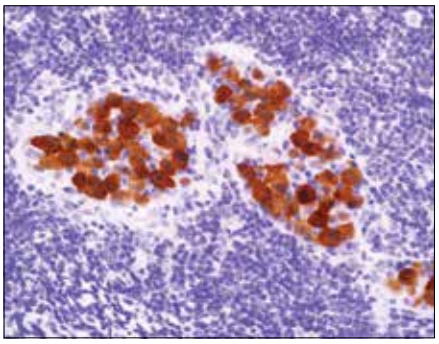


ALK Protein (ALK-1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45162	IMPATH ALK Protein RTU M (ALK-1)	50 Tests
44194	ALK Protein RTU M (ALK-1)	7 ml Ready To Use
44415	ALK Protein 0,1 M (ALK-1)	100 µl liquid Concentrated
44416	ALK Protein 1 M (ALK-1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control Anaplastic large cell lymphoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_3/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

ALK-1 is a fusion protein which is detected in 50%-85% of ALK+, anaplastic large cell lymphomas (ALCL) and has been shown to indicate improved prognosis in the ALK-1 (+) ALCL. Studies have demonstrated approximately 5%-10% of non-small cell lung carcinoma can express ALK protein recognized by this antibody producing a cytoplasmic staining pattern.

Hodgkin vs. Non-Hodgkin Lymphomas

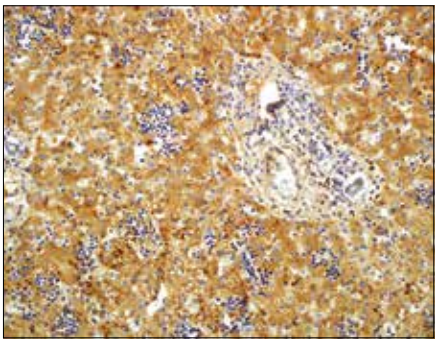
	ALK-1	CD79a	CD15	CD30	Fascin	Granzyme B	BCL6	PU.1	MUM1	EMA
Hodgkin Lymphoma, Classic	-	-	+	+	+	-	-	-	+	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	-	+	-	-	-	-	+	+	-/+	+
T-cell Rich LBCL	-	+	-	-	-	-	+	-	+	-
Anaplastic Large Cell Lymphoma	+	-	-	+	-	+	+/-	-	-	+

Soft Tissue Tumor

	ALK-1	CK Cocktail	Calretinin	MS Actin	SM Actin	S-100	TLE-1	CD56	CD99	TFE-3
Synovial Sarcoma	-	+	+/-	-	-	-	+	+	+	-
Epithelioid Sarcoma	-	+	-	-/+	-	-	-	-	-	-
Clear Cell Sarcoma	-	-	-	-	-	+	-	-	-	-
PNET/ES	-	-/+	-	-	-	+	-	-	+	-
Desmoplastic Small Round Cell	-	+	-	-	-	-	-	-	-	-
Myxoid Chondrosarcoma	-	-	+	-	-	+/-	-	-		-
Alveolar Soft Part Sarcoma	-	-	-	+	+	-	-	-	-	+
PEComa	-	-	+	-	+	-	-	-	-	-
Fibrous Histiocytoma	-	-	-	-	-	-	-	-	-	-
Inflammatory Myofibroblastic Tumor	+	-	-	+	+	-	-	-	-	-

Reference

1. Cataldo KA, et al. Am J Surg Pathol. 1999; 32(1):1386-1392.
2. Travis WD, et al. J Clin Oncol. 2013; 31:992-1001.



Alpha-Fetoprotein (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45163	IMPATH Alpha-Fetoprotein RTU R (Poly)	50 Tests
44195	Alpha Fetoprotein RTU R (Poly)	7 ml Ready To Use
44417	Alpha Fetoprotein 0,1 R (Poly)	100 µl liquid Concentrated
44418	Alpha Fetoprotein 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Fetal Liver
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Positive staining with anti-AFP is seen in hepatocytes of fetal liver and hepatoma. Since only traces of AFP are found in adult serum, elevated levels suggest either a benign or malignant lesion of the liver, a yolk sac carcinoma, or one of a few other tumors. Correspondingly, in conjunction with elevated serum levels, AFP has been immunohistochemically demonstrated in yolk sac tumor of gonadal and extragonadal sites, in hepatic malignancies, and a few other neoplasms. The antigen is not denatured by most fixatives.

Liver: Malignant vs. Benign

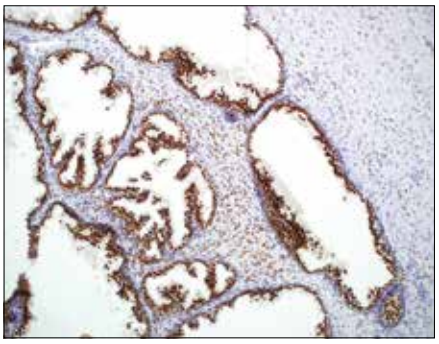
	AFP	Hep-Par1	Glypican-3	CD34	p53	A1AT	pCEA	mCEA	TTF-1
Hepatocellular Carcinoma	-/+	+	+	+	+	-/+	+	-	+ Cytoplasmic
Hepatoblastoma	+	+	+	-	+	+	+	-	-
Benign Liver Nodules	-	+	-	-	-	+/-	-	-	+ Cytoplasmic

Germ Cell Tumors

	AFP	Oct-4	Vimentin	EMA	Inhibin	hPL	CD30	Glypican-3	CD117	PLAP
Seminoma	-	+	+	-	-	-	-	-	+	+
Embryonal Carcinoma	-	+	-	-	-	-	+	-	-	+
Choriocarcinoma	-	-	-/+	+	-	+	-	+	-	+
Yolk Sac Tumor	+	-	-	-	-	-	-	+	-	+
Granulosa Cell Tumor	-	-	+	-	+	-	-	-	-	-
Hypercalcaemic Small Cell Carcinoma	-	-	-	+	-	-	-	-	-	-

Reference

1. Jacobsen GK, et al. Am J Surg Pathol. 1981; 5:257-66.
2. Peyrol S, et al. Digestion. 1978; 18:351-370.
3. Tsung SH. Arch Pathol Lab Med. 1977; 101:572-574.
4. Goodman ZD, et al. Cancer. 1985; 55:124-135.
5. Roth LM, et al. Cancer. 1976; 37:812-820.



Androgen Receptor (SP107)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45164	IMPATH Androgen Receptor RTU M (SP107)	50 Tests
44199	Androgen Receptor RTU M (SP107)	7 ml Ready To Use
44425	Androgen Receptor 0,1 M (SP107)	100 µl liquid Concentrated
44426	Androgen Receptor 1 M (SP107)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Prostate Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-androgen receptor has been useful clinically in differentiating morpheaform basal cell carcinoma (mBCC) from desmoplastic trichoepithelioma (DTE) in the skin. Immunohistochemical analysis and binding assays have demonstrated the presence of androgen receptors in all histological types of prostatic carcinoma, both therapy-responsive and therapy-unresponsive. Studies have shown that patients with 48% or more androgen receptor-positive cells have a statistically significant better outcome in terms of both progression-free and cause-specific survival. The variability of androgen receptor protein content per unit nuclear area has been shown to increase with increasing histological grade, suggesting that this variability might account for the response to endocrine therapy in high grade tumors.

Prostate: Malignant vs. Benign

	Androgen Receptor	PSA/PSAP	P504s	CK, 34βE12	p63	CK 5&6	CK 14
Prostate Carcinoma	+	+	+	-	-	-	-
Benign Prostate	+	+	-/+	+	+	+	+

Carcinoma: Differential Diagnosis

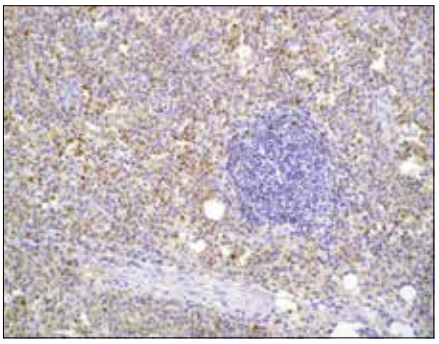
	Androgen Receptor	BCA-225	GCDFP-15	ER/PR	Mammaglobin	PSA/PSAP	CD44
Salivary Duct Carcinoma	+	+	+	-	-	-	-
Breast Carcinoma	+(apocrine)	+	+	+/-	+	-	-
Prostate Carcinoma	+	-	-	-	-	+	+

Cutaneous Neoplasm

	Androgen Receptor	CD10	CK 20	CD34	Ber-EP4	BCL2	CK 19
Basal Cell Carcinoma	+	+	-	-	+	+	+
Trichoepithelioma	-	-	+	+	+	+	+
Merkel Cell Carcinoma	-	-	+	-	+	+	+
Microcystic Adnexal Carcinoma	-	+/-	-	-	-/+	+	
Sebaceous Carcinoma	+	+/-	-	-	+	+/-	-

Reference

1. Bléchet C, et al. Virchows Arch. 2007 Apr; 450(4):433-9. Epub 2007 Feb 28.
2. Carroll RS, et al. Journal Neurosurgery. 1995; 82:453-60.
3. Cordon-Cardo C, et al. J Clin Invest. 2007 Jul; 117(7):1876-83.



Annexin A1 (MRQ-3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44200	Annexin A1 RTU M (MRQ-3)	7 ml Ready To Use
44427	Annexin A1 0,1 M (MRQ-3)	100 µl liquid Concentrated
44428	Annexin A1 1 M (MRQ-3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Hairy Cell Leukemia
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Annexin A1 (ANXA1) is strongly expressed on the cell membrane and occasionally in the cytoplasm of tumor cells in 97% of hairy cell leukemia. By contrast, any B-cell lymphomas other than hairy cell leukemia (HCL), including typical splenic marginal zone lymphoma, variant hairy cell leukemia, and prolymphocytic leukemia, are ANXA1-negative. Anti-ANXA1 has been reported as 100% sensitive and specific for hairy cell leukemia. Normal mature B-cells were ANXA1-negative. The expression of ANXA1 in myeloid cells and T-cell subset serves as positive control. ANXA1 is a molecule specific to HCL that can be used to differentiate this disease from other B-cell lymphomas. However, anti-ANXA1 is not a suitable marker for monitoring minimal residual disease of HCL in bone marrow. A more suitable approach for assessment for residual disease after therapy includes immunostaining using antibodies against CD20, T-bet, TRAcP, CD11c and DBA.44 in combination with anti-ANXA1.

B-cell Lymphomas

	Annexin A1	CD79a	BCL6	CD10	CD23	Cyclin D1	CD5	MUM1	TRAcP	CD11c
Follicular	-	+	+	+	-	-	-	-	-	
CLL/SLL	-	+	-	-	+	-	+	+	-	-/+
Mantle Cell	-	+	-	-	-	+	+	-/+	-	-
Marginal Zone	-	+	-	-	-	-	-	+	+/-	+
Lymphoplasmacytic	-	+	-	-	-	-	-	+	-	-
Diffuse Large Cell	-	+	+	-/+	-	-	-/+	+	-	
Burkitt	-	+	+	+	-	-	-	-	-	
Hairy Cell Leukemia	+	+	-	-	-	+(weak)/-	-		+	+

Reference

1. Falini B, Tiacci E, et al. Lancet. 2004 Jun 5; 363(9424):1869-70. Erratum in:Lancet. 2004 Jun 26; 363(9427):2194.
2. Wang KL, Wu TT, et al. Clin Cancer Res. 2006 Aug 1; 12(15):4598-604.
3. Xia SH, Hu LP, et al. Oncogene. 2002 Sep 26; 21(43):6641-8.
4. Dreier R, Schmid KW, Gerke V, Riehemann K. Histochem Cell Biol. 1998 Aug; 110(2):137-48.

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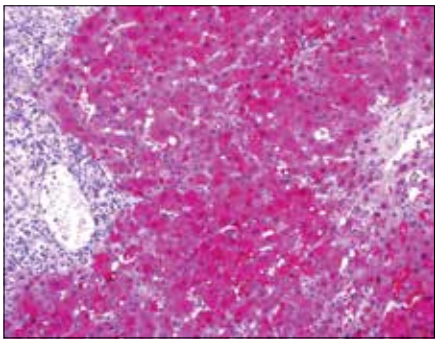


Arginase-1 (SP156)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45291	IMPATH Arginase-1 RTU R (SP156)	50 Tests
44201	Arginase-1 RTU R (SP156)	7 ml Ready To Use
44429	Arginase-1 0,1 R (SP156)	100 µl liquid Concentrated
44430	Arginase-1 1 R (SP156)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control Hepatocellular Carcinoma, Normal Liver
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

Please refer to product insert for complete protocol.

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

Please refer to product insert for complete protocol.

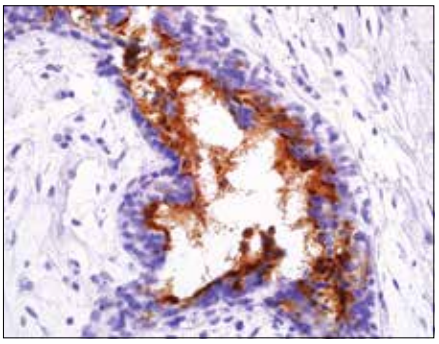
Product Description

Hepatocellular carcinoma (HCC) is the most common primary malignant tumor of the liver accounting for an estimated 70% -85% of total liver cancers worldwide. Diagnostic pitfalls exist in the morphologic distinction of HCC from other hepatocellular and non-hepatocellular mass lesions. In difficult or equivocal cases, the application of immunohistochemical (IHC) panels has been shown to aid in the distinction of benign and malignant liver lesions. In particular, the application of IHC using antibodies against CD10, polyclonal carcinoembryonic antigen, alpha-fetoprotein, HepPar-1, and glypican-3 (GPC-3) has proven valuable in liver biopsy and FNA cytology specimens. Recent studies have shown the usefulness of anti-Arginase-1 as an IHC marker of hepatocellular differentiation in benign and malignant lesions of liver on both biopsy as well as fine needle aspiration specimens. Arginase-1 expression was present in all (100%) of well-differentiated HCC, 92% cases of moderately differentiated HCC and was absent in all cases of poorly differentiated HCC (0%).

Liver Neoplasms					
	Arginase-1	Hep Par-1	Glypican-3	CD10	pCEA
Hepatic Adenoma	+	+	-	+	+
Hepatocellular Carcinoma	+	+	+	+	+
Metastatic Adenocarcinoma	-	-	-	-/+	-/+

Reference

1. Wee A. Cytopathology. 2011; 22:287-305.
2. Nassar A, et al. Diagnostic Cytopathology. 2009; 37:629-635.
3. Yan BC, et al. Am J SurgPathol. 2010; 34:1147-1154.



BCA-225 (Cu-18)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45293	IMPATH BCA-225 RTU M (Cu-18)	50 Tests
44204	BCA-225 RTU M (CU-18)	7 ml Ready To Use
44433	BCA-225 0,1 M (CU-18)	100 µl liquid Concentrated
44434	BCA-225 1 M (CU-18)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Breast carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

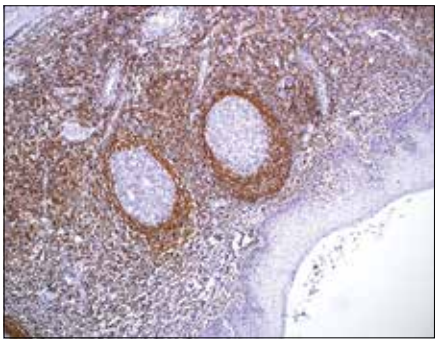
BCA-225 is a glycoprotein identified in human breast carcinoma cells that has been reported to show a restricted distribution in other human tissues. However, one study showed that BCA-225 expression was found to be common in adenocarcinomas of the breast (98%), kidney (94%), ovary (80%), and lung (74%) but was infrequent in adenocarcinomas of gastrointestinal tract (10%-16%). Adenocarcinomas of the prostate, bile ducts, thyroid, endometrium, endocervix, and pancreas showed an intermediate frequency of BCA-225 expression (36%-68%). Hepatocellular carcinomas showed no reactivity for BCA-225. Anti-BCA-225, used in conjunction with antibodies against CEA, CA19-9, and CA125, is a useful marker for detecting the origin of common metastatic adenocarcinomas (BCA225-, CEA+, and CA125- for colon tumors; BCA225+, CEA+ and CA19-9- for lung tumors; BCA225+, CEA- and CA125- for breast tumors). Anti-BCA-225 is also useful in discriminating adenocarcinoma from reactive mesothelium in cell block preparations.

Carcinoma: Differential Diagnosis

	BCA-225	Androgen Receptor	GCDFP-15	ER/PR	Mammaglobin	PSA/PSAP
Salivary Duct Carcinoma	+	+	+	-	-	-
Breast Carcinoma	+	+(apocrine)	+	+	+	-
Prostate Carcinoma	-	+	-	-	-	+

Reference

1. Ceriani RL. Monoclonal Ab's and breast cancer. Boston, Martinus, Nijhoff, 1985.
2. Mesa-Tejada R, et al. Am J Pathol. 1988; 130:305-314.
3. Loy TS, et al. Am J Clin Pathol. 1991 Sep; 96(3):326-9.
4. Ma CK, et al. Am J Clin Pathol. 1993 May; 99(5):551-7.



BCL2 (E17†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45165	IMPATH BCL2 RTU R (E17)	50 Tests
44205	BCL2 RTU R (E17)	7 ml Ready To Use
44435	BCL2 0,1 R (E17)	100 µl liquid Concentrated
44436	BCL2 1 R (E17)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-BCL2 has shown consistent negative reaction on reactive germinal centers and positive staining of neoplastic follicles in follicular lymphoma. Consequently, this antibody is valuable when distinguishing between reactive and neoplastic follicular proliferation in lymph node biopsies. This antibody may also be used in distinguishing between those follicular lymphomas that express BCL2 protein and the small number in which the neoplastic cells are BCL2 negative.

Cutaneous Neoplasm

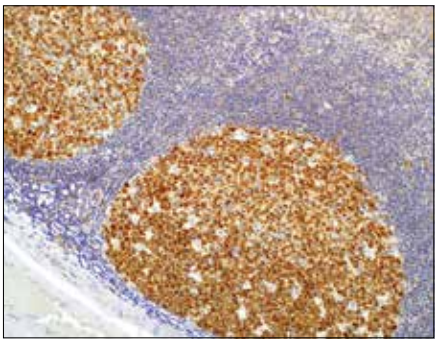
	BCL2	CD10	Androgen Receptor	CK 20	CD34	Ber-EP4	CK 19
Basal Cell Carcinoma	+	+	+	-	-	+	+
Trichoepithelioma	+	-	-	+	+	+	+
Merkel Cell Carcinoma	+	-	-	+	-	+	+
Microcystic Adnexal Carcinoma	+	+/-	-	-	-	-/+	
Sebaceous Carcinoma	+/-	+/-	+	-	-	+	-
Sebaceous Adenoma	+	-	+	-	-	+	-

B-cell Lymphomas

	BCL2	PAX-5	BCL6	Annexin A1	IgD	MUM1	CD10	CD23	Cyclin D1
Follicular	+	+	+	-	+	-	+	-	-
CLL/SLL	+	+	-	-	+	+	-	+	-
Mantle Cell	+	+	-	-	-/+	-/+	-	-	+
Marginal Zone	+	+	-	-	+	+	-	-	-
Lymphoplasmacytic	+	+	-	-	-	+	-	-	-
Diffuse Large Cell	+	+	+	-	-	+	-/+	-	-
Burkitt	-	+	+	-	-	-	+	-	-
Hairy Cell Leukemia	+	+	-	+	-		-	-	+(weak)/-

Reference

1. Pezzella F, et al. Am J Pathol. 1990; 137:225-232.
2. Moul JW, et al. Eur urol. 1999; 35(5-6):399-407.



BCL6‡ (GI191E/A8)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45166	IMPATH BCL6 RTU M (GI191E/A8)	50 Tests
44206	BCL6 RTU M (GI191E/A8)	7 ml Ready To Use
44437	BCL6 0,1 M (GI191E/A8)	100 µl liquid Concentrated
44438	BCL6 1 M (GI191E/A8)	1 ml liquid Concentrated

‡ BCL6 is protected by U.S. patents 6,174,997 and 6,783,945 (Cancer Genetics, Inc.)

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) for AP 2-step Polymer (Universal) 12 min

**Please refer to product insert for complete protocol.*

Product Description

BCL6 is a transcriptional regulator gene which codes for a 706-amino-acid nuclear zinc finger protein. Antibodies to this protein stain the germinal center cells (benign or malignant) in lymphoid follicles, and interfollicular malignant cells in follicular lymphoma, diffuse large B-cell lymphomas, and Burkitt lymphoma, as well as the majority of the Reed-Sternberg cells in nodular lymphocyte predominant Hodgkin lymphoma. Anti-BCL6 rarely stains mantle cell lymphoma and MALT lymphoma. BCL6 expression is seen in approximately 68% of ALK+ anaplastic large cell lymphomas (ALCL) but 28% of ALK- ALCL, NK/T-cell lymphoma (27%), peripheral T-cell lymphoma, NOS (8.6%), and T-lymphoblastic lymphoma (9.1%). BCL6 expression can also be observed in angioimmunoblastic T-cell lymphoma (66%-96%).

B-cell Lymphomas

	BCL6	TRAcP	Annexin A1	CD79a	BCL2	CD10	CD23	Cyclin D1	MUM1
Follicular	+	-	-	+	+	+	-	-	-
CLL/SLL	-	-	-	+	+	-	+	-	+
Mantle Cell	-	-	-	+	+	-	-	+	-/+
Marginal Zone	-	+/-	-	+	+	-	-	-	+
Lymphoplasmacytic	-	-	-	+	+	-	-	-	+
Diffuse Large Cell	+	-	-	+	+	-/+	-	-	+
Burkitt	+	-	-	+	-	+	-	-	-
Hairy Cell Leukemia	-	+	+	+	+	-	-	+(weak)/-	

Hodgkin vs. Non-Hodgkin Lymphomas

	BCL6	CD79a	CD15	CD30	Fascin	Granzyme B	PU.1	MUM1	ALK-1	EMA
Hodgkin Lymphoma, Classic	-	-	+	+	+	-	-	+	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	+	+	-	-	-	-	+	-/+	-	+
T-cell Rich LBCL	+	+	-	-	-	-	-	+	-	-
Anaplastic Large Cell Lymphoma	+/-	-	-	+	-	+	-	-	+	+
Angioimmunoblastic T-cell Lymphoma	+	-	-	-	-	-	-	-	-	-

Reference

1. Dogan A, Badgi E, et al. Am J Surg Pathol. 2000; 24(6):846-852.

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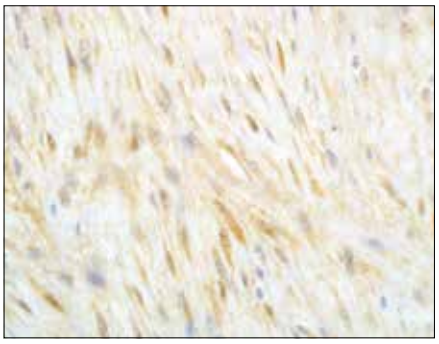


Beta-Catenin (14)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44207	Beta-Catenin RTU M (14)	7 ml Ready To Use
44439	Beta-Catenin 0,1 M (14)	100 µl liquid Concentrated
44440	Beta-Catenin 1 M (14)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous, Nuclear
Control Breast Carcinoma, Fibromatosis of Breast
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Beta-catenin is a 92 kD protein normally found in the cytoplasm of the cell in the submembranous location. This protein is associated with E-cadherin and may be essential for the function of E-cadherin. Mutations in the beta-catenin gene result in nuclear accumulation of this protein. Nuclear accumulation of this protein has been demonstrated in fibromatosis lesions of the breast and abdomen and therefore is useful in differentiating this lesion from other spindle cell lesions that may occur in these locations. Nuclear accumulation of beta-catenin has also been demonstrated in colorectal carcinoma.

Breast Lesion

	β-Catenin	GCDFP-15	Mammaglobin	E-cadherin	CK, 34βE12	p120
Lobular	-	+	+	-	+	+(cytoplasmic)
Ductal	+(membranous)	+	+	+	-	+(membranous)

Pancreatic Tumors

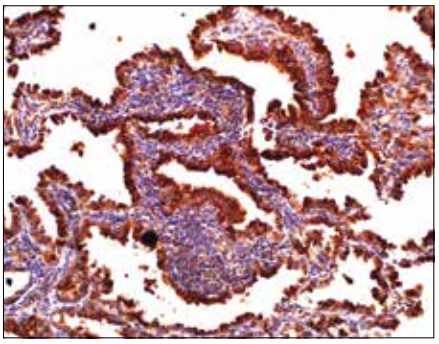
	β-Catenin	Synapto-physin	Chromo-granin A	E-cadherin	CD10	Gastrin	MUC4	CD56	CK 19	CA19-9
Pancreatic Adenocarcinoma	-	-	-	-	+/-	-	+	-	+	+
Neuroendocrine	+	+	+	-	-	+/-	-	+	+/-	+/-
Solid Pseudopapillary	+	+	-	-	+	-		+	-	-
Pancreatic Ductal Carcinoma	+/-	-	-	+/-	+/-	-		-	-	+
Acinic Cell Carcinoma	+	-	-	+	+/-	-		-	+	-/+
Pancreatoblastoma	+	-	+	-	-	-	-	+	-	-
Benign Pancreas	+	+	+	-	-	-	-	-	-	-

Spindle Cell Tumors

	β-Catenin	PGP 9.5	MS Actin	SM Actin	EMA	CK Cocktail	Calponin
Spindle Cell Carcinoma	+/-	+	-	-	+/-	+	-
Endometrial Stromal Tumor	+/-	+	+	+	-	-	+
Fibromatosis	+	+	-	+	-	-	-

Reference

1. Alman BA, et al. Am J Pathol. 1997 Aug; 151(2):329-34.
2. Li C, et al. Am J Pathol. 1998 Sep; 153(3):709-14.
3. Kuhnen C, et al. Pathol Res Pract. 2000; 196(5):299-304.
4. Abraham SC, et al. Hum Pathol. 2002 Jan; 33(1):39-46.



BG8, Lewis^{Y} (F3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45294	IMPATH BG8 RTU M (F3)	50 Tests
44208	BG8 RTU M (F3)	7 ml Ready To Use
44441	BG8 0,1 M (F3)	100 µl liquid Concentrated
44442	BG8 1 M (F3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Lung adenocarcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgM

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Blood group antigens have been examined as potential discriminators between pulmonary adenocarcinoma (PACA) and epithelioid mesotheloma (EM). Lewisy is the only one of these that appears to have some merit. BG8 is raised from the SKLU-3 lung cancer line and its ability to distinguish between PACA and EM was first reported by Jordon and colleagues in 1989. Three groups have since reported their results. These studies included 231 cases of PACA and 197 cases of EM. Sensitivity and specificity for PACA were both 93%. Yaziji H et al. reported a senstitivy of nonmesothelial antigens for adenocarcinoma as organ dependent, with BG8 performing at 98% in the breast cancer group, and 100% in the lung cancer group. They concluded using logical regression analysis that a three-antibody immunohistochemical panel including anti-calretinin, anti-BG8, and anti-MOC-31 (Ep-CAM) would provide 96% sensitivity and 100% specificity for distinguishing EM from adenocarcinoma from various sources (lung, ovary, breast, stomach).

Thymus

	BG8	CK 5	p63	BCL2	CD117	CD5	CD1a	CD57
Thymic Carcinoma	+	+	+	+	+	+	-	-
Thymoma	-	+	+	-	-	-	+	+

Pleura: Adenocarcinoma vs. Mesothelioma

	BG8	Calretinin	CK 5&6	D2-40	Caldesmon	E-cadherin	TTF-1	TAG-72	Ep-CAM
Adenocarcinoma	+	-	-	-	-	+	+	+	+
Mesothelioma	-	+	+	+	+	-	-	-	-

Skin: Spindle Cell Tumors

	BG8	FLI-1	Factor VIII	HHV-8	CK 8 & 18	CD34	SM Actin	NGFR	CD10	S-100
Spindle Squamous Cell Ca	-	-	-	-	+	-	-	-	-	-
Spindle Cell Melanoma	-	+	-	-	-	-	-	+	-	+
Atypical Fibroxanthomas	-	-	-	-	-	-	+	-	+	-
DF-SP	-	-	-	-	-	+	-	+	+/-	-
Peripheral Nerve Sheath	-	-	-	-	-	-	-	-	-	+/-
Angiosarcoma	-	+	+	-	-	+	-	-	-	-
Hemangioma	+	+	+	-	-	+	+	-	-	-
Kaposi's Sarcoma	-	+	+	+	-	+	+	-	-	-

Reference

1. King JE, et al. Histopathology. 2006 Feb; 48(3):223-32. Review.

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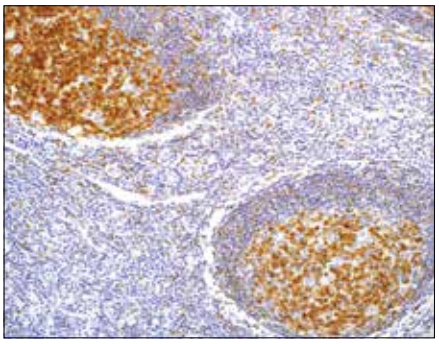


BOB.1 (SP92)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45124	IMPATH BOB-1 RTU R (SP92)	50 Tests
44202	BOB-1 RTU R (SP92)	7 ml Ready To Use
44431	BOB-1 0,1 R (SP92)	100 µl liquid Concentrated
44432	BOB-1 1 R (SP92)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution Buffer
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

The BOB.1/OBF.1 coactivator has shown to be a critical determinant of octamer-dependent gene transcription in B-lymphocytes. Expression of BOB.1/OBF.1 is restricted largely to B-lymphocytes. Analyses of BOB.1/OBF.1 expression in a variety of established B-cell lines representing different stages of B-cell development has suggested a constitutive, B-cell specific expression pattern. Interestingly, expression of BOB.1/OBF.1 can be induced in T-lymphocytes by costimulation with phorbol ester (PMA) and ionomycin. BOB.1 is expressed in germinal center B-cells, mantle B-cells, and plasma cells. Various lymphomas are also positive for this marker including the following: B-chronic lymphocytic leukemia, mantle cell lymphoma, follicular lymphoma, marginal zone lymphoma, plasmacytoma, Burkitt lymphoma, diffuse large cell lymphoma, diffuse large B-cell lymphoma, T-cell rich B-cell lymphoma, and nodular lymphocyte predominant Hodgkin lymphoma.

B-cell Lymphomas

	BOB.1	MUM1	PU.1	CD79a	p27	BCL6	IgD	CD10	CD23	Cyclin D1
Follicular	+	-	+	+	+	+	+	+	-	-
CLL/SLL	+	+	+	+	+	-	+	-	+	-
Mantle Cell	+	-	+	+	+	-	+	-	-	+
Marginal Zone BCL	+	+	+	+	+	-	-/+	-	-	-
Lymphoplasmacytic	+	+		+	+	-	-	-	-	-
Diffuse Large Cell Lymphoma	+	+	+	+	-	+	-	-	-	-

Hodgkin vs. Non-Hodgkin Lymphomas

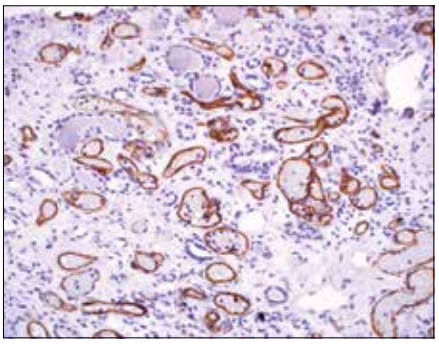
	BOB.1	CD45	MUM1	EMA	CD15	CD30	Fascin	BCL6	Oct-2	PU.1
Hodgkin Lymphoma, Classic	-	-	+	-	+	+	+	-	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	+	+	-/+	+	-	-	-	+	+	+
T-cell Rich LBCL	+	+	+	-	-	-	-	+	+	-

Acute Myeloid Leukemia

	BOB.1	MPO	Factor VIII	CD61	Oct-2	CD43	CD138	CD68
Promyelocytic, M3	+	+	-	-	+	+		+
Megakaryoblastic, M7	+/-	-	+	+	-		-	-

Reference

1. Dabbs DJ. Diagnositc Immunohistochemistry, Third Edition. Saunders. 2006.
2. Steimle-Grauer SA, et al. Virchows Arch. 2003; 442:284-293.



C3d (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45295	IMPATH C3d RTU R (Poly)	50 Tests
44209	C3d RTU R (Poly)	7 ml Ready To Use
44443	C3d 0,1 R (Poly)	100 µl liquid Concentrated
44444	C3d 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Acute rejected kidney transplant
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

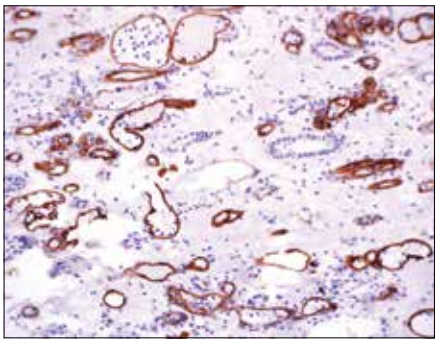
**Please refer to product insert for complete protocol.*

Product Description

Complement component C3 plays a central role in the activation of complement system. Its activation is required for both classical and alternative complement activation pathways. C3d deposition in the renal transplant PTCs (peritubular capillaries) is indicative of AR (acute rejection) with subsequent high probability of graft loss. Anti-C3d, combined with anti-C4d, can be utilized as a tool for diagnosis of AR that may serve to warrant prompt and aggressive anti-rejection treatment. Pfaltz et al. have shown that anti-C3d labeled the epidermal basement membrane in 97% (31/32) cases of bullous pemphigoid (BP), with none of the normal controls demonstrating such findings. In the same study 27% (3/11) cases of pemphigus vulgaris (PV) demonstrated intercellular C3d deposition. Anti-C3d immunohistochemistry is a helpful adjunct in the diagnosis of BP (and perhaps PV), especially in the cases in which only formalin-fixed, paraffin-embedded tissue is available for analysis.

Reference

1. Bickerstaff A, et al. Am J Pathol. 2008 Aug; 173 (2):347-57.
2. Kuypers DR, et al. Transplantation. 2003 Jul 15; 76 (1):102-8.
3. Pfaltz K, et al. J Cutan Pathol. 2009 Oct 15 (Epub ahead of print).
4. Eggertsen G, et al. APMIS. 2001 Dec; 109(12):825-34.



C4d (SP91)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45296	IMPATH C4d RTU R (SP91)	50 Tests
44210	C4d RTU R (SP91)	7 ml Ready To Use
44445	C4d 0,1 R (SP91)	100 µl liquid Concentrated
44446	C4d 1 R (SP91)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Acute rejected kidney transplant, Lymph node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

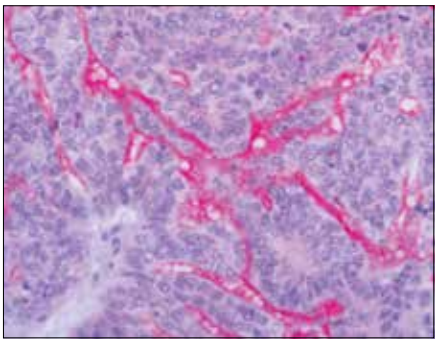
**Please refer to product insert for complete protocol.*

Product Description

C4d is a stable split product remnant of classical complement activation which becomes covalently bound to endothelium and basement membrane after induction of the classical antibody-induced pathway. As an established marker of antibody-mediated acute renal allograft rejection (AR) and its proclivity for endothelium, this component can be detected in peritubular capillaries in both chronic renal allograft rejection as well as hyperacute rejection, acute vascular rejection, acute cellular rejection, and borderline rejection. It has been shown to be a significant predictor of transplant kidney graft survival. Anti-C4d, combined with anti-C3d, can be utilized as a tool for diagnosis of AR that may serve to warrant prompt and aggressive anti-rejection treatment.

Reference

1. Jianghua C, et al. Clin Transplant. 2005; 19:785-91.
2. Kayler LK, et al. Transplantation. 2008; 85:813-20.
3. Ranjan P, et al. Nephrol Dial Transplant. 2008; 23:1735-41. Epub 2007 Dec 8.
4. Nadasdy GM, et al. Hum Pathol. 2005; 36:1178-85.
5. Seemayer CA, et al. Nephrol Dial Transplant. 2007; 22:568-76.
6. Bouron-Dal Soglio D, et al. Hum Pathol. 2008; 39:1103-10.



CA-125 (OC125)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45168	IMPATH CA-125 RTU M (OC125)	50 Tests
44211	CA125 RTU M (OC125)	7 ml Ready To Use
44845	CA125 0,1 M (OC125)	100 µl liquid Concentrated
44447	CA125 1 M (OC125)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Ovarian Serous Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CA-125 (cancer antigen 125), also known as mucin 16 or MUC16, is a protein which, in humans, is encoded by the MUC16 gene. CA-125 is a member of the mucin family of glycoproteins. Anti-CA-125 recognizes specific carbohydrate-associated epitope(s) localized in the variable region of the cancer cell-expressed immunoglobulin heavy chains. It is best known as a marker for ovarian cancer, but it may also be detected in other malignancies, including those originating in the endometrium, fallopian tubes, lungs, breast and gastrointestinal tract. Anti-CA-125 reacts with epithelioid malignancies of the ovary, papillary serous carcinoma of the cervix, adenocarcinoma of the endometrium, clear cell adenocarcinoma of the bladder, and a minority of epithelioid mesotheliomas. Anti-CA-125 also reacts with antigens in seminal vesicle carcinoma.

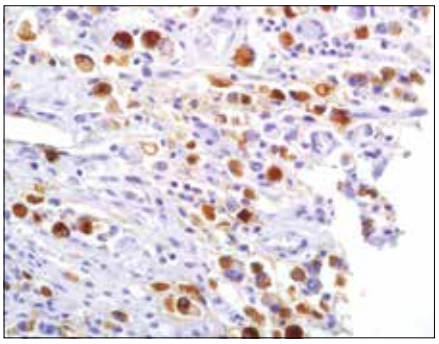
Colon vs. Ovarian Carcinoma

	CA-125	CK 7	CK 20	CEA	CDX-2	Villin	CA19-9	Ep-CAM	WT1	CK 5&6
Ovarian Carcinoma, Serous	+	+	-	+	-	+	+	+	+	-
Ovarian Carcinoma, Mucinous	-	+	-	-	+	+	+	+	-	
Ovarian Endometrioid Ca	+	+	-	-	-		+/-	+	+	-
Colorectal Carcinoma	-	-	+	+	+	+	+	+	-	-

Reference

1. Dabawat S, et al. Int J Gyn Path. 1983; 2:275-285.
2. Davis H, et al. Cancer Res. 1986; 46:6143-6148.
3. Nouwen E, et al. Cancer Res. 1986; 46:866-876.
4. Quirk J, et al. J Obst Gyn. 1988; 159:644-649.
5. Fukazawa I, et al. Gynecol Obstet. 1988; 243:41-50.
6. Zhou C, et al. Am J Surg Pathol. 1998 Jan; 22(1):113-20.
7. Mylonas I, et al. Anticancer Res. 2003 Mar-Apr; 23(2A):1075-80.

A.MENARINI diagnostics



CA19-9 (121SLE)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45692	IMPATH CA19-9 RTU M (121SLE)	50 Tests
44212	CA19-9 RTU M (121SLE)	7 ml Ready To Use
44448	CA19-9 0,1 M (121SLE)	100 µl liquid Concentrated
44449	CA19-9 1 M (121SLE)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Colon
Stability Up to 36 mo. at 2-8°C
Isotype IgM

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CA19-9 antigen is highly expressed in gastrointestinal (gastric, pancreatic, and colonic) adenocarcinomas and salivary gland mucoepidermoid carcinomas. Anti-CA19-9 is usually not reactive with breast, kidney, and prostate carcinomas.

Colon vs. Ovarian Carcinoma

	CA19-9	CK 7	CK 20	CEA	CDX-2	Villin	Ep-CAM	WT1	CA-125	CK 5&6
Ovarian Carcinoma, Serous	+	+	-	+	-	+	+	+	+	-
Ovarian Carcinoma, Mucinous	+	+	-	-	+	+	+	-	-	
Ovarian Endometrioid Ca	+/-	+	-	-	-		+	+	+	-
Colon Carcinoma	+	-	+	+	+	+	+	-	-	-

Breast Carcinoma

	CA19-9	CK 7	CK 20	ER/PR	CA15-3	p63	CD117	CK 5
Infiltrating Ductal Carcinoma	-	+	-	+	+	-	-	-
Adenoid Cystic Carcinoma	+	+	-	-	+	+	+	+

Pancreas

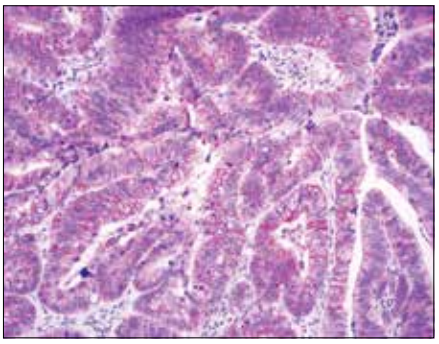
	CA19-9	Synapto-physin	Chromo-granin A	Insulin	Glucagon	Gastrin	MUC4	CD56	β-Catenin	CK 19
Ductal Adenocarcinoma	+	-	-	-	-	-	+	-	+/-	+
Neuroendocrine Tumor	+/-	+	+	+/-	+/-	+/-	-	+	+	+/-
Solid Pseudopapillary Tumor	-	+	-	-	-	-		+	+	-
Acinic Cell Carcinoma	-/+	-	-	-	-	-		-	+	+
Pancreatoblastoma	-	-	+	-	-	-	-	+	+	-

Colon vs. Prostate Adenocarcinoma

	CA19-9	CDX-2	CK 20	CEA	PSA	P504s
Colon Adenocarcinoma	+	+	+	+	-	+
Prostate Adenocarcinoma	-	-	-	-	+	+

Reference

1. Gatalica Z, et al. Applied IHC. 1994; 2(3):205-211.



Cadherin-17 (SP183)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45645	IMPATH Cadherin-17 RTU R (SP183)	50 Tests
45632	Cadherin-17 RTU R (SP183)	7 ml Ready To Use
45608	Cadherin-17 0,1 R (SP183)	100 µl liquid Concentrated
45609	Cadherin-17 1 R (SP183)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Colorectal carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Cadherin-17, also called liver-intestinal (LI) cadherin or human peptide transporter-1, is a member of the cadherin superfamily. Unlike some classic cadherins, such as E-, N-, and P-cadherins, cadherin-17 has seven cadherin repeats instead of five within the extracellular domain and only 20 amino-acid residues in the cytoplasmic domain. The markedly short cytoplasmic domain lacks homology with other cadherins and the adhesive function of cadherin-17 is not dependent on association with other cytoplasmic proteins. The subcellular distribution of cadherin-17 is also different from classic cadherins. In intestinal epithelial cells, E-cadherin is concentrated in adherens junctions whereas cadherin-17 is evenly distributed along the lateral contact area. Human normal tissues that are strongly stained with cadherin-17 include appendicular epithelium, colonic epithelium, and small intestinal epithelium. Other normal human tissues are not stained with cadherin-17. The results above indicate cadherin-17 can be used as a marker for identification of primary sites of tumors. In-house studies have shown cadherin-17 expression is usually diffuse and strong in colorectal adenocarcinomas, whereas it is usually focal or scattered in adenocarcinomas of the stomach, pancreas and bile duct, and is virtually absent in tumors of other anatomic sites.

Neoplasms						
	Cadherin-17	CDX-2	S100P	GATA3	TTF-1	Napsin A
Colorectal Adenocarcinoma	+	+	-	-	-	-
Gastric Adenocarcinoma	+	+	-	-	-	-
Esophogeal Adenocarcinoma	+	+	-	-	-	-
Pancreatic Ductal Adenocarcinoma	-/+	+/-	+	-	-	-
Hepatocellular Carcinoma	-	-	-	-	-	-
Lung Adenocarcinoma	-	-	-	-	+	+
Breast Carcinoma	-	-	-	+	-	-
Ovarian Carcinoma	-	-	-	-	-	-

Reference

1. Su MC, et al. Mod Pathol. 2008; 21:1379–1386.
2. Gessner R, et al. Ann N Y Acad Sci. 2000; 915:136–143.

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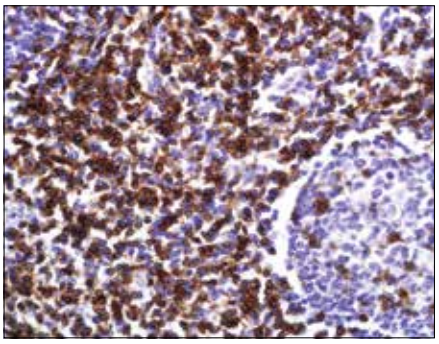


Calcitonin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45170	IMPATH Calcitonin RTU R (Poly)	50 Tests
44213	Calcitonin RTU R (Poly)	7 ml Ready To Use
44450	Calcitonin 0,1 R (Poly)	100 µl liquid Concentrated
44451	Calcitonin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Thyroid Medullary Carcinoma
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Immunohistochemical staining with anti-calcitonin antibody has proven to be an effective way of demonstrating calcitoninproducing cells in the thyroid. C-cell hyperplasia and medullary thyroid carcinomas stain positive for calcitonin. Studies of calcitonin have resulted in the identification of a wide spectrum of C-cell proliferative abnormalities.

Thyroid: Malignant vs. Benign

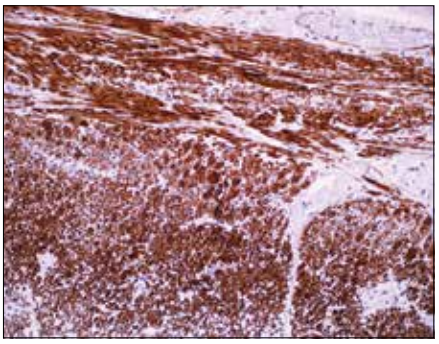
	Calcitonin	Thyroglobulin	CK 19	Galectin-3	TTF-1	HBME-1
Papillary Carcinoma	-	+	+	+	+	+
Follicular Carcinoma	-	+	-/+	+	+	+/-
Medullary Carcinoma	+	-	+/-	-	+	+
Benign Thyroid	-	+	-	-	+	-

Differential Diagnosis of Parathyroid vs. Thyroid Tumors

	Calcitonin	Chromogranin A	Synaptophysin	PTH	S-100	TTF-1
Parathyroid Tumors	-	+	+	+	-	-
Follicular Thyroid Tumors	-	-	-	-	+/-	+
Medullary Thyroid Cacinoma	+	+	+	-	-	+

Reference

1. Copp DH, et al. Endocrinology. 1962; 70:638-649.
2. Kameda Y, et al. Cell Tissue Res. 1980; 206:403-415.
3. Coombes RC, et al. Lancet. 1974; 1:1080-1083.
4. Dayal Y, et al. Cancer. 1979; 43:1331-13385.
5. DeLellis, RA et al. Am J Clin Pathol. 1978; 7(4):587-29.



Caldesmon (E89†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45272	IMPATH Caldesmon RTU R (E89)	50 Tests
44214	Caldesmon RTU R (E89)	7 ml Ready To Use
44452	Caldesmon 0,1 R (E89)	100 µl liquid Concentrated
44453	Caldesmon 1 R (E89)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Appendix, Breast
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Caldesmon is a regulatory protein found in smooth muscle and other tissues which interacts with actin, myosin, tropomyosin, and calmodulin. Anti-caldesmon labels smooth muscle and tumors of smooth muscle, myofibroblastic, and myoepithelial differentiation. Anti-caldesmon has also been used to differentiate epithelioid mesothelioma from serous papillary carcinoma of the ovary.

Small, Round Blue Cell Tumors

	Caldesmon	MS Actin	SM Actin	Myogenin	Myoglobin	Calponin	PGP 9.5	CD57	Vimentin	INI-1
Leiomyosarcoma	+	+	+	-	-	+	-	+/-	+	
Rhabdomyosarcoma	-	+	-	+	+	-	+	-	+	+

PEComa

	Caldesmon	HMB-45	MART-1	CD63	S-100	Tyrosinase	SM Actin	Calponin	Desmin	CD68
Angiomyolipoma	+	+	+	+	-	-	+	+	-	+
Lymphangiomyomatosis	+	+	+	+	-	-	+	+	-	-
Extrapulmonary Clear Cell Tumor	-	+	+	+	+	-	+	-	-	-
Primary Cutaneous PEComa	-	+	+	+	-	-	-	-	-	+/-
Pulmonary Clear Cell Sugar Tumor	-	+	+	+	+/-	-	-	-	-	+/-

Spindle Cell Tumors

	Caldesmon	SM Actin	MS Actin	Desmin	Calponin	Myogenin	CK Cocktail	EMA	ALK-1	S-100
Myofibroblastic Tumor	+	+	+	+	+	-	-	-	+	-
Spindle Cell Carcinoma	-	-	-	-	-	-	+	+/-	-	-
Neurofibroma	-	-	-	-	-	-	-	-	-	+
Rhabdomyosarcoma	-	-	+	+	-	+	-	+/-	-	-
Endometrial Stromal Tumor	-	+	+	-	+	-	-	-	-	-
Smooth Muscle	+	+	+	+	-	-	-	-	-	-

Reference

1. Comin CE, Saieva C, Messerini L. Am J Surg Pathol. 2007 Aug; 3198):1139-48.
2. Watanabe K, Kusakabe T, Hoshi N, Saito A, Suzuki T. Hum Pathol. 1999 Apr; 30(4):392-6.
3. McCluggage WC. Adv Anat Pathol. 2004 May; 11(3):162-71.

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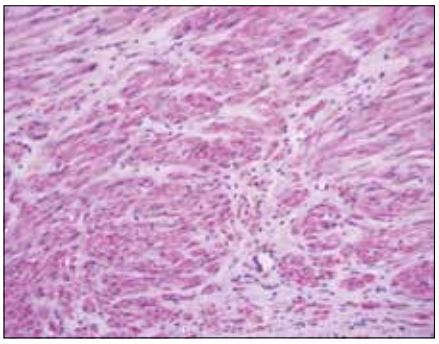


Calponin-1 (EP798Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45171	IMPATH Calponin-1 RTU R (EP798Y)	50 Tests
44215	Calponin RTU R (EP798Y)	7 ml Ready To Use
44454	Calponin 0,1 R (EP798Y)	100 µl liquid Concentrated
44455	Calponin 1 R (EP798Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Appendix
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Calponin is a 34 kD polypeptide that interacts with actin, tropomyosin, and calmodulin. It is involved in smooth muscle contraction mechanism and is restricted exclusively to smooth muscle tissue. Anti-calponin has been found to be useful in staining myoepithelium and is therefore useful for differentiating benign sclerosing adenosis of the breast from infiltrating ductal carcinoma. Calponin positivity has also been noted in malignant myoepithelioma and pleomorphic adenoma of salivary gland origin as well as angiomatoid malignant fibrous histiocytoma.

Myoepithelial Lesions: Malignant vs. Benign

	Calponin	CK Cocktail	MS Actin	SM Myosin	S-100	GFAP	EMA	CK 14	p63	Desmin
Malignant Myoepithelioma	+	+	+	+	+	+/-	+	+	-	-
Benign Myoepithelium	+	+	+	+	+	+	+	+	+	-

Soft Tissue Tumors

	Calponin	MS Actin	SM Actin	Myogenin	CK Cocktail	CD99	FLI-1	PGP 9.5	CD57	INI-1
Leiomyosarcoma	+	+	+	-	-/+	-	-	-	+/-	
Rhabdomyosarcoma	-	-/+	-/+	+	-	-	-	+	-	+
PNET/ES	-	-	-	-	-/+	+	+	+	+	+

Breast Carcinoma In-Situ vs. Infiltrating Breast Carcinoma

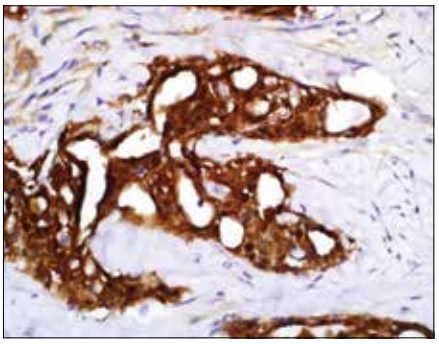
	Calponin	SM Myosin	p63
Sclerosing adenosis	+	+	+
Infiltrating Breast Carcinoma	-	-	-

Spindle Cell Tumors

	Calponin	β-Catenin	PGP 9.5	ALK	CK Cocktail	CD56	Myogenin	SM Myosin	Caldesmon	Desmin
Myofibroblastic Tumor	+	-	-	+	-	+	-	-	+	+
Endometrial Stromal Tumor	+	+/-	+	-	-	-	-	-	-	-
Smooth Muscle	+	-	-	-	-	-	-	-	+	+
Leiomyosarcoma	+	-	-	-	-/+	+	+/-	+	+	+

Reference

1. Wang NP, et al. Appl. Immunohistochem. 1997; 5(3):141-151.



Calretinin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45172	IMPATH Calretinin RTU R (Poly)	50 Tests
44216	Calretinin RTU R (Poly)	7 ml Ready To Use
44456	Calretinin 0,1 R (Poly)	100 µl liquid Concentrated
44457	Calretinin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control Mesothelioma
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-calretinin has been shown to be useful in differentiating mesothelioma from adenocarcinomas of the lung and other sources. Anti-calretinin has also demonstrated utility in differentiating adrenal cortical neoplasms from pheochromocytomas.

Adrenocortical Tumors

	Calretinin	Inhibin	MART-1	Synaptophysin	Chromogranin A	CD56
Pheochromocytoma	-	-	-	+	+	+
Carcinoma	-	-	-	-	-	-
Adenoma	+	+	+	-/+	-	+

Lung Adenocarcinoma vs. Mesothelioma

	Calretinin	CK 5&6	D2-40	HBME-1	Caldesmon	TAG-72	CEA	Ep-CAM	E-cadherin	TTF-1
Adenocarcinoma	-	-	-	-	-	+	+	+	+	+
Mesothelioma	+	+	+	+	+	-	-	-	-	-

Soft Tissue Tumor

	Calretinin	CK Cocktail	EMA	SM Actin	CD34	TLE-1	Desmin	S-100	CD56
Synovial Sarcoma	-	+	+	-	-	+	-	-	+
Myxoid Chondrosarcoma	-	-	-	-	-/+	-	-	+/-	-
PEComa	-	-	-	+	-	-	+/-	-	-

Sex Cord Stromal Tumors

	Calretinin	Inhibin	CD99	CK 7	EMA	Vimentin	MART-1
Granulosa Cell Tumors	+	+	+	-	-	+	+
Sertoli-Leydig Cell Tumors	+	+	+	+	-	+	+
Gonadoblastomas	+	+	+	-	-	+	-

Reference

1. Barberis MC, et al. Acta Cytol. 1997 Nov-Dec; 41(6):1757-61.
2. Doglioni C, et al. Am J Surg Pathol. 1996 Sep; 20(9):1037-46.
3. Leers MP, et al. Histopathology. 1998 Mar; 32(3); 209-16.
4. Ordonez NG. AM J Surg Pathol. 1998 Oct; 22(10):1203-14.
5. Ordonez NG. Mod Pathol. 1998 Oct; 11(10):929-33.
6. Abutaily AS, et al. J Clin Pathol. 2002 Sep; 55(9):662-8

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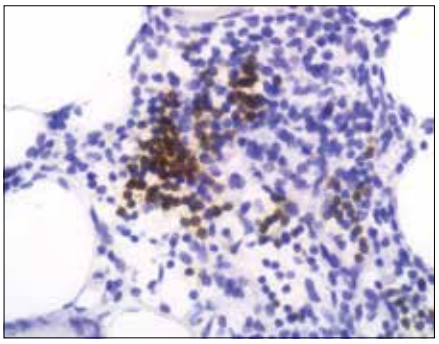


CD1a (EP3622†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45176	IMPATH CD1A RTU R (EP3622)	50 Tests
44225	CD1a RTU R (EP3622)	7 ml Ready To Use
44472	CD1a 0,1 R (EP3622)	100 µl liquid Concentrated
44473	CD1a 1 R (EP3622)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Skin, Thymus
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD1a is a non-polymorphic major histocompatibitity complex class I-related cell surface glycoprotein (45 to 55 kDa) and is expressed in association with β-microglobulin. In normal tissues, anti-CD1a reacts with cortical thymocytes, Langerhans cells, interdigitating dendritic cells, and rare antigen-presenting cells of the lymph node. Anti-CD1a labels Langerhans cell histiocytosis (Histiocytosis X), extranodal histiocytic sarcoma, a subset of T-lymphoblastic lymphoma/leukemia, and interdigitating dendritic cell sarcoma of the lymph node. When combined with antibodies against TTF-1 and CD5, anti-CD1a is useful in distinguishing between pulmonary and thymic neoplasms since CD1a is consistently expressed in thymic lymphocytes in both typical and atypical thymomas, but only focally in 1/6 of thymic carcinomas and not in lymphocytes in pulmonary neoplasms. Anti-CD1a was reported to be a new marker for perivascular epithelial cell tumor (PEComa).

Lymph Node

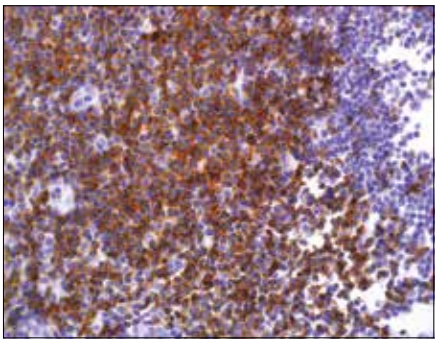
	CD1a	CD68	S-100	CD163	CD21/CD35	CD14
Reactive Histiocytosis	-	+	-	-	-	+
Langerhans Cell Histiocytosis	+	+	+	+	-	+
Sinus Histiocytosis with Massive Lymphadenopathy	-	+	+	+	-	+
Follicular Dendritic Cell Sarcoma	+/-	-	-	-	+	-
Dermatopathic Lymphadenitis	+	-	+	+	-	-

Histiocytic Proliferation

	CD1a	S-100	CD68	Vimentin	CD163	Factor XIIIa	HAM-56
Juvenile Xanthogranuloma	-	-	+	+	+	+	+
Langerhans Cell Histiocytosis	+	+	+	+	+	-	+
Dermatofibroma	-	-	+	+	-	+	-

Reference

1. Pinkus GS, et al. Am J Clin Pathol. 2002 Sep; 118(3):335-43.
2. Laguens G, et al. Immunol Lett. 2002 Dec 3; 84(3):159-62.
3. Pileri SA, et al. Histopathology. 2002 Jul; 41(1); 1-29.
4. Schmuth M, et al. Am J Clin Pathol. 2001 Jul; 1169(1):72-8.
5. Shiyong L, et al. Arch Pathol Lab Med. 2001 Jul; 125(7):958-60.
6. Goteri G, et al. J Clin Pathol. 2003 Jun; 56(6):453-8.
7. Deguchi M, et al. Arch Dermatol Res. 2002 Oct; 294(7):297-302. Epub 2002 Jul 27.



CD2 (MRQ-11)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45177	IMPATH CD2 RTU M (MRQ-11)	50 Tests
44226	CD2 RTU M (MRQ-11)	7 ml Ready To Use
44474	CD2 0,1 M (MRQ-11)	100 µl liquid Concentrated
44475	CD2 1 M (MRQ-11)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD2 is one of the earliest T-cell lineage restricted antigens to appear during T-cell differentiation and only rare CD2+ cells can be found in the bone marrow. Anti-CD2 is a pan-T-cell antigen marker. Anti-CD2 is therefore useful for the identification of virtually all normal T-lymphocytes. It is also very useful in the assessment of lymphoid malignancies as it is expressed in the majority of precursor and mature T-cell lymphomas and leukemias. As with other pan-T-cell antigens, CD2 may be aberrantly deleted in some neoplastic T-cell populations, especially peripheral T-cell lymphomas. When combined with anti-CD25, anti-CD2 may assist in the diagnosis of systemic mastocytosis and mastocytic leukemia.

T-cell Lymphomas

	CD2	CD45	CD3	CD4	CD5	CD7	CD8	CD25	CD45RO	PD-1
Angioimmunoblastic	+	+	+	+	+	+	-	+	+	+
Lymphoblastic	+/-	+	+	+/-	+	+	+/-	+	+	-
Subcutaneous Panniculitis-Like	+	+	+	-	+	+	+/-	-	+	-
NK	+	+	+	-	-	-/+	-	+	+	-
Cutaneous	+	+	+	+	-	+	-	-	-	-/+
Peripheral, NOS	+	+	+	+/-	+/-	+/-	-/+	+	+	-
Mycosis Fungoides	+	+	+	+	+	-	-	+	+	-

Mastocytosis

	CD2	Tryptase	CD117	CD25	CD163
Mastocytosis	+	+	+	+	-
Mastocytic Leukemia	+	+	+	+	-
Reactive Mast Cells	-	+	+	-	+

Reference

1. Aguilera NS, et al. Arch Pathol Lab Med. 2006 Dec; 130(12):1772-9.
2. Barrionuevo C, et al. Appl Immunohistochem Mol Morphol. 2007 Mar; 15(1):38-44.
3. Bovenschen HJ, et al. Br J Dermatol. 2005 Jul; 153(1):72-8.
4. Foon KA, Todd RF. Blood. 1986; 68:1-31.
5. Gonzalez L, et al. Journal of Comparative Pathology. 2001; 125:41-7.

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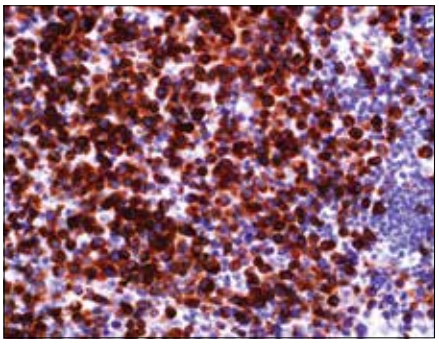


CD3 (MRQ-39)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45179	IMPATH CD3 (MRQ-39)	50 Tests
44231	CD3 RTU R (MRQ-39)	7 ml Ready To Use
44484	CD3 0,1 R (MRQ-39)	100 µl liquid Concentrated
44485	CD3 1 R (MRQ-39)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD3 is considered to be a pan-T-cell marker. Anti-CD3 reacts with an antigen present at the surface and in the cytoplasm of the T lymphocytes. The antibody for immunohistochemical detection locates the cytoplasmic component of CD3 protein. Anti-CD3 is widely used in detection of T-cell malignancies, both immature and mature.

Lymphoblastic Lymphomas, B-cell vs. T-cell

	CD3	TdT	CD10	PAX-5	CD20	CD19	CD5	CD7	CD117	CD1a
B-cell	-	+	+	+	+/-	+	-	-	-	+
T-cell	+	+	+/-	-	-	-	+/-	+/-	-/+	+/-

Lymphoma

	CD3	CD20	CD45R	CD45RO
Mature B-cell	-	+	+	-
Mature T-cell	+	-	-	+

T-cell Lymphomas

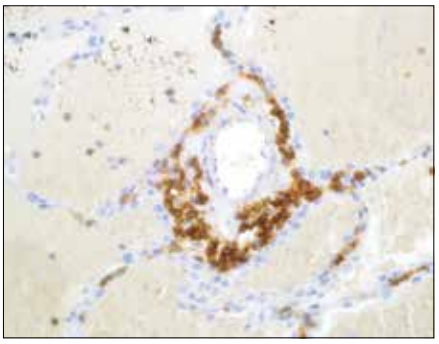
	CD3	CD45	CD2	CD4	CD5	CD7	CD8	CD25	PD-1
Angioimmunoblastic	+	+	+	+	+	+	-	+	+
Lymphoblastic	+	+	+/-	+/-	+	+	+/-	+	-
Subcutaneous Panniculitis-Like	+	+	+	-	+	+	+/-	-	-
NK	+	+	+	-	-	-/+	-	+	-
Cutaneous	+	+	+	+	-	+	-	-	-/+
Peripheral, NOS	+	+	+	+/-	+/-	+/-	-/+	+	-
Mycosis Fungoides	+	+	+	+	+	-	-	+	-

Histiocytic Neoplasms

	CD3	CD45	CD4	CD68	Lysozyme	CD163	Factor XIIIa	CD20
Histiocytic Neoplasms	-	+	+	+	+	+	+	-

Reference

1. Denning SM, et al. Oxford Univ. Press. 1987; 144-147.
2. Beverley PCL, et al. European J of Immunology. 11:329-334.
3. Clevers H, et al. European J of Immunology. 1988; 18:705-710.



CD4 (EP204†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44238	CD4 RTU R (EP204)	7 ml Ready To Use
44498	CD4 0,1 R (EP204)	100 µl liquid Concentrated
44499	CD4 1 R (EP204)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Lymph Node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

CD4 is a 55 kD glycoprotein expressed on the surface of T-helper/regulatory T-cells, monocytes, macrophages, and dendritic cells. Anti-CD4 is used in the immunophenotyping of lymphoproliferative disorders. The majority of peripheral T-cell lymphomas are derived from the T-helper/regulatory cell subset so that most mature T-cell neoplasms are CD4+ CD8-. As with other T-cell antigens, CD4 may be aberrantly expressed in neoplastic T-cells so that the evaluation of such tumors requires the application of a panel of markers in order to identify tumors with CD4 aberrant expression.

T-cell Lymphomas

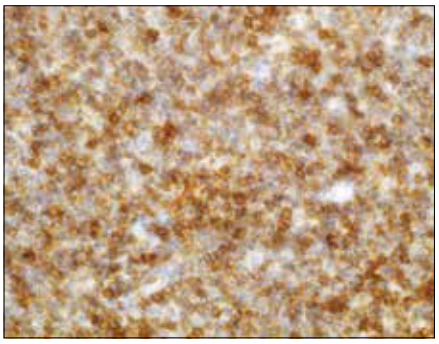
	CD4	CD45	CD2	CD3	CD5	CD7	CD8	CD25	CD45RO	PD-1
Angioimmunoblastic	+	+	+	+	+	+	-	+	+	+
Lymphoblastic	+/-	+	+/-	+	+	+	+/-	+	+	-
Subcutaneous Panniculitis-Like	-	+	+	+	+	+	+/-	-	+	-
NK	-	+	+	+	-	-/+	-	+	+	-
Cutaneous	+	+	+	+	-	+	-	-	-	-/+
Peripheral, NOS	+/-	+	+	+	+/-	+/-	-/+	+	+	-
Mycosis Fungoides	+	+	+	+	+	-	-	+	+	-

Histiocytic Neoplasms

	CD4	CD45	CD68	Lysozyme	CD163	Factor XIIIa	CD20	CD3
Histiocytic Neoplasms	+	+	+	+	+	+	-	-

Reference

1. Leong AS-Y, Cooper K, Leong FJW-M. Manual of diagnostic antibodies for immunohistochemistry, 2nd edition 2003; Greenwich Medical Media Ltd.
2. Akiyama T, et al. Pathol Int. 2008 Oct; 58(10):626-34.
3. Lehe C, et al. Cancer Res. 2008 Aug 1; 68(15):6350-9.
4. Garcia-Herrera A, et al. J Clin Oncol. 2008 Jul 10; 26(20):3364-71. Epub 2008 Jun 9.



CD5 (EP77†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44244	CD5 RTU R (EP77)	7 ml Ready To Use
44509	CD5 0,1 R (EP77)	100 µl liquid Concentrated
44510	CD5 1 R (EP77)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Lymph Node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD5 is a pan T-cell marker that also reacts with a range of neoplastic B-cells, e.g. chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL), mantle cell lymphoma, and a subset (~10%) of diffuse large B-cell lymphoma. CD5 aberrant expression is useful in making a diagnosis of mature T-cell neoplasms. Anti-CD5 detection is diagnostic in CLL/SLL within a panel of other B-cell markers, especially one that includes anti-CD23. Anti-CD5 is also very useful in differentiating among mature small lymphoid cell malignancies. In addition, anti-CD5 can be used in distinguishing thymic carcinoma (+) from thymoma (-). Anti-CD5 does not react with granulocytes or monocytes.

Thymus							
	CD5	CK 5	p63	BG8	BCL2	CD117	CD57
Thymic Carcinoma	+	+	+	+	+	+	-
Type B_3 Thymoma	-	+	+	-	-	-/+	+

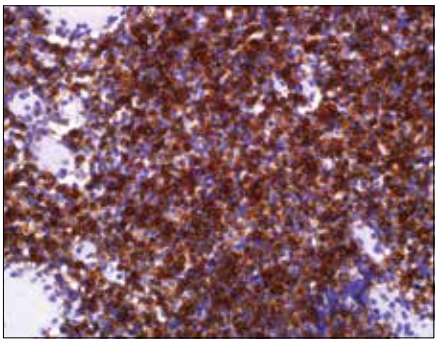
B-cell Lymphomas									
	CD5	CD45	CD20	CD79a	BCL2	ZAP-70	CD23	Cyclin D1	MUM1
CLL/SLL	+	+	+	+	+	+	+	-	+
Mantle Cell	+	+	+	+	+	-	-	+	-

Lymphoblastic Lymphomas, B-cell vs. T-cell										
	CD5	TdT	CD10	PAX-5	CD20	CD19	CD3	CD7	CD117	CD1a
B-cell	-	+	+	+	+/-	+	-	-	-	+
T-cell	+/-	+	+/-	-	-	-	+	+/-	-/+	+/-

T-cell Lymphomas										
	CD5	CD45	CD2	CD3	CD4	CD7	CD8	CD25	CD45RO	PD-1
Angioimmunoblastic	+	+	+	+	+	+	-	+	+	+
Lymphoblastic	+	+	+/-	+	+/-	+	+/-	+	+	-
Subcutaneous Panniculitis-Like	+	+	+	+	-	+	+/-	-	+	-
NK	-	+	+	+	-	-/+	-	+	+	-
Cutaneous	-	+	+	+	+	+	-	-	-	-/+
Peripheral, NOS	+/-	+	+	+	+/-	+/-	-/+	+	+	-
Mycosis Fungoides	+	+	+	+	+	-	-	+	+	-

Reference

1. Chan JKC, et al. Histopathology. 1994; 25:517-536.
2. Kasaian, MT, et al. Proc of the Soc for Exp Bio and Med 1991; 197:226-241



CD7 (MRQ-56)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45188	IMPATH CD7 RTU M (MRQ-56)	50 Tests
44250	CD7 RTU M (MRQ-56)	7 ml Ready To Use
44521	CD7 0,1 M (MRQ-56)	100 µl liquid Concentrated
44522	CD7 1 M (MRQ-56)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Peripheral T-cell lymphoma, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD7 antigen is a cell surface glycoprotein of 40 kD expressed on the surface of immature and mature T-cells as well as natural killer (NK) cells. It is a member of the immunoglobulin gene superfamily and is the first T-cell lineage associated antigen to appear in T-cell ontogeny, being expressed in T-cell precursors (preceding CD2 expression), and in myeloid precursors, in fetal liver and bone marrow, and persisting in circulating mature T-cells. While its precise function is not known, it is suggested that the molecule functions as an Fc receptor for IgM.

CD7 is the most consistently expressed T-cell antigen in lymphoblastic lymphomas and leukemias, and is therefore anti-CD7 is a useful marker in the identification of such neoplastic proliferations. In mature post-thymic T-cell neoplasms, CD7 is the most common pan-T-antigen to be aberrantly expressed, which is a useful pointer to a neoplastic T-cell process.

CD7 is immunoexpressed in 85% of mature peripheral T-cells, the majority of post-thymic T-cells, NK cells, T-cell lymphoblastic leukemia/lymphoma, acute myeloid leukemia, and chronic myelogenous leukemia. CD7 is conspicuously absent in adult T-cell leukemia/lymphoma and is not expressed in mycosis fungoides.

Lymphoblastic Lymphomas, B-cell vs. T-cell

	CD7	TdT	CD10	PAX-5	CD20	CD19	CD3	CD5	CD117	CD1a
B-cell	-	+	+	+	+/-	+	-	-	-	+
T-cell	+/-	+	+/-	-	-	-	+	+/-	-/+	+/-

T-cell Lymphomas

	CD7	CD45	CD2	CD3	CD4	CD5	CD8	CD25	CD45RO	PD-1
Angioimmunoblastic	+	+	+	+	+	+	-	+	+	+
Lymphoblastic	+	+	+/-	+	+/-	+	+/-	+	+	-
Subcutaneous Panniculitis-Like	+	+	+	+	-	+	+/-	-	+	-
NK	+/-	+	+	+	-	-	-	+	+	-
Cutaneous	+	+	+	+	+	-	-	-	-	-/+
Peripheral, NOS	+/-	+	+	+	+/-	+/-	-/+	+	+	-
Mycosis Fungoides	-	+	+	+	+	+	-	+	+	-

Reference

1. Hodak E, et al. J Am Acad Dermatol. 2006; 55:276-84
2. Went P, et al. J Clin Oncol. 2006; 24:2472-9.
3. Vonderheid EC. J Cutan Pathol. 2006; 33 Suppl 1:27-42.

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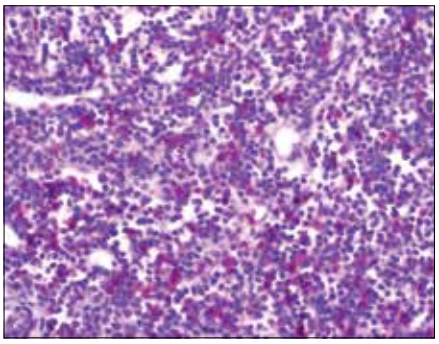


CD8 (C8/144B)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45191	IMPATH CD8 RTU M (C8/144B)	50 Tests
44254	CD8 RTU M (C8/144B)	7 ml Ready To Use
44529	CD8 0,1 M (C8/144B)	100 µl liquid Concentrated
44530	CD8 1 M (C8/144B)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

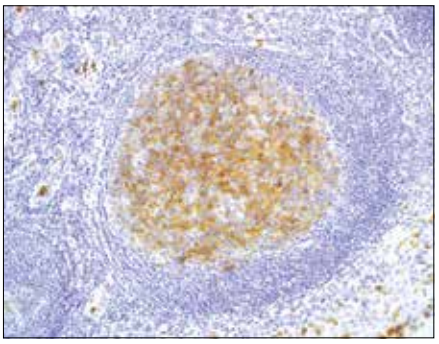
The CD8 (cluster of differentiation 8) antigen is a cell surface glycoprotein found on most cytotoxic T-lymphocytes that mediates efficient cell-cell interactions within the immune system. CD8 is a transmembrane glycoprotein that serves as a co-receptor for the T-cell receptor (TCR). TCR is a heterodimer composed of either α and β or γ and δ chains. CD3 chains and the CD4 or CD8 co-receptors are also required for efficient signal transduction through the TCR. The TCR is expressed on T-helper and cytotoxic T-cells that can be distinguished by their expression of CD4 and CD8 respectively. CD8 binds to a major histocompatibility complex (MHC) molecule, but is specific for the class I MHC protein. A primary function of CD8 is to facilitate antigen recognition by the TCR and to strengthen the avidity of the TCR-antigen interactions. The CD8 coreceptor is predominantly expressed on the surface of suppressor and cytotoxic T-cells at a low level by NK cells, large granular lymphocyte leukemia, and some T-ALL/T-LBL.

For mature T-cells, CD4 and CD8 are mutually exclusive, so anti-CD8, generally used in conjunction with anti-CD4, is a useful marker for distinguishing helper/inducer T-lymphocytes, and most peripheral T-cell lymphomas (CD4+/CD8-). Anaplastic large cell lymphoma is usually CD4+ and CD8-, and in T-lymphoblastic lymphoma/leukemia, CD4 and CD8 are often co-expressed. CD8 is also found in littoral cell angioma of the spleen.

T-cell Lymphomas										
	CD8	CD45	CD2	CD3	CD4	CD5	CD7	CD25	CD45RO	PD-1
Angioimmunoblastic	-	+	+	+	+	+	+	+	+	+
Lymphoblastic	+/-	+	+/-	+	+/-	+	+	+	+	-
Subcutaneous Panniculitis-Like	+/-	+	+	+	-	+	+	-	+	-
NK	-	+	+	+	-	-	-/+	+	+	-
Cutaneous	-	+	+	+	+	-	+	-	-	-/+
Peripheral, NOS	-/+	+	+	+	+/-	+/-	+/-	+	+	-
Mycosis Fungoides	-	+	+	+	+	+	-	+	+	-

Reference

1. Rossi ML, et al. J Clin Path. 1988; 41:314-319.
2. Stein H, et al. Adv Cancer Res. 1984; 42:67-147.
3. Phan-Dinh-Tuy F, et al. Mol Immun. 1982; 19:1649-1654.
4. Mason DY, et al. J Clin Pathol. 1992; 45:1084-8.
5. Nuchols JD, et al. J Cutan Pathol. 1999; 26(4):169-75.



CD10 (56C6)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45125	IMPATH CD10 RTU M (56C6)	50 Tests
44217	CD10 RTU M (56C6)	7 ml Ready To Use
44458	CD10 0,1 M (56C6)	100 µl liquid Concentrated
44459	CD10 1 M (56C6)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Kidney, Lymph node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

The antibody against CD10, common acute lymphoblastic leukemia antigen (CALLA), is a useful marker for the characterization of leukemias and lymphomas. This antibody labels lymphoblastic, Burkitt, and follicular lymphomas. Also, anti-CD10 detects the antigen of glomerular epithelial cells and the brush border of the proximal tubules; this characteristic may be helpful in interpreting renal ontogenesis in conjunction with other markers. Other non-lymphoid cells that are reactive with anti-CD10 are breast myoepithelial cells, bile canaliculi, neutrophils, stromal cells of bone marrow, and fibroblasts. Therefore, anti-CD10 has been used in classification of carcinomas, lymphomas, and leukemias.

Carcinomas

	CD10	CK 7	CK 20	β-Catenin	CK 5	p63	pCEA	CDX-2	Villin	Hep-Par1
Hepatocellular Carcinoma	+	-	-	-	-	-	+	-	-	+
Colorectal Adenocarcinoma	+	-	+	+	-	-	+	+	+	-
Transitional Cell Carcinoma	+	+	+	-	+	+	-	-	-	-

B-cell Lymphomas

	CD10	CD20	CD5	BCL2	BCL6	TCL1	CD23	Cyclin D1	MUM1
Follicular	+	+	-	+	+	+	-	-	-
CLL/SLL	-	+	+	+	-	+	+	-	+
Mantle Cell	-	+	+	+	-	+	-	+	-/+
Marginal Zone	-	+	-	+	-	-	-	-	+
Burkitt	+	+	-	-	+	+	-	-	-
Diffuse Large Cell	+/-	+	-/+	+	+/-	+	-	-	+

Kidney: Renal Epithelial Tumors

	CD10	RCC	PAX-2	Vimentin	Ksp-cadherin	Parvalbumin	CD117	Ep-CAM
Clear Cell RCC	+	+	+	+	-	-	-	-
Chromophobe RCC	-/+	-/+	+	-	+	+	+	+
Oncocytoma	+/-	-	+	-	+/-	+	+	-

Reference

1. Haralambidou S, at al. J Clin Pathol. 1987; 40:490-493.
2. Mechterscheimer, et al. Am J of Pathol 1989; 134(5):961-965.
3. Hoefnagel JJ, et al. Br J Dermatol. 2003 Dec; 149(6):1183-91.
4. Sasaoka A, et al. Clin Nephrol. 2003 Nov; 60(5):305-14.
5. Hans CP, et al. Blood. 2004 Jan 1; 103(1):275-82.

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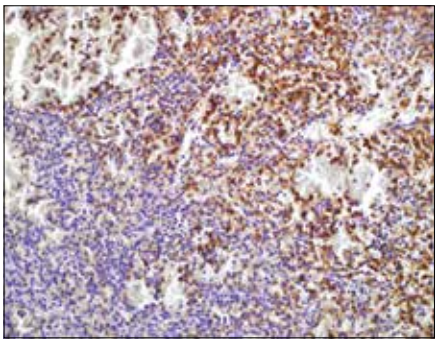


CD11c (5D11)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45126	IMPATH CD11c RTU M (5D11)	50 Tests
44219	CD11c RTU M (5D11)	7 ml Ready To Use
44843	CD11c 0,1 M (5D11)	100 µl liquid Concentrated
44462	CD11c 1 M (5D11)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Bone Marrow, Granulocytes, Monocytes, Hairy Cell Leukemia
Stability Up to 36 mo. at 2-8°C
Isotype IgG2a

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Hairy cell leukemia (HCL) is a distinctive yet uncommon chronic B-cell lymphoproliferative disorder predominantly involving the bone marrow and spleen. Bone marrow aspiration and trephine biopsy are necessary for making a definitive diagnosis and treatment of hairy cell leukemia (HCL). However, aspiration is successful in only 10% of patients due to diffusely increased reticulin fibers in the background marrow stroma in association with HCL infiltrates. In such situations, examination of bone marrow trephine histology together with immunohistochemical analysis is the only available method to make a definitive diagnosis of HCL.

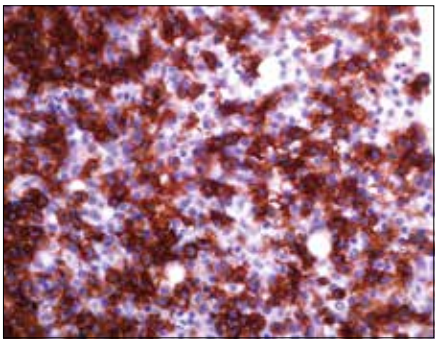
Korinna et al. investigated 31 bone marrow trephines with low-level HCL infiltrates and showed that the anti-CD11c (clone 5D11) was able to detect HCL to a level of 2% tumor cells in BM biopsies. This indicates that immunohistochemical staining of formalin-fixed, decalcified bone marrow trephine biopsies with anti-CD11c can be used both for early diagnosis of HCL and for detection of residual disease following therapy. It is important to note that the anti-CD11c-positive interstitial macrophages, which were generally more weakly stained than the hairy cells, did not interfere with the identification of the more strongly stained tumor cells. Among malignant lymphomas, CD11c is consistently expressed in HCL, although it is also rarely detected in B-CLL/small lymphocytic lymphoma and splenic MZL.

Mature B-cell Neoplasms

	CD11c	CD25	CD103	CD123	CD10	T-bet	DBA44	TRAcP	Annexin A1	Cyclin D1
Hairy Cell Leukemia	+	+	+	+	+20%	+	+/-	+/-	+	+(weak)/-
Hairy Cell Leukemia Variant	+	-	+/-	-	-	-	+/-	+/-	-	-
Splenic Marginal Zone Lymphoma	-/+	-	-	-	-	-	+/-	+/-	-	-

Reference

1. Korinna J, et al. Pathobiology. 2008; 75:252-256.
2. Jones G, et al. Br J Hemaetol. 2011; 156:186-195.
3. Went PT, et al. Am J Surg Pathol. 2005; 29:474-478.
4. Miranda RN, et al. Modem Pathology. 2000; 13:1308-1314.
5. Marotta G, et al. Leuk Lymphoma. 2000; 37:145-149.



CD13 (SP187)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45646	IMPATH CD13 RTU R (SP187)	50 Tests
45633	CD13 RTU R (SP187)	7 ml Ready To Use
45610	CD13 0,1 R (SP187)	100 µl liquid Concentrated
45611	CD13 1 R (SP187)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Liver
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD13 (aminopeptidase-N) is a transmembrane protease present in many tissues and cell types (e.g., endothelial and epithelial cells, fibroblasts, and leukocytes). CD13 is overexpressed in various solid and hematological malignancies in humans, including acute myeloid leukemia (AML), and is thought to influence tumor progression. Acute promyelocytic leukemia, hypogranular variant, poses difficulties in morphologic interpretation for separation from other subtypes of AML. CD13 is overexpressed in the tumor and is useful in diagnosing this variant by using a panel including antibodies against CD13(+), CD34(+), CD117(+), CD16(-), and CD33(+). Myeloid sarcoma (also called chloroma, extramedullary sarcoma, or granulocytic sarcoma) is essentially a solid tumor composed of myeloblasts or immature myeloid cells in an extramedullary site. It can be isolated or occur during the course of AML, chronic myeloid leukemia, myelodysplastic syndrome, or myeloproliferative neoplasias. Myeloid sarcoma should be distinguished from large cell lymphoma, lymphoblastic lymphoma, Burkitt lymphoma, undifferentiated carcinoma, malignant melanoma, extra-medullary hematopoiesis, and inflammation. Immunochemical analyses are needed for the accurate diagnosis of myeloid sarcoma. CD13 is overexpressed in myeloid sarcoma and anti-CD13 is very useful in diagnosing myeloid sarcoma using a panel including antibodies against CD34, CD43, CD117, MPO, lysozyme, CD163 and CD68. It has been reported that CD13 is expressed in both normal and neoplastic liver tissue, where it exhibits a canalicular distribution pattern similar to that seen for polyclonal CEA and CD10. Thus, anti-CD13 can be useful as an additional marker in differentiating between HCC and non-hepatocellular neoplasms.

Leukemia

	CD13	CD33	CD34	CD14	MPO	CD38	CD117	CD16	CD163	CD71
Acute Myeloid Leukemia with Minimal Differentiation	+	+	+	+	+	+	+	-	-	-
Acute Myeloid Leukemia without Maturation	+	+	+	-	+	-	+	-	-	-
Acute Myeloid Leukemia with Maturation	+	+	+	-	+	-	+	-	-	-
Acute Myelomonocytic Leukemia	+	+	+/-	+	+	-	+/-	+	-	-
Acute Monoblastic and Monocytic Leukemia	+	+	-/+	+	+/-	-	+/-	+	+	-
Acute Erythroid Leukemia	-	-	-/+	-	-	-	-/+	-	-	+
Acute Megakryoblastic Leukemia	+/-	+/-	-	-	-	-	-	-	-	+
Acute Basophilic Leukemia	+	+	+/-	-	+/-	-	+	-	-	-
Acute Panmyelosis with Myelofibrosis	+	+	+	-	+	-	+	-	-	-

Reference

1. Bauvois B, Dauzonne D. Med. Res. Rev.2006; 26:88–130.

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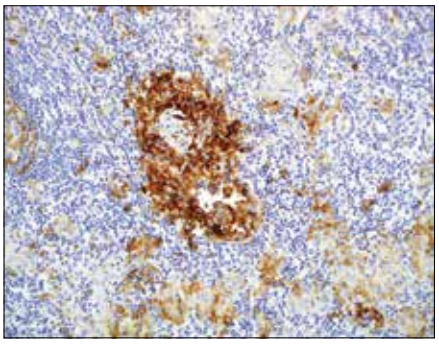


CD14 (EPR3653†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45274	IMPATH CD14 RTU R (EPR3653)	50 Tests
44221	CD14 RTU R (EPR3653)	7 ml Ready To Use
44465	CD14 0,1 R (EPR3653)	100 µl liquid Concentrated
44466	CD14 1 R (EPR3653)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Acute Myeloid Leukemia, Appendix, Colon, Tonsil, Lymph node
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

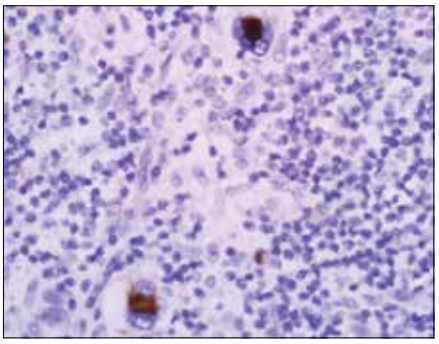
Anti-CD14 labels a 55 kDa, glycosyl-phosphatidylinositol-linked membrane protein, involved in endotoxin binding and recognition of apoptotic cells. CD14 is expressed by monocytes and dermal dendritic cells; anti-CD14 is considered to be a macrophage-derived monocyte marker. CD14 is also present in granulocytes, endothelial, epithelial cells, and placental trophoblasts. In the spleen, CD14 can be expressed in the red pulp and marginal zone cells, and histiocytes around sheathed capillaries. In the lymph node, true sinusoidal histiocytes, and follicular dendritic cells stain with anti-CD14. However, other monocyte-derived cells in the lymph node, such as in sinusoidal histiocytosis with erythrophagocytosis, macrophages associated with anthracosis, germinal center tingible body macrophages in reactive germinal centers, and diffuse large B-cell lymphoma do not express CD14 antigen. CD14 is not expressed in plasmacytoid dendritic cells. Anti-CD14 positive histiocytes are reported as markedly increased in DLBCL, but not in CLL/SLL, MCL, or FL.

Anti-CD14 is useful in confirming a diagnosis of massive lymphadenopathy with sinus histiocytosis (Rosai-Dorfman disease) when used in a panel including anti-S100 and anti-CD68. Anti-CD14 can also be used for decalcified bone marrow biopsy specimens to show increased myelomonocytic and monocytic neoplastic cells in chronic myelomonocytic leukemia and monocytic leukemia, and is very helpful in the distinction of myeloproliferative neoplasms, myelodysplastic syndrome, and acute monocytic leukemia. This antibody is more sensitive for leukemic monocytic cells than antibodies directed against CD163 and CD68/PG-M1.

Lymph Node				
	CD14	CD169	CD68	CD1a
Sinusoidal Histiocytes	+	-	-	-
Tingible Body Macrophages	-	-	+	-
Plasmacytoid Monocytes	-	-	-	-
Langerhans Cell Histiocytosis	+	+/-	+	+
Interdigitating DC	+/-	-	-	+

Reference

1. Gregory CD, et al. Apoptosis. 1999; 4:11-20.
2. Larregina AT, et al. Nature Immunol. 2001; 2:1151-8.
3. Ziegler-Heitbrock HW, et al. Immunol Today. 1993; 13:121-5.
4. Steiniger B, et al. Immunology. 1997; 92:307-16.
5. Buckly PJ, et al. AM J Pathol. 1987; 128:505-20.
6. Hartnell A, et al. Blood. 2001; 97:288-96.
7. Marmey B, et al. Hum Pathol. 2006; 37:68-77.



CD15 (MMA)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45174	IMPATH CD15 RTU M (MMA)	50 Tests
44222	CD15 RTU M (MMA)	7 ml Ready To Use
44467	CD15 0,1 M (MMA)	100 µl liquid Concentrated
44468	CD15 1 M (MMA)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Hodgkin Lymphoma
Stability Up to 36 mo. at 2-8°C
Isotype IgM

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

A positive reaction for anti-CD15 with a membranous and perinuclear golgi zone accentuation staining pattern provides immunohistochemical support for Reed-Sternberg cells in Hodgkin lymphoma. Also, this antibody is useful in distinguishing epithelioid mesothelioma from adenocarcinoma when combined with other antibodies.

Hodgkin vs. Non-Hodgkin Lymphomas

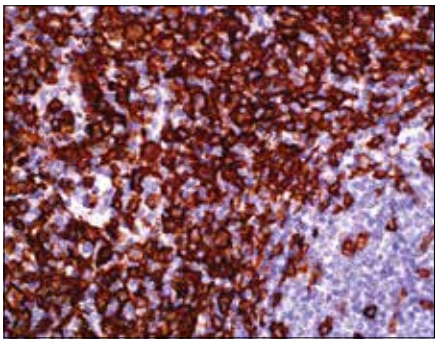
	CD15	CD79a	CD30	Fascin	Granzyme B	BCL6	PU.1	MUM1	ALK-1	EMA
Hodgkin Lymphoma, Classic	+	-	+	+	-	-	-	+	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	-	+	-	-	-	+	+	-/+	-	+
T-cell Rich B-cell Lymphoma	-	+	-	-	-	+	-	+	-	-
Anaplastic Large Cell Lymphoma	-	-	+	-	+	+/-	-	-	+	+

Skin: Adnexal Tumors

	CD15	CK 7	CK 20	S-100	EMA	GCDFP-15
Merkel Cell Carcinoma	-	-	+	-	+	-
Sebaceous Tumor	+	+	-	-	-	-
Apocrine Tumor	+/-	+	-	-	+/-	+
Eccrine Tumor	-	+	-	+	+	-

Reference

1. Skubitz K, et al. Oxford Univ Press. 1989; 800-805.
2. Hsu SM, et al. Am J Clin Path. 1984; 82.
3. Pinkus GS, et al. Am J Path. 1985; 119:244-252.
4. Wieczorek R, et al. Am J Path. 1985; 121:374-380.
5. Swerdlow SH, et al. Am J Path. 1986; 85:283-282.



CD16 (SP175)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45647	IMPATH CD16 RTU R (SP175)	50 Tests
45634	CD16 RTU R (SP175)	7 ml Ready To Use
45612	CD16 0,1 R (SP175)	100 µl liquid Concentrated
45613	CD16 1 R (SP175)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

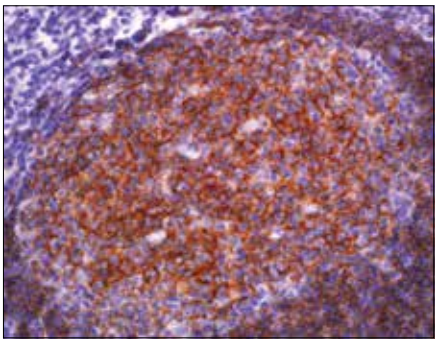
Product Description

CD16 is a biomarker associated with monocytes and natural killer (NK) cells of the lymphoid lineage. Anti-CD16 immunohistochemistry is useful in differentially diagnosing hepatosplenic gamma delta T-cell lymphoma and gamma delta T-cell large granular lymphocyte leukemia from other peripheral T-cell lymphomas, such as mucosal and cutaneous gamma delta T-cell lymphoma. It is reported that 58% of hepatosplenic gamma delta T-cell lymphomas express CD16, and 86% of gamma delta T-cell large granular lymphocyte leukemias are immunoreactive with anti-CD16. Mucosal and cutaneous gamma delta T-cell lymphomas usually do not express CD16 antigen. A significant decrease can be seen in the number of granulocytes expressing CD16 in chronic myelomonocytic leukemia compared to chronic myelogenous leukemia and control bone marrow biopsy, probably related to dysgranulopoiesis. Bone marrow biopsy immunohistochemistry can be helpful in CMML by identifying both the monocyte expansion and the dysgranulopoiesis with anti-CD16.

NK Cell Leukemia/Lymphoma	CD16	CD2	CD3	CD56	CD57	Granzyme B	Perforin	TIA-1
Aggressive NK-Cell Leukemia	+	+	+	+	-	+	+	+
Chronic Lymphoproliferative Disorders of NK-Cells	+	-/+	+	+/-	-/+	+	+	+
T-Cell Large Granular Lymphocytic Leukemia	+	+	+	-	+	+	+	+
Extranodal NK/T-Cell Lymphoma, Nasal Type	-	+	+	+	-	+	+	+

Reference

1. Liang X, Graham DK. Cancer. 2008; 112:1425-36.
2. Gibson SE, et al. Hum Pathol. 2011; 42:679-687.
3. Cooke CB, et al. Blood. 1996; 88:4265-4274.
4. Arnulf B, et al. Blood. 1998; 92:1723-1731.
5. Qubaja M, et al. Virchows Arch. 2009; 454:411-419.



CD19 (MRQ-36)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45175	IMPATH CD19 RTU M (MRQ-36)	50 Tests
44224	CD19 RTU M (MRQ-36)	7 ml Ready To Use
44470	CD19 0,1 M (MRQ-36)	100 µl liquid Concentrated
44471	CD19 1 M (MRQ-36)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) for AP 2-step Polymer (Universal) 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD19 is present in both benign and malignant B-cells and has long been considered to be the most reliable surface marker of this lineage over a wide range of maturational stages. In normal lymphoid tissue, CD19 is observed in germinal centers, in mantle zone cells, and in scattered cells of the interfollicular areas. Anti-CD19 exhibits an overall immunoreactivity pattern similar to those of the antibodies against CD20 and CD22. However, in contrast to CD20, CD19 is also expressed in immature B-cells. Recently, Masir et al. have described the expression of CD19 in normal lymphoid tissue and its loss in B-cell neoplasms.

Anti-CD19 positivity is seen in the vast majority of B-cell neoplasms commonly at a lower intensity than normal B-cell counterparts. Plasma cell neoplasms are nearly always negative, as are T-cell neoplasms.

Lymphoblastic Lymphomas, B-cell vs. T-cell

	CD19	TdT	CD10	PAX-5	CD20	CD3	CD5	CD7	CD117	CD1a
B-cell	+	+	+	+	+/-	-	-	-	-	+
T-cell	-	+	+/-	-	-	+	+/-	+/-	-/+	+/-

Plasma Cells

	CD19	CD138	CD79a	EMA	MUM1	CD56	Cyclin D1	CD43	CD20
Plasma Cell Neoplasm	-	+	+	+	+	+	-/+	-	-/+

Reference

1. Steinmetz OM, et al. Transplantation. 2007 Oct 15; 84(7):842-50.
2. Teng YK, et al. Arthritis Rheum. 2007 Dec; 56(12):3909-18.
3. Kimura M, et al. Int J Hematol. 2007 Jan; 85(1):41-8.
4. Masir N, et al. Histopathology. 2006 Feb; 48(3):239-46.
5. Greenberg SA, et al. Neurology. 2005 Dec 13; 65(11):1782-7.

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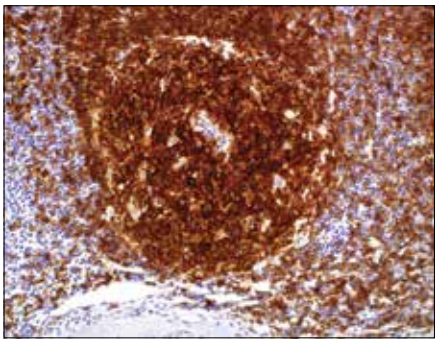


CD20 (L26)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45128	IMPATH CD20 RTU M (L26)	50 Tests
44227	CD20 RTU M (L26)	7 ml Ready To Use
44476	CD20 0,1 M (L26)	100 µl liquid Concentrated
44477	CD20 1 M (L26)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Lymph Node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD20 (Pan-B-cell) reacts with a membrane antigen of B-cells. This antibody also recognizes Reed-Sternberg cells, in classic Hodgkin lymphoma, in about 20% to 40% of cases. CD20 has occasionally been detected in T-cell malignancies. However, it is a very strong marker of mature B-cell lymphomas. Anti-CD20 does not usually immunoreact with non-hematopoietic neoplasms.

B-cell Lymphomas

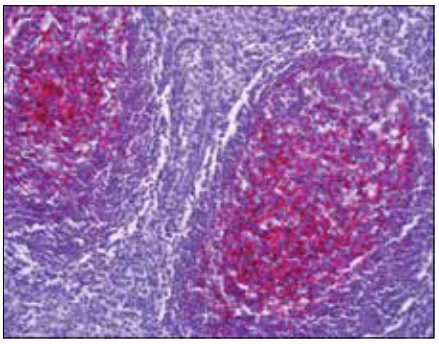
	CD20	BCL2	CD79a	IgD	BCL6	Annexin A1	CD10	CD23	Cyclin D1	MUM1
Follicular	+	+	+	+	+	-	+	-	-	-
CLL/SLL	+	+	+	+	-	-	-	+	-	+
Mantle Cell	+	+	+	+	-	-	-	-	+	-/+
Marginal Zone	+	+	+	-/+	-	-	-	-	-	+
Lymphoplasmacytic	+	+	+	-	-	-	-	-	-	+
Diffuse Large Cell	+	+	+	-	+	-	-/+	-	-	+
Burkitt	+	-	+	-	+	-	+	-	-	-
Hairy Cell Leukemia	+	+	+	-	-	+	-	-	+(weak)/-	

Lymphoblastic Lymphomas, B-cell vs. T-cell

	CD20	TdT	CD10	PAX-5	CD19	CD3	CD5	CD7	CD117	CD1a
B-cell	+/-	+	+	+	+	-	-	-	-	+
T-cell	-	+	+/-	-	-	+	+/-	+/-	-/+	+/-

Reference

1. Ishii Y, et al. Clin Exp Immuno. 1984; 58:183-192.
2. Davey FR, et al. Am J Pathol. 1987; 129:54-63.
3. Mason DY. Am J Pathol. 1987; 128:1-4.
4. Browne P, et al. Am J Clin Pathol. 2003 Nov; 120(5):767-777.
5. Tzankov A, et al. Clin Cancer Res. 2003 Apr; 9(4):1381-6.



CD21 (EP3093†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45275	IMPATH CD21 RTU R (EP3093)	50 Tests
44228	CD21 RTU R (EP3093)	7 ml Ready To Use
44478	CD21 0,1 R (EP3093)	100 µl liquid Concentrated
44479	CD21 1 R (EP3093)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Lymph Node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

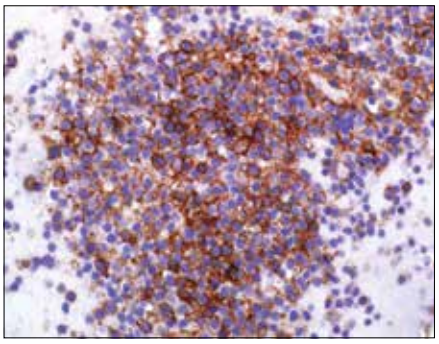
CD21 (also known as complement receptor 2 (CR2), C3d receptor, or EBV receptor) is a 140 kDa membrane protein on B-lymphocytes to which the Epstein-Barr virus (EBV) binds during infection of these cells. The antigen is absent on T-lymphocytes, monocytes, and granulocytes.

Anti-CD21 is useful in the identification of follicular dendritic cell matrix found in normal lymph node and tonsillar tissue. This antibody also labels follicular dendritic cell sarcomas. Anti-CD21 is valuable in differentiating follicular lymphoma with marginal zone differentiation from marginal zone lymphoma with follicular involvement. It also plays a role in separating among nodular lymphocyte predominant Hodgkin lymphoma, lymphocyte-rich classic Hodgkin lymphoma, and T-cell/histiocyte-rich B-cell lymphoma in combination with other B-cell and T-cell markers.

Lymph Node					
	CD21/CD35	CD68	S-100	CD1a	Lysozyme
Reactive Histiocytosis	-	+	-	-	+
Langerhans Histiocytosis	-	+	+	+	+
Sinus Histiocytosis with Massive Lymphadenopathy	-	+	+	-	+
Follicular Dendritic Cell Sarcoma	+	-	-	+/-	-
Dermatopathic Lymphadenitis	-	-	+	+	+

Reference

1. Dillon KM, et al. J Clin Pathol. 2002 Oct; 55(10):791-4.
2. Pileri SA, et al. Histopathology. 2002; 41:1-29.
3. Kunihiko Maeda, et al. J Histochem Cytochem. 2002; 50:1475-1485.
4. Herrmann LM, et al. Am J Pathol. 2003; 162:1075-1081.
5. Biddle DA, et al. Modern Pathology. 2002; 15:50-58.



CD23 (1B12)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45178	IMPATH CD23 RTU M (1B12)	50 Tests
44229	CD23 RTU M (1B12)	7 ml Ready To Use
44480	CD23 0,1 M (1B12)	100 µl liquid Concentrated
44481	CD23 1 M (1B12)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/K

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

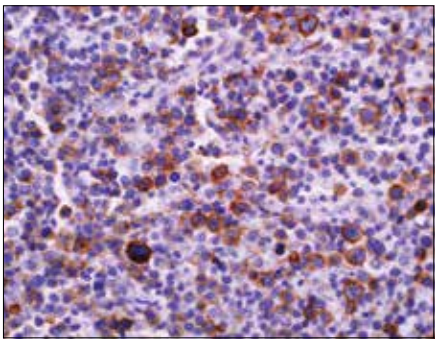
Product Description

Anti-CD23 is a B-cell antibody that is useful in differentiating between small lymphocytic lymphoma/chronic lymphocytic leukemia (anti-CD23 immunoreactive) from mantle cell lymphoma and follicular lymphoma (immunonegative). This antibody reacts with the antigen that is found on a subpopulation of peripheral blood cells, B-lymphocytes, and on EBV transformed B-lymphoblastoid cell lines. Anti-CD23 recognizes follicular dendritic cell meshwork and follicular dendritic sarcoma.

B-cell Lymphomas										
	CD23	TCL1	CD20	BCL2	BCL6	CD10	MUM1	Cyclin D1	CD5	TRAcP
Follicular	-	+	+	+	+	+	-	-	-	-
CLL/SLL	+	+	+	+	-	-	+	-	+	-
Mantle Cell	-	+	+	+	-	-	-/+	+	+	-
Marginal Zone	-	-	+	+	-	-	+	-	-	+/-
Lymphoplasmacytic	-	+	+	+	-	-	+	-	-	-
Diffuse Large Cell	-	+	+	+	+	-/+	+	-	-/+	-
Burkitt	-	+	+	-	+	+	-	-	-	-
Hairy Cell Leukemia	-	+	+	+	-	-		+(weak)/-	-	+

Reference

1. Kaiserlian D, et al. Immunology. 1993; 80:90-95.
2. Aubry JP, et al. Oxford Univ Press-Oxford, NY, Tokyo. 1987; 417-419.
3. Pallesen G. Oxford Univ Press-Oxford, NY, Tokyo 1987; 383-386.
4. Pezzella F, et al. Br j Haematol. 2000 Feb; 108(2):369-76.
5. Kurtin PJ, et al. Am J Clin Pathol. 1999 Sep; 112(3):319-29.
6. West RB, et al. Am J Clin Pathol. 2002 Apr; 117(4):636-43.



CD25 (4C9)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45129	IMPATH CD25 RTU M (4C9)	50 Tests
44230	CD25 (Interleukin-2 Receptor) RTU M (4C9)	7 ml Ready To Use
44482	CD25 (Interleukin-2 Receptor) 0,1 M (4C9)	100 µl liquid Concentrated
44483	CD25 (Interleukin-2 Receptor) 1 M (4C9)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Lesions of Mastocytosis
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

According to the World Health Organization classification system, the major diagnostic criterion for bone marrow involvement by systemic mastocytosis (SM) is the presence of dense aggregates (>15 cells) of mast cells. Expression of CD25, a low-affinity receptor for interleukin-2 (IL-2), affords a reliable diagnostic means for distinguishing neoplastic mast cell aggregates from reactive proliferations, and has therefore recently become a criterion for the diagnosis of SM combined with CD2 positivity. Anti-CD25 is therefore suggested as the “marker of choice” for cases of suspected systematic mastocytosis. Therefore, aberrant staining of mast cell clusters by anti-CD25 in tissue is essentially diagnostic of SM. Anti-CD25 has also been useful in identifying mast cells in skin biopsies in the setting of urticaria pigmentosa, which is associated with SM.

B-cell Lymphomas

	CD25	CD45	CD20	CD79a	BCL2	T-bet	TRAcP	Annexin A1	CD43
Hairy Cell Leukemia	+	+	+	+	+	+	+	+	-

T-cell Lymphomas

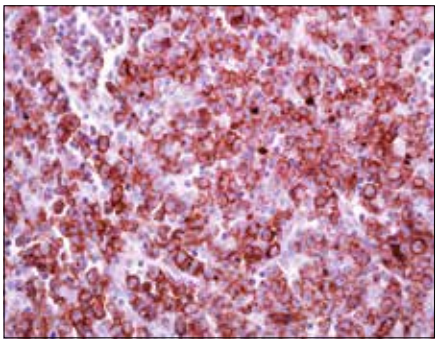
	CD25	CD2	CD3	CD4	CD5	CD7	CD8	CD45RO	PD-1	Granzyme B
Angioimmunoblastic	+	+	+	+	+	+	-	+	+	-
Lymphoblastic	+	+/-	+	+/-	+	+	+/-	+	-	+/-
Subcutaneous Panniculitis-Like	-	+	+	-	+	+	+/-	+	-	+
NK	+	+	+	-	-	-/+	-	+	-	+
Cutaneous	-	+	+	+	-	+	-	-	-/+	+
Peripheral, NOS	+	+	+	+/-	+/-	+/-	-/+	+	-	-/+
Mycosis Fungoides	+	+	+	+	+	-	-	+	-	+/-

Mastocytosis

	CD25	Tryptase	CD117	CD163	CD2
Systemic Mastocytosis	+	+	+	-	+
Mastocytic Leukemia	+	+	+	-	+
Reactive Mast Cells	-	+	+	+	-

Reference

1. Hahn HP, Hornick JL. Am J Surg Pathol. 2007 Nov; 31(11):1669-76.
2. Hollmann TJ, Brenn T, Hornick JL. Am J Surg Pathol. 2008 Jan; 32(1):139-45.
3. Miracco C, et al. Oncol Rep. 2007 Nov; 18(5):1115-22.



CD30 (Ber-H2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45180	IMPATH CD30 RTU M (Ber-H2)	50 Tests
44232	CD30 RTU M (Ber-H2)	7 ml Ready To Use
44486	CD30 0,1 M (Ber-H2)	100 µl liquid Concentrated
44487	CD30 1 M (Ber-H2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Classic Hodgkin Lymphoma, Lymphoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD30 detects a formalin-resistant epitope that is expressed by Reed-Sternberg cells in classic Hodgkin lymphoma, the majority of anaplastic large cell lymphomas, primary cutaneous CD30 positive T-cell lymphoproliferative disorders, and in embryonal carcinomas. Occasionally diffuse large B-cell lymphoma stains with this antibody. This antibody also stains plasma cells in paraffin-embedded tissue. However, reactive immunoblasts are immunoreactive with this antibody. The staining pattern of anti-CD30 in lymphoma or embryonal carcinoma is different, with the former being membranous and exhibiting Golgi zone accentuation in location, and the latter being membranous only.

Hodgkin vs. Non-Hodgkin Lymphomas

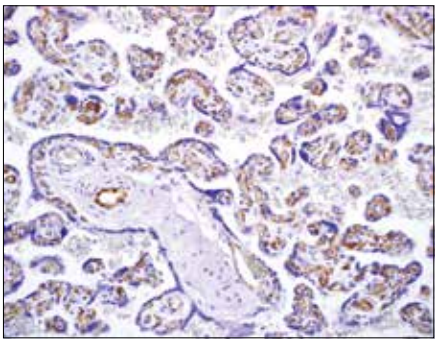
	CD30	CD79a	CD15	Fascin	Granzyme B	BCL6	PU.1	MUM1	ALK-1	EMA
Hodgkin Lymphoma, Classic	+	-	+	+	-	-	-	+	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	-	+	-	-	-	+	+	-/+	-	+
T-cell Rich LBCL	-	+	-	-	-	+	-	+	-	-
Anaplastic Large Cell Lymphoma	+	-	-	-	+	+/-	-	-	+	+

Germ Cell Tumors

	CD30	Oct-4	AFP	Vimentin	EMA	Inhibin	hPL	Glypican-3	CD117	PLAP
Seminoma	-	+	-	+	-	-	-	-	+	+
Embryonal Carcinoma	+	+	-	-	-	-	-	-	-	+
Choriocarcinoma	-	-	-	-/+	+	-	+	+	-	+
Yolk Sac Tumor	-	-	+	-	-	-	-	+	-	+
Granulosa Cell Tumor	-	-	-	+	-	+	-	-	-	-
Hypercalcaemic Small Cell Carcinoma	-	-	-	-	+	-	-	-	-	-

Reference

1. Schwarting R, et al. Blood. 1989; 74:1678-1689.
2. Fonatsch C, et al. Genomics. 1992; 14:825-826.
3. Piris J, et al. Histopathology. 1990; 17:211-218.
4. George DH, et al. Am J Surg Pathol. 2003 Apr; 27(4):487-93.
5. Hedvat CV, et al. Hum Pathol. 2002 Oct; 33(10):968-74.



CD31 (JC70)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45181	IMPATH CD31 RTU M (JC70)	50 Tests
44233	CD31 RTU M (JC70)	7 ml Ready To Use
44488	CD31 0,1 M (JC70)	100 µl liquid Concentrated
44489	CD31 1 M (JC70)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD31 is expressed by stem cells of the hematopoietic system and is primarily used to identify and concentrate these cells for experimental studies as well as for bone marrow transplantation. Endothelial cells also express this marker, therefore, antibodies to CD31 have been used as a tool to identify the vascular origin of neoplasms. Anti-CD31 has shown to be highly specific and sensitive for vascular endothelial cells. Staining of nonvascular tumors (excluding hematopoietic neoplasms) has not been observed with this antibody.

Skin: Spindle Cell Tumors

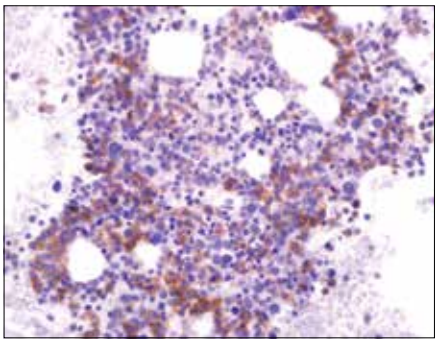
	CD31	FLI-1	Factor VIII	HHV-8	SM Actin	MS Actin	Collagen IV	D2-40	NGFR	CD10
Squamous Cell Carcinoma	-	-	-	-	-	-	-	+	-	-
Spindle Cell Melanoma	-	+	-	-	-	-	-	+	+	-
Atypical Fibroxanthomas	-	-	-	-	+	+	-	-	-	+
DF-SP	-	-	-	-	-	-	-	-	+	+/-
DF-FH	-	-	-	-	-	-	-	-	-	+
Peripheral Nerve Sheath	-	-	-	-	-	+	-	+	-	-
Smooth Muscle	-	-	-	-	+	+	-	-	-	-
Angiosarcoma	+	+	+	-	-	-	+/-	+/-	-	-
Glomus Tumor	-	-	-	-	+	+	+	-	-	-
Solitary Fibrous Tumor	-	-/+	-	-	-	-	-	-	-	-
Hemangioma	+	+	+	-	+	-	+	-	-	-
Hemangioendothelioma	+	+	-	-	-	-	-	-	-	-
Kaposi's Sarcoma	+/-	+	+	+	+	-	+/-	+	-	-

Renal Cell Carcinoma vs. Hemangioblastoma

	CD31	D2-40	FLI-1	CK Cocktail	CD10	Adipophilin
Metastatic RCC	-	-	-	+	+	-
Hemangioblastoma	+	+	+	-	-	+

Reference

1. Parums DV, et al. J Clin Pathol. 1990 Sep; 43(9):752-7.
2. De Young BR, et al. Applied Immunohistochemistry. 1993; 1:97-100.
3. Alles JU, Bosslet K. J Histochem Cytochem. 1986 Feb; 34(2):209-14.
4. Alexander-Sefre F, et al. J Clin Pathol. 2003 Oct; 56(10):786-8.



CD33 (PWS44)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45130	IMPATH CD33 RTU M (PWS44)	50 Tests
44234	CD33 RTU M (PWS44)	7 ml Ready To Use
44490	CD33 0,1 M (PWS44)	100 µl liquid Concentrated
44491	CD33 1 M (PWS44)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Acute myeloid leukemia with monocytic differentiation or with minimal differentiation, Placenta syncytiotrophoblasts
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) for AP 2-step Polymer (Universal) 12 min

**Please refer to product insert for complete protocol.*

Product Description

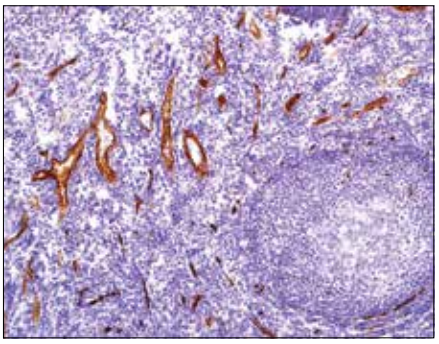
CD33 (gp67, or siglec-3) is a 67 kDa glycosylated transmembrane protein that is a member of the sialic acid–binding immunoglobulin-like lectin (siglec) family. The genomic locus of this protein has been mapped to chromosome 19q13.1-3.5. In maturing granulocytic cells, there is progressive down-regulation of CD33 from the blast stage to mature neutrophils. However, in monocytes and macrophages/histiocytes, strong expression of CD33 is maintained throughout maturation. Therefore, the positive control tissue should be bone marrow myeloid cells (especially myeloid precursors), liver Kupffer cells, lung alveolar macrophages, or placental syncytiotrophoblasts. Detection of CD33 using monoclonal antibodies has been a critical component in immunophenotyping acute leukemias, particularly acute myeloid leukemias. This anti-CD33 may be particularly advantageous for cases of acute myeloid leukemia, minimally differentiated (AML-M0) and acute monocytic leukemia (AML-M5), in which other paraffin section markers of myeloid differentiation (such as anti-myeloperoxidase) may be negative. However, anti-CD33 staining cannot be used in isolation and must be correlated with other myeloid and lymphoid markers because cases of myeloid antigen–positive acute lymphoblastic leukemia may show bona fide CD33 expression.

Neoplasms

	CD33	CD34	CD117	CD71	CD163	MPO
AML with Minimal Differentiation	+	+	+	-	-	-/+
AML without Differentiation	+	+	+	-	-	-/+
AML with Maturation	+	+	+	-	-	+
APL	+	-	+	-	-	+
Acute Myelomonocytic Leukemia	+	+/-	+/-	-	+	+/-
Acute Monoblastic and Monocytic Leukemia	+	+/-	+/-	-	+	-/+
Acute Erythroid Leukemia	+	-	+/-	+	-	-
Acute Megakaryoblastic Leukemia	+/-	-	-	-	-	-
B-lymphoblastic Leukemia/ Lymphoma	-/+	+/-	-	-	-	-
T-lymphoblastic Leukemia/ Lymphoma	+/-	+/-	-	-	-	-

Reference

1. Crocker PR, et al. Biochem Soc Symp. 2002; 69:83-96.
2. Braylan RC, et al. Cytometry. 2001; 46:23-27.
3. Chang H, et al. Leuk Res. 2004; 28:43-48.



CD34 (QBEnd/10)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45131	IMPATH CD34 RTU M (QBEnd/10)	50 Tests
44235	CD34 RTU M (QBEnd/10)	7 ml Ready To Use
44492	CD34 0,1 M (QBEnd/10)	100 µl liquid Concentrated
44493	CD34 1 M (QBEnd/10)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Placenta, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) for AP 2-step Polymer (Universal) 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD34 recognizes a cell surface antigen of approximately 110 kD that is expressed selectively on human hematopoietic progenitor cells, including myeloid and lymphoid lineage progenitors. It is a marker of choice for identifying and counting the blasts in acute myeloid leukemia. In addition, this marker is expressed by soft tissue tumors, such as solitary fibrous tumor and gastrointestinal stromal tumor. CD34 expression is also found in vascular endothelium. Additionally, it appears that proliferating endothelial cells express this molecule in greater amounts than non-proliferating endothelial cells. Anti-CD34 labels > 85% of angiosarcoma and Kaposi's sarcoma, but shows low specificity.

Soft Tissue Sarcoma

	CD34	CK Cocktail	EMA	MS Actin	TLE-1	S-100	CD99	CD56	Calretinin
Epithelioid Sarcoma	+	+	+	-/+	-	-	-	-	-
Myxoid Chondrosarcoma	-/+	-	-	-	-	+/-		-	+
Synovial Sarcoma	-	+	+	-	+	-	+/-	+	+/-

Skin: Spindle Cell Tumors

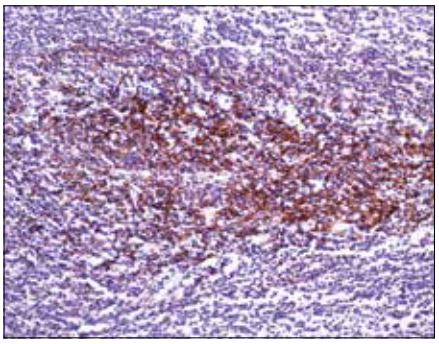
	CD34	FLI-1	GLUT1	BG8	Factor VIII	HHV-8	CK 8 & 18	NGFR	Collagen IV	CD99
DFSP	+	-	-	-	-	-	-	+	-	-
Angiosarcoma	+	+	-	-	+	-	-	-	+/-	-
Solitary Fibrous Tumor	+	-/+	-	-	-	-	-	-	-	+/-
Hemangioma	+	+	+	+	+	-	-	-	+	-
Hemangioendothelioma	+	+	-	-	-	-	+	-	-	-
Kaposi's Sarcoma	+	+	-	-	+	+	-	-	+/-	-

Epithelioid Cell Neoplasms

	CD34	INI-1	EMA	FLI-1	Desmin	GLUT1	Claudin 1	MS Actin	SM Actin	CD56
Epithelioid Sarcoma	+	+	+	-	+	+	+	+	-	-
Epithelioid Angiosarcoma	+	+	-	+	-					
GIST	+	-	-	-	-	-		-	-	-

Reference

1. Civin CL, et al. London Academic Press. 1989; 818-825.
2. Fina L, et al. Blood. 1990; 75:2417-2426.
3. Sankey EA, et al. J Pathol. 1990; 43:752-757.
4. Ramani P, et al. Histopathology. 1990; 17:237-242.



CD35 (RLB25)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45182	IMPATH CD35 RTU M (RLB25)	50 Tests
44236	CD35 RTU M (RLB25)	7 ml Ready To Use
44494	CD35 0,1 M (RLB25)	100 µl liquid Concentrated
44495	CD35 1 M (RLB25)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

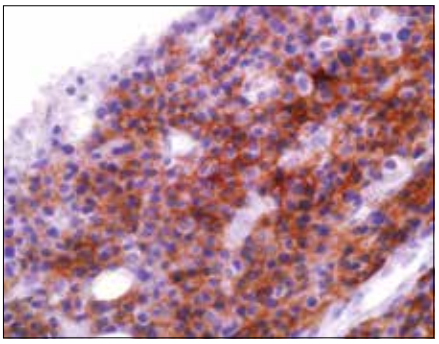
CD35, complement receptor 1, is a cell membrane-bound, monomeric glycoprotein on numerous cell types including erythrocytes, leukocytes, glomerular podocytes, and follicular dendritic cells. The primary function of CD35 is to serve as the cellular receptor for C3b and C4b, the most important components of the complement system leading to clearance of foreign macromolecules. The Knops blood group system is a system of antigens located on this protein. The protein mediates cellular binding to particles and immune complexes that have activated complement.

Follicular dendritic cells (FDC) are restricted to the B-cell regions of secondary lymphoid follicles. They are CD21+/CD35+/CD1a-. Anti-CD35 labels follicular dendritic cells and follicular dendritic cell sarcoma.

Lymph Node					
	CD21/CD35	CD68	S-100	CD1a	Lysozyme
Reactive Histiocytosis	-	+	-	-	+
Langerhans Histiocytosis	-	+	+	+	+
Sinus Histiocytosis with Massive Lymphadenopathy	-	+	+	-	+
Follicular Dendritic Cell Sarcoma	+	-	-	+/-	-
Dermatopathic Lymphadenitis	-	-	+	+	+

Reference

1. Dillon KM, et al. J Clin Pathol. 2002 Oct; 55(10):791-4.
2. Pileri SA, et al. Histopathology. 2002; 41:1-29.
3. Kunihiko Maeda, et al. J Histochem Cytochem. 2002; 50:1475-1485.
4. Chan AC, et al. histopathology. 2001 Jun; 38(6):510-8.
5. Biddle DA, et al. Modern Pathology. 2002; 15:50-58.
6. Cheuk W, et al. Am J Surg Pathol. 2001 Jun; 25(6):721-31.
7. Chang KC, et al. J Pathol. 2003 Nov; 201(3):404-12.



CD38 (SP149)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45276	IMPATH CD38 RTU R (SP149)	50 Tests
44237	CD38 RTU R (SP149)	7 ml Ready To Use
44496	CD38 0,1 R (SP149)	100 µl liquid Concentrated
44497	CD38 1 R (SP149)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Bone marrow, Lymph node, Plasma cell myeloma, Plasma Cells
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD38 is a very useful immunostaining marker, when combined with antibodies against CD138, MUM1, and EMA in a panel, for the diagnosis of immunodeficiency-related lymphomas, which usually include plasmablastic lymphoma, primary effusion lymphoma, and large B-cell lymphoma arising in HHV8-associated multicentric Castleman disease. Such immuno-deficiency-related lymphomas are either pan-B-cell-marker negative or only weakly positive. Furthermore, IHC detection of plasma cells by anti-CD38 immunohistochemical staining on a bone marrow trephine biopsy is necessary to obtain the accurate counts of malignant plasma cells needed to make a definitive diagnosis given that malignant plasma cell counts are difficult to obtain due to sub-optimal bone marrow aspiration, frequent focal distribution of myeloma cells in bone marrow, and loss of neoplastic plasma cells when manual processing is being performed. Recent studies have demonstrated that anti-CD38, combined with anti-CD44 (negative) and/or anti-TCL1 (positive), is useful in identifying the cases of large B-cell lymphoma with cMYC gene rearrangement (respective sensitivity of 82% and 77%; respective specificity of 100% and 100%). Therefore, anti-CD38 is very important in differential diagnosis of anti-CD20-positive, anti-TdT/anti-cyclin D1-negative diffuse large-to-medium-sized B-cell neoplasms, including diffuse large B-cell lymphoma, Burkitt lymphoma, and B-cell lymphoma, unclassifiable, with features intermediate between DLBCL and Burkitt lymphoma.

Lymphoma

	CD38	CD138	MUM1	CD20	PAX-5	CD45	CD79a	CD30	EMA	HHV-8
Plasmablastic Lymphoma	+	+	+	-	-	-	+	+	+	-
Primary Effusion Lymphoma	+	+	+	-	-	+	-	+	+	+
Large B-cell Lymphoma arising in HHV8-associated Multicentric Castleman Disease	-/+	-		+/-		+	-			+
Extranodal Marginal Zone Lymphoma with Plasmacytoid Differentiation	+	+	+	-	-	+	+			

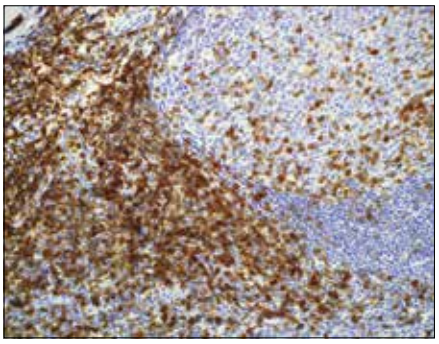
Lymphoma

	CD38	CD44	TCL1	CD10	BCL2
Large B-cell Lymphoma with c-Myc Rearrangement	+	-	+	+	-/+
Large B-cell Lymphoma with no c-Myc Rearrangement	-	+	-/+	+/-	+

Reference

1. Martin F, Kearney JF. Nat Rev Immunol. 2002; 2:323-335.

A.MENARINI diagnostics



CD43 (MT1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45183	IMPATH CD43 RTU M (MT1)	50 Tests
44239	CD43 RTU M (MT1)	7 ml Ready To Use
44500	CD43 0,1 M (MT1)	100 µl liquid Concentrated
44501	CD43 1 M (MT1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil, Lymph Node
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

The literature indicates that from 70% to 90% of T-cell lymphomas and from 22% to 37% of B-cell lymphomas express CD43. No reactivity has been observed with reactive B-cells. So a B-lineage population that co-expresses CD43 is highly likely to be a malignant lymphoma, especially a low grade lymphoma, rather than a reactive B-cell population. When anti-CD43 is used in combination with anti-CD20, effective immunophenotyping of the lymphomas in paraffin-embedded tissue sections can be obtained. Co-staining of a lymphoid infiltrate with anti-CD20 and anti-CD43 argues against a reactive process and favors a diagnosis of lymphoma.

Lymphoma

	CD43	CD20	CD45R	CD45RO	CD3
Mature B-cell	-	+	+	-	-
Mature T-cell	+	-	-	+	+

Acute Myeloid Leukemia

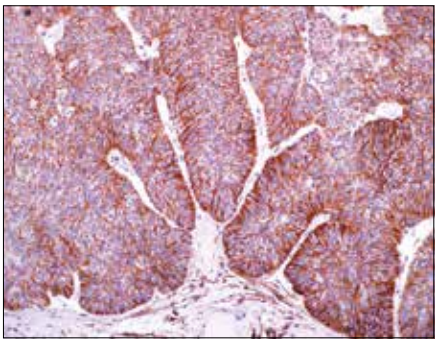
	CD43	MPO	CD68	Factor VIII	CD61	BOB.1	Oct-2	Glyco-phorin A	CD71	CD34
Acute Myeloid, M0	+	-	-	-	-	-	-	-	-	+
Acute Myeloid, M1&2	+	+	+	-	-			-	-	+
Promyelocytic, M3	+	+	-	-	-	+	+	-	-	-
Myelomonocytic, M4	+	+	+	-	-	-	+	-	-	+
Monoblastic, M5	+	+	+	-	-	-	+	-	-	-/+
Acute Erythroid, M6	+/-	+	-	-	-	-	-	+	+	-/+
Megakaryoblastic, M7	+/-	-	-	+	+	+/-	-	-	-	-

Plasma Cells

	CD43	CD138	CD79a	EMA	MUM1	CD56	Cyclin D1	CD20	CD19
Plasma Cell Neoplasm	-	+	+	+	+	+	-/+	-/+	-

Reference

1. Cabecades JM, et al. Histopathology. 1991; 19:419-424.
2. Strickler JG, et al. Hum Pathol. 1987; 18:808-814.
3. Sheibani K, et al. Hum Pathol. 1987; 18:1051-1062.
4. Chan JKC, et al. Histopathology. 1988; 12:461-480.
5. Arber DA, et al. App Immunohistochem. 1993; 1:88-96.



CD44 (MRQ-13)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45184	IMPATH CD44 RTU M (MRQ-13)	50 Tests
44240	CD44 RTU M (MRQ-13)	7 ml Ready To Use
44502	CD44 0,1 M (MRQ-13)	100 µl liquid Concentrated
44503	CD44 1 M (MRQ-13)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Benign Urothelium
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Enzyme 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

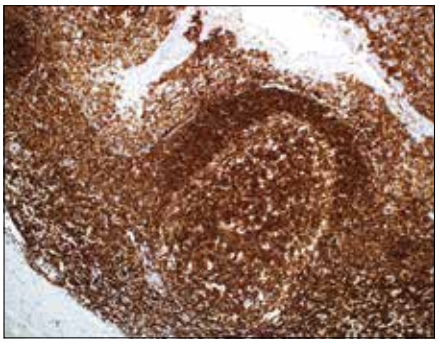
The CD44 family of glycoproteins exists in a number of variant isoforms, the most common being the standard 85-95 kD or hematopoietic variant (CD44s) that is found in mesodermal cells such as hematopoietic, fibroblastic, and glial cells, as well as in some carcinoma cell lines. Higher molecular weight isoforms have been described in epithelial cells (CD44v) and are thought to function in intercellular adhesion and stromal binding. While many human tumors express CD44, a positive correlation between increased CD44v expression and tumor progression and/or dedifferentiation has been demonstrated in only some. Probably the most practical application of anti-CD44 immunostaining at present is the discrimination of urothelial transitional cell carcinoma in-situ from non-neoplastic changes in the urothelium.

Bladder: Dysplasia vs. Reactive

	CD44	CK 20	p53	Ki-67
Carcinoma in-situ	-	+	+	+
Reactive Atypia	+(all cell layers)	-	-	+
Normal Urothelium	+(umbrella cells)	+(umbrella cells)	-	-

Reference

1. Abbasi AM, et al. Eurpoean Journal of Cancer. 1993; 29A:294.
2. Chuang CK, Liao SK. Anticancer Res. 2003 Nov-Dec; 23(6C):4635-9.
3. East JE, Hart IR. European Journal of Cancer. 1993; 29A:1921-22.
4. Ekici S, et al. Journal of Urology. 2002; 167:2037-41.
5. Gadalla HA, et al. BJU Int. 2004 Jan; 93(1):151-5.



CD45 (LCA) (2B11 & PD7/26)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45185	IMPATH CD45 RTU M (2B11 & PD7/26)	50 Tests
44241	CD45 RTU M (2B11 & PD7/26)	7 ml Ready To Use
44504	CD45 0,1 M (2B11 & PD7/26)	100 µl liquid Concentrated
44577	CD45 1 M (2B11 & PD7/26)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Lymphoma, Tonsil, Lymph Node
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/K

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

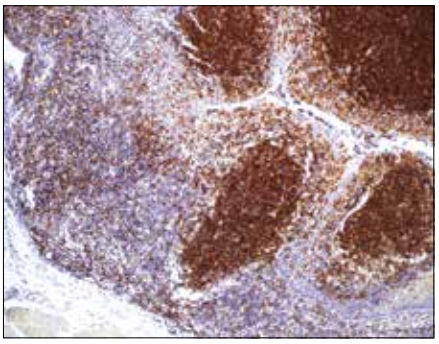
Anti-CD45 (Anti-Leukocyte Common Antigen) is routinely used to aid the differential diagnosis of undifferentiated neoplasms, whenever malignant lymphoma is suspected by the morphological or clinical data. It is a highly specific antibody, therefore a positive result is highly indicative of lymphoid or myeloid origin. Certain types of lymphoid neoplasms may lack CD45 (Hodgkin lymphoma, some T-cell lymphomas, and some leukemias) so its absence does not rule out a hematolymphoid tumor. This antibody is expressed almost exclusively by cells of hematopoietic lineage and is present in most benign and malignant lymphocytes as well as plasma cell precursors.

B-cell Lymphomas	CD45	CD20	MUM1	BCL2	BCL6	CD5	CD10	CD23	Cyclin D1	TRAcP
Follicular	+	+	-	+	+	-	+	-	-	-
CLL/SLL	+	+	+	+	-	+	-	+	-	-
Mantle Cell	+	+	-/+	+	-	+	-	-	+	-
Marginal Zone	+	+	+	+	-	-	-	-	-	+/-
Lymphoplasmacytic	+	+	+	+	-	-	-	-	-	-
Diffuse Large Cell	+	+	+	+	+	-/+	-/+	-	-	-
Burkitt	+	+	-	-	+	-	+	-	-	-
Hairy Cell Leukemia	+	+		+	-	-	-	-	+(weak)/-	+

T-cell Lymphomas	CD45	CD2	CD3	CD4	CD5	CD7	CD8	CD25	CD45RO	PD-1
Angioimmunoblastic	+	+	+	+	+	+	-	+	+	+
Lymphoblastic	+	+/-	+	+/-	+	+	+/-	+	+	-
Subcutaneous Panniculitis-Like	+	+	+	-	+	+	+/-	-	+	-
NK	+	+	+	-	-	-/+	-	+	+	-
Cutaneous	+	+	+	+	-	+	-	-	-	-/+
Peripheral, NOS	+	+	+	+/-	+/-	+/-	-/+	+	+	-
Mycosis Fungoides	+	+	+	+	+	-	-	+	+	-

Reference

1. Mason DY. Am J Pathol. 1987; 128:1-4.
2. Hall PA, et al. Histopathology. 1988; 13:149-160.
3. Kurtin PJ, Pinkus GS. Hum Path. 1985; 16:353-365.
4. Maluf HM, et al. Mod Pathol. 1995; 8:155-9.



CD45R (MB1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44242	CD45R RTU M (MB1)	7 ml Ready To Use
44505	CD45R 0,1 M (MB1)	100 µl liquid Concentrated
44506	CD45R 1 M (MB1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Lymph node, tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

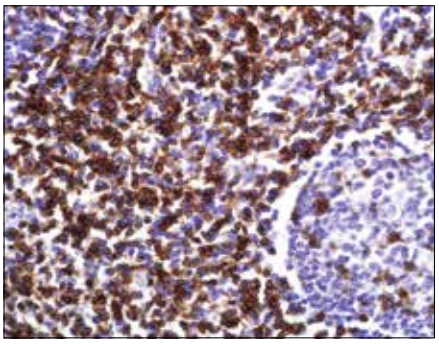
CD45R, also named MB1, is the isoform of CD45, the protein encoded by this gene is a member of the protein tyrosine phosphatase (PTP) family. PTPs are known to be signaling molecules that regulate a variety of cellular processes including cell growth, differentiation, mitotic cycle, and oncogenic transformation. This PTP contains an extracellular domain, a single transmembrane segment, and two tandem intracytoplasmic catalytic domains and thus belongs to receptor type PTP. This gene is specifically expressed in hematopoietic cells and has been shown to be an essential regulator of T- and B-cell antigen receptor signaling. CD45 functions as a phospho-tyrosine phosphatase, a vital component for efficient tyrosine phosphorylation induction by the TCR/CD3 complex. The tyrosine phosphatase activity of CD45 is contained within the conserved intracellular domain. Src and Syk family protein tyrosine kinases are utilized by the TCR/CD3 complex to initiate signaling cascades. Several members of these two families, including Lck, Fyn and Zap70, have been implicated as physiological substrates of CD45.

This antibody exhibits strong and specific reactivity with most B-lymphocytes such as follicle center cells, mantle cells, some medullary thymocytes, post-thymic naïve T-lymphocytes, and 80% of B-cell lymphomas. It is a useful marker for distinguishing B-cell lymphomas from T-cell lymphomas.

Lymphoma					
	CD45R	CD20	CD43	CD45RO	CD3
Mature B-cell	+	+	-	-	-
Mature T-cell	-	-	+	+	+

Reference

1. Hall PA, et al. J. of Clinical Pathology. 1987; 40:870-873.
2. Myskow MW, et al. American J. of Pathology. 1988; 90:564-574.
3. West KP, et al. J. of Pathology. 1986; 150:89-101.
4. Poppema S, et al. Am. J. of Pathology. 1987; 127:418-429.
5. Norton AJ, et al. Histopathology. 1986; 10:1243-1260.
6. Lauritzen AF, et al. APMIS. 1991 Jul; 99(7):631-9.
7. Sott CS, et al. Clin Exp Immunol. 1991 Dec; 86(3):500-5.
8. Master PS, et al. Int J Hematol. 1992 Jun; 55(3):235-42.
9. Shin SS, et al. Hum Pathol. 1992 Jun; 23(6):686-94.



CD45RO (UCHL-1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45132	IMPATH CD45RO RTU M (UCHL-1)	50 Tests
44243	CD45RO RTU M (UCHL-1)	7 ml Ready To Use
44507	CD45RO 0,1 M (UCHL-1)	100 µl liquid Concentrated
44508	CD45RO 1 M (UCHL-1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous, Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD45RO (Pan T-cell) reacts with thymocytes and activated T-cells, but only on a subpopulation of resting T-cells. This antibody shows no reactivity with B-cells making it a good marker for T-cell tumors. In addition, granulocytes and monocytes are also labeled with this antibody. T-cell, Pan has been designated as CD45RO at The International Leukocyte Typing Workshop.

Lymphoma

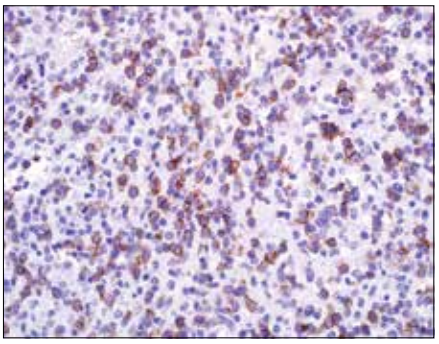
	CD45RO	CD20	CD45R	CD43	CD3
Mature B-cell	-	+	+	-	-
Mature T-cell	+	-	-	+	+

T-cell Lymphomas

	CD45RO	CD45	CD2	CD3	CD4	CD5	CD7	CD8	CD25	PD-1
Angioimmunoblastic	+	+	+	+	+	+	+	-	+	+
Lymphoblastic	+	+	+/-	+	+/-	+	+	+/-	+	-
Subcutaneous Panniculitis-Like	+	+	+	+	-	+	+	+/-	-	-
NK	+	+	+	+	-	-	-/+	-	+	-
Cutaneous	-	+	+	+	+	-	+	-	-	-/+
Peripheral, NOS	+	+	+	+	+/-	+/-	+/-	-/+	+	-
Mycosis Fungoides	+	+	+	+	+	+	-	-	+	-

Reference

1. Hall PA, et al. J Clin Path. 1987; 40:151-156.
2. Smith SH, et al. Immunology. 1986; 58:63-70.
3. Cabecadas JM, et al. Histopathology. 1991.
4. Tworek JA, et al. Am J Clin Pathol. 1998 Nov; 110(5):582-9.
5. Falini B, et al. Hum Pathol. 1990 Jun; 21(6):624-9.
6. Koch AE, et al. J Clin Immunol. 1990 Jul; 109(4):192-9.
7. Ritter JH, et al. J Cutan Pathol. 1994 Dec; 21(6):481-93.



CD56 (MRQ-42)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45186	IMPATH CD56 RTU R (MRQ-42)	50 Tests
44245	CD56 RTU R (MRQ-42)	7 ml Ready To Use
44511	CD56 0,1 R (MRQ-42)	100 µl liquid Concentrated
44512	CD56 1 R (MRQ-42)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Neuroblastoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD56 recognizes two proteins of the neural cell adhesion molecule, the basic molecule expressed on most neuroectodermally-derived tissues and neoplasms (e.g. retinoblastoma, medulloblastomas, astrocytomas, neuroblastomas, and small cell carcinomas). It is also expressed on some mesodermally-derived tumors (rhabdomyosarcoma). Anti-CD56 plays an important role in the diagnosis of nodal and nasal NK/T-cell lymphomas.

Plasma Cells

	CD56	CD138	CD79a	EMA	MUM1	Cyclin D1	CD43	CD20	CD19
Plasma Cell Neoplasm	+	+	+	+	+	-/+	-	-/+	-

Pancreatic Tumors

	CD56	Synapto-physin	Chromo-granin A	Insulin	Glucagon	Gastrin	CD10	CK 19	β-Catenin	PGP 9.5
Neuroendocrine	+	+	+	+/-	+/-	+/-	-	+/-	+	+
Solid Pseudopapillary	+	+	-	-	-	-	+	-	+	-
Pancreatoblastoma	+	-	+	-	-	-	-	-	+	-

Spindle Cell Tumors

	CD56	ALK-1	PGP 9.5	MS Actin	SM Actin	SM Myosin	CK Cocktail	Calponin	BCL2	Myogenin
Myofibroblastic Tumor	+	+	-	+	+	-	-	+	-	-
Neurofibroma	+	-	+	-	-	-	-	-	+	-
Schwannoma	+	-	-	-	-	-	-	-	+	-
Leiomyosarcoma	+	-	-	+	+	+	-/+	+	-	-

T-cell Lymphomas

	CD56	CD2	CD4	CD5	CD8	PD-1	Perforin	Granzyme B
Subcutaneous Panniculitis-Like	-	+	-	+	+/-	-	+	+
NK	+	+	-	-	-	-	+	+
Peripheral, NOS	-	+	+/-	+/-	-/+	-	-/+	-/+
Mycosis Fungoides	-	+	+	+	-	-	-	+/-

Reference

1. Gerardy-Schahn R, et al. International J of Cancer Sup. 1994; 8:38-42.

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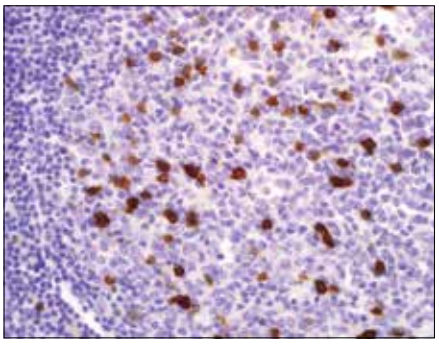


CD57 (NK-1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45134	IMPATH CD57 RTU M (NK-1)	50 Tests
44246	CD57 RTU M (NK-1)	7 ml Ready To Use
44513	CD57 0,1 M (NK-1)	100 µl liquid Concentrated
44514	CD57 1 M (NK-1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgM/K

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD57 (anti-NK-1) marks a subset of lymphocytes known as natural killer (NK) cells. Follicular center cell lymphomas often contain many NK cells within the neoplastic follicles. Anti-CD57 also stains neuroendocrine cells and their derived tumors, including carcinoid tumor and medulloblastoma. Anti-CD57 can also be useful in separating type B3 thymoma from thymic carcinoma when combined with a panel that includes antibodies against GLUT1, CD5, and CEA.

Thymus

	CD57	CK 5&6	Mesothelin	MOC-31	CEA	CD117	CD5	GLUT1
Thymic Carcinoma	+	+	-	-/+	+	-	+	+
Thymoma	+/-	-/+	+	+	-	+	-	-

Neuroid Skin Lesions

	CD57	S-100	Myelin BP	GFAP
Neuroma	+	+	+	-
Neurotised Nevi	-	+	-	-
Neurofibroma	+	+	+	-

T-cell Lymphomas

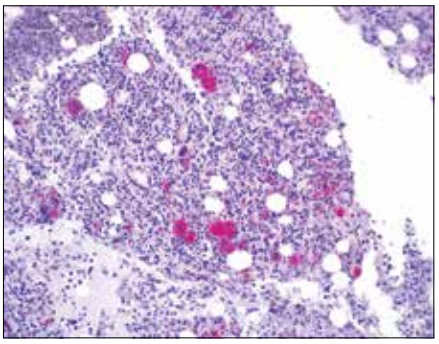
	CD57	CD2	CD3	CD4	CD5	CD7	CD25	CD45RO	Perforin	Granzyme B
NK-Type	+/-	+	+	-	-	+	+	+	-	+
Peripheral	-	+	+	+	+	-	+	+	-	-

Small, Round Blue Cell Tumors

	CD57	PGP 9.5	SM Actin	CK Cocktail	CD99	FLI-1	WT1	Vimentin	INI-1
Neuroblastoma	+	+	-	-	-	-	-	+	+
Embryonal Carcinoma	+	+	-	+	-	-	-	-	+
PNET/ES	+	+	-	-/+	+	+	-	+	+
DSRCT	+/-	-	-	+	-	+	+	+	+
Medulloblastoma	+		-	-	-	-		-	+

Reference

1. Lanier LL, et al. Journ of Immun. 1983; 131(4):1789-1796.
2. Ritchie AW, James K, Micklem HS. Clin and Exp Imm. 1983; 51(3):439-447.



CD61 (2f2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45135	IMPATH CD61 RTU M (2f2)	50 Tests
44247	CD61 RTU M (2F2)	7 ml Ready To Use
44515	CD61 0,1 M (2F2)	100 µl liquid Concentrated
44516	CD61 1 M (2F2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Bone Marrow
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD61 is the human integrin beta chain beta 3 protein (ITGB3). Integrins are integral cell-surface proteins composed of an alpha chain and a beta chain. A given chain may combine with multiple partners resulting in different integrins. Integrin beta 3 is found along with the alpha IIb chain in platelets. Integrins are known to participate in cell adhesion as well as cell-surface mediated signaling. The integrin beta 3 chain of the vitronectin receptor and GPIIb/IIIa complex is a 90-110 kDa glycoprotein polypeptide which is expressed on platelets, megakaryocytes, macrophages, osteoclasts, and synovial lining cells. Integrin alpha-IIb/beta-3 recognizes the sequence H-H-L-G-G-G-A-K-Q-A-G-D-V in fibrinogen gamma chain. Following activation, integrin alpha-IIb/beta-3 brings about platelet/platelet interaction through binding of soluble fibrinogen. This step leads to rapid platelet aggregation which physically plugs ruptured endothelial surface. In case of HIV-1 infection, the interaction with extracellular viral Tat protein seems to enhance angiogenesis in Kaposi's sarcoma lesions.

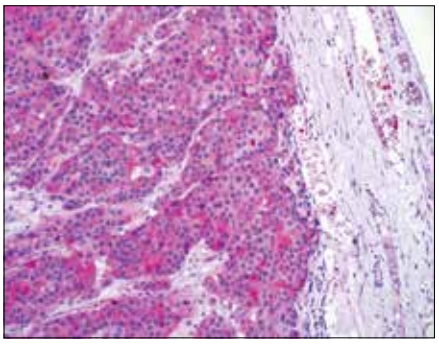
This antibody is useful in evaluating the number of megakaryocytes, size, nuclear lobation, and the presence of obviously abnormal forms and micromegakaryocytes in myelodysplastic syndrome, acute myeloid leukemia with multilineage dysplasia, acute megakaryoblastic leukemia, and myeloproliferative neoplasms.

Acute Myeloid Leukemia

	CD61	MPO	CD68	Factor VIII	Lysozyme	BOB.1	Oct-2	Glyco-phorin A	CD34	CD138
Acute Myeloid, M0	-	-	-	-	+	-	-	-	+	+
Acute Myeloid, M1&2	-	+	+	-	+			-	+	+
Promyelocytic, M3	-	+	-	-	-	+	+	-	-	
Myelomonocytic, M4	-	+	+	-	+	-	+	-	+	
Monoblastic, M5	-	+	+	-	+	-	+	-	-/+	
Acute Erythroid, M6	-	+	-	-		-	-	+	-/+	+
Megakaryoblastic, M7	+	-	-	+		+/-	-	-	-	-

Reference

1. Thiele J, et al. Eur J Haematol. 1990; 44:63-70.
2. Thiele J, et al. Virchows Archiv B Cell Pathol. 1990; 58:295-302.
3. Goldman BI, et al. Modern Pathology. 2001; 14:589-594.
4. Fox SB, et al. 1990 Jul; 17(1):69-74.
5. Duperray A, et al. Blood. 1989 Oct; 74(5):1603-11.
6. Campana D, et al. Leukemia. 1990 Sep; 4(9):620-4.
7. Thiele J, et al. Anal Quant Histol. 1990 Aug; 12(4):285-9.



CD63 (NKI/C3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45136	IMPATH CD63 RTU M (NKI/C3)	50 Tests
44248	CD63 RTU M (NKI/C3)	7 ml Ready To Use
44517	CD63 0,1 M (NKI/C3)	100 µl liquid Concentrated
44518	CD63 1 M (NKI/C3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Melanoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/K

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

Please refer to product insert for complete protocol.

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

Please refer to product insert for complete protocol.

Product Description

This antibody reacts with a 53 kDa protein which forms a part of the family of tetraspan moieties. The antigen was originally designated as a lysosomal membrane protein characterized as an activation dependent platelet surface antigen. In fact the CD63 antigen has a diverse distribution on the surface and in the cytoplasm of many cell types including lymphoid, myeloid, endothelial cells, and melanoma. It has been quite useful in identifying malignant melanoma. It has also been reported as useful in differentiating renal oncocytoma (apical and/or polar staining pattern) from eosinophilic renal cell carcinoma (diffuse cytoplasmic staining pattern). CD63 is well expressed in tissue mast cells in the lung, skin, and bone marrow. It can be overexpressed on the surface of neoplastic mast cells in aggressive systemic mastocytosis although it is less expressed in indolent systemic mastocytosis.

Normal Melanocytes, Benign and Malignant Melanotic Neoplasia

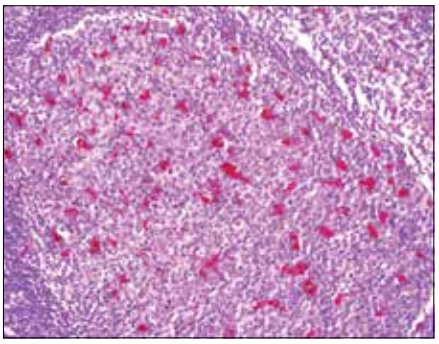
	CD63	S-100	SOX-10	HMB-45	MART-1	Tyrosinase	MiTF	Factor XIIIa
Adult Melanocytes	+	+	+	-	+	+	+	-
Junctional Nevus	-	+	+	+	+	+	+	-
Interdermal Nevus	-	+	+	-	+	+	+	-
Primary Melanoma	+	+	+	+	+	+	+	-
Metastatic Melanoma	+	+	+	+	+	+	+	-
Spindle Cell Melanoma	+	+	+	+	+	+	+	-
Angiomyolipoma	+	+	+	+	+	-	+	-
Adrenal Cortical	-	+	-	-	+	-	-	-
Intranodal Nevus Cells	-	+	+	-	+	+	+	-
Dermatofibroma	-	-	-	-	-	-	-	+

PEComa

	CD63	HMB-45	MART-1	S-100	Tyrosinase	SM Actin	Calponin	Caldesmon	Desmin	CD68
Angiomyolipoma	+	+	+	-	-	+	+	+	-	+
Lymphangiomyomatosis	+	+	+	-	-	+	+	+	-	-
Extrapulmonary Clear Cell Tumor	+	+	+	+	-	+	-	-	-	-
Primary Cutaneous PEComa	+	+	+	-	-	-	-	-	-	+/-
Pulmonary Clear Cell Sugar Tumor	+	+	+	+/-	-	-	-	-	-	+/-

Reference

1. Azorsa DO, Hyman JA, Hildreth JE. Blood. 1991 Jul 15; 78(2):280-4.



CD68 (Kp-1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45187	IMPATH CD68 RTU M (Kp-1)	50 Tests
44249	CD68 RTU M (KP-1)	7 ml Ready To Use
44519	CD68 0,1 M (KP-1)	100 µl liquid Concentrated
44520	CD68 1 M (KP-1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD68 marks cells of monocyte/macrophage lineage. This antibody is capable of staining monocytes, Kupffer cells, osteoclasts, granulocytes and their precursors; lymphomas are negative or show few granules. This antibody may be useful for the identification of myelomonocytic and histiocytic tumors. Since this detects a formalin-resistant epitope that may be associated with lysosomal granules, other lysosome-rich cells may also stain.

Acute Myeloid Leukemia

	CD68	MPO	Factor VIII	CD61	Lysozyme	BOB.1	Oct-2	Glyco-phorin A	CD34	CD138
Acute Myeloid, M0	-	-	-	-	+	-	-	-	+	+
Acute Myeloid, M1&2	+	+	-	-	+			-	+	+
Promyelocytic, M3	-	+	-	-	-	+	+	-	-	
Myelomonocytic, M4	+	+	-	-	+	-	+	-	+	
Monoblastic, M5	+	+	-	-	+	-	+	-	-/+	
Acute Erythroid, M6	-	+	-	-		-	-	+	-/+	+
Megakaryoblastic, M7	-	-	+	+		+/-	-	-	-	-

Lymph Node

	CD68	S-100	CD1a	Lysozyme	CD21/CD35	PD-1
Reactive Histiocytosis	+	-	-	+	-	-
Langerhans Histiocytosis	+	+	+	+	-	-
Sinus Histiocytosis with Massive Lymphadenopathy	+	+	-	+	-	-
Follicular Dendritic Cell Sarcoma	-	-	+/-	-	+	-
Dermatopathic Lymphadenitis	-	+	+	+	-	-

Histiocytic Neoplasia

	CD68	CD45	CD4	Lysozyme	CD163	Factor XIIIa	CD20	CD3
Histiocytic Neoplasia	+	+	+	+	+	+	-	-

Reference

1. Facchetti F, et al. Histopathology. 1991; 19:141-5.
2. Ruco LP, et al. Am J Clin Pathol. 1989; 92:273-9.

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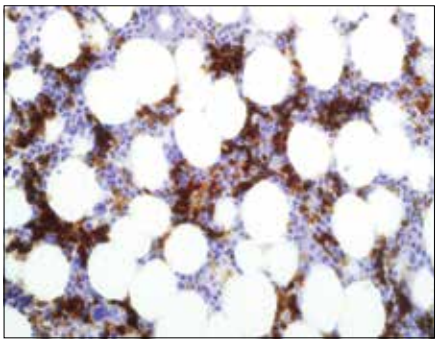


CD71 (MRQ-48)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45189	IMPATH CD71 RTU M (MRQ-48)	50 Tests
44251	CD71 RTU M (MRQ-48)	7 ml Ready To Use
44523	CD71 0,1 M (MRQ-48)	100 µl liquid Concentrated
44524	CD71 1 M (MRQ-48)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Bone Marrow
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

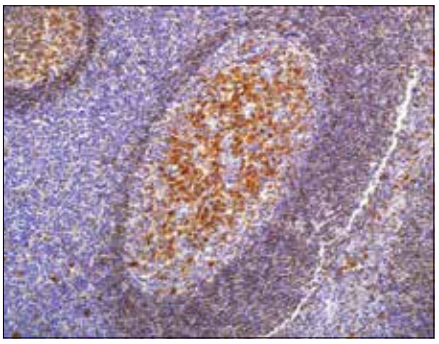
Product Description

The transferrin receptor (CD71) is most highly expressed on placental syncytiotrophoblasts, myocytes, basal keratinocytes, hepatocytes, endocrine pancreas, spermatocytes, and erythroid precursors. The level of transferrin receptor expression is highest in early erythroid precursors through the intermediate normoblast phase, after which expression decreases through the reticulocyte phase. The maturation of erythrocytes results in loss of transferrin receptor expression, in concert with downregulation of the machinery for hemoglobin synthesis. The high level of transferrin receptor within erythroid precursors makes anti-CD71 an excellent marker for evaluation of erythroid precursors within bone marrow biopsy specimens and shows the following features: 1) distinct membranous and cytoplasmic staining pattern, which is easily recognized in bone marrow biopsy; 2) restriction to erythroid lineage within bone marrow biopsy specimens; 3) CD71 expression decreases with the maturation of erythrocytes, with the highest level seen in early forms and the lowest level in late normoblast stage, and most importantly; 4) mature erythrocytes do not express CD71, which facilitates bone marrow analyses. Anti-CD71 is useful in identifying erythroid precursors with very little interference from mature erythrocytes and also in the determination of erythroid leukemia, benign erythroid proliferative disorders, and myelodysplastic syndrome, although further studies are needed for making a definitive diagnosis of myelodysplastic syndrome.

Erythroid				
	CD71	Glycophorin A	Hemoglobin A	Spectrin
Erythroid Hyperplasia	+	+	+	+
Erythroid Hypoplasia	+	+	+	+
Acute Erythroid Leukemia	+	+	+	+
Extramedullary Hematopoiesis	+	+	+	+
Mature Erythrocytes	-	+	+	+

Reference

1. Ponka P, et al. Int J Biochem Cell Biol. 1999; 31:1111-1137.
2. Sieff C, et al. Blood. 1982; 60:703-713.
3. Lesley J, et al. Cell Immunol. 1984; 83:14-25.
4. Nakahata T, et al. Leuk Lymphoma. 1994; 13:401-409.
5. Marsee DK, et al. Am J Clin Pathology. 2010; 13:429-435.



CD74 (LN2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44252	CD74 RTU M (LN2)	7 ml Ready To Use
44525	CD74 0,1 M (LN2)	100 µl liquid Concentrated
44526	CD74 1 M (LN2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Lymph Node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

CD74, also known as the MHC class II associated invariant chain (Ii), is a type II transmembrane protein which binds to the peptide binding groove of newly synthesized MHC class II alpha/beta heterodimers and prevents their premature association with endogenous polypeptides. CD74 is produced in molar excess over MHC class II and some of this is expressed by an unknown pathway on the cell surface independent of or in association with MHC class II molecules. The half life of CD74 on the cell surface is only 3 to 4 minutes after which it is internalized. CD74 is expressed primarily by antigen presenting cells such as B-lymphocytes (from before the pre-B cell stage to before the plasma cell stage), macrophages, and monocytes, and many epithelial cells. CD74 may exist in different isoforms ranging in size from 33 to 41 kDa, depending on genetic splicing.

Anti-CD74 stains predominantly germinal center lymphocytes and B-cell lymphomas but rarely T-cell lymphomas. It stains the cell membrane but a paranuclear globular labeling is also noted. It is a useful addition to the lymphoma phenotyping panel when B5 or alcohol fixed tissue is used. Anti-CD74 has been shown to be useful in differentiating atypical fibroxanthoma (-) from malignant fibrous histiocytoma (+).

Myeloid Leukemia, Cutaneous Myeloid Sarcoma

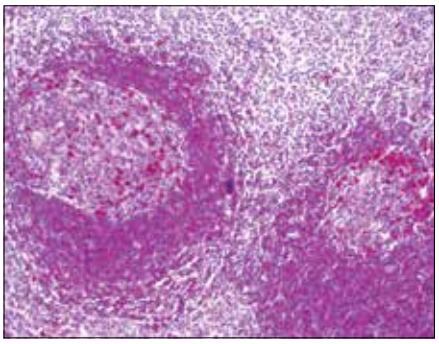
	CD74	MPO	CD68	Factor VIII	CD61	BOB.1	Oct-2	Glyco-phorin A	Spectrin	CD34
Acute, M0	+	-	-	-	-	-	-	-	-	+
Acute, M1&2	+	+	+	-	-			-	-	+
Acute Myelomonocytic, M4	+	+	+	-	-	-	+	-	-	+
Acute Monoblastic, M5	+	+	+	-	-	-	+	-	-	-/+
Chronic	+	+	-	-	-	+/-	-	-	-	-/+

Lymphoblastic Lymphomas, BCL vs. TCL

	CD74	TdT	CD10	PAX-5	CD20	CD19	CD3	CD5	CD7	CD117
Lymphoblastic BCL	+	+	+/-	+	+/-	+	-	-	-	-
Lymphoblastic TCL	-	+	+	-	-	-	+	+/-	+	-

Reference

1. Chan JKC, et al. Histopathology. 1994; 25:517-536.
2. Kaddu S, et al. J Am Acad Dermatol. 1999; 40:966-978.



CD79a (JCB117)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45190	IMPATH CD79a RTU M (JCB117)	50 Tests
44253	CD79a RTU M (JCB117)	7 ml Ready To Use
44527	CD79a 0,1 M (JCB117)	100 µl liquid Concentrated
44528	CD79a 1 M (JCB117)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CD79a is a B-cell marker that is generally used to complement anti-CD20 especially for mature B-cell lymphomas after treatment with Rituximab (anti-CD20). This antibody will stain many of the same lymphomas as anti-CD20, but also is more likely to stain B-lymphoblastic lymphoma/leukemia than is anti-CD20. Anti-CD79a also stains more cases of plasma cell myeloma and occasionally some types of endothelial cells as well.

B-cell Lymphomas

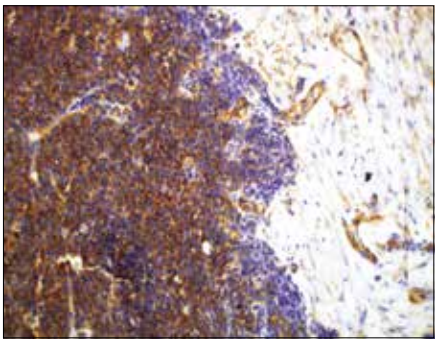
	CD79a	PAX-5	MUM1	BCL2	BCL6	p27	CD10	CD23	Cyclin D1	TRAcP
Follicular	+	+	-	+	+	+	+	-	-	-
CLL/SLL	+	+	+	+	-	+	-	+	-	-
Mantle Cell	+	+	-	+	-	+	-	-	+	-
Marginal Zone BCL	+	+	+	+	-	+	-	-	-	+/-
Lymphoplasmacytic	+	+	+	+	-	+	-	-	-	-
Diffuse Large Cell Lymphoma	+	+	+	+	+	-	-	-	-	-
Burkitt Lymphoma	+	+	-	-	+	-	+	-	-	-
Hairy Cell Leukemia	+	+		+	-	-	-	-	+(weak)/-	+

Plasma Cells

	CD79a	CD138	EMA	MUM1	CD56	Cyclin D1	CD43	CD20	CD19
Plasma Cell Neoplasm	+	+	+	+	+	-/+	-	-/+	-

Reference

1. Kurtin PJ, et al. Am J Clin Pathol. 1999 Sep; 112(3):319-29.
2. Blakolmer K, et al. Mod Pathol. 2000 Jul; 13(70:766-72.
3. Yao X, et al. Mod Pathol. 2001 Feb; 14(2):105-10.



CD99 (EPR3097Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45192	IMPATH CD99 RTU R (EPR3097Y)	50 Tests
44255	CD99 RTU R (EPR3097Y)	7 ml Ready To Use
44531	CD99 0,1 R (EPR3097Y)	100 µl liquid Concentrated
44532	CD99 1 R (EPR3097Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Ewing's Sarcoma, Pancreas
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD99/MIC-2 antigen is present on the cell membrane of Ewing's sarcoma and primitive peripheral neuroectodermal tumors (PNET). It is also present on some cells in bone marrow, lymph nodes, spleen, cortical thymocytes, granulosa cells of the ovary, CNS ependymal cells, Sertoli cells of the testis, and endothelial cells. MIC-2 has also been identified in lymphoblastic lymphoma, rhabdomyosarcoma, mesenchymal chondrosarcoma, and thymoma.

Soft Tissue Sarcoma

	CD99	CK Cocktail	S-100	MS Actin	SM Actin	CD34	TLE-1	CD56	TFE-3	Calretinin
Synovial Sarcoma	+	+	-	-	-	-	+	+	-	+/-
Clear Cell Sarcoma	-	-	+	-	-	-	-	-	-	-
PNET/ES	+	-/+	+	-	-	-	-	-	-	-
Desmoplastic Small Round Cell	-	+	-	-	-	-	-	-	-	-
Mesenchymal Chondrosarcoma	+	-	+/-	-	-	-/+	-	-	-	+
Alveolar Soft Part Sarcoma	-	-	-	+	+	-	-	-	+	-
PEComa	-	-	-	-	+	-	-	-	-	+

Skin: Spindle Cell Tumors

	CD99	FLI-1	GLUT1	Factor VIII	HHV-8	CD10	CD34	D2-40	SM Actin	MS Actin
Atypical Fibroxanthomas	+	-	-	-	-	+	-	-	+	+
Angiosarcoma	-	+	-	+	-	-	+	+/-	-	-
Glomus Tumor	-	-	-	-	-	-	+/-	-	+	+
Solitary Fibrous Tumor	+/-	-/+	-	-	-	-	+	-	-	-
Hemangioma	-	+	+	+	-	-	+	-	+	-
Kaposi's Sarcoma	-	+	-	+	+	-	+	+	+	-

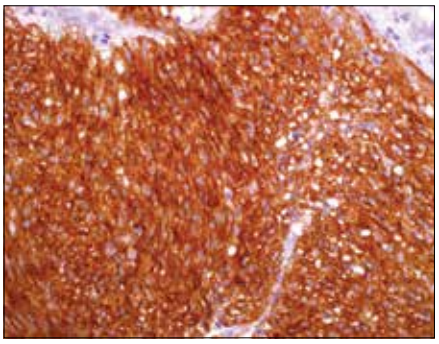
Sex Cord Stromal Tumors

	CD99	Calretinin	Inhibin	CK 7	EMA	Vimentin	MART-1
Granulosa Cell Tumors	+	+	+	-	-	+	+
Sertoli-Leydig Cell Tumors	-/+	+	+	+	-	+	+
Gonadoblastomas	+	+	+	-	-	+	-

Reference

1. Rettig WJ, et al. Lab Invest. 1992; 66:133.

A.MENARINI diagnostics



CD117, c-kit (YR145†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45273	IMPATH CD117 RTU R (YR145)	50 Tests
44218	CD117 RTU R (YR145)	7 ml Ready To Use
44460	CD117 0,1 R (YR145)	100 µl liquid Concentrated
44461	CD117 1 R (YR145)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Gastrointestinal stromal tumor, Seminoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD117, c-kit, is a tyrosine kinase receptor found on interstitial cells of Cajal, germ cells, bone marrow stem cells, melanocytes, breast epithelium, and mast cells. This receptor is found on a wide variety of tumor cells including follicular and papillary carcinoma of thyroid, adenocarcinomas from endometrium, lung, ovary, pancreas, and breast as well as malignant melanoma, endodermal sinus tumor, and small cell carcinoma; however, anti-CD117 has been particularly useful in differentiating gastrointestinal stromal tumors from Kaposi's sarcoma, tumors of smooth muscle origin, fibromatosis, and neural tumors of the GI tract. Anti-CD117 is also useful in recognizing myeloblasts in bone marrow biopsy and clot section.

GIST Mutation vs. Wild Type

	CD117	DOG1	CD34
GIST, Kit Mutation	+	+	+
GIST, PDGFRA Mutation	-	+	-
GIST, Wild Type	+	+	+/-

Mastocytosis

	CD117	Tryptase	CD25	CD163	CD2
Systemic Mastocytosis	+	+	+	-	+
Reactive Mast Cells	+	+	-	+	-

Germ Cell Tumors

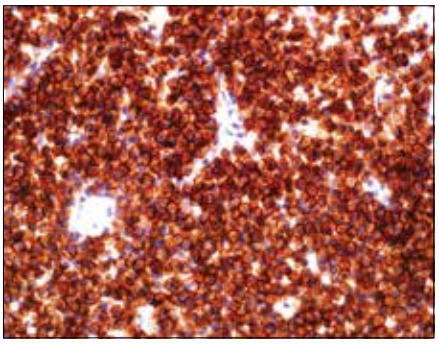
	CD117	Oct-4	AFP	CK Cocktail	EMA	Inhibin	D2-40	CD30	Vimentin	PLAP
Seminoma	+	+	-	-	-	-	+	-	+	+
Embryonal Carcinoma	-	+	-	+	-	-	-	+	-	+

Kidney: Renal Epithelial Tumors

	CD117	RCC	CD10	S100A1	Vimentin	Ksp-cadherin	Parvalbumin
Clear Cell RCC	-	+	+	+	+	-	-
Chromophobe RCC	-/+	-/+	-/+	-	-	+	+
Papillary RCC	+	+	+	+	+	-/+	-
Oncocytoma	+	-	+/-	+	-	+/-	+

Reference

1. Sircar K, et al. AM J Surg Pathol. 1999; 23:377-389.



CD138/syndecan-1 (B-A38)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45173	IMPATH CD138 RTU M (B-A38)	50 Tests
44220	CD138 RTU M (B-A38)	7 ml Ready To Use
44463	CD138 0,1 M (B-A38)	100 µl liquid Concentrated
44464	CD138 1 M (B-A38)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD138 is a protein encoded by a transmembrane (type I) heparan sulfate proteoglycan gene and is a member of the syndecan proteoglycan family.

CD138, Syndecan 1, is expressed in the late stages of B-cell differentiation with progression towards plasma cells. Syndecan 1 is up-regulated by WT-1 and in turn acts as a receptor for collagen, fibronectin and thrombospondin. It binds basic fibroblast growth factor, an angiogenic agent, and thereby modulates neovascularisation. The free ectodomain of syndecan I suppresses proliferation of tumor cells.

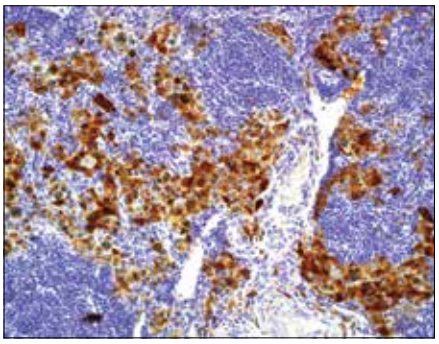
Anti-CD138 is expressed in distinct stages of differentiation of normal lymphoid cells. It can be used to differentiate lymphoplasmacytic lymphoma from marginal zone lymphoma. ALK+ large B-cell lyphoma (LBLC) usually strongly expresses CD138 whereas lineage-associated markers such as anti-CD20 and anti-CD79a do not stain ALK+ LBLC. Anti-CD138 is immunoreactive with HHV8-associated primary effusion lymphoma even though the lymphoma cells lack the expression of B-cell markers. Anti-CD138 is a good marker to identify and enumerate plasma cells, benign, reactive, or malignant, in bone marrow biopsy specimens.

Plasma Cell Neoplasm and Lymphoproliferative Neoplasms

	CD138	CD79a	EMA	MUM1	CD56	Cyclin D1	CD43	CD20	CD19
Plasma Cell Neoplasm	+	+	+	+	+	-/+	-	-/+	-
ALK + LBCL	+	-	+	+	-	-	-/+	-	-
Plasmablastic Lymphoma	+	+	+	+	-	-	-	-	-
HHV Associated LBCL	-	-	-	-	-	-	-	+/-	+/-
Primary Effusion Lymphoma	+	-	+	+	-	-	-	-	-
Lymphoblastic Lymphoma	+	+	-	+/-	-	-	-	+	+
Splenic Marginal Zone Lymphoma	-/+	+	-	+/-	-	-	-	+	+

Reference

1. Lampert IA, et al. Appl Immunohistochem Mol Morphol. 2005 Jun; 13(2):124-31.
2. Oksanen A, et al. J Clin Pathol. 2005 Apr; 58(4):376-81.



CD163 (MRQ-26)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45127	IMPATH CD163 RTU M (MRQ-26)	50 Tests
44223	CD163 RTU M (MRQ-26)	7 ml Ready To Use
44844	CD163 0,1 M (MRQ-26)	100 µl liquid Concentrated
44469	CD163 1 M (MRQ-26)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Inflamed Tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CD163 has been identified as an acute phase-regulated transmembrane protein whose function is to mediate the endocytosis of haptoglobin-hemoglobin complexes. This receptor is expressed on the surface of monocytes with low expression and on tissue macrophages, histiocytes with high expression.

Staining with anti-CD163 has been helpful to distinguish synovial macrophages from synovial intimal fibroblasts in the setting of rheumatoid arthritis, where its specificity for macrophages was found to be superior to that of anti-CD68. Increased levels of CD163 were also detected in patients with microbial infections and myelomonocytic leukemias by an enzyme-linked immunosorbent assay. Flow cytometry studies have confirmed that CD163 expression is limited to leukemias with monocytic differentiation. Anti-CD163 can be used to identify and enumerate myelomonocytic blasts and monocytic blasts in bone marrow biopsy for diagnosis of acute myeloid leukemia.

Mastocytosis

	CD163	Tryptase	CD117	CD25	CD2
Systemic Mastocytosis	-	+	+	+	+
Reactive Mast Cells	+	+	+	-	-

Histiocytic Neoplasms

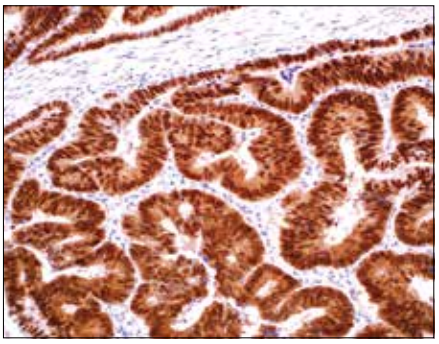
	CD163	CD45	CD4	CD68	Lysozyme	Factor XIIIa	CD20	CD3
Histiocytic Neoplasms	+	+	+	+	+	+	-	-

Skin: Dermatofibrosarcoma Protuberans (DF-SP) vs. Dermatofibroma Fibrous Histiocytoma (DF-FH)

	CD163	CD34	NGFR	CD10	Factor XIIIa	p63	Desmin	CK Cocktail	S-100
DF-SP	-	+	+	+/-	-	-	-	-	-
DF-FH	-	-	-	+	+	-	-	-	-

Reference

1. Backe E, et al. J Clin Pathol. 1991; 44:936-945.
2. Buechler C, et al. J Leukoc Biol. 2000; 67:97-103.
3. Hiraoka A, etal. Pathol Res Pract. 2005; 201 (5):379-84.
4. Hogger P, et al. J Immunol. 1998; 161:1883-1890.
5. Kristiansen M, et al. Nature. 2001; 409:198-201.



CDX-2 (EPR2764Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45278	IMPATH CDX-2 RTU R (EPR2764Y)	50 Tests
44256	CDX2 RTU R (EPR2764Y)	7 ml Ready To Use
44533	CDX2 0,1 R (EPR2764Y)	100 µl liquid Concentrated
44534	CDX2 1 R (EPR2764Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Colon
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

CDX-2 is a caudal-related homeobox transcription factor whose expression in the adult is normally restricted to the intestinal epithelium. It is implicated in the development and maintenance of the intestinal mucosa. This protein is expressed immunohistochemically in the nuclei of normal intestinal epithelium. CDX-2 protein expression has been seen in gastrointestinal (GI) carcinomas, more so in lower GI than in upper GI. Anti-CDX-2 has been useful to establish gastrointestinal origin of metastatic adenocarcinomas and carcinoids and is especially useful to distinguish metastatic colorectal adenocarcinoma from lung adenocarcinoma. However, mucinous carcinomas of the ovary also stain positively with this antibody, which limits the usefulness of this marker in the distinction of metastatic colorectal adenocarcinoma versus mucinous carcinoma of the ovary.

Carcinomas

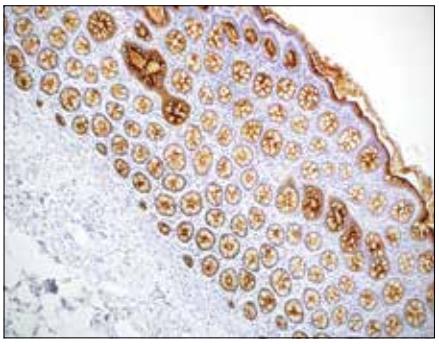
	CDX-2	CK Cocktail	CK 7	CK 20	pCEA	CK 5	p63	β-Catenin	TTF-1	Hep-Par1
Hepatocellular Carcinoma	-	-	-	-	+	-	-	-	+ (cytoplasmic)	+
Bladder Carcinoma	+	+	+	+	+	-	-	-	-	-
Salivary Gland Carcinoma	-	+	+	-	+	+	+	-		-
Lung Adenocarcinoma	-	+	+	-	+	-	-	-	+	-
Colorectal Adenocarcinoma	+	+	-	+	+	-	-	+	-	-
Cervical Carcinoma	-	+	+	-	+	-	-	-	-	-
Sweat Gland Carcinoma	-	+	+	-	+	+	+	-		-
Pancreatic Carcinoma	-	+	+	-	+	-	-	-	-	-
Gastric Carcinoma	+	+	+	-	+	-	-	-	-	-

Colon vs. Prostate Adenocarcinoma

	CDX-2	CK 20	CEA	CA19-9	PSA	P504s
Colon Adenocarcinoma	+	+	+	+	-	+
Prostate Adenocarcinoma	-	-	-	-	+	+

Reference

1. Mazziotta RM, et al. Appl Immunohistochem Mol Morphol. 2005 Mar; 13(1):55-60.



CEA (CEA31)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45194	IMPATH CEA RTU M (CEA31)	50 Tests
44258	CEA RTU M (CEA31)	7 ml Ready To Use
44537	CEA 0,1 M (CEA31)	100 µl liquid Concentrated
44538	CEA 1 M (CEA31)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Colon adenocarcinoma, Colon mucosa
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CEA is employed essentially as a tool to assist in the distinction between adenocarcinoma and epithelioid malignant mesotheliomas, along with other markers such as those against calretinin, CK 5&6, CD15, HBME-1, MOC-31, and Ber-EP4. Another suggested use of anti-CEA is to immunophenotype various metastatic adenocarcinomas as a means of identifying their origin within a panel of different markers. Anti-CEA positivity is seen in adenocarcinomas from the lung, colon, stomach, esophagus, pancreas, gallbadder, urachus, salivary gland, ovary, and endocervix. Polyclonal anti-CEA is useful in staining hepatocellular carcinoma in a canalicular pattern.

Liver: Malignant vs. Benign

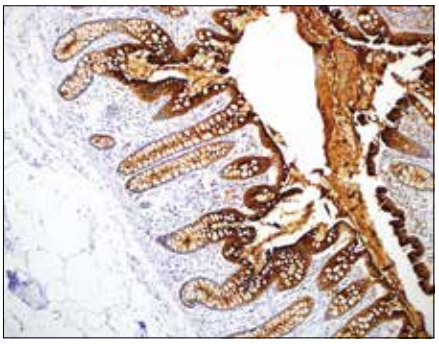
	mCEA	pCEA	Hep-Par1	Glypican-3	CD34	p53	AFP	A1AT	TTF-1
Hepatocellular Carcinoma	-	+	+	+	+	+	-/+	-/+	+ (cytoplasmic)
Hepatoblastoma	-	+	+	+	-	+	+	+	-
Benign Liver Nodules	-	-	+	-	-	-	-	+/-	+ (cytoplasmic)

Pleura: Adenocarcinoma vs. Mesothelioma

	CEA	Calretinin	CK 5&6	D2-40	WT1	Caldesmon	TAG-72	Ep-CAM	E-cadherin	TTF-1
Adenocarcinoma	+	-	-	-	-	-	+	+	+	+
Mesothelioma	-	+	+	+	+	+	-	-	-	-

Reference

1. Abutaily AS, et al. J Clin Pathol. 2002 Sep; 55(9):662-8.
2. Bhatnagar J, et al. Anticancer Res. 2002 May-Jun; 22(3):1849-57.



CEA (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45193	IMPATH CEA RTU R (Poly)	50 Tests
44257	CEA RTU R (Poly)	7 ml Ready To Use
44535	CEA 0,1 R (Poly)	100 µl liquid Concentrated
44536	CEA 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Colon
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CEA is employed essentially as a tool to assist in the distinction between adenocarcinoma and epithelioid malignant mesotheliomas, along with other markers such as those against calretinin, CK 5&6, CD15, HBME-1, MOC-31, and Ber-EP4. Another suggested use of anti-CEA is to immunophenotype various metastatic adenocarcinomas as a means of identifying their origin within a panel of different markers. Anti-CEA positivity is seen in adenocarcinomas from the lung, colon, stomach, esophagus, pancreas, gallbadder, urachus, salivary gland, ovary, and endocervix. Polyclonal anti-CEA is useful in staining hepatocellular carcinoma in a canalicular pattern.

Liver: Malignant vs. Benign

	pCEA	mCEA	Hep-Par1	Glypican-3	CD34	p53	AFP	A1AT	TTF-1
Hepatocellular Carcinoma	+	-	+	+	+	+	-/+	-/+	+ (cytoplasmic)
Hepatoblastoma	+	-	+	+	-	+	+	+	-
Benign Liver Nodules	-	-	+	-	-	-	-	+/-	+ (cytoplasmic)

Pleura: Adenocarcinoma vs. Mesothelioma

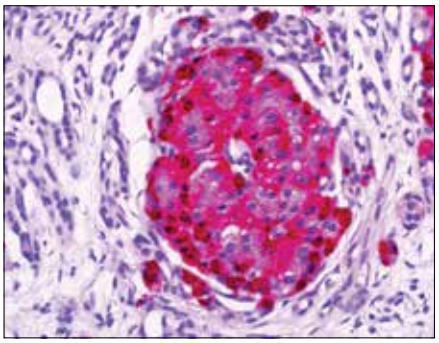
	CEA	Calretinin	CK 5&6	D2-40	WT1	Caldesmon	TAG-72	Ep-CAM	E-cadherin	TTF-1
Adenocarcinoma	+	-	-	-	-	-	+	+	+	+
Mesothelioma	-	+	+	+	+	+	-	-	-	-

Carcinomas

	pCEA	CK Cocktail	CK 7	CK 20	CDX-2	CK 5	p63	β-Catenin	TTF-1	Hep-Par1
Hepatocellular Carcinoma	+	-	-	-	-	-	-	-	+	+
Bladder Carcinoma	+	+	+	+	+	-	-	-	-	-
Salivary Gland Carcinoma	+	+	+	-	-	+	+	-		-
Lung Adenocarcinoma	+	+	+	-	-	-	-	-	+	-
Colorectal Adenocarcinoma	+	+	-	+	+	-	-	+	-	-
Cervical Carcinoma	+	+	+	-	-	-	-	-	-	-
Sweat Gland Carcinoma	+	+	+	-	-	+	+	-		-
Pancreatic Carcinoma	+	+	+	-	-	-	-	-	-	-
Gastric Carcinoma	+	+	+	-	+	-	-	-	-	-

Reference

1. Sheahan K, et al. Am J Clin Pathol. 1990; 94:157-64.



Chromogranin A (LK2H10)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45195	IMPATH Chromogranin A RTU M (LK2H10)	50 Tests
44259	Chromogranin A RTU M (LK2H10)	7 ml Ready To Use
44539	Chromogranin A 0,1 M (LK2H10)	100 µl liquid Concentrated
44540	Chromogranin A 1 M (LK2H10)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pancreas
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Immunohistochemical methods have localized chromogranin in a wide variety of endocrine tissues such as the pituitary, pancreas, hypothalamus, and parathyroid. Neuroendocrine cells exhibit a fine granular immunoreactivity to antichromogranin. It is generally accepted that the co-expression of certain keratins and chromogranin mean neuroendocrine lineage. The presence of strong anti-chromogranin staining and absence of anti-keratin staining should raise the possibility of paraganglioma. The co-expression of chromogranin and NSE is typical of neuroendocrine neoplasms. Most pituitary adenomas and prolactinomas readily express chromogranin.

Retroperitoneal Neoplasms

	Chromo-granin A	NSE	Synapto-physin	Neurofilament	PGP 9.5	S-100	GFAP	CD99
Neuroblastoma	+	+	+	+	+	-	+/-	-
Ganglioneuroblastoma	+	+	+	+	+	+	+	-
Ganglioneuroma	+	+	+	+	+	+	+	-

Adrenal Tumors

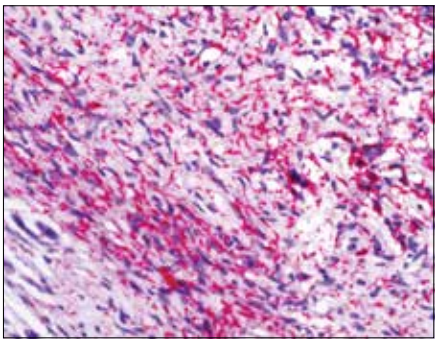
	Chromogranin A	Inhibin	Calretinin	MART-1	Synaptophysin	CD56
Pheochromocytoma	+	-	-	-	+	+
Adrenal Cortical Carcinoma	-	+	+	+	-/+	+
Adrenal Cortical Adenoma	-	+	+	+	-/+	+

Pancreas

	Chromo-granin A	Synapto-physin	CK 19	CA19-9	Gastrin	E-cadherin	CD10	CD56	β-Catenin	S100P
Ductal Adenocarcinoma	-	-	+	+	-	+/-	+/-	-	+/-	+
Neuroendocrine Tumor	+	+	+/-	+/-	+/-	-	-	+	+	-
Solid Pseudopapillary Tumor	-	+	-	-	-	+(nuclear)	+	+	+	-
Acinic Cell Carcinoma	-	-	+	-/+	-	+	+/-	-	+	-
Pancreatoblastoma	+	-	-	-	-	-	-	+	+	-
Benign Islet Cells	+	+	-	-	-	-	-	+	+	-
Benign Duct	-	-	-	-	-	-	-	-	-	-

Reference

1. Fischer-Colbrie R, et al. Neuroscience. 1985; 16:547.
2. Hearn SA. J Histochem Cytochem. 1987; 35:795-801.



Claudin 1 (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45298	IMPATH Claudin 1 RTU R (Poly)	50 Tests
44260	Claudin1 RTU R (Poly)	7 ml Ready To Use
44541	Claudin1 0,1 R (Poly)	100 µl liquid Concentrated
44542	Claudin1 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Colon Carcinoma, Neurofibroma
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

The claudins are a family of over twenty proteins which are components of tight junctions. Tight junctions are specialized regions of cell-to-cell contact made up of a network of strands to act as a molecular 'gasket' for preventing the leakage of ions, water, etc. between cells. They are abundant in luminal epithelial sheets where they maintain epithelial cell polarity. The claudins constitute a variable component, with specific claudins being associated with specific tissues. The immunoreactivity for anti-claudin 1 is membranous and is found in nearly all carcinomas. The staining is much stronger in the carcinoma cells than in normal tissues. Anti-claudin 1 in a panel of immunostains that includes antibodies against EMA (positive), S-100 (negative), and GLUT1 can be utilized as a robust marker in the diagnosis of perineurioma and neurofibroma. Some studies have shown anti-claudin 1 to be a specific marker for meningiomas. Therefore, anti-claudin 1 with anti-EMA, anti-S-100 protein, anti-CD34, and anti-glial fibrillary acidic protein (GFAP) may be helpful in the differentiation of meningiomas from histologic mimics.

Perineurioma vs. Neurofibroma

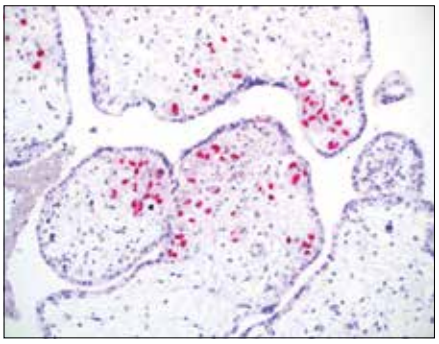
	Claudin 1	EMA	S-100	GLUT1
Perineurioma	+	+	-	+
Neurofibroma	+	+	+	-

Meningiomas from Histologic Mimics

	Claudin 1	EMA	S-100	CD34	GFAP
Meningothelial Meningioma	+	+	-	-	-
Atypical Meningioma	+	+	-	+	-
Fibrous Meningioma	-	+	+	-	-
Solitary Fibrous Tumor	-	-	-	+	-
Meningeal Hemangiopericytoma	-	-	-	+	-
Schwannoma	+/-	-	+	-	+

Reference

1. Folpe AL, et al. Am J Surg Pathol. 2002; 26:1620-6.
2. Hornick JL, Fletcher CD. Am J Surg Pathol. 2005; 29:845-58.
3. Y Soini. Histopathology. 2005; 47:551-560.
4. Smith MEF, et al. Histopathology. 2005; 47:575-581.
5. Liu Y, et al. Lung Cancer. 2007; 56(3):307-17.
6. Macarenco RS, et al. Arch Pathol Lab Med. 2007 Apr; 131(4)625-36.



CMV (8B1.2, 1G5.2 & 2D4.2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45203	IMPATH CMV RTU M (8B1.2,1G5.2&2D4.2)	50 Tests
44278	CMV RTU M (8B1.2,1G5.2&2D4.2) RUO	7 ml Ready To Use
44578	CMV 0,1 M (8B1.2,1G5.2&2D4.2) RUO	100 µl liquid Concentrated
44579	CMV 1 M (8B1.2,1G5.2&2D4.2) RUO	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control CMV infected tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

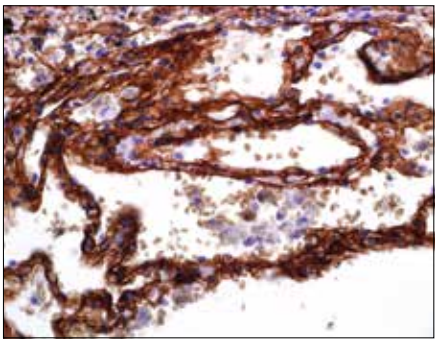
**Please refer to product insert for complete protocol.*

Product Description

CMV infection is usually seen in immunocompromised patients involving the GI tract, lung, heart, liver, and placenta among other organs. There is no cross-reactivity with other herpesviruses or adenoviruses.

Reference

1. de la Hoz RE, et al. J Clin Virol. 2002; 25:S1-S12.
2. Bronsther O, et al. J Med Virol. 1988; 24:423-434.
3. Drummer JS, et al. J Infect Dis. 1985; 152:1182-1191.
4. Anwar F, et al. Ann Diag Pathol. 1999; 3:19-22.
5. Cote L, et al. J Clin Microbiol. 1993; 31:2066-2069.
6. Sheehan MM, et al. Cytopathology. 1998; 9:29–37.
7. Saetta A, et al. Virchows Arch. 1998; 432:159-162.
8. Solans EP, et al. Diagn Cytopath. 1997; 16:350-352.
9. Colina F, et al. J Clin Pathol. 1995; 48:351-357.
10. Rimsza LM, et al. Am J Clin Pathol. 1996; 106:544-548.
11. Kandiel A, et al. Am J Gastroenterol. 2006; 101:2857-2865.
12. Kambham N, et al. Am J Surg Pathol. 2004; 28:365-373.
13. Ribalta T, et al. Virchows Arch. 2002; 440:166-171.
14. Cruz-Spano L, et al. Med Sci Monit. 2002; 8:BR230-BR235.



Collagen Type IV (CIV22)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44261	Collagen Type IV RTU M (CIV22)	7 ml Ready To Use
44543	Collagen Type IV 0,1 M (CIV22)	100 µl liquid Concentrated
44544	Collagen Type IV 1 M (CIV22)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Intercellular
Control Lung, Muscle
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Collagen Type IV is the major component of the basal lamina so antibodies to this molecule confirm its presence and reveal the morphological appearance of the structure. Normal tissue stains with this antibody in a fashion consistent with the sites of mesenchymal elements and epithelial basal laminae. Anti-Collagen IV can also be useful in the classification of soft tissue tumors: schwannomas and leiomyomas. Their well-differentiated, malignant counterparts usually immunoreact with this antibody. The vascular nature of neoplasms, hemangiopericytoma, angiosarcoma and epithelioid hemangioendothelioma can be revealed by this antibody with greater reliability than non-specific stains (e.g. silver reticulum).

Spindle Cell Melanoma vs. Epithelioid Peripheral Nerve Sheath Tumor

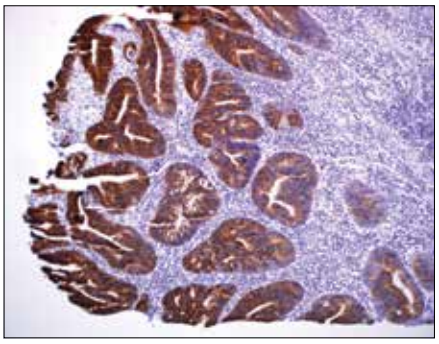
	Collagen IV	S-100	HMB-45	Tyrosinase	NGFR	SOX-10
Spindle Cell Melanoma	-	+	+	+	+	+
PNST	+	+	+	+	+	+

Skin: Spindle Cell Tumors

	Collagen IV	FLI-1	S-100	CD99	Factor XIIIa	HHV-8	CD10	CD34	D2-40	MS Actin
Squamous Cell Carcinoma	-	-	-	-	-	-	-	-	+	-
Spindle Cell Melanoma	-	+	+	-	-	-	-	-	+	-
Atypical Fibroxanthomas	-	-	-	+	+/-	-	+	-	-	+
DF-SP	-	-	-	-	-	-	+/-	+	-	-
DF-FH	-	-	-	-	+	-	+	-	-	-
Peripheral Nerve Sheath	-	-	+/-	+	-	-	-	-	+	+
Smooth Muscle	-	-	-	-/+	-	-	-	-	-	+
Angiosarcoma	+/-	+	-	-	-	-	-	+	+/-	-
Glomus Tumor	+	-	-	-	-	-	-	+/-	-	+
Solitary Fibrous Tumor	-	-/+	-	+/-	+/-	-	-	+	-	-
Hemangioma	+	+	-	-	-	-	-	+	-	-
Hemangioendothelioma	-	+	-	-	-	-	-	+	-	-
Kaposi's Sarcoma	+/-	+	-	-	-	+	-	+	+	-

Reference

1. Gould VE, et al. Pathol Annul. 1976; 11:353-386.
2. McArdle JP, et al. Int J Cancer. 1984; 34:633-638.
3. Sakr WA, et al. Hum Path. 1987; 18:1043-1050.
4. Barsky SH, et al. Am J Surg Pathol. 1983; 7:667-677.



COX-2 (SP21)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45279	IMPATH COX-2 RTU R (SP21)	50 Tests
44262	COX-2 RTU R (SP21)	7 ml Ready To Use
44545	COX-2 0,1 R (SP21)	100 µl liquid Concentrated
44546	COX-2 1 R (SP21)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Colon Adenocarcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

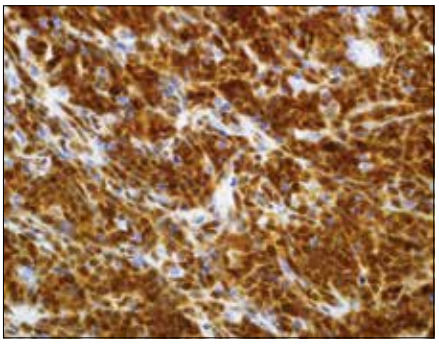
Cyclooxygenase 2 (COX-2) catalyzes the conversion of arachidonic acid to prostaglandin H2 in the first step in the biosynthesis of prostaglandins, thromboxanes, and prostacyclins. COX-2 inhibition by nonsteroidal anti-inflammatory agents has been shown to decrease angiogenesis and tumor growth as well as promote apoptosis. COX-2 overexpression has been associated with increased microvascular density.

Squamous vs. Transitional Carcinoma

	COX-2	CK, 34βE12	p63	CK 5	Thrombo-modulin	CK 7	CK 20	Uroplakin III
Squamous Carcinoma	-	+	+	+	+	-	-	-
Transitional Cell Carcinoma	+	+	+	-/+	+	+	+	+

Reference

1. Sano H, et al. Cancer Res. 1995 Sep 1; 55(17):3785-9.
2. Denkert C, et al. Cancer. 2003 Jun 15; 97(12):2978-87.



Cyclin D1 (EP12†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44263	Cyclin D1 RTU R (EP12)	7 ml Ready To Use
44547	Cyclin D1 0,1 R (EP12)	100 µl liquid Concentrated
44548	Cyclin D1 1 R (EP12)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Mantle Cell Lymphoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Cyclin D1, one of the key cell cycle regulators, is a putative proto-oncogene overexpressed in a wide variety of human neoplasms. Cyclins are proteins that govern transitions through distinct phases of the cell cycle by regulating the activity of the cyclin-dependent kinases. In mid-to-late G1 phase of the cell cycle, cyclin D1 shows a maximum expression following growth factor stimulation. Anti-cyclin D1 has been successfully employed and is a promising tool for further studies in both cell cycle biology and cancer associated abnormalities. This antibody is useful for separating mantle cell lymphomas (cyclin D1 positive) from CLL/SLL and follicular lymphomas (cyclin D1 negative). Hairy cell leukemia and plasma cell myeloma can weakly express Cyclin D1.

B-cell Lymphomas

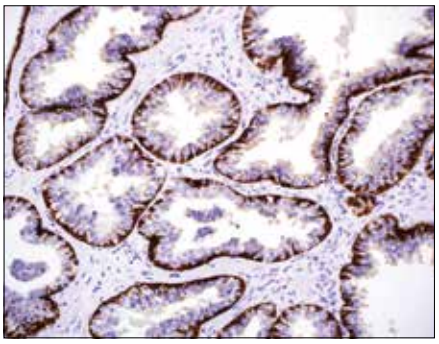
	Cyclin D1	Annexin A1	MUM1	CD79a	BCL2	BCL6	PD-1	CD10	CD23	CD5
Follicular	-	-	-	+	+	+	+	+	-	-
CLL/SLL	-	-	+	+	+	-	-	-	+	+
Mantle Cell	+	-	-/+	+	+	-	-	-	-	+
Marginal Zone	-	-	+	+	+	-	-	-	-	-
Lymphoplasmacytic	-	-	+	+	+	-	-	-	-	-
Diffuse Large Cell	-	-	+	+	+	+	-	-/+	-	-/+
Burkitt	-	-	-	+	-	+	-	+	-	-
Hairy Cell Leukemia	+(weak)/-	+		+	+	-	-	-	-	-

Plasma Cells

	Cyclin D1	CD138	CD79a	EMA	MUM1	CD56	CD43	CD20	CD19
Plasma Cell Neoplasm	-/+	+	+	+	+	+	-	-/+	-

Reference

1. Mankin RC, Hunter SV. Arch Pathol Lab Med. 1999 Dec; 123(12):1182-8.
2. Yatabe Y, et al. Blood. 2000 Apr 1; 95(7):2253-61.
3. Kodet R, et al. Virchows Arch. 2003 Jun; 442(6):538-47. Epub 2003 May 01.



Cytokeratin (34betaE12)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45138	IMPATH Cytokeratin RTU M (34betaE12)	50 Tests
44264	Cytokeratin RTU M (34betaE12)	7 ml Ready To Use
44549	Cytokeratin 0,1 M (34betaE12)	100 µl liquid Concentrated
44550	Cytokeratin 1 M (34betaE12)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Prostate
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-cytokeratin 34betaE12 is an antibody that recognizes cytokeratins 1, 5, 10, and 14 which are found in complex epithelia. Anti-cytokeratin 34betaE12 shows no reactivity with hepatocytes, pancreatic acinar cells, proximal renal tubules, or endometrial glands; there is no reactivity with cells derived from simple epithelia. Mesenchymal tumors, lymphomas, melanomas, neural tumors, and neuroendocrine tumors are unreactive with this antibody. Anti-cytokeratin 34betaE12 does label myoepithelial cells and has been shown to be useful in distinguishing prostate adenocarcinoma from benign prostate. This antibody has also been useful in separating benign from malignant intraductal breast proliferations.

Prostate: Malignant vs. Benign

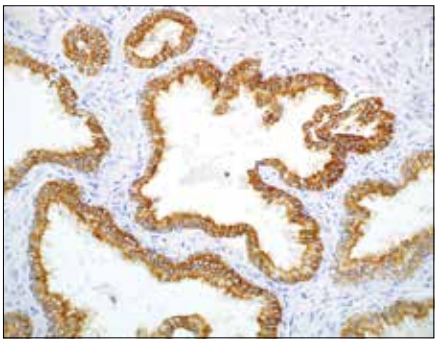
	CK, 34βE12	PSA/PSAP	Androgen Receptor	P504s	p63	CK 5	CK 14
Prostate Carcinoma	-	+	+	+	-	-	-
Benign Prostate	+	+	+	-/+	+	+	+

Prostate Lesions

	CK, 34βE12	PSA/PSAP	P504s	p63	CK 7	Thrombo-modulin	Uroplakin III	PAX-2
Prostate Carcinoma	-	+	+	-	-	-	-	-
Urothelial Carcinoma	+	-	-	+	+	+	+	-
Nephrogenic Adenoma	+/-	-	+	-	+	-	-	+

Reference

1. Gown AM, et al. Am J Pathol. 1984; 114:309.
2. O'Malley FP, et al. Virch Arch A. 1990; 417:191.
3. Amin MB. Arch Pathol Lab Med. 1994 March; 118:260-264.
4. Wojno KJ, et al. Am J Surg Pathol. 1995; 19:251-60.
5. Moinfar F, et al. Am J Surg Pathol. 1999; 23:1048-58.
6. Yang XJ, et al. Am J Surg Pathol. 1999; 23:147-52.



Cytokeratin (35betaH11)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45201	IMPATH Cytokeratin 8 RTU M (35betaH11)	50 Tests
44273	Cytokeratin 8 RTU M (35betaH11)	7 ml Ready To Use
44567	Cytokeratin 8 0,1 M (35betaH11)	100 µl liquid Concentrated
44568	Cytokeratin 8 1 M (35betaH11)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Prostate
Stability Up to 36 mo. at 2-8°C
Isotype IgM/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Cytokeratin 8 (CK8) belongs to a group of proteins known as intermediate-sized filaments that make up the cytoskeletal structure of virtually all epithelial cells. Cytokeratin 8 is a basic (Type II) cytokeratin with a molecular weight of ~52 kDa. Type I and type II keratins heteropolymerize to form in the cytoplasm of epithelial cells. This product typically dimerizes with cytokeratin 18 to form an intermediate filament in simple single-layered epithelial cells. This protein plays a role in maintaining cellular structural integrity and also functions in signal transduction and cellular differentiation. CK8 is present in simple epithelia and all adenocarcinomas.

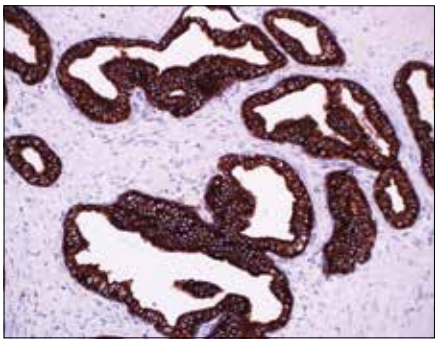
CK8 exists on several types of normal and neoplastic epithelia, including many ductal and glandular epithelia such as may be found in colon, stomach, small intestine, trachea, and esophagus as well as in transitional epithelium. Anti-35betaH11 does not react with skeletal muscle or nerve cells. Epithelioid sarcoma, chordoma, and adamantinoma express strong positivity corresponding to that of simple epithelia (with antibodies against CK8, CK18 and CK19). Anti-35betaH11 has also been suggested as a marker for the differentiation of lobular (“ring-like, perinuclear”) from ductal (“peripheral-predominant”) carcinoma of the breast.

Epithelioid Cell Neoplasms

	CK, 35βH11	INI-1	TFE-3	EMA	CD34	FLI-1	Desmin	S-100	HMB-45	DOG1
Epithelioid Sarcoma	-	+	-	+	+	-	+	-	-	-
Epithelioid Angiosarcoma	+	+	-	-	+	+	-	-	-	-
MPNST	+	+/-	-	-	-/+	-	+	+	-	-
Leiomyosarcoma	+	-	-	-	-/+		+	-	-	-
GIST	-	-	-	-	+	-	-	-	-	+
Endothelial Tumors	-	+	-	-	+	+	-	-	-	-
PEComa	-	-	-	-	-	-	-	+	+	-
Clear Cell Sarcoma	+	-	-	-	-	-	-	+	-	-
Alveolar Soft Part Sarcoma	-	-	+	-	-	-	-	-	-	-
Melanoma	-	-	-	-	-	-	-	+	+	-
Plasmacytoma	+	-	-	+	-	-	-	-	-	-

Reference

1. Battifora H. Am J Surg Pathol. 1988; 12:24.
2. Gown AM, et al. Am J Clin Pathol. 1985; 84:413.
3. Knapp AC, et al. Cell. 1989; 59:67-79.



Cytokeratin (OSCAR)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45299	IMPATH Cytokeratin RTU M (OSCAR)	50 Tests
44265	Cytokeratin RTU M (OSCAR)	7 ml Ready To Use
44551	Cytokeratin 0,1 M (OSCAR)	100 µl liquid Concentrated
44552	Cytokeratin 1 M (OSCAR)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Prostate
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

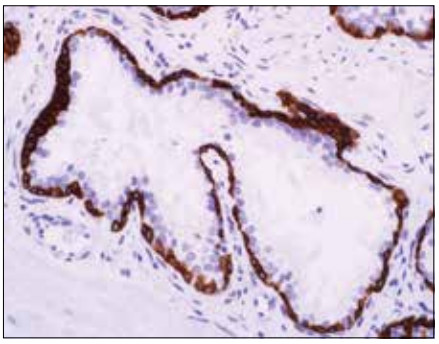
Anti-cytokeratin (OSCAR) is well-suited to distinguish epithelial carcinoma from non-epithelial malignancies and is used to aid epithelial tumor classification. This antibody has been used to characterize the source of various neoplasms and to study the distribution of keratin containing cells in epithelia during normal development and during the development of epithelial neoplasms. This antibody stains cytokeratins present in normal and abnormal human tissues and has shown high sensitivity in the recognition of epithelial cells and carcinomas.

Carcinomas

	CK, OSCAR	CK 7	CK 20	CK 5	p63	TTF-1	GCDFP-15	pCEA	Hep-Par1	RCC
Hepatocellular Carcinoma	-	-	-	-	-	+ (cytoplasmic)	-	+	+	-
Renal Cell Carcinoma	+	-	-	-	-	-	-	-	-	+
Bladder Carcinoma	+	+	+	-	-	-	-	+	-	-
Salivary Gland Carcinoma	+	+	-	+	+		+	+	-	-
Thyroid Carcinoma	+	+	-	-	-	+	-	-	-	-
Spindle Cell Carcinoma	+	-	-	-	-		-	-	-	-
Breast Carcinoma	+	+	-	-	-	-	+	-	-	-
Lung Adenocarcinoma	+	+	-	-	-	+	-	+	-	-
Colorectal Adenocarcinoma	+	-	+	-	-	-	-	+	-	-
Prostate Adenocarcinoma	+	-	-	-	+	-	-	-	-	-
Transitional Cell Carcinoma	+	+	+	+	+	-	-	-	-	-
Ovarian Carcinoma	+	+	-	+	-	-	-	-	-	-
Cervical Carcinoma	+	+	-	-	-	-	-	+	-	-
Sweat Gland Carcinoma	+	+	-	+	+		+	+	-	-
Pancreatic Carcinoma	+	+	-	-	-	-	-	+	-	-
Gastric Carcinoma	+	+	-	-	-	-	-	+	-	-
Squamous Cell Carcinoma	+	-	-	+	+	-	-	-	-	-
Endometrial Adenocarcinoma	+	+	-			-	-	-	-	-

Reference

1. Battifora H. Am J Surg Pathol. 1988; 12:24.
2. Gown AM, et al. Am J Clin Pathol. 1985; 84:413.
3. Knapp AC, et al. Cell. 1989; 59:67-79.



Cytokeratin 5 (EP1601Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45281	IMPATH Cytokeratin 5 RTU R (EP1601Y)	50 Tests
44270	Cytokeratin 5 RTU R (EP1601Y)	7 ml Ready To Use
44561	Cytokeratin 5 0,1 R (EP1601Y)	100 µl liquid Concentrated
44562	Cytokeratin 5 1 R (EP1601Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Mesothelioma, Prostate
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Cytokeratin 5 is an intermediate filament protein of 58 kD molecular weight within the cytokeratin family. It is a type II (basic) cytokeratin. Antibodies to this protein identify basal cells of squamous and glandular epithelia, myoepithelia, and mesothelium.

Anti-cytokeratin 5 has been useful in the differential diagnosis of metastatic carcinoma in the pleura versus epithelioid mesothelioma. Epithelioid mesotheliomas are strongly positive in all cases, but up to 11% of pulmonary adenocarinomas will show focal immunostaining. Almost all squamous cell carcinomas, half of transitional carcinomas, and many undifferentiated large cell carcinomas immunostain with anti-CK 5. Anti-CK 5, along with anti-p63, affords a high sensitivity and specificity for squamous differentiation. Myoepithelial cells of the breast, glandular epithelia, and basal cells of the prostate are labeled with anti-CK 5. This antibody, along with anti-CK 14, has found application in identifying basal-like breast carcinoma, a tumor with poor prognosis. Some carcinomas of ovarian origin may display anti-CK 5 positivity.

Prostate: Malignant vs. Benign

	CK 5	PSA/PSAP	Androgen Receptor	P504s	CK, 34βE12	p63	CK 14
Prostate Carcinoma	-	+	+	+	-	-	-
Benign Prostate	+	+	+	-/+	+	+	+

Breast Carcinoma

	CK 5	CK 7	CK 20	ER/PR	CA15-3	CA19-9	p63	CD117
Infiltrating Ductal Carcinoma	-/+	+	-	+	+	-	-	-
Adenoid Cystic Carcinoma	+	+	-	-	+	+	+	+

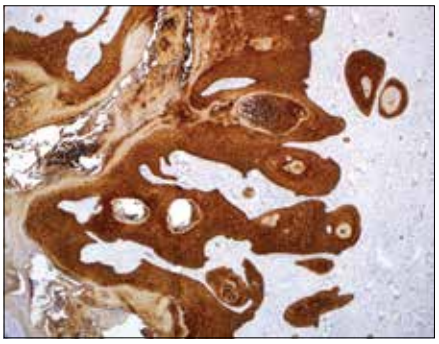
Squamous vs. Transitional Carcinoma

	CK 5	CK, 34βE12	p63	Thrombo-modulin	CK 7	CK 20	Uroplakin III
Squamous Carcinoma	+	+	+	+	-	-	-
Transitional Cell Carcinoma	-/+	+	+	+	+	+	+

Reference

1. Clarke CL, Sandle J, et al. J Pathol. 2004 Oct; 204(2):147-52.
2. Comin CE, Saieva C, Messerini L. Am J Surg Pathol. 2007 Aug; 31(8):1139-48.
3. Dabbs DJ, Chivukula M, Carter G, Bhargava R. Mod Pathol. 2006 Nov; 19(11):1506-11. Epub 2006 Aug 25.
4. Douglas-Jones A, Shah V, Morgan J, Dallimore N, Rashid M. Histopathology. 2005 Aug; 47(2):202-8.
5. Livasy CA, Perou CM, et al. Hum Pathol. 2007 Feb; 38(2):197-204.

A.MENARINI diagnostics



Cytokeratin 5 & 6 (D5 & 16B4)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45300	IMPATH Cytokeratin 5&6 RTU M (D5 & 16B4)	50 Tests
44271	Cytokeratin 5&6 RTU M (D5/16B4)	7 ml Ready To Use
44563	Cytokeratin 5&6 0,1 M (D5/16B4)	100 µl liquid Concentrated
44564	Cytokeratin 5&6 1 M (D5/16B4)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Mesothelioma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1 & IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-CK 5 & 6 positivity is seen in nearly 100% of malignant mesotheliomas and in nearly 0% of lung adenocarcinomas. Anti-CK 5 & 6 positivity can be seen in undifferentiated large cell carcinoma as well as squamous carcinoma, and has been useful in recognizing spindle cell squamous cell carcinoma of the skin. Less than 10% of carcinomas of the breast, colon, and prostate stain positively for this marker. Anti-CK 5 & 6 has also been used successfully as a myoepithelial cell marker in the prostate and breast to determine malignancy. Anti-CK 5 & 6 is a useful marker to distinguish lung squamous cell carcinoma from lung adenocarcinoma and large cell carcinoma within a panel including antibodies against TTF-1, Napsin A, p63, SOX2, desmocollin3, and desmoglein3.

Pleura: Adenocarcinoma vs. Mesothelioma

	CK 5&6	Calretinin	D2-40	HBME-1	Caldesmon	CEA	TAG-72	Ep-CAM	E-cadherin	TTF-1
Adenocarcinoma	-	-	-	-	-	+	+	+	+	+
Mesothelioma	+	+	+	+	+	-	-	-	-	-

Carcinomas

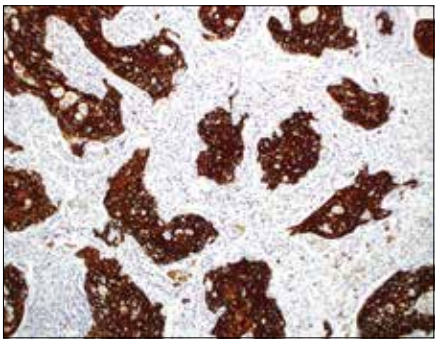
	CK 5&6	CK Cocktail	CK 7	CK 20	p63	ER/PR	CD10	CEA	CK, HMW	CK, LMW
Salivary Gland Carcinoma	+	+	+	-	+	-		+	+	+
Ovarian Carcinoma	+	+	+	-	-	-	-	-	+	+
Sweat Gland Carcinoma	+	+	+	-	+	+		+	+	+
Squamous Cell Carcinoma	+	+	-	-	+	-	-	-		
Transitional Cell Carcinoma	+	+	+	+	+	-	+	-	+	+

Colon vs. Ovarian Carcinoma

	CK 5&6	CK 7	CK 20	CEA	CDX-2	Villin	CA19-9	Ep-CAM	WT1	CA-125
Ovarian Carcinoma, Serous	-	+	-	+	-	+	+	+	+	+
Ovarian Carcinoma, Mucinous		+	-	-	+	+	+	+	-	-
Ovarian Endometrioid Ca	-	+	-	-	-		+/-	+	+	+
Colon Carcinoma	-	-	+	+	+	+	+	+	-	-

Reference

1. Ordonez NG. Am J Surg Pathol. 1998; 22(10):1215-1221.
2. Ordonez NG. Am J Surg Pathol. 1998; 22(10):1203-1214.
3. Cury PM, Butcher DW, et al. Mod Pathol. 2000; 13(2):107-12.



Cytokeratin 5 + Cytokeratin 14 (EP1601Y† + LL002)

Rabbit and Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45693	IMPATH CK5 + CK14 RTU M (EP1601Y & LL002)	50 Tests
44203	CK5 + CK14 RTU M (EP1601Y & LL002)	7 ml Ready To Use

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Esophagus, Squamous Cell Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

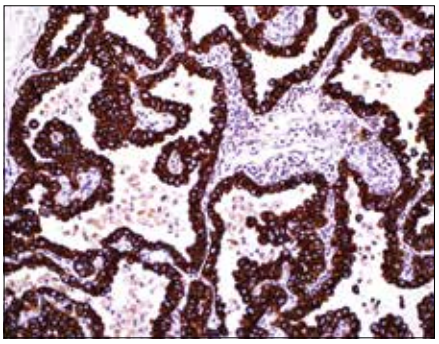
Product Description

Cytokeratin 5 is an intermediate filament protein of 58 kD molecular wt. amongst the cytokeratin family. It is a type II (basic) cytokeratin. Antibodies to this protein identify basal cells of squamous and glandular epithelia, myoepithelia, and mesothelium. Cytokeratin 14 is a 50 kD polypeptide found in basal cells of squamous epithelia, some glandular epithelia, myoepithelium, and mesothelial cells.

Anti-Cytokeratin 5 has been useful in the differential diagnosis of metastatic carcinoma in the pleura versus epithelial mesothelioma. Almost all squamous cell carcinomas, half of transitional carcinomas, and many undifferentiated large cell carcinomas immunostain with CK5. Anti-CK14 has been demonstrated to be useful in differentiating squamous cell carcinomas from other epithelial tumors. Anti-CK5, along with anti-CK14, has found application in identifying the basaloid phenotype of breast carcinoma, a tumor with poor prognosis.

Reference

1. Clarke CL, et al. J Pathol. 2004 Oct; 204(2):147-52.
2. Comin CE, et al. Am J Surg Pathol. 2007 Aug; 31(8):1139-48.
3. Dabbs DJ, et al. Mod Pathol. 2006 Nov; 19(11); 1506-11. Epub 2006 Aug 25.
4. Livasy CA, et al. Hum Pathol. 2007 Feb; 38(2):197-204.
5. Reis-Filho JS, et al. Appl Immunohistochem Mol Morphol. 2003 Mar; 11(1):1-8.
6. Chu PG, et al. Histopathology. 2001 Jul; 39(1):9-16.
7. Chu PG, Weiss LM. Histopathology. 2001 Nov; 39(5):455-62.



Cytokeratin 7 (OV-TL 12/30)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45200	IMPATH Cytokeratin 7 RTU M (OV-TL 12/30)	50 Tests
44272	Cytokeratin 7 RTU M (OV-TL 12/30)	7 ml Ready To Use
44565	Cytokeratin 7 0,1 M (OV-TL 12/30)	100 µl liquid Concentrated
44566	Cytokeratin 7 1 M (OV-TL 12/30)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Lung adenocarcinoma, Salivary gland
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/K

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-cytokeratin 7 reacts with proteins that are found in most ductal, glandular, and transitional epithelia of the urinary tract and bile duct epithelial cells. Anti-cytokeratin 7 distinguishes between lung and breast epithelium that stain positive, and colon and prostate epithelial cells that are negative. This antibody also reacts with many benign and malignant epithelial lesions, e.g. adenocarcinomas of the ovary, breast, and lung. Transitional cell carcinomas are positive and prostate cancer is negative. This antibody does not recognize intermediate filament proteins.

Carcinomas

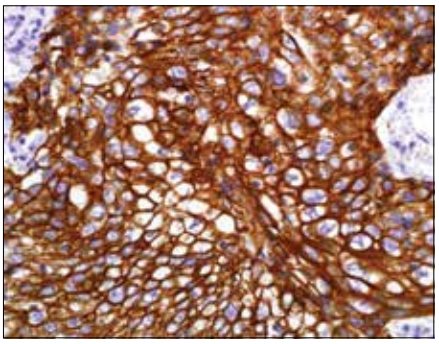
	CK 7	CK Cocktail	CK 20	GCDFP-15	ER/PR	CK 5	p63	TTF-1	CEA	CDX-2
Bladder Adenocarcinoma	+	+	+	-	-	-	-	-	+	+
Breast Carcinoma	+	+	-	+	+	-	-	-	-	-
Lung Adenocarcinoma	+	+	-	-	-	-	-	+	+	-
Endometrial Adenocarcinoma	+	+	-	-				-	-	-
Ovarian Carcinoma	+	+	-	-	+	+	-	-	-	-
Cervical Carcinoma	+	+	-	-	-	-	-	-	+	-
Sweat Gland Carcinoma	+	+	-	-	-	+	+		+	-
Pancreatic Carcinoma	+	+	-	-	-	-	-	-	+	-
Gastric Carcinoma	+	+	-	-	-	-	-	-	+	+
Transitional Cell Carcinoma	+	+	+	-	-	+	+	-	-	-
Squamous Cell Carcinoma	-	+	-	-	+	+	+	-	-	-

Colon vs. Ovarian Carcinoma

	CK 7	CK 20	CEA	CDX-2	Villin	CA19-9	Ep-CAM	WT1	CA-125	CK 5
Ovarian Carcinoma, Serous	+	-	+	-	+	+	+	+	+	-
Ovarian Carcinoma, Mucinous	+	-	-	+	+	+	+	-	-	
Ovarian Carcinoma, Endometrioid	+	-	-	-		+/-	+	+	+	-
Colorectal Carcinoma	-	+	+	+	+	+	+	-	-	-

Reference

1. Hatta N, Morita R, Yamada M, et al. Dermatol Surg. 2004 Oct; 30(10):1329-34.
2. Murray SK, Breau RH, Guha AK, Gupta R. Am J Surg Pathol. 2004 Sep; 28(9):1154-62.
3. Jerome MV, Mazieres J, Groussard O, et al. Histopathology. 2004 Aug; 45(2):125-34.



Cytokeratin 8 & 18 (B22.1 & B23.1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45202	IMPATH Cytokeratin 8 & 18 RTU M (B22.1 & B2)	50 Tests
44274	Cytokeratin 8&18 RTU M (B22.1&B23.1)	7 ml Ready To Use
44569	Cytokeratin 8&18 0,1 M (B22.1&B23.1)	100 µl liquid Concentrated
44570	Cytokeratin 8&18 1 M (B22.1&B23.1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pancreas, Prostate
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k & IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

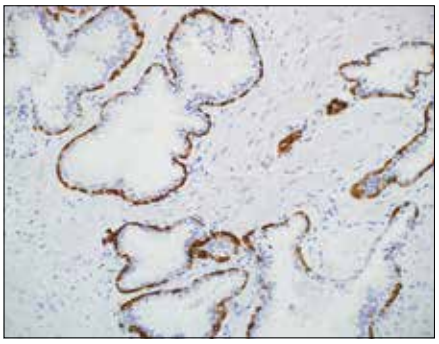
Cytokeratins 8 & 18 (CK 8 & 18) can be found in most simple epithelia, e.g. thyroid, female breast, gastrointestinal tract, and respiratory tract. Adenocarcinomas and most non-keratinizing squamous carcinomas will stain with anti-CK 8 & 18, but keratinizing squamous carcinomas will not. This antibody is used when attempting to demonstrate the presence of Paget cells; there is very little keratin 18 in the normal epidermis so this will only stain Paget cells. The use of immunostaining facilitates the interpretation and has been shown to be more sensitive than mucin histochemistry.

Skin: Spindle Cell Tumors

	CK 8 & 18	FLI-1	HHV-8	CD34	Collagen IV	D2-40	MS Actin	CD10	S-100	CD99
Spindle Cell Squamous Carcinoma	+	-	-	-	-	+	-	-	-	-
Spindle Cell Melanoma	-	+	-	-	-	+	-	-	+	-
Atypical Fibroxanthomas	-	-	-	-	-	-	+	+	-	+
DFSP	-	-	-	+	-	-	-	+/-	-	-
DF-FH	-	-	-	-	-	-	-	+	-	-
Peripheral Nerve Sheath	+	-	-	-	-	+	+	-	+/-	+
Smooth Muscle	-	-	-	-	-	-	+	-	-	-/+
Angiosarcoma	-	+	-	+	+/-	+/-	-	-	-	-
Glomus Tumor	-	-	-	+/-	+	-	+	-	-	-
Solitary Fibrous Tumor	-	-/+	-	+	-	-	-	-	-	+/-
Hemangioma	-	+	-	+	+	-	-	-	-	-
Hemangioendothelioma	+	+	-	+	-	-	-	-	-	-
Kaposi's Sarcoma	-	+	+	+	+/-	+	-	-	-	-

Reference

1. Moll R, et al. Histochem Cell Biol. 2008; 129:705-33.
2. Skinnider B. Am J Surg Pathol. 2005; 29:747-54.



Cytokeratin 14 (LL002)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45197	IMPATH Cytokeratin 14 RTU M (LL002)	50 Tests
44266	Cytokeratin 14 RTU M (LL002)	7 ml Ready To Use
44553	Cytokeratin 14 0,1 M (LL002)	100 µl liquid Concentrated
44554	Cytokeratin 14 1 M (LL002)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Squamous Cell Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_3

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

The cytokeratin14 gene encodes a member of the keratin family, the most diverse group of intermediate filaments. This gene product, a type I (acidic) keratin, is usually found as a heterotetramer with two keratin 5 molecules, keratin 5 being a type II (basic) keratin. Together they form the cytoskeleton of epithelial cells. Mutations in the genes for these keratins are associated with epidermolysis bullosa simplex. Cytokeratin 14 (CK 14) is a 50 kD polypeptide found in basal cells of squamous epithelia, some glandular epithelia, myoepithelium, and mesothelial cells.

Anti-CK 14 has been demonstrated to be useful in differentiating squamous cell carcinomas from other epithelial tumors, particularly those which are poorly differentiated; it may be used in combination with antibodies against p63 and CK 5&6. Anti-CK 14 is one of the specific basal markers for distinguishing between basal and nonbasal subtypes of breast carcinomas. Anti-CK 14 is also a good marker for differentiation of intraductal from invasive salivary duct carcinoma by the positive staining of basal cells surrounding the in-situ neoplasm as well as for differentiation of benign prostate from prostate carcinoma. Furthermore, this antibody has been useful in separating oncocytic tumors of the kidney from its renal mimics, and in identifying metaplastic carcinomas of the breast.

Prostate: Malignant vs. Benign

	CK 14	PSA/PSAP	Androgen Receptor	P504s	CK, 34βE12	p63	CK 5
Prostate Carcinoma	-	+	+	+	-	-	-
Benign Prostate	+	+	+	-/+	+	+	+

Myoepithelial Tumor: Malignant vs. Benign

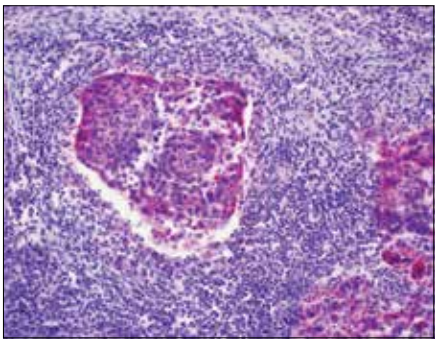
	CK 14	CK Cocktail	MS Actin	Calponin	SM Myosin	S-100	GFAP	EMA	p63	Desmin
Malignant Myoepithelioma	+	+	+	+	+	+	+/-	+	-	-
Benign Myoepithelium	+	+	+	+	+	+	+	+	+	-

Breast Carcinoma

	CK 14	CK 7	CK 20	ER/PR	CA15-3	CA19-9	p63	CD117	CK 5	CD44
Infiltrating Ductal Carcinoma	-	+	-	+	+	-	-	-	-	+
Adenoid Cystic Carcinoma	-	+	-	-	+	+	+	+	+	-

Reference

1. Reis-Filho JS, et al. Appl Immunohistochem Mol Morphol. 2003 Mar; 11(1):1-8.
2. Chu PG, et al. Histopathology. 2001 Jul; 39(1):9-16.
3. Chu PG, Weiss LM. Histopathology. 2001 Nov; 39(5):455-62.



Cytokeratin 17 (Ks 17.E3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45198	IMPATH Cytokeratin 17 RTU M (Ks 17.E3)	50 Tests
44267	Cytokeratin 17 RTU M (Ks 17.E3)	7 ml Ready To Use
44555	Cytokeratin 17 0,1 M (Ks 17.E3)	100 µl liquid Concentrated
44556	Cytokeratin 17 1 M (Ks 17.E3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Breast, Cervix immature metaplasia
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Cytokeratin 17 (CK 17) is expressed in epithelial cells of various origins, such as bronchial epithelial cells and skin appendages. It may be considered as “epithelial stem cell” marker because CK 17 antibody marks basal cell differentiation. CK 17 can be useful when included in a panel of antibodies against TTF-1, napsin A, CK 5&6, p63, and SOX-2 for diagnostic differentiation between lung adenocarcinoma (LADC) and lung squamous cell carcinoma (SCLC), especially for poorly-differentiated lung carcinoma. CK 17 is expressed in SCLC much higher than in LADC. In breast carcinomas, approximately 20% of patients show no expression of ER, PR and Her2, which are defined as triple negative tumor. Eighty-five percent of the triple negative breast carcinomas immunoreact with basal cytokeratins including anti-CK 17. Also important is that cases of triple negative breast carcinoma with expression of CK 17 show an aggressive clinical course. The histologic differentiation of ampullary cancer, intestinal vs. pancreatobiliary, is very important for treatment. Usually anti-CK 17 and anti-MUC1 immunoreactivity represents pancreatobiliary subtype whereas anti-MUC2 and anti-CDX-2 positivity defines intestinal subtype.

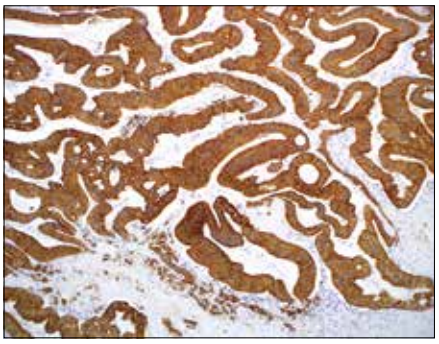
Cervix Neoplasia			
	CK 17	p16	CK 8
CIN I	+/-	+	-/+
CIN II	+	+	-/+
CIN III	+	+	+

Ampullary Cancer				
	CK 17	MUC1	CDX-2	MUC2
Intestinal Subtype	-	-	+	+
Ductal	+	+	-	-

Ampullary Carcinoma: Enteric vs. Ductal			
	CK 17	Hep-Par1	CDX-2
Enteric	-	+	-
Ductal	+	-	-/+

Reference

1. Regauer S, Reich O. Histopathology. 2007 Apr; 50(5):629-35.
2. Chu PG, Schwarz RE, Lau SK, Yen Y, Weiss LM. Am J Surg Pathol. 2005 Mar; 29(3):359-67.
3. Cohen-Kerem R, Madah W, et al. Ann Otol Rhinol Laryngol. 2004 Oct; 113(10):821-7.
4. Martens JE, Arends J, et al. Anticancer Res. 2004 Mar-Apr; 24(2B):771-5.



Cytokeratin 19 (A53-B/A2.26)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45199	IMPATH Cytokeratin 19 RTU M (A53-B/A2.26)	50 Tests
44268	Cytokeratin 19 RTU M (A53-B/A2.26)	7 ml Ready To Use
44557	Cytokeratin 19 0,1 M (A53-B/A2.26)	100 µl liquid Concentrated
44558	Cytokeratin 19 1 M (A53-B/A2.26)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Bladder, Colon, Colon carcinoma, Thyroid carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-cytokeratin 19 reacts with a wide variety of epithelia and epithelial malignancies including adenocarcinomas of the colon, stomach, pancreas, biliary tract, liver, and breast. Perhaps the most useful application is the identification of thyroid carcinoma of the papillary type, although follicular carcinoma is also labeled by this antibody approximately 50%-60% of the time.

Thyroid: Malignant vs. Benign

	CK 19	Thyroglobulin	Calcitonin	Galectin-3	TTF-1	HBME-1
Papillary Carcinoma	+	+	-	+	+	+
Follicular Carcinoma	-/+	+	-	+	+	+/-
Medullary Carcinoma	+/-	-	+	-	+	+
Benign Thyroid	-	+	-	-	+	-

Cutaneous Neoplasm

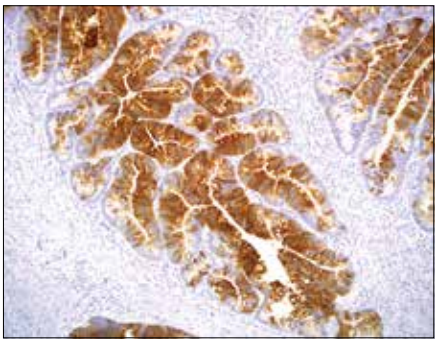
	CK 19	CD10	Androgen Receptor	CK 20	CD34	Ber-EP4	BCL2
Basal Cell Carcinoma	+	+	+	-	-	+	+
Trichoepithelioma	+	-	-	+	+	+	+
Merkel Cell Carcinoma	+	-	-	+	-	+	+
Microcystic Adnexal Carcinoma		+/-	-	-	-	-/+	+
Sebaceous Carcinoma	-	+/-	+	-	-	+	+/-
Sebaceous Adenoma	-	-	+	-	-	+	+

Pancreas

	CK 19	Synapto-physin	Chromo-granin A	E-cadherin	CD10	Gastrin	CA19-9	CD56	β-Catenin	S100P
Neuroendocrine Tumor	+/-	+	+	-	-	+/-	+/-	+	+	-
Solid Pseudopapillary Tumor	-	+	-	+(nuclear)	+	-	-	+	+	-
Ductal Carcinoma	+	-	-	+/-	+/-	-	+	-	+/-	+
Acinic Cell Carcinoma	+	-	-	+	+/-	-	-/+	-	+	-
Pancreatoblastoma	-	-	+	-	-	-	-	+	+	-
Normal Pancreas	-	+	+	-	-	-	-	-	+	-

Reference

1. Zubair W, et al. Hum Pathol. 30:1166-1171.



Cytokeratin 20 (Ks20.8)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45139	IMPATH Cytokeratin 20 RTU M (Ks20.8)	50 Tests
44269	Cytokeratin 20 RTU M (Ks20.8)	7 ml Ready To Use
44559	Cytokeratin 20 0,1 M (Ks20.8)	100 µl liquid Concentrated
44560	Cytokeratin 20 1 M (Ks20.8)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Colon Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

This antibody reacts primarily with gastric and intestinal epithelium, urothelium, and Merkel cells. Anti-cytokeratin 20 is useful in the differentiation of specific types of simple epithelial cells of the urinary tract as well as normal and malignantly transformed epithelia. Studies have identified the presence of cytokeratin 20 in adenocarcinomas of the colon, stomach, pancreas, and biliary system. Additionally, mucinous ovarian tumors, transitional cell, and Merkel cell carcinomas have shown reactivity. In contrast, squamous cell carcinomas and adenocarcinomas of the breast, lung, and endometrium, non-mucinous tumors of the ovary, and small cell carcinomas are non-reactive.

Bladder: Dysplasia vs. Reactive

	CK 20	p53	CD44	Ki-67
Carcinoma-in-situ	+	+	-	+
Reactive Atypia	-	-	+	+
Normal Urothelium	+	-	+(basal layer)	-

Carcinomas

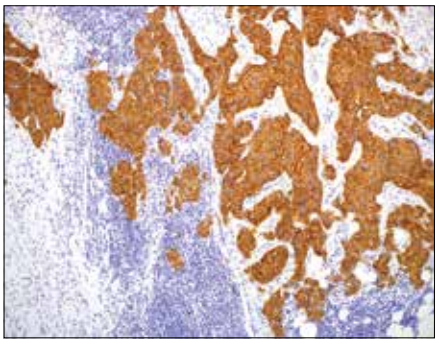
	CK 20	CK Cocktail	CK 7	CD10	β-Catenin	CK 5	p63	CEA	CDX-2	Villin
Lung Adenocarcinoma	-	+	+		-	-	-	+	-	-
Colorectal Adenocarcinoma	+	+	-	+	+	-	-	+	+	+
Transitional Cell Carcinoma	+	+	+	+	-	+	+	-	-	-
Squamous Cell Carcinoma	-	+	-	-	-	+	+	-	-	-

Cutaneous Neoplasm

	CK 20	CD10	Androgen Receptor	CD34	Ber-EP4	BCL2	CK 19
Basal Cell Carcinoma	-	+	+	-	+	+	+
Trichoepithelioma	+	-	-	+	+	+	+
Merkel Cell Carcinoma	+	-	-	-	+	+	+
Microcystic Adnexal Carcinoma	-	+/-	-	-	-/+	+	
Sebaceous Carcinoma	-	+/-	+	-	+	+/-	-
Sebaceous Adenoma	-	-	+	-	+	+	-

Reference

1. Moll R, et al. Histochem Cell Biol. 2008; 129:705-33.



Cytokeratin Cocktail (AE1 & AE3)

Mouse Cocktail Antibody

Cat. No.	Description	Volume
45140	IMPATH Cytokeratin Cocktail RTU M (AE1 & AE3)	50 Tests
44277	Cytokeratin Cocktail RTU M (AE1&AE3)	7 ml Ready To Use
44575	Cytokeratin Cocktail 0,1 M (AE1&AE3)	100 µl liquid Concentrated
44576	Cytokeratin Cocktail 1 M (AE1&AE3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Breast, Colon, Lung, Skin
Stability Up to 36 mo. at 2-8°C
Isotype IgG1/k & IgG1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-cytokeratin cocktail, (AE1 & AE3) is well-suited to distinguish epithelial carcinoma from non-epithelial malignancies and is used to aid epithelial tumor classification. This antibody has been used to characterize the source of various neoplasms and to study the distribution of keratin containing cells in epithelia during normal development and during the development of epithelial neoplasms. This antibody stains cytokeratins present in normal and abnormal human tissues and has shown high sensitivity in the recognition of epithelial cells and carcinomas.

Small, Round Blue Cell Tumors

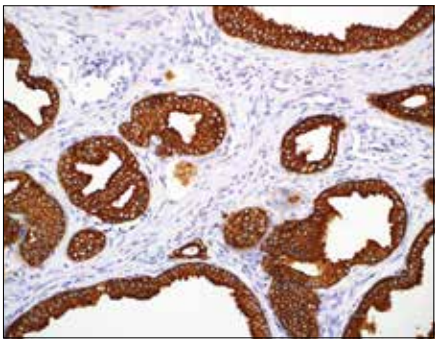
	CK Cocktail	MS Actin	SM Actin	Myogenin	CD99	CD57	FLI-1	CD45	Vimentin	INI-1
Lymphoblastic Lymphoma	-	-	-	-	+	-	+	+	+	+
Rhabdomyosarcoma	-	-/+	-/+	+	-	-	-	-	+	+
Neuroblastoma	-	-	-	-	-	+	-	-	+	+
Embryonal Carcinoma	+	-	-	-	-	+	-	-	-	+
PNET/ES	-/+	-	-	-	+	+	+	-	+	+
DSRCT	+	-	-	-	-	+/-	+	-	+	+
Medulloblastoma	-	-	-	-	-	+	-	-	-	+

Soft Tissue Tumor

	CK Cocktail	S-100	MS Actin	SM Actin	CD34	TLE-1	A1AT	CD99	TFE-3	ALK-1
Synovial Sarcoma	+	-	-	-	-	+	-	+	-	-
Epithelioid Sarcoma	+	-	-/+	-	+	-	-	-	-	-
Clear Cell Sarcoma	-	+	-	-	-	-	-	-	-	-
PNET/ES	-/+	+	-	-	-	-	-	+	-	-
Desmoplastic Small Round Cell	+	-	-	-	-	-	-	-	-	-
Myxoid Chondrosarcoma	-	+/-	-	-	-/+	-	-		-	-
Alveolar Soft Part Sarcoma	-	-	+	+	-	-	-	-	+	-
PEComa	-	-	-	+	-	-	-	-	-	-
Fibrous Histiocytoma	-	-	-	-	-	-	+	-	-	-
Inflammatory Myofibroblastic Tumor	-	-	+	+	-	-	-	-	-	+

Reference

1. Battifora H. Am J Surg Pathol. 1988; 12:24.



Cytokeratin, HMW (AE3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45301	IMPATH Cytokeratin HMW RTU M (AE3)	50 Tests
44275	Cytokeratin, HMW RTU M (AE3)	7 ml Ready To Use
44571	Cytokeratin, HMW 0,1 M (AE3)	100 µl liquid Concentrated
44572	Cytokeratin, HMW 1 M (AE3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Bladder, Prostate, Salivary gland
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-cytokeratin, high molecular weight (AE3) is capable of recognizing all basic keratins; therefore, it is a broadly reactive antibody staining most epithelia and their neoplasms. Members of the acidic and basic subfamilies are found together in pairs. Since each epithelium contains at least one acidic and one basic keratin, this antibody is used to observe the distribution of keratin-containing cells in normal epithelia and to identify neoplasms derived from such epithelium.

Carcinomas

	CK, HMW	CK 7	CK 20	CK, LMW	CK 5	TTF-1	GCDFP-15	pCEA	Hep-Par1	RCC
Hepatocellular Carcinoma	-	-	-	-	-	+ (cytoplasmic)	-	+	+	-
Renal Cell Carcinoma	-	-	-	+	-	-	-	-	-	+
Bladder Carcinoma	+	+	+	+	-	-	-	+	-	-
Salivary Gland Carcinoma	+	+	-	+	+		-	+	-	-
Thyroid Carcinoma	+	+	-	+	-	+	-	-	-	-
Spindle Cell Carcinoma	+	-	-		-		-	-	-	-
Breast Carcinoma	+	+	-	+	-	-	+	-	-	-
Lung Adenocarcinoma	+	+	-	+	-	+	-	+	-	-
Colorectal Adenocarcinoma	-	-	+	+	-	-	-	+	-	-
Prostate Adenocarcinoma	-	-	-	+	-	-	-	-	-	-
Transitional Cell Carcinoma	+	+	+	+	+	-	-	-	-	-
Ovarian Carcinoma, Non Mucinous	+	+	-	+	+	-	-	-	-	-
Pancreatic Carcinoma	+/-	+	-	+	-	-	-	+	-	-
Squamous Cell Carcinoma	+	-	-	+	+	-	-	-	-	-

Skin: Pagetoid Tumors

	CK, HMW	CK, LMW	S-100	CEA	Vimentin
Melanoma	-	-	+	-	+
Paget's Disease	-	+	-/+	+	-
Bowen's Disease	+	+	-	-	-

Reference

1. Tyler CR. Arch Pathol Lab Med. 1978; 102:113.
2. Weiss RA, et al. J Cell Biol. 1984; 98:1397.

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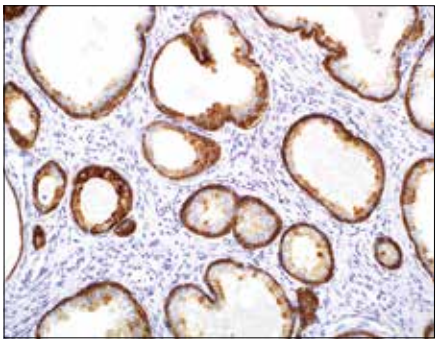


Cytokeratin, LMW (AE1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45302	IMPATH Cytokeratin LMW RTU M (AE1)	50 Tests
44276	Cytokeratin, LMW RTU M (AE1)	7 ml Ready To Use
44573	Cytokeratin, LMW 0,1 M (AE1)	100 µl liquid Concentrated
44574	Cytokeratin, LMW 1 M (AE1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Prostate, Salivary gland
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-cytokeratin, low molecular weight (AE1) labels most acidic keratins; therefore, it is a broadly reactive antibody staining most epithelia and their neoplasms. Members of the acidic and basic cytokeratin subfamilies are found together in pairs; each epithelium contains at least one acidic and one basic keratin so this antibody can show the distribution of keratin containing cells in epithelia. This antibody has shown great sensitivity and broad specificity for keratins under various conditions of fixation and staining. Anti-low molecular weight cytokeratin (AE1) is particularly suited to distinguish poorly differentiated carcinomas from non-epithelial neoplasms. This marker stains both normal and neoplastic cells of epithelial origin.

Carcinomas

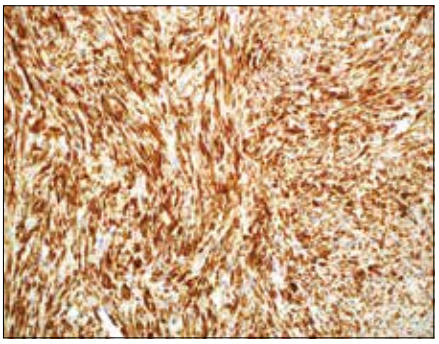
	CK, LMW	CK 7	CK 20	CK, HMW	CK 5	TTF-1	GCDFP-15	pCEA	Hep-Par1	RCC
Hepatocellular Carcinoma	-	-	-	-	-	+ (cytoplasmic)	-	+	+	-
Renal Cell Carcinoma	+	-	-	-	-	-	-	-	-	+
Bladder Carcinoma	+	+	+	+	-	-	-	+	-	-
Salivary Gland Carcinoma	+	+	-	+	+		-	+	-	-
Thyroid Carcinoma	+	+	-		-	+	-	-	-	-
Spindle Cell Carcinoma		-	-	+	-		-	-	-	-
Breast Carcinoma	+	+	-	+	-	-	+	-	-	-
Lung Adenocarcinoma	+	+	-	+	-	+	-	+	-	-
Colorectal Adenocarcinoma	+	-	+	-	-	-	-	+	-	-
Prostate Adenocarcinoma	+	-	-	-	-	-	-	-	-	-
Transitional Cell Carcinoma	+	+	+	+	+	-	-	-	-	-
Ovarian Carcinoma	+	+	-	+	+	-	-	-	-	-
Pancreatic Carcinoma	+	+	-	+/-	-	-	-	+	-	-
Squamous Cell Carcinoma	+	-	-	+	+	-	-	-	-	-

Skin: Pagetoid Tumors

	CK, LMW	CK, HMW	S-100	CEA	Vimentin
Melanoma	-	-	+	-	+
Paget's Disease	+	-	-/+	+	-
Bowen's Disease	+	+	-	-	-

Reference

1. Tyler CR. Arch Pathol Lab Med. 1978; 102:113.



Desmin (D33)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45204	IMPATH Desmin RTU M (D33)	50 Tests
44279	Desmin RTU M (D33)	7 ml Ready To Use
44580	Desmin 0,1 M (D33)	100 µl liquid Concentrated
44581	Desmin 1 M (D33)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Skeletal Muscle
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

Please refer to product insert for complete protocol.

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

Please refer to product insert for complete protocol.

Product Description

Anti-desmin detects a protein that is expressed by cells of normal smooth, skeletal, and cardiac muscles. The light microscope has suggested that desmin is primarily located at or near the periphery of Z lines in striated muscle fibrils. In smooth muscle, desmin interconnects cytoplasmic dense bodies with membrane-bound dense plaques. Anti-desmin reacts with leiomyomas, leiomyosarcoma, rhabdomyomas, rhabdomyosarcoma, and perivascular cells of glomus tumors of the skin (if they are of myogenic nature). This antibody is used to demonstrate the myogenic components/ derivation of tumors.

Soft Tissue Tumor

	Desmin	CK Cocktail	EMA	MS Actin	SM Actin	CD34	CD99	ALK-1
Epithelioid Sarcoma	-	+	+	-/+	-	+	-	-
PNET/ES	-	-/+	-	-	-	-	+	-
Desmoplastic Small Round Cell	+	+	-	-	-	-	-	-
Myofibroblastic Tumor	+/-	-	-	+	+	-	-	+

Spindle Cell Tumors

	Desmin	β-Catenin	PGP 9.5	CD117	S-100	Myogenin	CD34	CK Cocktail	Calponin	BCL2
Spindle Cell Carcinoma	-	+/-	+	-	-	-	-	+	-	-
Neurofibroma	-	-	+	-	+	-	-	-	-	+
Rhabdomyosarcoma	+	-	-	+	-	+	-	-	-	+
Endometrial Stromal Tumor	-	+/-	+	-	-	-	-	-	+	-
Smooth Muscle	+	-	-	-	-	-	-	-	+	-
Fibromatosis	-	+	+	-	-	-	-	-	-	-
GIST	-	-	-	+	-	-	+	-	-	+
Schwannoma	-	-	-	-	+	-	-	-	-	+
Leiomyosarcoma	+	-	-	-	-	+/-	-	-/+	+	-
MPNST	-	-	+		+	-	-/+	-		+(focal)

Reference

1. Altmannsberger M, et al. Am J Pathol. 1985; 118:85-95.
2. Attanoos RL, et al. Histopathology. 2003 Sep; 43(3):231-8.

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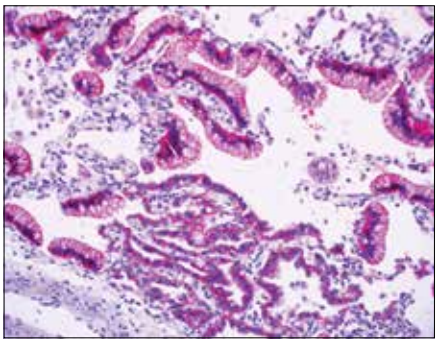


E-cadherin (EP700Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45283	IMPATH E-cadherin RTU R (EP700Y)	50 Tests
44281	E-Cadherin RTU R (EP700Y)	7 ml Ready To Use
44584	E-Cadherin 0,1 R (EP700Y)	100 µl liquid Concentrated
44585	E-Cadherin 1 R (EP700Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Breast
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

E-cadherin is an adhesion protein that is expressed in cells of epithelial lineage. Anti-E-cadherin stains positively in glandular epithelium as well as adenocarcinomas of the lung, G.I. tract, and ovary. Another application involves the differentiation of ductal (which stains positive) vs. lobular cancer of the breast. It has also been shown to be positive in some thyroid carcinomas Loss of E-cadherin expression has been suggested as a poor prognostic sign in breast carcinoma and non-small cell lung carcinoma.

Small Cell Carcinoma vs. Merkel Cell Carcinoma

	E-cadherin	TTF-1	CEA	CK 20	Chromo-granin A	Neuro-filament	CD117	Synapto-physin
Merkel Cell Carcinoma	+(nuclear)	-	-	+	+	+	+	+
Small Cell Carcinoma	-	+	-	-	-	-	+/-	+

Breast Carcinoma

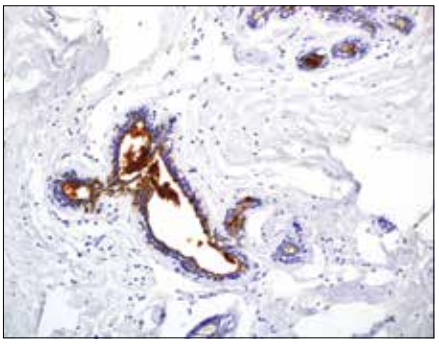
	E-cadherin	GCDFP-15	Mammaglobin	β-Catenin	CK, 34βE12	p120
Lobular	-	+	+	-	+	+(cytoplasmic)
Ductal	+	+	+	+(membranous)	-	+(membranous)

Pancreas

	E-cadherin	Synapto-physin	Chromo-granin A	CD10	Gastrin	CK 19	CA19-9	CD56	β-Catenin	S100P
Neuroendocrine Tumor	-	+	+	-	+/-	+/-	+/-	+	+	-
Solid Pseudopapillary Tumor	+(nuclear)	+	-	+	-	-	-	+	+	-
Ductal Carcinoma	+/-	-	-	+/-	-	+	+	-	+/-	+
Acinic Cell Carcinoma	+	-	-	+/-	-	+	-/+	-	+	-
Pancreatoblastoma	-	-	+	-	-	-	-	+	+	-
Normal Pancreas	-	+	+	-	-	-	-	-	+	-

Reference

1. Han AC, et al. Hum Pathol. 1997 Jun; 28/(6):641-5.
2. Simsir A, et al. Diagn Cytopathol. 1999 Mar; 20(3):125-30.
3. Han AC, et al. Cancer. 1999 Apr 25; 87(2):83-6.



EMA (E29)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45205	IMPATH EMA RTU M (E29)	50 Tests
44282	EMA RTU M (E29)	7 ml Ready To Use
44586	EMA 0,1 M (E29)	100 µl liquid Concentrated
44587	EMA 1 M (E29)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Breast, Skin
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-EMA is a useful marker for staining many carcinomas. It stains normal and neoplastic cells from various tissues, including mammary epithelium, sweat glands, and squamous epithelium. Hepatocellular carcinoma, adrenal carcinoma, and embryonal carcinomas are consistently EMA negative, so keratin positivity with negative EMA favors one of these tumors. Anti-EMA is frequently positive in meningioma, which can be useful when distinguishing it from other intracranial neoplasms, e.g. Schwannomas.

Hodgkin vs. Non-Hodgkin Lymphomas

	EMA	CD79a	CD15	CD30	Fascin	Granzyme B	BCL6	PU.1	MUM1	ALK-1
Hodgkin Lymphoma, Classic	-	-	+	+	+	-	-	-	+	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	+	+	-	-	-	-	+	+	-/+	-
T-cell Rich LBCL	-	+	-	-	-	-	+	-	+	-
Anaplastic LCL	+	-	-	+	-	+	+/-	-	-	+

Skin: Adnexal Tumors

	EMA	CK 7	CK 20	S-100	GCDFP-15	CD15
Merkel Cell Carcinoma	+	-	+	-	-	-
Sebaceous Tumor	-	+	-	-	-	+
Apocrine Tumor	+/-	+	-	-	+	+/-
Eccrine Tumor	+	+	-	+	-	-

Skin: Basal vs. Squamous Cell Carcinoma

	EMA	CK Cocktail	Ep-CAM	BCL2
Basal Cell Carcinoma	-	+	+	+
Squamous Cell Carcinoma	+	+	-	-

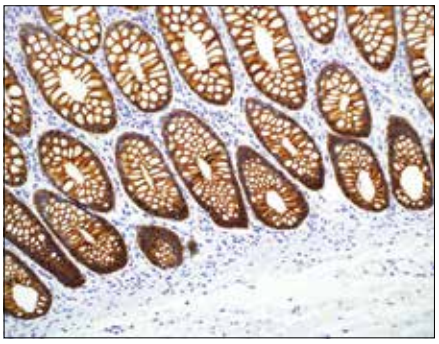
Brain: CNS Tumors

	EMA	INI-1	Neurofilament	S-100	CK Cocktail	Vimentin
Meningioma	+	+	-	-	-	+
Rhabdoid Tumors	+	-	+	+/-	+	+

Reference

1. Pincus GS, et al. Human Pathol. 1985; 16:929-940.

A.MENARINI diagnostics



Ep-CAM/Epithelial Specific Antigen (Ber-EP4)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45648	IMPATH Ep-CAM RTU M (Ber-EP4)	50 Tests
45635	Ep-CAM RTU M (Ber-EP4)	7 ml Ready To Use
45614	Ep-CAM 0,1 M (Ber-EP4)	100 µl liquid Concentrated
45615	Ep-CAM 1 M (Ber-EP4)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Adenocarcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Ep-CAM consists of two glycoproteins, 34 and 39 kDa, sometimes designated as epithelial antigen, epithelial specific antigen, or epithelial glycoprotein. In paraffin sections, the protein is detected with mouse anti-human antibodies like anti-Ber-EP4 and anti-MOC-31. The glycoproteins are located on the cell membrane surface and in the cytoplasm of virtually all epithelial cells with the exception of most squamous epithelia, hepatocytes, renal proximal tubular cells, gastric parietal cells, and myoepithelial cells. In liver lesions like hepatitis and cirrhosis, the hepatocytes frequently become anti-Ep-CAM positive. Normal mesothelial cells are anti-Ep-CAM negative, but may express focal reaction when undergoing reactive changes. Ep-CAM is found in the large majority of adenocarcinomas of most sites (50%-100% in various studies) as well as in neuroendocrine tumors, including small cell carcinoma. Renal cell carcinoma and hepatocellular carcinoma stain with anti-Ber-EP4 in about 30% of cases. Basal cell and basosquamous carcinoma are anti-Ber-EP4 positive in almost all cases. Malignant mesothelioma (epithelioid and biphasic) is anti-Ber-EP4 positive in 4%-26% of the cases. The staining is usually focal, but may occasionally be widespread. Synovial sarcoma (epithelioid and biphasic) and desmoplastic small round cell tumor stain with anti-Ber-EP4 in most cases. Seminoma, embryonal carcinoma, yolk sac tumor, and choriocarcinoma reveal anti-Ber-EP4 positivity in a minor proportion of cases. The lack of reactivity in the majority of malignant mesotheliomas can, in an appropriate panel, be utilized to discriminate between this tumor and adenocarcinoma.

Pleura: Adenocarcinoma vs. Mesothelioma

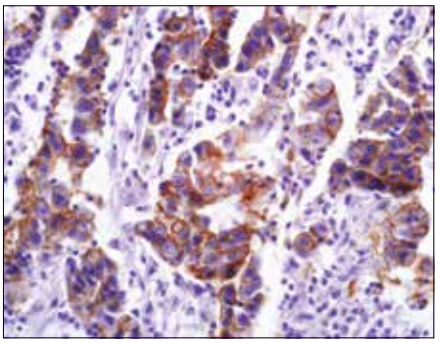
	Ber-EP4	Calretinin	CK 5&6	D2-40	HBME-1	Caldesmon	CEA	TAG-72	E-cadherin	TTF-1
Adenocarcinoma	+	-	-	-	-	-	+	+	+	+
Mesothelioma	-	+	+	+	+	+	-	-	-	-

Carcinomas

	Ber-EP4	MOC-31	Hep-Par1	CK Cocktail	CK, 34βE12	CAM 5.2	CK 19
Basal Cell Carcinoma	+	+/-	-	+	+	+/-	-
Skin Squamous Carcinoma	-	-/+	-	+	+	-	-
Merkel Cell Carcinoma	+	+	-	+	-/+	+	-
Hepatocellular Carcinoma	-	-	+	-	-	+	-
Cholangio Carcinoma	+	+	-	+	+	+	+
Sarcomatoid Carcinoma	+	-	-	+	+	+/-	-

Reference

1. Latza, et al. J Clin Pathol. 1990; 43:213-19.
2. Ma, et al. Am J Clin Pathol. 1993; 99(5):551-7.
3. Carella, et al. Am J Surg Pathol. 2001; 25(1):43-50.



Ep-CAM/Epithelial Specific Antigen (MOC-31)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44283	EP-CAM RTU M (MOC-31)	7 ml Ready To Use
44588	EP-CAM 0,1 M (MOC-31)	100 µl liquid Concentrated
44589	EP-CAM 1 M (MOC-31)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Colon Adenocarcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Anti-MOC-31 reacts with a transmembrane glycoprotein present on most glandular epithelium and tumors originating from such epithelium. This antibody has been used to distinguish adenocarcinoma from mesothelioma and hepatocellular carcinoma. This antibody is also useful in distinguishing serous carcinomas of the ovary from mesothelioma.

Colon vs. Ovarian Carcinoma

	MOC-31	CK 7	CK 20	CEA	CDX-2	Villin	CA19-9	WT1	CA-125	CK 5
Ovarian Carcinoma, Serous	+	+	-	+	-	+	+	+	+	-
Ovarian Carcinoma, Mucinous	+	+	-	-	+	+	+	-	-	
Ovarian Endometrioid Carcinoma	+	+	-	-	-		+/-	+	+	-
Colon Carcinoma	+	-	+	+	+	+	+	-	-	-

Kidney: Renal Epithelial Tumors

	MOC-31	RCC	CD10	PAX-2	Vimentin	Ksp-cadherin	Parvalbumin	CD117
Clear Cell RCC	-	+	+	+	+	-	-	-
Chromophobe RCC	+	-/+	-/+	+	-	+	+	+
Oncocytoma	-	-	+/-	+	-	+/-	+	+

Skin: Basal vs. Squamous Cell Carcinoma

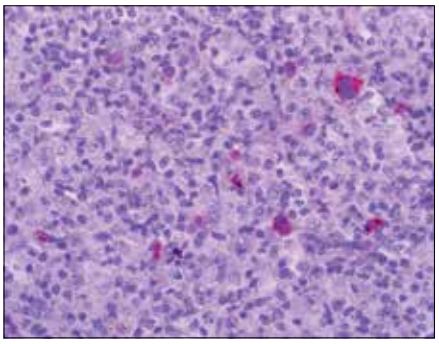
	MOC-31	CK Cocktail	EMA	BCL2
Basal Cell Carcinoma	+/-	+	-	+
Squamous Cell Carcinoma	-/+	+	+	-

Pleura: Adenocarcinoma vs. Mesothelioma

	MOC-31	Calretinin	CK 5&6	D2-40	HBME-1	Caldesmon	CEA	TAG-72	E-cadherin	TTF-1
Adenocarcinoma	+	-	-	-	-	-	+	+	+	+
Mesothelioma	-	+	+	+	+	+	-	-	-	-

Reference

1. Kakar S, et al. Arch Pathol Lab Med. 2007 Nov; 131(11):1648-54. Review.
2. King JE, et al. Histopathology. 2006 Feb; 48(3):223-32. Review.



Epstein-Barr Virus (MRQ-47)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45206	IMPATH Epstein-Barr Virus RTU R (MRQ-47)	50 Tests
44284	Epstein-Barr Virus RTU R (MRQ-47)	7 ml Ready To Use
44590	Epstein-Barr Virus 0,1 R (MRQ-47)	100 µl liquid Concentrated
44591	Epstein-Barr Virus 1 R (MRQ-47)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control EBV infected tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

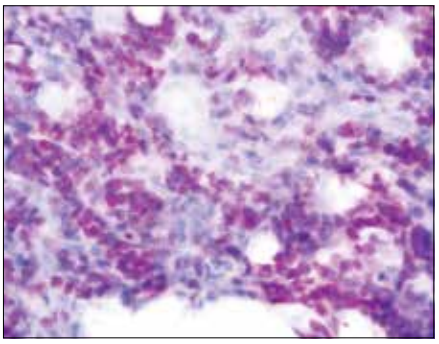
**Please refer to product insert for complete protocol.*

Product Description

Anti-Epstein-Barr virus targets the 60 kDa latent membrane protein (LMP-1) encoded by the BNLF1 gene of the Epstein-Barr virus. There is cross-reactivity with Reed-Sternberg cells of Hodgkin disease. The Epstein-Barr virus is an important cause of infectious mononucleosis and has been associated with oral carcinomas.

Reference

1. Margaret L, et al. J. Mol Diag. 2008; 10(4):279-291.
2. Vinay Kumar, et al. Robbins Basic Pathology. 2007; 8th edition 212-213; 458- 459.
3. Antonino Carbone, et al. The Oncologist. 2008; 13:577-585.



Estrogen Receptor (EP1†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44285	Estrogen Receptor RTU R (EP1)	7 ml Ready To Use
44592	Estrogen Receptor 0,1 R (EP1)	100 µl liquid Concentrated
44593	Estrogen Receptor 1 R (EP1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Breast, Endometrium
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

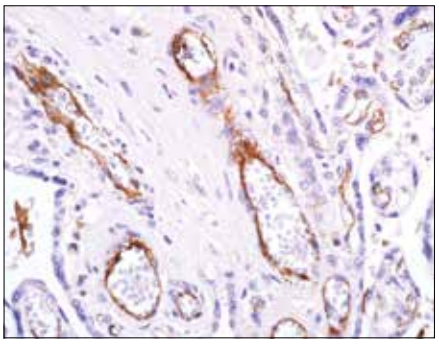
**Please refer to product insert for complete protocol.*

Product Description

Anti-estrogen receptor reacts with a 67 kDa polypeptide. This antibody stains nuclei of breast epithelial cells and some carcinomas, as well as endometrial epithelia and myometrium.

Reference

1. Li X, et al. Mol Cell Bio. 2004; 24 (17):7681-94.
2. Vassallo J, et al. Appl Immunohistochem Moi Morphol. 2004; 12:177-182.
3. Rossi S, et al. Am J ClinPathol. 2005; 124:295-302.
4. Huang Z, et al. Appl Immunohistochem Moi Morphol. 2005; 13:91-95.
5. Treaba DO, et al. Mod Pathol. 2005 (suppl 1); 18:53A.
6. Harvey, et al. J Clin Oncol. 1999; 17:1474-1481.
7. Cheang CU, et al. J Clin Oncol. 2006; 24:5637-5644.
8. Pertschuk LP, et al. Cancer. 1996; 77:2514-2519.



Factor VIII-R Ag. (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45207	IMPATH Factor VIII RTU R (Poly)	50 Tests
44286	Factor VIII RTU R (Poly)	7 ml Ready To Use
44594	Factor VIII 0,1 R (Poly)	100 µl liquid Concentrated
44595	Factor VIII 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Placenta
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

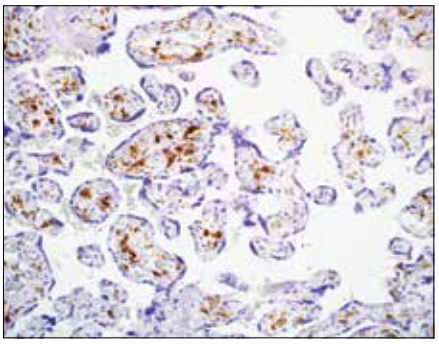
Anti-factor VIII-related antigen reacts with endothelial cells. This antibody has helped to establish the endothelial nature of some lesions of disputed histogenesis, e.g. Kaposi's sarcoma and cardiac myxoma. This antibody is widely used for differentiating vascular lesions from those of other tissue differentiation within a panel of other vascular markers although not all tumors of endothelial differentiation react with this antigen.

Skin: Spindle Cell Tumors

	Factor VIII	FLI-1	HHV-8	D2-40	SM Actin	MS Actin	NGFR	CD10	CK Cocktail	S-100
Spindle Squamous Cell Carcinoma	-	-	-	+	-	-	-	-	+	-
Spindle Cell Melanoma	-	+	-	+	-	-	+	-	-	+
Atypical Fibroxanthomas	-	-	-	-	+	+	-	+	-	-
Peripheral Nerve Sheath	-	-	-	+	-	+	-	-	-	+/-
Smooth Muscle	-	-	-	-	+	+	-	-	-	-
Angiosarcoma	+	+	-	+/-	-	-	-	-	-	-
Hemangioma	+	+	-	-	+	-	-	-	-	-
Kaposi's Sarcoma	+	+	+	+	+	-	-	-	-	-

Reference

1. Wick MR, et al. Lab Invest. 1985; 52:75A.
2. Bhawan J, et al. Cancer. 1985; 55:570-576.
3. Ansell J, et al. Cancer. 1982; 50:1506-1512.
4. Fulling KH, et al. Cancer. 1983; 51:1107-1118.
5. Bian XW, et al. Anal Quant Cytol Histol. 2000 Jun; 22(3):267-74.
6. Yamamoto T, et al. Pathol Int. 1996 May; 46(5):364-71.
7. Zatterstrom UK, et al. Head Neck. 1995 Jul-Aug; 17(4):312-8.



Factor XIIIa (EP3372†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44287	Factor XIIIa RTU R (EP3372)	7 ml Ready To Use
44596	Factor XIIIa 0,1 R (EP3372)	100 µl liquid Concentrated
44597	Factor XIIIa 1 R (EP3372)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Dermatofibroma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Factor XIIIa is a blood proenzyme that has been identified in platelets, megakaryocytes, and fibroblast-like mesenchymal or histiocytic cells present in the placenta, uterus, and prostate; it is also present in monocytes, macrophages, and dermal dendritic cells. Anti-factor XIIIa has been found to be useful in differentiating between dermatofibroma (90% (+)), dermatofibrosarcoma protuberans (25%(+)), and desmoplastic malignant melanoma (0%(+)). Anti-factor XIIIa positivity is also seen in capillary hemangioblastoma (100%(+)), hemangioendothelioma (100%(+)), hemangiopericytoma (100%(+)), xanthogranuloma (100%(+)), xanthoma (100%(+)), hepatocellular carcinoma (93%(+)), glomus tumor (80%(+)), and meningioma (80 % (+)).

Melanotic Lesions

	Factor XIIIa	S-100	HMB-45	MART-1	Tyrosinase	MiTF	CD63	WT1	SOX-10
Junctional Nevus	-	+	+	+	+	+	-	+/-	
Primary Melanoma	-	+	+	+	+	+	+		+
Metastatic Melanoma	-	+	+	+	+	+	+	+	+
Adrenal Cortical	-	+	-	+	-	-	-		
Dermatofibroma	+	-	-	-	-	-	-		

Skin: Spindle Cell Tumors

	Factor XIIIa	MS Actin	CD10	SM Actin	CD34	NGFR	CD99	A1ACT	A1AT
Atypical Fibroxanthomas	+/-	+	+	+	-	-	+	+	+
Dermatofibrosarcoma Protuberans	-	-	+/-	-	+	+	-	-	-
Dermatofibroma Fibrous Histiocytoma	+	-	+	-	-	-	-	-	-

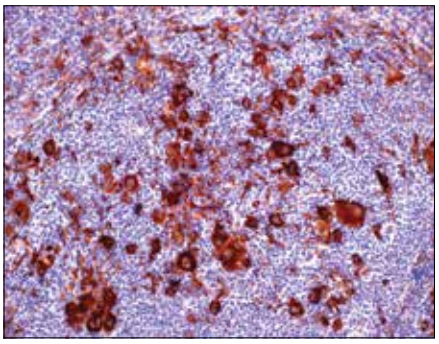
Histiocytic Proliferation

	Factor XIIIa	S-100	CD68	Vimentin	Lysozyme	CD1a	HAM-56
Juvenile Xanthogranuloma	+	-	+	+	+	-	+
Langerhans Cell Histiocytosis	-	+	+	+	+	+	+
Dermatofibroma	+	-	+	+	-	-	-

Reference

1. Abenoza P, Lillemoe T. Am J Dermatopathol. 1993 Oct; 15(5):429-34.
2. Anstey A, Cerio R, et al. Am J Dermatopathol. 1994 Feb; 16(1):14-22.
3. Glusac EJ, Barr RJ, et al. Am J Surg Pathol. 1994 Jun; 18(6):583-90.

A.MENARINI diagnostics



Fascin (55k-2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45209	IMPATH Fascin RTU M (55k-2)	50 Tests
44288	Fascin RTU M (55K-2)	7 ml Ready To Use
44598	Fascin 0,1 M (55k-2)	100 µl liquid Concentrated
44599	Fascin 1 M (55k-2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Hodgkin Lymphoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

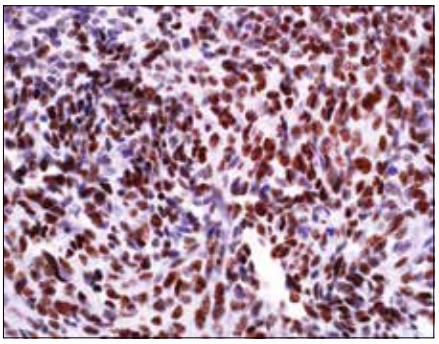
Anti-fascin is a very sensitive marker for Reed-Sternberg cells and variants in nodular sclerosis, mixed cellularity, and lymphocyte depletion Hodgkin disease. It is uniformly negative in lymphoid cells, plasma cells, and myeloid cells. Anti-fascin is positive in dendritic cells. This marker may be helpful to distinguish between Hodgkin lymphoma and non-Hodgkin lymphoma in difficult cases. Also, the lack of expression of fascin in the neoplastic follicles in follicular lymphoma can be helpful in distinguishing these lymphomas from reactive follicular hyperplasia in which the number of follicular dendritic cells is normal or increased. Anti-fascin has been suggested as a prognostic marker in neuroendocrine neoplasms of the lung as well as in ovarian cancer.

Hodgkin vs. Non-Hodgkin Lymphomas

	Fascin	CD79a	CD15	CD30	Granzyme B	BCL6	PU.1	MUM1	ALK-1	EMA
Hodgkin Lymphoma, Classic	+	-	+	+	-	-	-	+	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	-	+	-	-	-	+	+	-/+	-	+
T-cell Rich LBCL	-	+	-	-	-	+	-	+	-	-
Anaplastic Large Cell Lymphoma	-	-	-	+	+	+/-	-	-	+	+

Reference

1. Pincus GS, et al. American Journ of Path. 150(2):543-562.
2. Pelosi G, et al. Lung Cancer. 2003 Nov; 42(2):203-13.
3. Goncharuk VN, et al. J Cutan Pathol. 2002 Aug; 29(7):430-8.
4. Kempf W, et al. J Cutan Pathol. 2002 May; 29(5):295-300.
5. Kraus MD, et al. Am J Dermatopathol. 2001 Apr; 23(2):104-11.
6. Hu W, et al. Clin Exp Metastasis. 2000; 18(1):83-8.
7. Chu Pg Ann. Diagn Pathol. 1999 Apr; 3(2):104-33.



FLI-1 (MRQ-1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44289	FLI-1 RTU M (MRQ-1)	7 ml Ready To Use
44600	FLI-1 0,1 M (MRQ-1)	100 µl liquid Concentrated
44601	FLI-1 1 M (MRQ-1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Primitive neuroectodermal tumor
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Ewing sarcoma/peripheral primitive neuroectodermal tumor (ES/pPNET) is a rare primary tumor of the bone/soft tissue that resembles other undifferentiated tumors. The differential diagnosis of undifferentiated tumors of the soft tissue includes blastemal Wilms' tumor, rhabdoid tumor, neuroblastoma, lymphoma, clear cell sarcoma, small cell carcinoma, synovial sarcoma (SS), neuroblastoma, desmoplastic small round cell tumor (DSRCT), and ES/pPNET. The Fli-1 gene and Fli-1 protein are best known for their critical role in the pathogenesis of ES/pPNET. Fli-1 is normally expressed in endothelial cells and in hematopoietic cells, including T-lymphocytes. The immunohistochemical detection of Fli-1 protein has been shown in two recent studies to be valuable in the discrimination of ES/pPNET from most of its potential mimics, with the notable exception of lymphoblastic lymphoma.

Small, Round Blue Cell Tumors

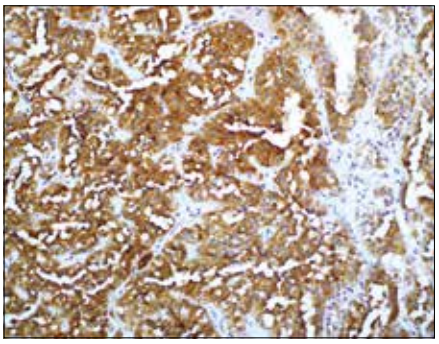
	FLI-1	MS Actin	SM Actin	Myogenin	CK Cocktail	CD99	PGP 9.5	CD45	Vimentin	CD57
Lymphoblastic Lymphoma	+	-	-	-	-	+		+	+	-
Rhabdomyosarcoma	-	-/+	-/+	+	-	-	+	-	+	-
Neuroblastoma	-	-	-	-	-	-	+	-	+	+
Embryonal Carcinoma	-	-	-	-	+	-	+	-	-	+
PNET/ES	+	-	-	-	-/+	+	+	-	+	+
DSRCT	+	-	-	-	+	-	-	-	+	+/-
Medulloblastoma	-	-	-	-	-	-		-	-	+

Skin: Spindle Cell Tumors

	FLI-1	GLUT1	CD99	Factor VIII	HHV-8	CK 8 & 18	CD34	NGFR	Collagen IV	D2-40
Spindle Cell Melanoma	+	-	-	-	-	-	-	+	-	+
Angiosarcoma	+	-	-	+	-	-	+	-	+/-	+/-
Solitary Fibrous Tumor	-/+	-	+/-	-	-	-	+	-	-	-
Hemangioma	+	+	-	+	-	-	+	-	+	-
Hemangioendothelioma	+	-	-	-	-	+	+	-	-	-
Kaposi's Sarcoma	+	-	-	+	+	-	+	-	+/-	+

Reference

1. Mhawech-Fauceglia P, et al. Histopathology. 2006 Dec; 49(6):569-75.
2. Kuroda N, et al. Med Mol Morphol. 2006 Dec; 39(4):221-5. Epub 2006 Dec 21.
3. Blind C, et al. J Clin Pathol. 2008 Jan; 61(1):79-83. Epub 2007 Apr 5.
4. Ellison DA, Parham DM, Bridge J, Beckwith JB. Hum Pathol. 2007 Feb; 38(2):205-11. Epub 2006 Nov 28.



FSH (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45216	IMPATH FSH RTU R (Poly)	50 Tests
44310	FSH RTU R (Poly)	7 ml Ready To Use
44642	FSH 0,1 R (Poly)	100 µl liquid Concentrated
44643	FSH 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pituitary
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

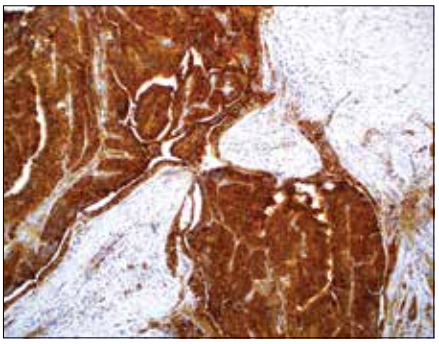
Product Description

Follicle-stimulating hormone (FSH) is a member of the pituitary glycoprotein hormone family which includes luteinizing hormone, chorionic gonadotropin, and thyroid-stimulating hormone. Follicle-stimulating hormone enables ovarian folliculogenesis to the antral follicle stage and is essential for Sertoli cell proliferation and maintenance of sperm quality in the testis. Members of the pituitary glycoprotein hormone family consist of a shared alpha chain and a beta chain encoded by a separate gene. The FSHB gene encodes the beta subunit of follicle stimulating hormone. Anti-FSH is a useful marker in classification of pituitary tumors and the study of pituitary disease. It reacts with FSH-producing cells (gonadotrophs).

Pituitary Panel						
	FSH	ACTH	GH	LH	Prolactin	TSH
Pituitary	+	+	+	+	+	+

Reference

1. Schmidt M, et al. Pathol Res Pract. 2001; 197(10):663-9.



Galectin-3 (9C4)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45142	IMPATH Galectin-3 RTU M (9C4)	50 Tests
44291	Galectin-3 RTU M (9C4)	7 ml Ready To Use
44604	Galectin-3 0,1 M (9C4)	100 µl liquid Concentrated
44605	Galectin-3 1 M (9C4)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Papillary thyroid carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

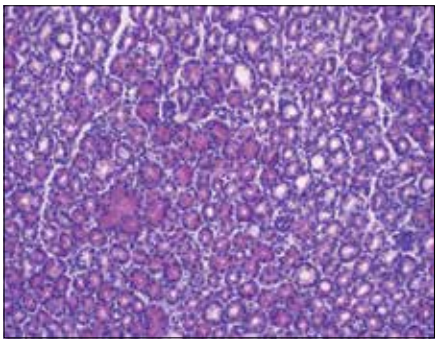
Galectin-3 is a 30 kD protein, a member of the b-galactosidase-binding lectin family. It has been implicated in processes including cell growth, adhesion, inflammation, mRNA processing, and apoptosis. It is predominantly expressed in the nucleus of epithelial and immune cells. Galectin-3 is found in neutrophils and vascular endothelium. Over-expression is related to malignant transformation and metastasis in carcinomas of the breast, colon, tongue, liver, and thyroid but is absent in thyroid adenomas. Anti-galectin-3 is utilized for differentiation between follicular adenoma, follicular carcinoma, and papillary carcinoma of the thyroid, and is best used in a panel with other markers such as anti-CK19 and anti-HBME-1. Anti-galectin-3 shows the most intense staining in the advancing tongues of minimally invasive follicular carcinoma and may be helpful in differentiating a follicular adenoma from a minimally invasive carcinoma.

Thyroid: Malignant vs. Benign

	Galectin-3	Thyroglobulin	Calcitonin	CK 19	TTF-1	HBME-1
Papillary Carcinoma	+	+	-	+	+	+
Follicular Carcinoma	+	+	-	-/+	+	+/-
Medullary Carcinoma	-	-	+	+/-	+	+
Benign Thyroid	-	+	-	-	+	-

Reference

1. Inohara H, et al. Cancer. 1999; 85:2475-84.
2. Herrmann ME, et al. Arch Pathol Lab Med. 2002; 126:710-713.
3. Papotti M, et al. European Journal of Endocrinology. 2002; 147:515-521.



Gastrin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45143	IMPATH Gastrin RTU R (Poly)	50 Tests
44292	Gastrin RTU R (Poly)	7 ml Ready To Use
44606	Gastrin 0,1 R (Poly)	100 µl liquid Concentrated
44607	Gastrin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Stomach
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

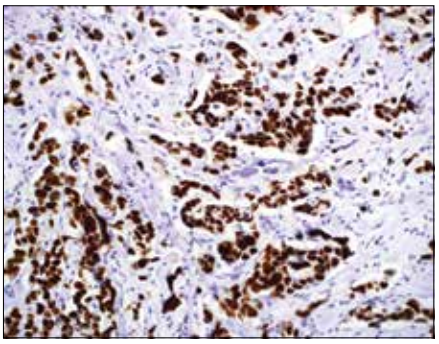
**Please refer to product insert for complete protocol.*

Product Description

Gastrin is a hormone whose main function is to stimulate secretion of hydrochloric acid by the gastric mucosa, which results in gastrin formation inhibition. This hormone also acts as a mitogenic factor for gastrointestinal epithelial cells. Gastrin has two biologically active peptide forms: G34 and G17. They activate two different receptors: the CCK-1 receptor, which has low affinity for gastrin but high affinity for the related hormone cholecystokinin (CCK), and the CCK-2 receptor, which has high affinity for both gastrin and CCK and mediates the acid-secretory as well as the proliferative effects of gastrin. More recently, gastrin has been suggested to induce leukocyte-endothelial cell interactions and to have a pro-inflammatory effect. Anti-gastrin stains G-cells of human antral/pyloric mucosa and cells producing gastrin or a structural gastrin analog as is seen in stomach; no staining of other cells or tissue types has been observed. This antibody may react with sulfated and nonsulfated forms of gastrin.

Reference

1. Kirchner T, et al. Am J Surg Path. 1987; 11:909-17.
2. Bornstein-Quevedo L, Gamboa- Dominguez A. Hum Pathol. 2001 Nov; 32(11):1252-6.
3. Herrmann ME, et al. Arch Pathol Lab Med. 2000 Jun; 124(6):832-5.



GATA3 (L50-823)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45652	IMPATH GATA3 RTU M (L50-823)	50 Tests
45639	GATA3 RTU M (L50-823)	7 ml Ready To Use
45622	GATA3 0,1 M (L50-823)	100 µl liquid Concentrated
45623	GATA3 1 M (L50-823)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Breast carcinoma, Urothelial carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

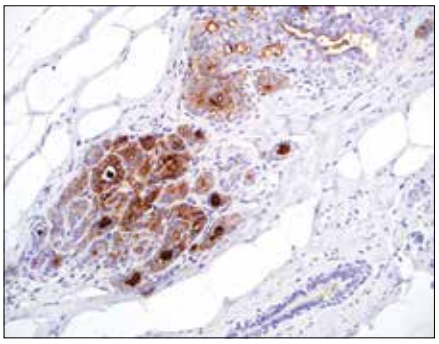
GATA3 (GATA binding protein 3 to DNA sequence [A/T]GATA[A/G]) is a zinc finger transcription factor and plays an important role in promoting and directing cell proliferation, development, and differentiation in many tissues and cell types. GATA3 expression is primarily seen in breast carcinoma and urothelial carcinoma and only rarely found in tumors from other organs, such as endometrial endometrioid adenocarcinoma. GATA3 is expressed in all breast lobular carcinomas and 91% of invasive ductal carcinomas (grade I, 100%; grade II, 89% and grade III, 86%). GATA3 expression seems to be lower in luminal B subtype breast carcinoma. It has also been reported that GATA3 expression is correlated with the status of ER, PR and Her2 in breast carcinoma. GATA3 expression is found in urothelial carcinoma, especially in invasive and high grade tumors. Therefore, anti-GATA3 can be used in a panel of antibodies for diagnosis of unknown primary carcinoma, when carcinomas of the breast or bladder are a possibility.

Carcinomas

	GATA3	S100P	PAX-8	TTF-1	Napsin A	HBME-1	CDX-2	Arginase-1	CA IX	Cadherin-17
Breast Carcinoma	+	-	-	-	-	-	-	-	+	-
Lung Adenocarcinoma	-	-	-	+	+	-	-	-	-	-
Thyroid Carcinoma	-	-	+	+	-	+	-	-		-
Gastric Adenocarcinoma	-	-	-	-	-	-	+	-		-/+
Colon Adenocarcinoma	-	-	-	-	-	-	+	-		+
Pancreatic Ductal Carcinoma	-	+	-	-	-	-	+	-		-/+
Hepatocellular Carcinoma	-	-	-	-	-	-	-	+		-
Urothelial Carcinoma	+	+	-	-	-	-	-	-		-
Renal Cell Carcinoma	-	-	+	-	-/+	-	-	-	+	-

Reference

1. Higgins JP, et al. Am J Surg Pathol. 2007; 31:673–680.
2. Liu H, et al. Am J Clin Pathol. 2012; 138:57-64.
3. Miettinen M, et al. Am J Surg Pathol. 2014; 38:13-22.



GCDFP-15 (EP1582Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45285	IMPATH GCDFP-15 RTU R (EP1582Y)	50 Tests
44300	GCDFP-15 RTU R (EP1582Y)	7 ml Ready To Use
44622	GCDFP-15 0,1 R (EP1582Y)	100 µl liquid Concentrated
44623	GCDFP-15 1 R (EP1582Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Breast Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

GCDFP-15 is a 15 kD glycoprotein which is localized in the apocrine metaplastic epithelium lining breast cysts and in apocrine glands in the axilla, vulva, eyelid, and ear canal. Approximately 70% of breast carcinomas stain positive with antibody to GCDFP-15. Anti-GCDFP-15 is the most specific marker for breast carcinoma. Colorectal carcinomas, lung carcinoma, and mesotheliomas usually do not stain with this antibody. Lung adenocarcinoma rarely stains with this antibody.

Carcinomas

	GCDFP-15	CK 7	CK 20	CK, LMW	CK, HMW	CK 5	p63	Vimentin	ER/PR	CEA
Salivary Gland Carcinoma	+	+	-	+		+	+	+	-	+
Breast Carcinoma	+	+	-	+	+	-	-	-	+	-
Sweat Gland Carcinoma	+	+	-			+	+	-	-	+

Carcinoma: Differential Diagnosis

	GCDFP-15	Androgen Receptor	BCA-225	ER/PR	Mammaglobin	PSA/PSAP	CD44
Salivary Duct Carcinoma	+	+	+	-	-	-	-
Breast Carcinoma	+	+(apocrine)	+	+/-	+	-	-
Prostate Carcinoma	-	+	-	-	-	+	+
Lung Carcinoma	-			+/-	-	-	-

Breast Lesion

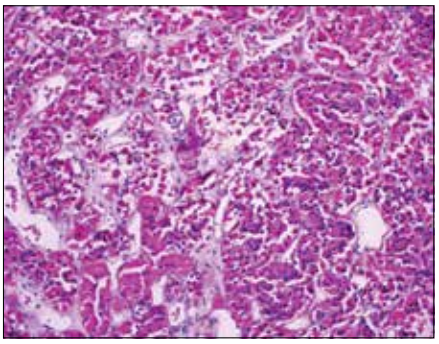
	GCDFP-15	Mammaglobin	β-Catenin	E-cadherin	CK, 34βE12	p120
Lobular	+	+	-	-	+	+(cytoplasmic)
Ductal	+	+	+(membranous)	+	-	+(membranous)

Breast vs. Lung vs. Prostate Carcinoma

	GCDFP-15	Mammaglobin	PSA	TTF-1	Napsin A
Breast Carcinoma	+	+	-	-	-
Lung Carcinoma	-	-	-	+	+
Prostate Carcinoma	-	-	+	-	-

Reference

1. Mazoujian G, Mrgolis R. Am J Dermatopathol. 1988 Feb; 10(1):28-35.
2. Ansai S, et al. Am J Dermatopathol. 1995 Jun; 17(3):249-55.



GH (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45210	IMPATH GH RTU R (Poly)	50 Tests
44293	GH RTU R (Poly)	7 ml Ready To Use
44608	GH 0,1 R (Poly)	100 µl liquid Concentrated
44609	GH 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pituitary
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

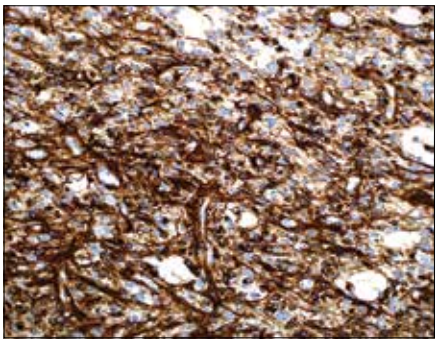
Pituitary growth hormone (GH) plays a crucial role in stimulating and controlling the growth, metabolism and differentiation of many mammalian cell types by modulating the synthesis of multiple mRNA species. These effects are mediated by the binding of GH to its membrane-bound receptor, GHR, and involve a phosphorylation cascade that results in the modulation of numerous signaling pathways. GH is synthesized by acidophilic or somatotropic cells of the anterior pituitary gland. Human growth hormone contains 191 amino acid residues with two disulfide bridges. Anti-GH is a useful marker in classification of pituitary tumors and the study of pituitary disease (acromegaly). It reacts with GH-producing cells. Growth hormone receptors have been found in various non-pituitary cells, including that from hepatocellular carcinoma and various benign and malignant cutaneous lesions.

Pituitary Panel

	GH	ACTH	FSH	LH	Prolactin	TSH
Pituitary	+	+	+	+	+	+

Reference

1. Fukaya T, et al. Cancer. 1980; 45:15981.
2. Kovacs K, et al. Virch Arch Pathol Anat. 1982; 395:59.
3. Cunha KS, et al. J Clin Pathol. 2003 Oct; 56(10):758-63.
4. Chopin LK, et al. Growth Horm IGF Res. 2002 Apr; 12(2):126-36.
5. Matsuno A, et al. Pathol Res Pract. 2001; 197(1):13-20.
6. Garcia-Caballero T, et al. Endocrine. 2000 Jun; 12(3):265-71.



Glial Fibrillary Acidic Protein (GFAP) (EP672Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44294	GFAP RTU R (EP672Y)	7 ml Ready To Use
44610	GFAP 0,1 R (EP672Y)	100 µl liquid Concentrated
44611	GFAP 1 R (EP672Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Brain
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Anti-GFAP antibody detects astrocytes, Schwann cells, satellite cells, enteric glial cells, and some groups of ependymal cells. This marker is mainly used to distinguish neoplasms of astrocytic origin from other neoplasms in the central nervous system.

Retroperitoneal Lesions

	GFAP	NSE	Synapto-physin	Chromo-granin A	Neuro-filament	PGP 9.5	S-100	CD99
Neuroblastoma	+/-	+	+	+	+	+	-	-
Ganglioneuroblastoma	+	+	+	+	+	+	+	-
Ganglioneuroma	+	+	+	+	+	+	+	-

Myoepithelial Tumor: Malignant vs. Benign

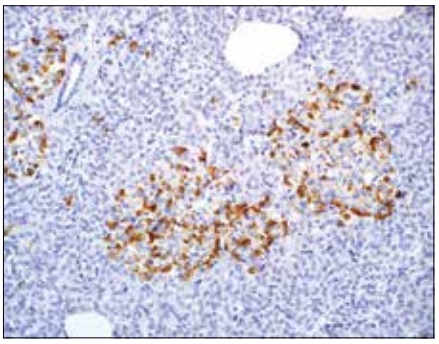
	GFAP	CK Cocktail	MS Actin	Calponin	SM Myosin	S-100	EMA	CK 14	p63	Desmin
Malignant Myoepithelioma	+/-	+	+	+	+	+	+	+	-	-
Benign Myoepithelium	+	+	+	+	+	+	+	+	+	-

CNS Tumors

	GFAP	Neuro-filament	Synapto-physin	S-100	CK Cocktail	PR	EMA	Vimentin	NGFR	INI-1
Astrocytoma	+	-	-	+	-	-	-	+	+	+
Glioblastoma	+	-	-	+	-	-	-	+	-	+
Oligodendriglioma	-	-	-	+	-	-	-	+	-	+
Ependymoma	+	-	-	+	-	-	-	-/+	+	+
Choroid Plexus Carcinoma	-/+	-	+	+	+	-	-		-	+
Central Neurocytoma	-	-	+	-	-	-	-	-	+	+
Neuroblastoma	+/-	+	+	+/-	-	-	-	+	+	+
Pineocytoma	-	-	+	-	-	-	-		-	+
Meningioma	-	-	-	-	-	+	+	+	-	+
Schwannoma	+	-	-	+	-	-	-	+	+	+
Rhabdoid Tumors	-	+/-		+/-	+		+	+		-
Metastatic Carcinoma	-	-	-	-	+	-/+	+	-/+	-	+

Reference

1. Viale G, et al. Virchow's Arch A Pathol Anat. 1991; 418:339-348.
2. Choi BH, et al. Science. 1984; 223:407-409.



Glucagon (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45145	IMPATH Glucagon RTU R (Poly)	50 Tests
44295	Glucagon RTU R (Poly)	7 ml Ready To Use
44612	Glucagon 0,1 R (Poly)	100 µl liquid Concentrated
44613	Glucagon 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pancreas
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-glucagon detects glucagon-secreting cells and tumors such as glucagonomas. Studies show that approximately 80% of glucagonomas are malignant and these patients have a syndrome often initially recognized by dermatologists. Symptoms include necrolytic migratory erythema as well as diabetes, anemia, stomatitis, weight loss, frequent venous thromboses, and in some instances, diarrhea and psychiatric disturbances. The diagnosis may be readily confirmed by the demonstration of elevated plasma glucagon concentration.

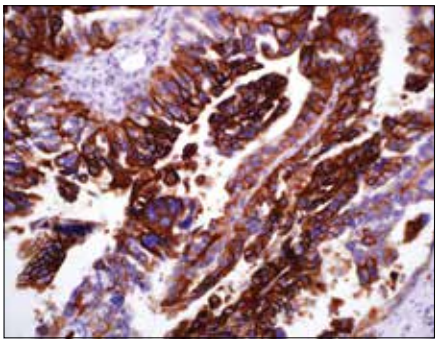
Pancreas

	Glucagon	Synapto-physin	Chromo-granin A	Gastrin	CD56	β-Catenin	CK 19	CA19-9	E-cadherin	CD10
Neuroendocrine Tumor	+/-	+	+	+/-	+	+	+/-	+/-	-	-
Solid Pseudopapillary Tumor	-	+	-	-	+	+	-	-	+(nuclear)	+
Ductal Carcinoma	-	-	-	-	-	+/-	+	+	+/-	+/-
Acinic Cell Carcinoma	-	-	-	-	-	+	+	-/+	+	+/-
Pancreatoblastoma	-	-	+	-	+	+	-	-	-	-
Normal Pancreas	+	+	+	-	-	+	-	-	-	-

Reference

1. Unger RH, et al. N Eng J Med. 1981; 304:1518-1524.
2. Larson L. Hum Pathol. 1978; 9:401-416.
3. Erlandsen SL. Williams and Wilkins. Baltimore, 1980; 140-155.
4. Friesen SR. N Eng J Med. 1982; 306:580-590.
5. Weitgasser R, et al. Appl Immunohistochem Mol Morphol. 2001 Mar; 9(1):92-6.
6. Bordi C, et al. Am J Clin Pathol. 1987 Aug; 88(2):153-61.

A.MENARINI diagnostics



GLUT1 (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45305	IMPATH GLUT1 RTU R (Poly)	50 Tests
44296	GLUT1 RTU R (Poly)	7 ml Ready To Use
44614	GLUT1 0,1 R (Poly)	100 µl liquid Concentrated
44615	GLUT1 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Colorectal carcinoma, Malignant mesothelioma
Stability Up to 36 mo. at 2-8°C

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Glucose transporter type I (GLUT1), a prototype member of the GLUT superfamily, is a membrane-associated, erythrocyte glucose transport protein. It is a major glucose transporter in the mammalian blood-brain barrier, and also mediates glucose transport in endothelial cells of the vasculature, adipose tissue, and cardiac muscle. GLUT1 is detectable in many human tissues including those of colon, lung, stomach, esophagus, and breast. GLUT1 is overexpressed in malignant cells and in a variety of tumors that include the breast, pancreas, cervix, endometrium, lung, mesothelium, colon, bladder, thyroid, bone, soft tissues, and oral cavity. Immunohistochemical detection of GLUT1 has been shown to discriminate between reactive mesothelium and malignant mesothelioma in more than one study. Anti-GLUT1, anti-claudin1, and anti-EMA are “perineurial” markers that are useful in the diagnosis of perineuriomas. Anti-GLUT1 is also useful in distinguishing benign endometrial hyperplasia from atypical endometrial hyperplasia and adenocarcinoma. GLUT1 expression has been shown to be associated with increased malignant potential, invasiveness, and a poor prognosis in general. Expression of GLUT1 is a late event in colorectal cancer and expression in a high proportion of cancer cells is associated with a high incidence of lymph node metastases.

Mesothelial Cells: Malignant vs. Benign

	GLUT1	Mesothelin	Calretinin	p53
Malignant	+	+	+	+
Reactive Benign	-	+	+	-

Skin: Spindle Cell Tumors

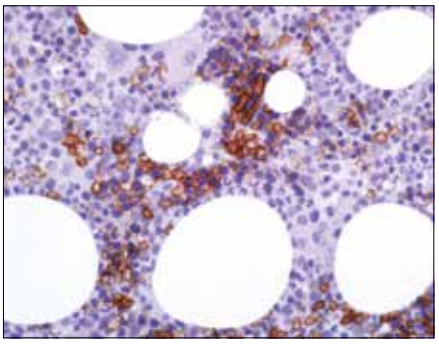
	GLUT1	SM Actin	BG8	Factor VIII	Collagen IV	FLI-1	CD34	CD31	Factor XIIIa	CD99
Solitary Fibrous Tumor	-	-	-	-	-	-/+	+	-	+/-	+/-
Hemangioma	+	+	+	+	+	+	+	+	-	-

Perineurioma vs. Neurofibroma

	GLUT1	Claudin 1	EMA	S-100
Perineurioma	+	+	+	-
Neurofibroma	-	+	+	+

Reference

1. Kato Y, et al. Mod Pathol. 2007 Feb; 20(2):215-20. Epub 2006 Dec 22.
2. Acurio A, et al. Mod Pathol. 2008; 21:334A.
3. Afify A, et al. Acta Cytol. 2005 Nov-Dec; 49(6):621-6.
4. Parente P, et al. Journal of Experimental & Clinical Cancer Research. 2008; 27:34.
5. Zimmerman RL, et al. Cancer. 2002 Feb 25; 96(1):53-7.



Glycophorin A (GA-R2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45306	IMPATH Glycophorin A RTU M (GA-R2)	50 Tests
44297	Glycophorin A RTU M (GA-R2 & HIR2)	7 ml Ready To Use
44616	Glycophorin A 0,1 M (GA-R2 & HIR2)	100 µl liquid Concentrated
44617	Glycophorin A 1 M (GA-R2 & HIR2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Bone Marrow
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Glycophorins A (GPA) and B (GPB) are major sialoglycoproteins of the human erythrocyte membrane which bear the antigenic determinants for the MN and SU blood groups. Glycophorins span the membrane and present their amino-terminal end to the extracellular surface of the human erythrocyte. The genetic array of expressed glycophorin surface antigens on erythrocytes defines the blood group phenotype of the individual. GPA is the carrier of blood group M and N specificities, while GPB accounts for S and U specificities. GPA and GPB provide the cells with a large mucin-like surface and it has been suggested this provides a barrier to cell fusion thus minimizing aggregation between red blood cells in the circulation. Anti-glycophorin A has been used to characterize erythroid cell development and in the diagnosis of erythroid leukemias.

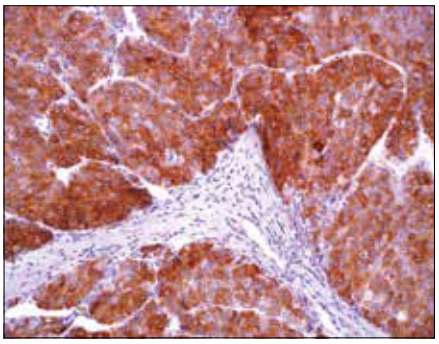
Acute Myeloid Leukemia

	Glyco-phorin A	MPO	CD68	Factor VIII	CD61	Lysozyme	BOB.1	Oct-2	CD34	CD117
Acute Myeloid, M0	-	-	-	-	-	+	-	-	+	+
Acute Myeloid, M1&2	-	+	+	-	-	+			+	+
Promyelocytic, M3	-	+	-	-	-	-	+	+	-	+
Myelomonocytic, M4	-	+	+	-	-	+	-	+	+	+
Monoblastic, M5	-	+	+	-	-	+	-	+	-/+	+
Acute Erythroid, M6	+	+	-	-	-		-	-	-/+	+/-
Megakaryoblastic, M7	-	-	-	+	+		+/-	-	-	-

Reference

1. van der Valk P, et al. Am J Surg Pathol. 1989 Feb; 13(2):97-106.
2. Muller M, et al. J Bet Med A Physiol Pathol Clin Med. 2001 Feb; 48(1):51-7.
3. Sadahira Y, et al. J Clin Pathol. 1999 Dec; 52(12):919-21.
4. Chang CC, et al. Am J Clin Pathol. 2000 Nov; 114(5):807-11.
5. Muller M, et al. J Vet Med A Physiol Pathol Clin Med. 2001 Feb; 48(1):51-7.

A.MENARINI diagnostics



Glypican-3 (1G12)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45307	IMPATH Glypican-3 RTU M (1G12)	50 Tests
44298	Glypican-3 RTU M (1G12)	7 ml Ready To Use
44618	Glypican-3 0,1 M (1G12)	100 µl liquid Concentrated
44619	Glypican-3 1 M (1G12)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Hepatocellular carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Glypican-3 (GPC3) is a glycosylphospatidyl inositol-anchored membrane protein, which may also be found in a secreted form. Anti-GPC3 has been identified as a useful tumor marker for the diagnosis of hepatocellular carcinoma (HCC), hepatoblastoma, melanoma, testicular germ cell tumors, and Wilms' tumor. In patients with HCC, GPC3 is overexpressed in neoplastic liver tissue and elevated in serum, but is undetectable in normal liver, benign liver, and the serum of healthy donors. GPC3 expression is also found to be higher in HCC liver tissue than in cirrhotic liver or liver with focal lesions such as dysplastic nodules and areas of hepatic adenoma (HA) with malignant transformation. In the context of testicular germ cell tumors, GPC3 expression is upregulated in certain histologic subtypes, specifically yolk sac tumors and choriocarcinoma. A high level of GPC3 expression has also been found in some types of embryonal tumors, such as Wilms' tumor and hepatoblastoma, with a low or undetectable expression in normal adjacent tissue.

Liver: Malignant vs. Benign

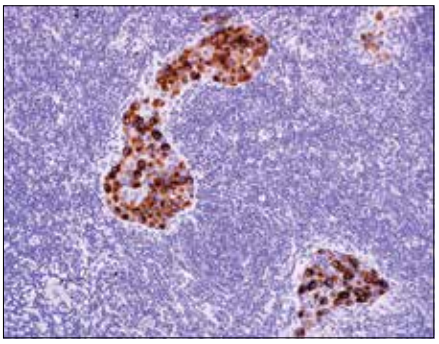
	Glypican-3	Hep-Par1	CD34	p53	AFP	A1AT	pCEA	mCEA	TTF-1
Hepatocellular Carcinoma	+	+	+	+	-/+	-/+	+	-	+ Cytoplasmic
Hepatoblastoma	+	+	-	+	+	+	+	-	-
Benign Liver Nodules	-	+	-	-	-	+/-	-	-	+ Cytoplasmic

Gonads: Germ Cell Tumors vs. Somatic Adenocarcinoma

	Glypican-3	Oct-4	AFP	Vimentin	EMA	Inhibin	hPL	CD30	CD117	PLAP
Seminoma	-	+	-	+	-	-	-	-	+	+
Embryonal Carcinoma	-	+	-	-	-	-	-	+	-	+
Choriocarcinoma	+	-	-	-/+	+	-	+	-	-	+
Yolk Sac Tumor	+	-	+	-	-	-	-	-	-	+
Somatic Carcinoma	-	-	-	-	+	-	-	-	-	-
Granulosa Cell Tumor	-	-	-	+	-	+	-	-	-	
Hypercalcaemic Small Cell Carcinoma	-	-	-	-	+	-	-	-	-	-

Reference

1. Capurro M, et al. Gastroenterology. 2003 Jul; 125(1):89-97.
2. Coston WMP, et al. Am J Surg Pathol. 2008; 00(00):1-12.
3. Kandil D, et al. Cancer. 2007 Oct 25; 111(5):316-22.
4. Kakar S, et al. Arch Pathol Lab Med. 2007 Nov; 131(11):1648-54. Review.



Granzyme B (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45211	IMPATH Granzyme B RTU R (Poly)	50 Tests
44299	Granzyme B RTU R (Poly)	7 ml Ready To Use
44620	Granzyme B 0,1 R (Poly)	100 µl liquid Concentrated
44621	Granzyme B 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Spleen, Anaplastic large cell lymphoma
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Granzymes are serine proteases which are stored in specialized lytic granules of cytotoxic T-lymphocytes and in natural killer cells. Anti-granzyme B has been useful in diagnosing natural killer/T-cell lymphoma, as well as anaplastic large cell lymphoma. High percentages of cytotoxic T-cells have been shown to be an unfavorable prognostic indicator in Hodgkin disease.

T-cell Lymphomas

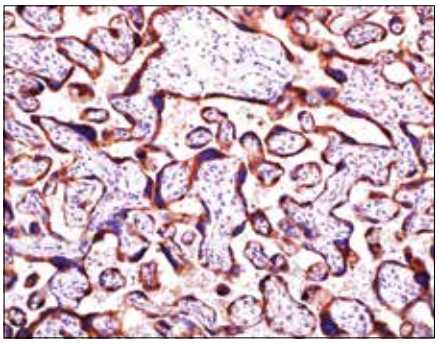
	Granzyme B	CD2	CD3	CD4	CD5	CD7	CD8	CD25	CD45RO	PD-1
Angioimmunoblastic	-	+	+	+	+	+	-	+	+	+
Lymphoblastic	+/-	+/-	+	+/-	+	+	+/-	+	+	-
Subcutaneous Panniculitis-Like	+	+	+	-	+	+	+/-	-	+	-
NK	+	+	+	-	-	-/+	-	+	+	-
Cutaneous	+	+	+	+	-	+	-	-	-	-/+
Peripheral, NOS	-/+	+	+	+/-	+/-	+/-	-/+	+	+	-
Mycosis Fungoides	+/-	+	+	+	+	-	-	+	+	-

Hodgkin vs. Non-Hodgkin Lymphomas

	Granzyme B	CD79a	CD15	CD30	Fascin	BCL6	PU.1	MUM1	ALK-1	EMA
Hodgkin Lymphoma, Classic	-	-	+	+	+	-	-	+	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	-	+	-	-	-	+	+	-/+	-	+
T-cell Rich LBCL	-	+	-	-	-	+	-	+	-	-
Anaplastic Large Cell Lymphoma	+	-	-	+	-	+/-	-	-	+	+

Reference

1. Oudejans JJ, et al. Blood. 1997 Feb 15; 89(4):1376-82.
2. Oudejans JJ, et al. Am J Pathol. 1996 Jan; 148(1):233-40.
3. Liu J, et al. J Dermatol. 2003 Oct; 30(10):735-41.
4. Kato N, et al. Am J Dermatopathol. 2003 Apr; 25(2):142-7.
5. Kummer JA, et al. Clin Exp Immunol. 1995; 100:164-172.



hCG (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45148	IMPATH Hcg RTU R (Poly)	50 Tests
44312	hCG RTU R (Poly)	7 ml Ready To Use
44646	hCG (beta) 0,1 R (Poly)	100 µl liquid Concentrated
44647	hCG (beta) 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Placenta
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

hCG is a protein secreted in large quantities by normal trophoblasts; the antibody detects cells and tumors of trophoblastic origin such as choriocarcinoma. Large cell carcinoma and adenocarcinoma of the lung demonstrate anti-hCG positivity in 90% and 60% of cases respectively. 20% of lung squamous cell carcinomas are positive for anti-hCG. hCG expression by non-trophoblastic tumors may indicate aggressive behavior since it has been observed that hCG may play a role in the host response to a given tumor.

Gonads: Germ Cell Tumors vs. Somatic Adenocarcinoma

	hCG	Oct-4	AFP	EMA	Inhibin	D2-40	CD30	Glypican-3	CD117	PLAP
Seminoma	-	+	-	-	-	+	-	-	+	+
Embryonal Carcinoma	-	+	-	-	-	-	+	-	-	+
Choriocarcinoma	+	-	-	+	-	-	-	+	-	+
Yolk Sac Tumor	-	-	+	-	-	-	-	+	-	+
Somatic Carcinoma	-	-	-	+	-		-	-	-	-
Granulosa Cell Tumor	-	-	-	-	+		-	-	-	
Hypercalcaemic Small Cell Carcinoma	-	-	-	+	-	+	-	-	-	-

Placental Trophoblastic Cells

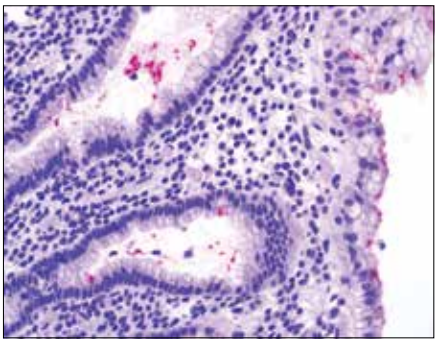
	1st Trimester		2nd Trimester		3rd Trimester	
	hCG	hPL	hCG	hPL	hCG	hPL
Cytotrophoblast	-	-	-	-	-	-
Intermediate Trophoblast	1-24%	25-49%	-/+	50-74%	1-24%	1-49%
Syncytiotrophoblast	>75%	1-24%	25-49%	50-74%	1-24%	>75%

Placental Trophoblastic Proliferations

	hCG	p57	PLAP	hPL	CK, OSCAR	Vimentin
Partial Mole	Weak, diffuse	+	+	Weak, diffuse	Strong, diffuse	-
Complete Mole	Strong, diffuse	-	Weak, focal	Weak, focal	Strong, diffuse	-
Choriocarcinoma	Strong, diffuse	-	Weak, focal	Weak, focal	Strong, diffuse	-/+
Placental Site Tumor	Strong, focal		Strong, diffuse	Strong, diffuse	Strong, diffuse	Strong, diffuse

Reference

1. Morrish DW, et al. J Histochem Cytochem. 1987; 35:39-101.
2. Kurman RJ, et al. Cancer. 1976; 38:2404-2419.



Helicobacter pylori (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45146	IMPATH Helicobacter pylori RTU R (Poly)	50 Tests
44302	Helicobacter pylori RTU R (Poly)	7 ml Ready To Use
44626	Helicobacter pylori 0,1 R (Poly)	100 µl liquid Concentrated
44627	Helicobacter pylori 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cell Wall
Control H. Pylori infected stomach tissue
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

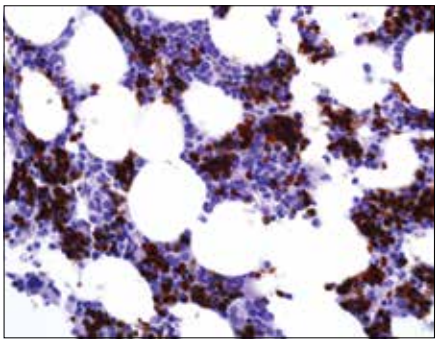
**Please refer to product insert for complete protocol.*

Product Description

The spiral shaped bacterium Helicobacter pylori is strongly associated with inflammation of the stomach and is also implicated in the development of gastric malignancy, peptic ulcers, and chronic gastritis in humans. It is associated with the development of adenocarcinoma and low grade lymphoma of mucosa associated lymphoid tissue in the stomach. More recently this bacterium has also been implicated with a number of vascular disorders including heart disease. It is not clear how H. pylori is transmitted or why some patients become symptomatic while others do not. The bacteria are most likely spread from person to person through fecal to oral or oral to oral routes. Possible environmental sources include contaminated water reservoirs. Helicobacter pylori can exist in a number of locations: in the mucus, attached to epithelial cells, or inside of vacuoles in epithelial cells, where it produces adhesions that bind to membrane-associated lipids and carbohydrates in or on epithelial cells. One can test noninvasively for H. pylori infection with a blood antibody test, stool antigen test, or with the carbon urea breath test (in which the patient drinks 14C- or 13C-labelled urea, which the bacterium metabolizes, producing labelled carbon dioxide that can be detected in the breath). However, the most reliable method for detecting H. pylori infection is a biopsy during endoscopy with a rapid urease test, histologic examination, and microbial culture. None of the test methods are completely failsafe. Even a biopsy as a test method is dependent on the location of the biopsy. Blood antibody tests, for example, range from 76% to 84% sensitivity. Some drugs can affect H. pylori urease activity and give false negatives with the urea-based tests. Immunohistochemistry staining anti-H.pylori on the surface and stomach mucosa is a valuable tool for diagnosis of H. pylori infections.

Reference

1. Toulaymat M, et al. Arch Pathol Lab Med. 1999 Sep; 123(9):778-81.
2. Cartun RW, et al. Modern Pathology. 1991; Vol. 4, No. 4:498-502.
3. Shimizu T, et al. Helicobacter. 1996 Dec; 1(4):197-206.
4. Jhala NC, et al. Am J Clin Pathol. 2003; 119:101-107.



Hemoglobin A (EPR3608†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45286	IMPATH HEMOGLOBIN A RTU R (EPR3608)	50 Tests
44303	HEMOGLOBIN A RTU R (EPR3608)	7 ml Ready To Use
44628	HEMOGLOBIN A 0,1 R (EPR3608)	100 µl liquid Concentrated
44629	HEMOGLOBIN A 1 R (EPR3608)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Bone Marrow, Spleen
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

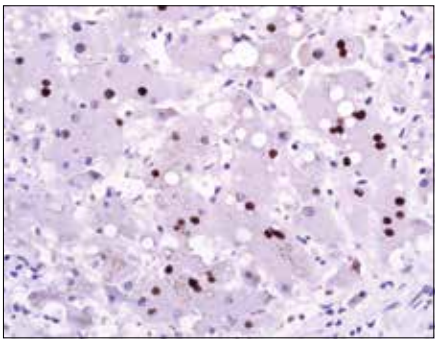
Hemoglobin alpha chain belongs to the globin family and is involved in oxygen transport from the lung to the various peripheral tissues. Hemoglobin A is comprised of two alpha chains and two beta chains, whereas hemoglobin A2 is comprised of two alpha chains and two delta chains. Immunohistochemical localization of hemoglobin is excellent as an erythroid marker for the detection of immature, dysplastic, and megaloblastic erythroid cells in myeloproliferative disorders, such as erythroleukemia. In contrast, myeloid cells, lymphoid cells, plasma cells, histiocytes, and megakaryocytes stain negative with anti-hemoglobin A. Anti-hemoglobin A, combined with antibodies against CD34, CD117, CD68, and MPO can be helpful in distinguishing between reactive extramedullary hematopoiesis and that seen in neoplastic myeloid disorders in spleen. Anti-hemoglobin A is limited to expression by erythroid precursors in bone marrow and is therefore of assistance in calculating percentages of erythroid precursors.

Splenic Hematopoietic Proliferations in Neoplastic and Benign Disorders

	Hemoglobin A	MPO	CD34	CD117	CD68
Chronic Myelogenous Leukemia	-	+	-/+	+/-	+
Chronic Idiopathic Myelofibrosis	-	+	+/-	-/+	
Myelodysplastic Syndrome	-		+	-/+	
Myelodysplastic/ Myeloproliferative Disorders	-	+	-	-	+
Mastocytosis	-	+	-	+	
Erythroid Disorders	+	+/-	-	-	-/+
Splenic Lymphoma	-	-/+	-	-	
Acute Myeloid Leukemia	-	+	+	+	+
Polycythemia Vera	+		+	+	

Reference

1. O'Malley DP, et al. Mod Pathol. 2005; 18:550-1561.
2. Dunphy CH, et al. Appl Immun Mol Morphol. 2005; 15(2):154-159.



Hepatitis B Virus Core Antigen (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45212	IMPATH Hepatitis B Virus Core RTU R (Poly) RUO	50 Tests
44304	Hepatitis B Virus Core Antigen RTU R (Poly) RUO	7 ml Ready To Use
44630	Hepatitis B Virus Core Antigen 0,1 R (Poly) RUO	100 µl liquid Concentrated
44631	Hepatitis B Virus Core Antigen 1 R (Poly) RUO	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Hepatitis B infected tissue
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

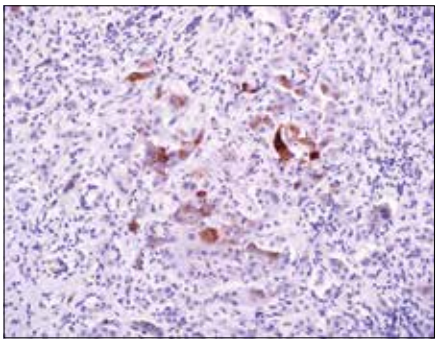
**Please refer to product insert for complete protocol.*

Product Description

Anti-hepatitis B core antigen labels cell nuclei infected with hepatitis B virus, a common cause of hepatitis leading to cirrhosis. Hepatitis B is the second most common cause of parenterally transmitted hepatitis.

Reference

1. Inohara H, et al. Cancer. 1999; 85:2475-84.
2. Herrmann ME, et al. Arch Pathol Lab Med. 2002; 126:710-713.
3. Papotti M, et al. European Journal of Endocrinology. 2002; 147:515-521.
4. Bartolazzi A, et al. Lancet. 2001; 357:1644-50.
5. Orlandi F, et al. Cancer Research. 1998 Jul 15; 58, 3015-3020.
6. Gasbarri A, et al. J Clin Oncol. 17:3494-3502.
7. Orlandi F, et al. Cancer Res. 1998 Jul 15; 58(14):3015-20.
8. Konstantinov KN, et al. Am J Pathol. 1996 Jan; 148(1):25-30.



Hepatitis B Virus Surface Antigen (S1-210)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45213	IMPATH Hepatitis B Virus Surface RTU M (S1-210) RUO	50 Tests
44305	Hepatitis B Virus Surface Anti RTU M (S1-210) RUO	7 ml Ready To Use
44632	Hepatitis B Virus Surface Anti 0,1 M (S1-210) RUO	100 µl liquid Concentrated
44633	Hepatitis B Virus Surface Anti 1 M (S1-210) RUO	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Hepatitis B infected tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

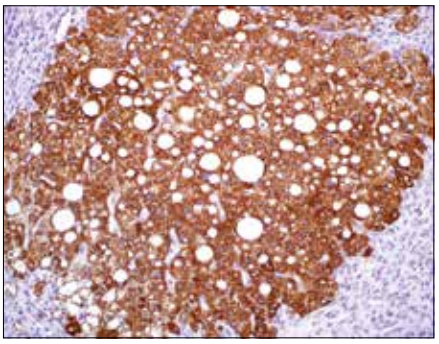
**Please refer to product insert for complete protocol.*

Product Description

Anti-hepatitis B surface antigen labels the cell cytoplasm infected with hepatitis B virus, a common cause of hepatitis leading to cirrhosis. Hepatitis B is the second most common cause of parenterally transmitted hepatitis.

Reference

1. Stahl S, et al. Proc Natl Acad Sci. 1982; 79:1606.
2. Goodman ZD, et al. Am J Clin Pathol. 1988 Apr; 89(4):533-7.
3. van den Oord JJ, et al. J Histochem Cytochem. 1989 Apr; 37(4):551-4.
4. Sharma RR, et al. Trop Gastroenterol. 2002 Jan-Mar; 23(1):16-9.



Hepatocyte Specific Antigen (Hep Par-1) (OCH1E5)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45147	IMPATH Hepatocyte Specific Antigen RTU M (OCH1E5)	50 Tests
44306	Hepatocyte Specific Antigen RTU M (OCH1E5)	7 ml Ready To Use
44634	Hepatocyte Specific Antigen 0,1 M (OCH1E5)	100 µl liquid Concentrated
44635	Hepatocyte Specific Antigen 1 M (OCH1E5)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Liver
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

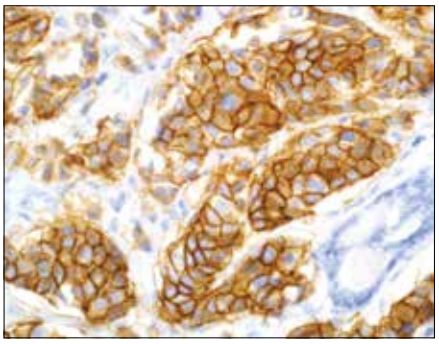
Anti-hepatocyte specific antigen, also known as anti-Hep-Par1, recognizes both benign and malignant liver-derived tissues including such tumors as hepatoblastoma, hepatocellular carcinoma, and hepatic adenoma. It recognizes both normal adult and fetal liver tissue. The typical pattern is a granular cytoplasmic staining. This antibody is useful in differentiating hepatocellular carcinomas with adenoid features from adenocarcinomas, either primary in the liver or metastatic lesions to the liver. In labeling hepatoblastoma, it is useful in differentiating this entity from other small round cell tumors.

Liver: Malignant vs. Benign

	Hep-Par1	Glypican-3	CD34	p53	AFP	A1AT	pCEA	mCEA	TTF-1
Hepatocellular Carcinoma	+	+	+	+	-/+	-/+	+	-	+ Cytoplasmic
Hepatoblastoma	+	+	-	+	+	+	+	-	-
Benign Liver Nodules	+	-	-	-	-	+/-	-	-	+ Cytoplasmic

Reference

1. Minervini MI, et al. Mod Pathol. 1997; 10(7):686-692.
2. Fasano M, et al. Mod Pathol. 1998; 11(10):934-938.
3. Tsui WMS, et al. Am J Surg Pathol. 1999; 23(1):34-48.
4. Wieczorek T, et al. Am J Clin Pathol. 2002 Dec; 118(6):911-21.
5. Chu PG, et al. Am J Surg Pathol. 2002 Aug; 26(8):978-88.
6. Maitra A, et al. Am J Clin Pathol. 2001 May; 115(5):689-94.



Her2/Neu (EP3†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45636	Her2/Neu RTU R (EP3)	7 ml Ready To Use
45616	Her2/Neu 0,1 R (EP3)	100 µl liquid Concentrated
45617	Her2/Neu 1 R (EP3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Breast carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

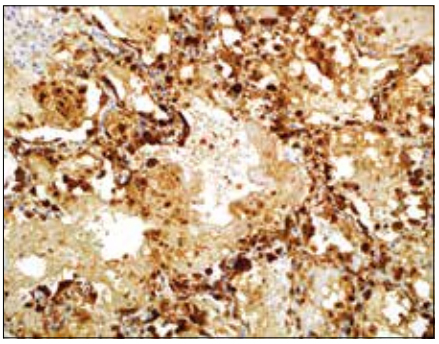
**Please refer to product insert for complete protocol.*

Product Description

The c-erbB-2 oncoprotein is in the epidermal growth factor receptor family. These receptors are overexpressed in various adenocarcinomas including that from the gastrointestinal tract, ovary, and up to 30% of breast carcinomas. Overexepression in breast carcinoma has been shown to be associated with a poor prognosis. Similar observations have been made in the case of osteosarcoma, gastric carcinoma, and bladder carcinoma.

Reference

1. Owens MA, et al. Clin Breast Cancer. 2004; 5:63-69.
2. Yaziji H, et al. JAMA. 2004; 291:1972-1977.



Herpes Simplex Virus I (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45214	IMPATH Herpes Simplex Virus I RTU R (PolY)	50 Tests
44308	Herpes simplex virus I RTU R (Poly)	7 ml Ready To Use
44638	Herpes simplex virus I 0,1 R (Poly)	100 µl liquid Concentrated
44639	Herpes simplex virus I 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control HSV I infected tissue
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

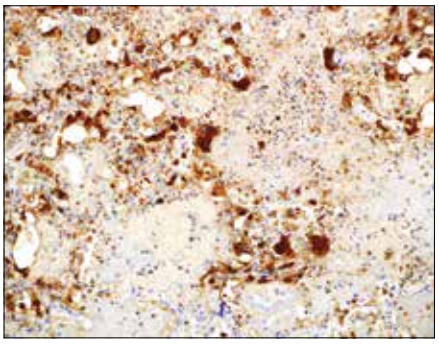
**Please refer to product insert for complete protocol.*

Product Description

Herpes simplex virus is quite ubiquitous and is variable in its presentation in human disease. Type I usually infects the non-genital mucosal surfaces. It may affect the skin or internal organs (typically brain, lung, liver, adrenal gland, or GI tract) of immunocompromised individuals. This polyclonal antibody reacts with Type I Herpes viruses. There may be cross-reactivity with varicella zoster virus at higher concentrations. Cross-reactivity with CMV or Epstein-Barr virus is not seen with this antibody.

Reference

1. Adams RL, et al. J Pathol. 1984; 143:241-7.
2. Silverberg SG, et al. Principles and Practice of Surgical Pathology and CytoPathology, 3rd edition. 1997; 214-217.
3. Vago L, et al. Acta Neuropathol (Berl). 1996 Oct; 92(4):404-8.
4. Nikkels AF, et al. J C lin Pathol. 1996 Mar; 49(3):243-8.
5. Shintaku M, et al. Arch Pathol Lab Med. 2003 Feb; 127(2):231-4.



Herpes Simplex Virus II (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45215	IMPATH Herpes Simplex Virus II RTU R (Poly)	50 Tests
44309	Herpes simplex virus II RTU R (Poly)	7 ml Ready To Use
44640	Herpes simplex virus II 0,1 R (Poly)	100 µl liquid Concentrated
44641	Herpes simplex virus II 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control HSV II infected tissue
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

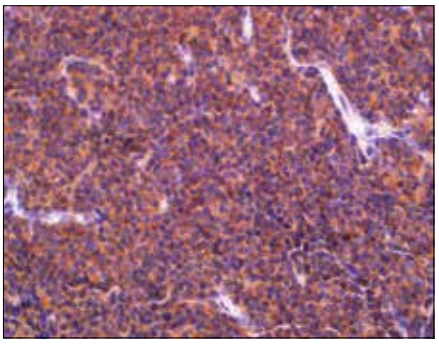
**Please refer to product insert for complete protocol.*

Product Description

Herpes simplex virus is quite ubiquitous and is quite variable in its presentation in human disease. Type II typically involves the genitalia. It may affect the skin or internal organs (typically brain, lung, liver, adrenal gland, or GI tract) of immunocompromised individuals. This polyclonal antibody reacts with Type II Herpes viruses. There may be cross-reactivity with varicella zoster virus at higher concentrations. Cross-reactivity with CMV or Epstein-Barr virus is not seen with this antibody.

Reference

1. Adams RL, et al. J Pathol. 1984; 143:241-7.
2. Silverberg SG, et al. Principles and Practice of Surgical Pathology and CytoPathology, 3rd edition. 1997; 214-217.
3. Vago L, et al. Acta Neuropathol (Berl). 1996 Oct; 92(4):404-8.
4. Nikkels AF, et al. J C lin Pathol. 1996 Mar; 49(3):243-8.
5. Shintaku M, et al. Arch Pathol Lab Med. 2003 Feb; 127(2):231-4.



HGAL (MRQ-49)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45311	IMPATH HGAL RTU M (MRQ-49)	50 Tests
44311	HGAL RTU M (MRQ-49)	7 ml Ready To Use
44644	HGAL 0,1 M (MRQ-49)	100 µl liquid Concentrated
44645	HGAL 1 M (MRQ-49)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Lymph node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

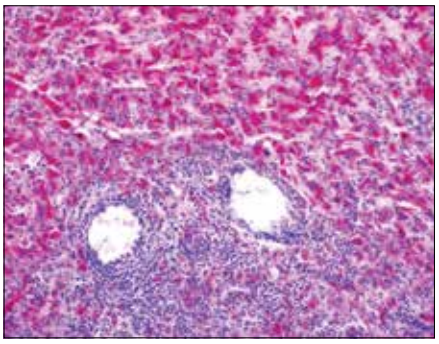
Product Description

Human germinal center–associated lymphoma (HGAL) protein is specifically expressed in the cytoplasm of germinal center B-cells, but is absent in mantle and marginal zone B-cells and in the interfollicular and paracortical regions in normal tonsils and lymph nodes. Its high degree of specificity for germinal center B-cells makes anti-HGAL an ideal marker for the detection of germinal center-derived B-cell lymphomas. Anti-HGAL has the highest overall sensitivity of detecting follicular lymphoma (FL) and in detecting the interfollicular and diffuse components of FL compared with antibodies against BCL2, LMO2, CD10, and BCL6. The addition of anti-HGAL to the immunohistochemical panel is beneficial in the work-up of nodal and extranodal B-cell lymphomas and the efficacy of anti-HGAL in detecting the follicular, interfollicular, and diffuse components of FL is of particular value in the setting of variant immunoarchitectural patterns.

Mature B-cell Lymphomas							
	HGAL	LMO2	CD20	CD5	CD23	CD10	BCL2
Follicular Lymphoma	+	+	+	-	-	+/-	+/-
Diffuse Large B-cell Lymphoma	+	+	+	-/+	-	+/-	+
Small Lymphocytic Lymphoma	-	-	+	+	+	-	+
Mantle Cell Lymphoma	-	-	+	+	-	-	+
Marginal Zone Lymphoma	-	-	+	-	-	-	+

Reference

1. Natkunam Y, et al. Blood. 2005; 105:3979–3986.
2. Natkunam Y, et al. Blood. 2007; 109:298-305.
3. Younes SF, et al. Am J Surg Pathol. 2010; 34:1266-1276.
4. Higgins RA, et al. Arch Pathol Lab Med. 2008; 132:441-446.



HMB-45 (HMB-45)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45153	IMPATH HMB-45 RTU M (HMB-45)	50 Tests
44334	HMB-45 RTU M (HMB-45)	7 ml Ready To Use
44688	HMB-45 0,1 M (HMB-45)	100 µl liquid Concentrated
44689	HMB-45 1 M (HMB-45)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Melanoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

Please refer to product insert for complete protocol.

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

Please refer to product insert for complete protocol.

Product Description

Metastatic amelanotic melanoma can often be confused with a variety of poorly differentiated carcinomas, large cell lymphomas, and sarcomas using H & E stains alone. It is also difficult to differentiate melanoma from spindle cell carcinomas and various types of mesenchymal neoplasms. Anti-HMB-45 stains fetal and neonatal melanocytes, junctional and blue nevus cells, and malignant melanoma. Angiomyolipoma (PEComa) is also labeled by this product.

Melanotic Neoplasms

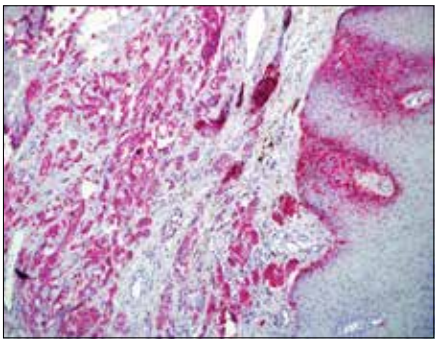
	HMB-45	S-100	SOX-10	MART-1	Tyrosinase	MiTF	CD63	Factor XIIIa
Junctional Nevus	+	+	+	+	+	+	-	-
Interdermal Nevus	-	+	+	+	+	+	-	-
Primary Melanoma	+	+	+	+	+	+	+	-
Metastatic Melanoma	+	+	+	+	+	+	+	-
Spindle Cell Melanoma	+	+	+	+	+	+	+	-
Angiomyolipoma	+	+	+	+	-	+	+	-
Adrenal Cortical	-	+		+	-	-	-	-
Dermatofibroma	-	-	-	-	-	-	-	+

PEComa

	HMB-45	MART-1	CD63	S-100	Tyrosinase	SM Actin	Calponin	Caldesmon	Desmin	CD68
Angiomyolipoma	+	+	+	-	-	+	+	+	-	+
Lymphangiomyomatosis	+	+	+	-	-	+	+	+	-	-
Extrapulmonary Clear Cell Tumor	+	+	+	+	-	+	-	-	-	-
Primary Cutaneous PEComa	+	+	+	-	-	-	-	-	-	+/-
Pulmonary Clear Cell Sugar Tumor	+	+	+	+/-	-	-	-	-	-	+/-

Reference

1. Gown AM, et al. A J Path. 1986; 123:195.
2. Wick MR, et al. Arch Path Lab. 1988; 112:616.
3. Leong ASY, et al. Surg Path. 1989; 2:137.
4. Abrahamsen HN, et al. Cancer. 2004 Apr 15; 100(8):1683-91.
5. Vaggelli L, et al. Tumori. 2000 Jul-Aug; 86(4):346-8.



HMB-45 + Mart-1 (Melan A) + Tyrosinase (HMB-45 + A103 + T311)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45318	IMPATH HMB-45&MART-1 RTU M (HMB-45&MelanA)	50 Tests
44333	HMB-45 + MART-1 (MelanA) RTU M (HMB-45, A103, T311)	7 ml Ready To Use

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Melanoma, Skin
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

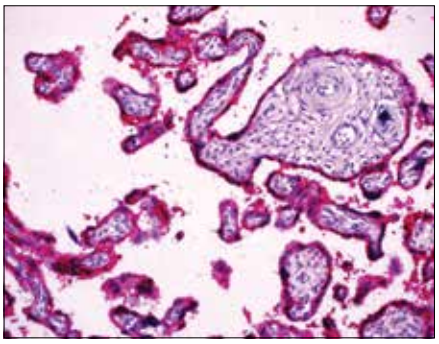
**Please refer to product insert for complete protocol.*

Product Description

Anti-Melanoma (HMB-45) identifies immature melanosomes. MART-1 (also known as Melan A) is a melanocyte differentiation antigen. It is present in melanocytes of normal skin and retina, nevi and in more than 85% of melanomas. Tyrosinase is an enzyme integral in the process of melanin synthesis, and found in 85% to 90% of malignant melanomas. Given these statistics, this cocktail is ideally suited to detection of melanomas and melanocytic lesions.

Reference

1. Orchard G. Br J Biomed Sci. 2002; 59(4):196-202.
2. Gupta D, et al. Am J Surg Pathol. 2002 Nov; 26(11):1450-7.
3. Prasad ML, et al. Am J Surg Pathol. 2001 Jun; 25(6):782-7.
4. de Vries TJ, et al. J Pathol. 2001 Jan; 193(1):13-20.
5. Yaziji H, Gown AM. In J Surg Pathol. 2003 Jan; 11(1):11-5.
6. Sindham VB, et al. BMC Cancer. 2003 May 7; 3(1):15.
7. Perez RP, et al. Hum Pathol. 2000 Nov; 31(11):1381-8.
8. Hoang MP, et al. J Cutan Pathol. 2001 Sep; 28(8):400-6.
9. Baidsen BL, et al. Am J Surg Pathol. 2000 Aug; 24(8):1140-6.
10. Vaggelli L, et al. Tumori. 200 Jul-Aug; 86(4):346-8.



Human Placental Lactogen (hPL) (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45312	IMPATH Hpl RTU R (Poly)	50 Tests
44314	hPL RTU R (Poly)	7 ml Ready To Use
44650	hPL 0,1 R (Poly)	100 µl liquid Concentrated
44651	hPL 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Placenta
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Human placental lactogen (hPL), also previously known as 'human chorionic somatomammotropin', is a 22 kD protein with partial homology to growth hormone. hPL is first detectable in the maternal serum in the fifth week of gestation and reaches a plateau by the thirty-fourth week. hPL has been demonstrated by immunochemistry in the syncytiotrophoblastic cells of choriocarcinoma. A rare variant of trophoblastic tumor has been reported in the testis with resemblance to uterine placental site trophoblastic tumor. It consists purely of intermediate trophoblasts which are diffusely positive for hPL and focally for ß-hCG.

Gonads: Germ Cell Tumors vs. Somatic Adenocarcinoma

	hPL	Oct-4	AFP	Vimentin	EMA	Inhibin	CD30	Glypican-3	CD117	PLAP
Seminoma	-	+	-	+	-	-	-	-	+	+
Embryonal Carcinoma	-	+	-	-	-	-	+	-	-	+
Choriocarcinoma	+	-	-	-/+	+	-	-	+	-	+
Yolk Sac Tumor	-	-	+	-	-	-	-	+	-	+
Somatic Carcinoma	-	-	-	-	+	-	-	-	-	-
Granulosa Cell Tumor	-	-	-	+	-	+	-	-	-	
Hypercalcaemic Small Cell Carcinoma	-	-	-	-	+	-	-	-	-	-

Placental Trophoblastic Cells

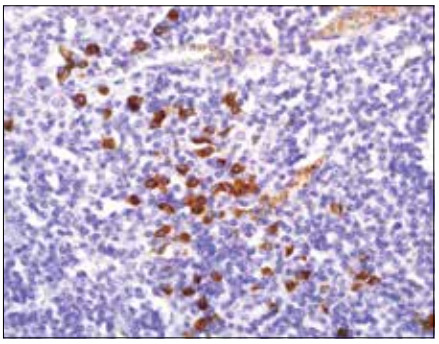
	1st Trimester		2nd Trimester		3rd Trimester	
	hCG	hPL	hCG	hPL	hCG	hPL
Cytotrophoblast	-	-	-	-	-	-
Intermediate Trophoblast	1-24%	25-49%	- /+	50-74%	1-24%	1-49%
Syncytiotrophoblast	>75%	1-24%	25-49%	50-74%	1-24%	>75%

Trophoblastic Proliferations

	hPL	p57	hCG	PLAP	CK, OSCAR	Vimentin
Partial Mole	Weak, diffuse	+	Weak, diffuse	+	Strong, diffuse	-
Complete Mole	Weak, focal	-	Strong, diffuse	Weak, focal	Strong, diffuse	-
Choriocarcinoma	Weak, focal	-	Strong, diffuse	Weak, focal	Strong, diffuse	-/+
Placental Site Tumor	Strong, diffuse		Strong, focal	Strong, diffuse	Strong, diffuse	Strong, diffuse

Reference

1. Shih IM, Kurman RJ. Am J Surg Pathol. 2004 Sep; 28(9):1177-83.



IgA (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45217	IMPATH IgA RTU R (Poly)	50 Tests
44317	IgA RTU R (Poly)	7 ml Ready To Use
44654	IgA 0,1 R (Poly)	100 µl liquid Concentrated
44655	IgA 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

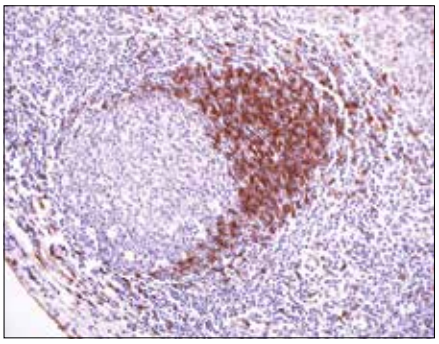
Immunoglobulin A (IgA) is a class of antibodies which plays a critical role in mucosal immunity. More IgA is produced in mucosal linings than all other types of antibody combined; between 3g and 5g is secreted into the intestinal lumen each day. In its secretory form, it is the main immunoglobulin found in mucous secretions, including tears, saliva, colostrum, intestinal juice, vaginal fluid, and secretions from the prostate and respiratory epithelium. It is also found in small amounts in blood. Because it is resistant to degradation by enzymes, secretory IgA can survive in harsh environments such as the digestive and respiratory tracts, to provide protection against microbes that multiply in body secretions. IgA is a poor activator of the complement system, and opsonizes only weakly. Its heavy chains are of the type α. IgA exists in two isotypes, IgA1 (90%) and IgA2 (10%). IgA1 is found in serum and is made by bone marrow B-cells. IgA2 is made by B-cells located in the mucosa and has been found in colostrum, maternal milk, tears, and saliva. Anti-IgA antibody reacts with surface immunoglobulin IgA alpha chains. It is useful when identifying plasma cell myeloma.

Immunoglobulin, Heavy and Light Chain

	IgA	IgG	IgD	IgM	Kappa	Lambda
Secretory Meningioma	+	-	-	+		
Cutaneous Lymphoma	-	-	-	-	+/-	-/+
Myeloma	+	+	-/+	-/+	+/-	-/+
Diffuse LBCL	-	+	-	+	+/-	-/+
Marginal Zone Lymphoma	-	-	-/+	+	+/-	-/+
SLL/CLL	-	-	+	+	+/-	-/+

Reference

1. Arnold A, et al. New Eng J Med. 1983; 309:1593-1599
2. Leong AS, et al. Manual of Diagnostic Antibodies for Immunohistology. Geenwich Medical Media Ltd. 1999. pp 217-219.
3. Hertel BF, et al. New Eng J Med. 1980; 302:1293-1297.
4. Taylor CR. Arch Path Lab Med. 1978; 102:113-121.
5. Warnake R, et al. Masson Publishing USA. 1981. pp 203-221.



IgD (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45218	IMPATH IgD RTU R (Poly)	50 Tests
44316	IgD RTU R (Poly)	7 ml Ready To Use
44656	IgD 0,1 R (Poly)	100 µl liquid Concentrated
44657	IgD 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-IgD reacts with surface immunoglobulin D delta chains. This antibody is useful when identifying leukemias, plasmacytomas, and B-cell lineage-derived lymphomas (in particular marginal zone lymphoma). Cytoplasmic staining is easily identified on paraffin tissue.

Immunoglobulin, Heavy and Light Chain

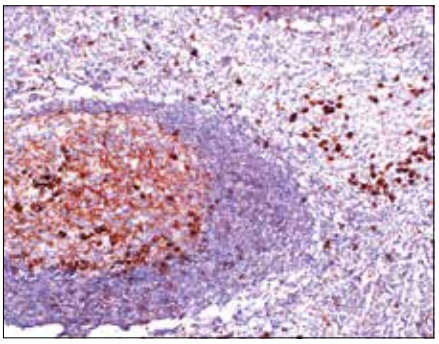
	IgD	IgA	IgG	IgM	Kappa	Lambda
Secretory Meningioma	-	+	-	+		
Cutaneous Lymphoma	-	-	-	-	+/-	-/+
Myeloma	-/+	+	+	-/+	+/-	-/+
Diffuse LBCL	-	-	+	+	+/-	-/+
Marginal Zone Lymphoma	-/+	-	-	+	+/-	-/+
SLL/CLL	+	-	-	+	+/-	-/+

B-cell Lymphomas

	IgD	CD79a	BCL2	BCL6	MUM1	CD10	CD23	Cyclin D1	p27	Annexin A1
Follicular	+	+	+	+	-	+	-	-	+	-
CLL/SLL	+	+	+	-	+	-	+	-	+	-
Mantle Cell	+	+	+	-	-	-	-	+	+	-
Marginal Zone BCL	-/+	+	+	-	+	-	-	-	+	-
Lymphoplasmacytic	-	+	+	-	+	-	-	-	+	-
Diffuse Large Cell Lymphoma	-	+	+	+	+	-	-	-	-	
Burkitt Lymphoma	-	+	-	+	-	+	-	-	-	
Hairy Cell Leukemia	-	+	+	-		-	-	+(weak)/-	-	+

Reference

1. Campo E, et al. Am J Surg Pathol. 1999 Jan; 23(1):59-68.
2. Mori S, et al. Acta Pathol Jpn. 1986 Oct; 36(1):1429-40.
3. Oka K, et al. Acta Haematol. 1993; 90(2):84-9.
4. Bertero M, et al. J Am Acad Dermatol. 1994 Jan; 30(1):23-30.
5. Mollego M, et al, Isaacson PG. Am J Surg Pathol. 1997 Jul; 21(7):772-80.
6. Tang X, et al. Pathol Int. 1995 Jan; 45(1):34-44.
7. Gupta D, et al. Mod Pathol. 2000 Nov; 13(11):1161-6.



IgG (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45219	IMPATH IgG RTU R (Poly)	50 Tests
44318	IgG RTU R (Poly)	7 ml Ready To Use
44658	IgG 0,1 R (Poly)	100 µl liquid Concentrated
44659	IgG 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Immunoglobulin G (IgG) is a monomeric immunoglobulin, built of two heavy chains (γ) and two light chains. Each IgG has two antigen binding sites. It is the most abundant immunoglobulin and is approximately equally distributed in blood and in tissue liquids, constituting 75% of serum immunoglobulins in humans. IgG molecules are synthesized and secreted by plasma cells and B-cells. IgG antibodies are predominately involved in the secondary antibody response, (the main antibody involved in primary response is IgM) which occurs approximately one month following antigen recognition, thus the presence of specific IgG generally corresponds to maturation of the antibody response. Pro-inflammatory cytokines, particularly IL-4 and IL-2, have a crucial role in activation of the IgG antibody response. This is the only isotype that can pass through the human placenta, thereby providing protection to the fetus in utero. Along with IgA secreted in the breast milk, residual IgG absorbed through the placenta provides the neonate with humoral immunity before its own immune system develops.

IgG can bind to many kinds of pathogens (for example viruses, bacteria, and fungi), and protects the body against such agents by agglutination and immobilization, complement activation (classical pathway), opsonization for phagocytosis and neutralization of their toxins. It also plays an important role in antibody-dependent, cell-mediated cytotoxicity (ADCC). IgG is also associated with type II and type III hypersensitivity.

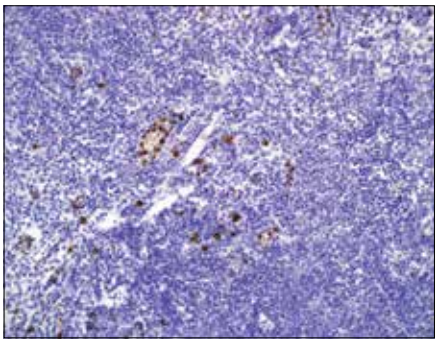
Anti-IgG reacts with surface immunoglobulin IgG gamma chains. This antibody is useful when identifying leukemias, plasmacytomas, and B-cell lineage-derived Hodgkin lymphomas.

Immunoglobulin, Heavy and Light Chain

	IgG	IgA	IgD	IgM	Kappa	Lambda
Secretory Meningioma	-	+	-	+		
Cutaneous Lymphoma	-	-	-	-	+/-	-/+
Myeloma	+	+	-/+	-/+	+/-	-/+
Diffuse LBCL	+	-	-	+	+/-	-/+
Marginal Zone Lymphoma	-	-	-/+	+	+/-	-/+
SLL/CLL	-	-	+	+	+/-	-/+

Reference

1. Arnold A, et al. New Eng J Med. 1983; 309:1593-1599.
2. Leong AS, et al. Manual of Diagnostic Antibodies for Immunohistology. Geenwich Medical Media Ltd. 1999. pp 217-219.
3. Hertel BF, et al. New Eng J Med. 1980; 302:1293-1297.
4. Taylor CR. Arch Path Lab Med. 1978; 102:113-121.
5. Warnake R, et al. Masson Publishing USA. 1981. pp 203-221.
6. Ando K, et al. Intern Med. 2000 Feb; 39(2):170-5.
7. Schmid U, et al. Am J Surg Pathol. 1995 Jan; 19(1):12-20.



IgG4 (MRQ-44)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44315	IgG4 RTU M (MRQ-44)	7 ml Ready To Use
44652	IgG4 0,1 M (MRQ-44)	100 µl liquid Concentrated
44653	IgG4 1 M (MRQ-44)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

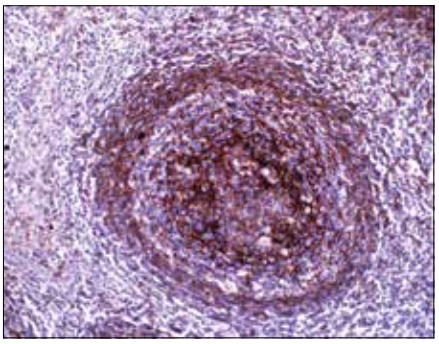
**Please refer to product insert for complete protocol.*

Product Description

IgG4-related sclerosing disease has been recognized as a systemic disease entity characterized by an elevated serum IgG4 level, sclerosing fibrosis, and diffuse lymphoplasmacytic infiltration with the presence of many IgG4-positive plasma cells. As these patients tend to respond favorably to steroid treatment, it is important to recognize this entity and differentiate it from such mimics as lymphoma. Clinical manifestations are apparent in the pancreas, bile duct, gall bladder, lacrimal gland, salivary gland, retroperitoneum, kidney, lung, breast, thyroid, and prostate. Immunohistochemical analyses in the case of IgG4-related sclerosing disease not only exhibits significantly more IgG4-positive plasma cells in affected tissues, but also significantly higher IgG4/IgG ratios (typically > 30%).

Reference

1. Noriyuki Sakata, et al. Am J SurgPathol. April 2008; 32(4):553-559.
2. Sudhir Dhobale. et al. J ClinRheumatol. 2009; 15:354-357.
3. Yaqiong Li, et al. Pathology International. 2009; 59:636-641.
4. Wah Cheul, et al. Am J SurgPathol. 2009; 33:1058-1064.
5. Vikram Deshpande, et al. Modern Pathology. 2009; 22:1287-1295.
6. Yasuharu Sato, et al. Modern Pathology. 2009; 22:589-599.
7. Terumi Kamisawa, et al. Published online: May 21, 2009.



IgM (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45220	IMPATH IgM RTU R (Poly)	50 Tests
44319	IgM RTU R (Poly)	7 ml Ready To Use
44660	IgM 0,1 R (Poly)	100 µl liquid Concentrated
44661	IgM 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

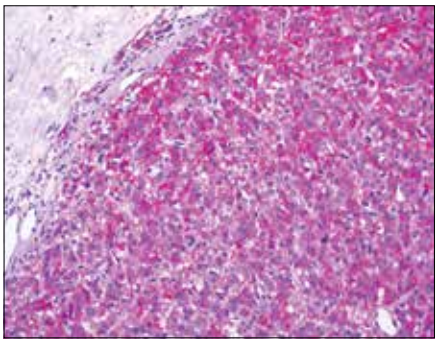
Immunoglobulin M (IgM) is a basic antibody that is present on B-cells. It is the primary antibody against A and B antigens on red blood cells. IgM is the largest antibody in the human blood. IgM forms polymers where multiple immunoglobulins are covalently linked together with disulfide bonds, mostly as a pentamer but also as a hexamer. IgM has a molecular mass of approximately 900 kD (in its pentamer form). Because each monomer has two antigen binding sites, a pentameric IgM has 10 binding sites. Typically however, IgM cannot bind 10 antigens at the same time because the large size of most antigens hinders binding to nearby sites. Due to its polymeric nature, IgM possesses high avidity, and is particularly effective in germline cells; the gene segment encoding the µ constant region of the heavy chain is positioned first among other constant region gene segments. For this reason, IgM is the first immunoglobulin expressed by mature B-cells. IgM antibodies appear early in the course of an infection and usually reappear, to a lesser extent, after further exposure. Demonstrating IgM antibodies in a patient's serum indicates recent infection.

Anti-IgM reacts with surface immunoglobulin M µ chains. IgM is one of the predominant surface immunoglobulins on B-lymphocytes. This antibody is useful when identifying lymphomas, plasmacytomas, and B-cell lineage-derived Hodgkin lymphomas.

Immunoglobulin, Heavy and Light Chain						
	IgM	IgA	IgG	IgD	Kappa	Lambda
Secretory Meningioma	+	+	-	-		
Cutaneous Lymphoma	-	-	-	-	+/-	-/+
Myeloma	-/+	+	+	-/+	+/-	-/+
Diffuse LBCL	+	-	+	-	+/-	-/+
Marginal Zone Lymphoma	+	-	-	-/+	+/-	-/+
SLL/CLL	+	-	-	+	+/-	-/+

Reference

1. Arnold A, et al. New Eng J Med. 1983; 309:1593-1599.
2. Hertel BF, et al. New Eng J Med. 1980; 302:1293-1297.
3. Taylor CR. Arch Path Lab Med. 1978; 102:113-121.
4. Warnake R, et al. Masson Publishing USA. 1981. pp 203-221.
5. de Boer CJ, et al. Ann Oncol. 1997; 8 Suppl 2:109-17.
6. Kojima M, et al. APMIS. 2002 Dec; 110(12):875-80.
7. Pambuccian SE, et al. Am J Surg Pathol. 1997 Feb; 21(2):179-86.



Inhibin, alpha (R1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45221	IMPATH Inhibin alpha RTU M (R1)	50 Tests
44320	Inhibin (Alpha) RTU M (R1)	7 ml Ready To Use
44662	Inhibin (Alpha) 0,1 M (R1)	100 µl liquid Concentrated
44663	Inhibin (Alpha) 1 M (R1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Adrenal Cortex
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti–inhibin alpha is an antibody against a peptide hormone which has demonstrated utility in the differentiation between adrenal cortical tumors and renal cell carcinoma. Sex cord stromal tumors of the ovary as well as trophoblastc tumors also demonstrate cytoplasmic positivity with this antibody. This antibody has been used to make the differential diagnosis of intrauterine vs. ectopic pregnancy in endometrial curettings.

Adrenal Tumors

	Inhibin	Calretinin	MART-1	Synaptophysin	Chromogranin A	CD56
Pheochromocytoma	-	-	-	+	+	+
Adrenocortical Carcinoma	+	+	+	-/+	-	+
Adrenocortical Adenoma	+	+	+	-/+	-	+

Germ Cell Tumors vs. Carcinoma

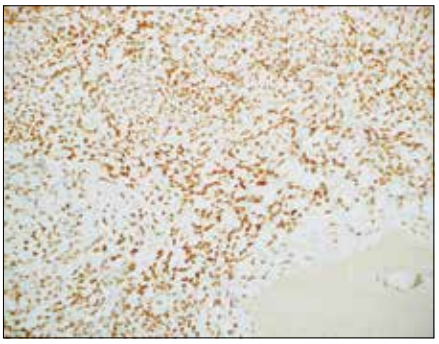
	Inhibin	Oct-4	AFP	Vimentin	EMA	hPL	CD30	Glypican-3	CD117	PLAP
Seminoma	-	+	-	+	-	-	-	-	+	+
Embryonal Carcinoma	-	+	-	-	-	-	+	-	-	+
Choriocarcinoma	-	-	-	-/+	+	+	-	+	-	+
Yolk Sac Tumor	-	-	+	-	-	-	-	+	-	+
Carcinoma	-	-	-	-	+	-	-	-	-	-
Hypercalcaemic Small Cell Carcinoma	-	-	-	-	+	-	-	-	-	-

Sex Cord Stromal Tumors

	Inhibin	Calretinin	CD99	CK 7	EMA	Vimentin	MART-1
Granulosa Cell Tumors	+	+	+	-	-	+	+
Sertoli-Leydig Cell Tumors	+	+	-/+	+	-	+	+
Gynandroblastoma	+	+					
Gonadoblastomas	+	+	+	-	-	+	-

Reference

1. Arora DS, et al. J Pathol. 1997 Apr; 181(4):413-8.
2. Stewart CJ, et al. Histopathology. 1997 Jul; 31(1):67-74.
3. Yamashita K, et al. Am J Obstet Gynecol. 1997 Dec; 177(6):1450 –7.
4. McCluggage Wg, et al. Am J Surg Pathol. 1998 May; 22(5):615-9.
5. Kommoss F, et al. Mod Pathol. 1998 Jul; 11(7):656-64.



INI-1 (MRQ-27)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44321	INI-1 RTU M (MRQ-27)	7 ml Ready To Use
44664	INI-1 0,1 M (MRQ-27)	100 µl liquid Concentrated
44665	INI-1 1 M (MRQ-27)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Astrocytoma, Brain, Endothelial cells
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

The INI-1 gene, which encodes a functionally uncharacterized protein component of the hSWI/SNF chromatin remodeling complex, is often mutated or deleted in malignant rhabdoid tumor (MRT). Two isoforms of INI-1, that differ by the variable inclusion of amino acids, potentially are produced by differential RNA splicing. The morphology of MRTs can present challenges in differential diagnosis. The overall survival of patients with MRT relative to its potential mimics (medulloblastoma, supratenorial primitive neuroectodermal tumors (sPNETs)) is quite low, and thus differentiation from these other tumors is desirable. Lack of nuclear labeling by anti-INI-1 is characteristic of MRT. The majority of medulloblastomas and sPNETs are labeled by anti-INI-1. Epithelioid sarcoma in soft tissue frequently demonstrates rhabdoid features in histology. Sometimes, it is difficult to distinguish epithelioid sarcoma from malignant rhabdoid tumor since both tumors have demonstrated a loss of INI-1 expression. However, epithelioid sarcoma shows anti-CD34 and anti-β-Catenin immunoreactivity. MRT is negative for both markers.

Small, Round Blue Cell Tumors

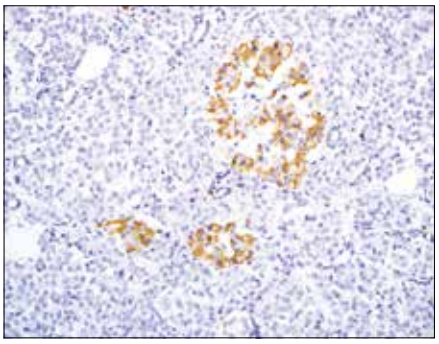
	INI-1	MS Actin	Myoglobin	Myogenin	CK Cocktail	CD99	CD57	FLI-1	WT1	Vimentin
Rhabdomyosarcoma	+	+	+	+	-	-	-	-	-	+
PNET/ES	+	-	-	-	-/+	+	+	+	-	+
DSRCT	+	-	-	-	+	-	+/-	+	+	+
Medulloblastoma	+	-		-	-	-	+	-		-

Brain: CNS Tumors

	INI-1	GFAP	Neuro-filament	Synapto-physin	S-100	CK Cocktail	PR	EMA	Vimentin	NGFR
Astrocytoma	+	+	-	-	+	-	-	-	+	+
Glioblastoma	+	+	-	-	+	-	-	-	+	-
Oligodendriglioma	+	-	-	-	+	-	-	-	+	-
Ependymoma	+	+	-	-	+	-	-	-	-/+	+
Choroid Plexus Carcinoma	+	-	-	-	+	+	-	-		-
Neuroblastoma	+	+/-	+	+	+/-	-	-	-	+	+
Pineocytoma	+	-	-	+	-	-	-	-		-
Meningioma	+	-	-	-	-	-	+	+	+	-
Rhabdoid Tumors	-	+/-	+/-	+/-	+/-	+		+	+	

Reference

1. Bourdeaut F, et al. J Pathol. 2007 Feb; 211(3):323-30.
2. Fowler DJ, et al. Fetal PediatrPathol. 2006 May-Jun; 25(3):159-68.
3. Haberler, C et al. Am J SurgPathol. 2006 Nov; 30(11):1462-8.



Insulin (Polyclonal)

Guinea Pig Polyclonal Antibody

Cat. No.	Description	Volume
45222	IMPATH Insulin RTU G (Poly)	50 Tests
44322	Insulin RTU G (Poly)	7 ml Ready To Use
44666	Insulin 0,1 G (Poly)	100 µl liquid Concentrated
44667	Insulin 1 G (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pancreas
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

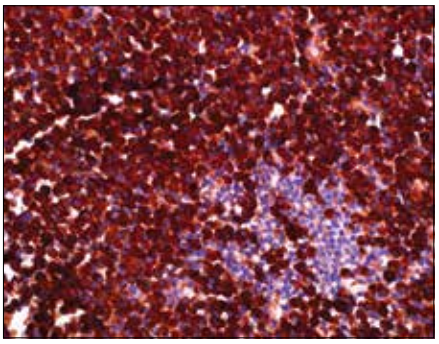
Insulin is a 51-amino acid polypeptide composed of A and B chains connected through the C-peptide. Insulin is one of the major regulatory hormones of intermediate metabolism throughout the body. The biological actions of this hormone involve integration of carbohydrate, protein, and lipid metabolism. Insulin enhances membrane transport of glucose, amino acids, and certain ions. It also promotes glycogen storage, formation of triglycerides, and synthesis of proteins and nucleic acids. Immunohistochemical investigations have localized insulin in the beta cells of pancreatic islets of Langerhans. Deficiency of insulin results in diabetes mellitus, one of the leading causes of morbidity and mortality in the general population. Insulin is also present in tumors of beta cell origin such as insulinoma. Anti-insulin staining in the cytoplasm of tumors is the most reliable indication of functional insulinomas.

Pancreas

	Insulin	Synapto-physin	Chromo-granin A	Gastrin	CD56	β-Catenin	CK 19	CA19-9	E-cadherin	CD10
Neuroendocrine Tumor	+/-	+	+	+/-	+	+	+/-	+/-	-	-
Solid Pseudopapillary Tumor	-	+	-	-	+	+	-	-	+(nuclear)	+
Ductal Carcinoma	-	-	-	-	-	+/-	+	+	+/-	+/-
Acinic Cell Carcinoma	-	-	-	-	-	+	+	-/+	+	+/-
Pancreatoblastoma	-	-	+	-	+	+	-	-	-	-
Normal Pancreas	+	+	+	-	-	+	-	-	-	-

Reference

1. Akagi T, et al. Cancer. 1981; 47:417-424.
2. Scully RE, et al. N eng J Med. 1983; 308:30-37.
3. Erlandsen SL. Williams and Wilkins, Baltimore. 1980; 140-155.
4. Friesen SR. N Eng J Med. 1982; 306:580-590.
5. Jorda M, et al. Arch Pathol Lab Med. 2003 Feb; 127(2):196-9.
6. Letizia C, et al. Eur J Endocrinol. 2001 May; 144(5):517-20.
7. Govindarajan M, et al. Diabetes Res Clin Pract. 2001 Jan; 51(1):29-38.
8. Azzoni C, et al. Virchows Arch. 1998 Dec; 433(6):495-504.
9. Lubensky IA, et al. Am J Pathol. 1998 Jul; 153(1):223-31.



Kappa (L1C1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44323	Kappa Light Chain RTU M (L1C1)	7 ml Ready To Use
44668	Kappa Light Chain 0,1 M (L1C1)	100 µl liquid Concentrated
44669	Kappa Light Chain 1 M (L1C1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Anti-kappa detects surface immunoglobulin on normal and neoplastic B-cells. In paraffin-embedded tissue, anti-kappa exhibits strong staining of kappa-positive plasma cells and cells that have absorbed exogenous immunoglobulins. When dealing with B-cell neoplasms, the determination of light chain ratios remains the centerpiece. Most B-cell lymphomas express either kappa or lambda light chains, whereas reactive proliferations display a mixture of kappa and lambda positive cells. If only a single light chain type is detected, a lymphoproliferative disorder exists. Monoclonality is determined by a kappalambda ratio of greater than 3:1 or a lambda-kappa ratio greater than 2:1.

Immunoglobulin, Heavy and Light Chain

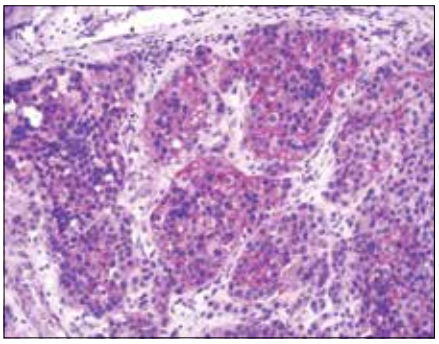
	Kappa	IgA	IgG	IgD	IgM	Lambda
Myeloma	+/-	+	+	-/+	-/+	-/+
Diffuse LBCL	+/-	-	+	-	+	-/+
Marginal Zone Lymphoma	+/-	-	-	-/+	+	-/+
SLL/CLL	+/-	-	-	+	+	-/+

B-cell Lymphomas

	Kappa	Lambda	CD79a	BCL2	BCL6	CD5	CD10	CD23	Cyclin D1	Annexin A1
Follicular	+/-	-/+	+	+	+	-	+	-	-	-
CLL/SLL	+/-	-/+	+	+	-	+	-	+	-	-
Mantle Cell	+/-	-/+	+	+	-	+	-	-	+	-
Marginal Zone	+/-	-/+	+	+	-	-	-	-	-	-
Lymphoplasmacytic	+/-	-/+	+	+	-	-	-	-	-	-
Diffuse Large Cell	+/-	-/+	+	+	+	-/+	-/+	-	-	-
Burkitt	+/-	-/+	+	-	+	-	+	-	-	-
Hairy Cell Leukemia	+/-	-/+	+	+	-	-	-	-	+(weak)/-	+

Reference

1. Michie SA, et al. A J Clin Path. 1987.
2. Hertel BF, et al. Lab Invest. 1977; 36:12.
3. Taylor CL. Arch Pathol Lab Med. 1978; 12:113-121.
4. Ashton-Key M, et al. Histopathology. 1996 Dec; 29(6):525-31.
5. Kurtin PJ, et al. Am J Clin Pathol. 1999 Sep; 112(3):319-29.
6. Abbondanzo SL, et al. Ann Diagn Pathol. 1999 Oct; 3(5):318-27.
7. Lee LA, et al. Am J Otolaryngol. 2002 Sep-Oct; 23(5):316-20.
8. Mendes S, Dreno B. Acta Derm Venereol. 2003; 83(3):167-70.



KBA.62 (KBA.62)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45319	IMPATH KBA.62 RTU M (KBA.62)	50 Tests
44335	KBA.62 RTU M (KBA.62)	7 ml Ready To Use
44690	KBA.62 0,1 M (KBA.62)	100 µl liquid Concentrated
44691	KBA.62 1 M (KBA.62)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Melanoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

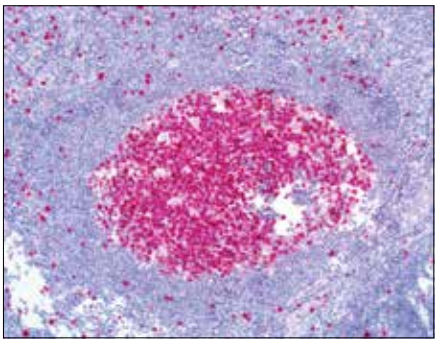
Product Description

Anti-KBA.62 (Melanoma Associated Antigen) is a novel anti-melanoma antibody. Studies thus far have shown a similar sensitivity to melanocytic proliferations as that seen with S-100 protein staining, which is somewhat higher than that seen with anti-HMB-45. This has been confirmed by one study on a series of 215 sentinel lymph nodes. Moreover, anti-KBA.62 identified 6 patients (3%) who had confirmed sentinel lymph node metastasis but stained negative using anti-HMB-45. In this setting, the resolution appears to be higher than S-100 protein in that the staining pattern (membranous) is quite distinct. Interestingly, most cases of desmoplastic and spindle cell melanomas show strongly positive results with anti-KBA.62, unlike that seen with other melanocyte markers. It should be noted that anti-KBA.62 will label occasional endothelial cells which can serve as an internal positive control. A small percentage of well-differentiated squamous cell carcinomas of the skin (and lung) have also been noted to stain with this antibody; however, the poorly-differentiated forms of carcinoma do not, thus resolving a greater practical problem in differential diagnosis. Anti-KBA.62 is a useful additional marker for melanoma, specifically in desmoplastic/spindle cell cases and in the context of micrometastasis in sentinel lymph node.

	KBA.62	S-100	HMB-45	MART-1	Tyrosinase	MiTF	CD63	Factor XIIIa	WT1	PNL2
Adult Melanocytes	+	+	-	+	+	+	+	-		+
Junctional Nevus	+	+	+	+	+	+	-	-	+/-	+
Interdermal Nevus	+	+	-	+	+	+	-	-	+/-	+
Primary Melanoma	+	+	+	+	+	+	+	-		+
Metastatic Melanoma	+	+	+	+	+	+	+	-	+	+
Spindle Cell Melanoma	+	+	+	+	+	+	+	-	+	+
Angiomyolipoma	-	+	+	+	-	+	+	-		+
Adrenal Cortical Lesions	-	+	-	+	-	-	-	-		-
Intranodal Nevus Cells	+	+	-	+	+	+	-	-		+
Dermatofibroma	-	-	-	-	-	-	-	+		-

Reference

1. Kocan P, et al. Cesk Patol. 2004 Apr; 40(2):50-6.
2. Cecile Pages, et al. Hum Pathol. 2008; 39:1136-1142.
3. E Cohen-Knafo, et al. J Clin Pathol. 1995; 48:826-831.
4. Kaufmann O, et al. Mod Pathol. 1998 Aug; 11(8):740-6.



Ki-67 (EP5†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44324	Ki67 Antigen RTU R (EP5)	7 ml Ready To Use
44670	Ki67 Antigen 0,1 R (EP5)	100 µl liquid Concentrated
44671	Ki67 Antigen 1 R (EP5)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

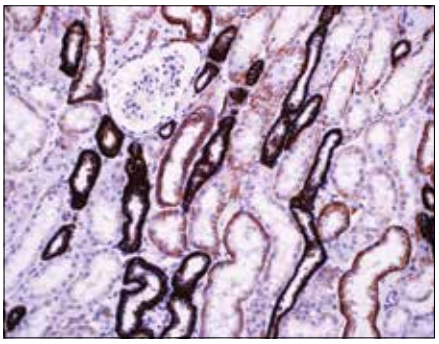
The Ki-67 antigen is a nuclear, non-histone protein that is present in all stages of the cell cycle except G0. In general, Ki-67 is a good marker of proliferating cell populations. Anti-Ki-67 labeling index has been shown to be a good prognostic marker in a number of neoplasms including grade II astrocytoma, oligodendroglioma, colon carcinoma, and breast carcinoma.

Bladder: Dysplasia vs. Reactive				
	Ki-67	CK 20	p53	CD44
Carcinoma-in-situ	+	+	+	-
Reactive Atypia	+	-	-	+ (all cell layers)
Normal Urothelium	-	+ (umbrella cells)	-	+ (umbrella cells)

Cervix			
	Ki-67	BCL2	CK 17
Cervical Intraepithelial Neoplasia	+	-	-
Tubo-Endometrial Metaplasia	-	+	+
Microglandular Hyperplasia	-	-	-

Reference

1. Mckeever P, et al. J Neuropathol Exp Neurol. 1998; 57:931-936.
2. Coons SW, et al. Neurosurgery. 1997 Oct; 41(4):878-84.
3. Allegra CJ, et al. J Clin Oncol. 2003 Jan 15; 21(2):241-50.
4. Trihia H, et al. Cancer. 2003 Mar 1; 97(5):1321-31.
5. Veronese SM, et al. Anticancer Res. 1995 Nov-Dec; 15(6B):2717-22.
6. Bacus SS, et al. Am J Pathol. 1989; 135:783-792.
7. Gonzalez-Vela MC, et al. Histol Histopathol. 2001 Apr; 16(2):399-406.
8. Imamura H, et al. Jpn J Cancer Res. 1997 Oct; 88(10):1017-23.



Ksp-cadherin (MRQ-33)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45315	IMPATH Ksp-cadherin RTU M (MRQ-33)	50 Tests
44325	KSP Cadherin RTU M (MRQ-33)	7 ml Ready To Use
44672	KSP Cadherin 0,1 M (MRQ-33)	100 µl liquid Concentrated
44673	KSP Cadherin 1 M (MRQ-33)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Kidney
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

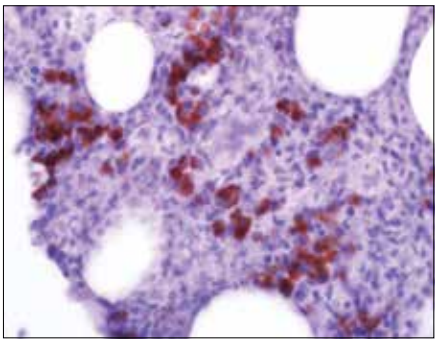
Product Description

Kidney-specific cadherin (Ksp-cadherin or cadherin-16) is a kidney-specific member of the cadherin family of cell adhesion molecules. Within the kidney, Ksp-cadherin is found exclusively in the basolateral membrane of renal tubular epithelial cells and collecting duct cells, and not in glomeruli, renal interstitial cells, or blood vessels. Recent studies have shown that anti-Ksp-cadherin can be used to distinguish chromophobe renal cell carcinoma from oncocytoma with a membranous staining pattern in 96% of chromophobe carcinomas, but in only 6% of oncocytomas. However, other studies report anti-Ksp-cadherin positivity in 100% of chromophobe RCCs, and 95% of oncocytomas.

Kidney: Renal Epithelial Tumors								
	Ksp-cadherin	RCC	CD10	PAX-2	Vimentin	Parvalbumin	CD117	Ep-CAM
Clear Cell RCC	-	+	+	+	+	-	-	-
Chromophobe RCC	+	-/+	-/+	+	-	+	+	+
Oncocytoma	+/-	-	+/-	+	-	+	+	-

Reference

1. Mazal PR, et al. Hum Pathol. 2005 Jan; 36(1):22-8.
2. Shen SS, et al. Mod Pathol. 2005 Jul; 18(7):933-40.
3. Thedieck C, et al. Br J Cancer. 2005 Jun 6; 92(11):2010-7.



Lambda (Lamb14)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44326	Lambda Light Chain RTU M (Lamb14)	7 ml Ready To Use
44674	Lambda Light Chain 0,1 M (Lamb14)	100 µl liquid Concentrated
44675	Lambda Light Chain 1 M (Lamb14)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Anti-lambda detects surface immunoglobulin on normal and neoplastic B-cells. Anti-lambda staining is seen in B-cell follicles of human lymphoid tissue. When dealing with B-cell neoplasms, the determination of light chain ratios remains helpful. Most B-cell lymphomas express either kappa or lambda light chains, whereas reactive proliferations display a mixture of kappa and lambda positive cells. If only a single light chain type is detected, a lymphoproliferative disorder is very likely. Monoclonality is determined by a kappa-lambda ratio of greater than 3:1, a lambda-kappa ratio greater than 2:1.

Immunoglobulin, Heavy and Light Chain

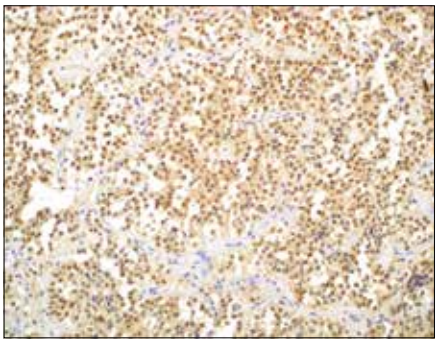
	Lambda	IgA	IgG	IgD	IgM	Kappa
Myeloma	-/+	+	+	-/+	-/+	+/-
Diffuse LBCL	-/+	-	+	-	+	+/-
Marginal Zone Lymphoma	-/+	-	-	-/+	+	+/-
SLL/CLL	-/+	-	-	+	+	+/-

B-cell Lymphomas

	Lambda	Kappa	CD79a	BCL2	BCL6	CD5	CD10	CD23	Cyclin D1	Annexin A1
Follicular	-/+	+/-	+	+	+	-	+	-	-	-
CLL/SLL	-/+	+/-	+	+	-	+	-	+	-	-
Mantle Cell	-/+	+/-	+	+	-	+	-	-	+	-
Marginal Zone	-/+	+/-	+	+	-	-	-	-	-	-
Lymphoplasmacytic	-/+	+/-	+	+	-	-	-	-	-	-
Diffuse Large Cell	-/+	+/-	+	+	+	-/+	-/+	-	-	-
Burkitt	-/+	+/-	+	-	+	-	+	-	-	-
Hairy Cell Leukemia	-/+	+/-	+	+	-	-	-	-	+(weak)/-	+

Reference

1. Michie SA, et al. A J Clin Path. 1987.
2. Hertel BF, et al. Lab Invest. 1977; 36:12.
3. Taylor CL. Arch Pathol Lab Med. 1978; 12:113-121.
4. Abbondanzo SL, et al. Ann Diagn Pathol. 1999 Oct; 3(6):394.
5. Kurtin PJ, et al. Am J Clin Pathol. 1999 Sep; 112(3):319-29.
6. Ashton-Key M, et al. Histopathology. 1996 Dec; 29(6):525-31.



LH (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45224	IMPATH LH RTU R (Poly)	50 Tests
44328	LH RTU R (Poly)	7 ml Ready To Use
44678	LH 0,1 R (Poly)	100 µl liquid Concentrated
44679	LH 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pituitary
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

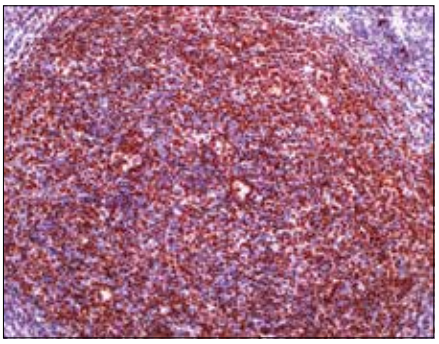
Luteinizing hormone (LH) is a glycoprotein. Each monomeric unit is a sugar-like protein molecule; two of these make the full, functional protein. Its structure is similar to the other glycoproteins, follicle-stimulating hormone (FSH), thyroid-stimulating hormone (TSH), and human chorionic gonadotropin (hCG). The protein dimer contains 2 polypeptide units, labeled alpha and beta subunits that are connected by two bridges. The alpha subunits of LH, FSH, TSH, and hCG are identical, and contain 92 amino acids. The beta subunits vary. LH has a beta subunit of 121 amino acids (LHB) that confers its specific biologic action and is responsible for interaction with the LH receptor. This beta subunit contains the same amino acids in sequence as the beta subunit of hCG and both stimulate the same receptor; however, the hCG beta subunit contains an additional 24 amino acids and the hormones differ in the composition of their sugar moieties. The gene for the alpha subunit is located at chromosome 6q12.21. The luteinizing hormone beta subunit gene is localized in the LHB/CGB gene cluster at chromosome 19q13.32. In contrast to the alpha gene activity, beta LH subunit gene activity is restricted to the pituitary gonadotropic cells. It is regulated by the gonadotropin releasing hormone from the hypothalamus. Inhibin, activin, and sex hormones do not affect genetic activity for the beta subunit production of LH. In both males and females, LH is essential for reproduction. Mutations in this gene are associated with hypogonadism which is characterized by infertility and pseudohermaphroditism.

Anti-LH is a useful marker in classification of pituitary tumors and the study of pituitary disease. It reacts with LH-producing cells (gonadotrophs).

Pituitary Panel						
	LH	ACTH	FSH	GH	Prolactin	TSH
Pituitary	+	+	+	+	+	+

Reference

1. La Rosa S, et al. Virchows Arch. 2000 Sep; 437(3):264-9.
2. Saccomanno K, et al. J Clin Endocrinol Metab. 1994 May; 78(5):1103-7.
3. Felix I, et al. Hum Pathol. 1991 Jul; 22(7):719-21.
4. Sano T, et al. Virchows Arch A Pathol Anat Histopathol. 1990; 417(4):361-7.



LMO2 (SP51)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45316	IMPATH LMO2 RTU R (SP51)	50 Tests
44327	LMO2 RTU R (SP51)	7 ml Ready To Use
44676	LMO2 0,1 R (SP51)	100 µl liquid Concentrated
44677	LMO2 1 R (SP51)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Diffuse large B-cell lymphoma, Follicular Lymphoma, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

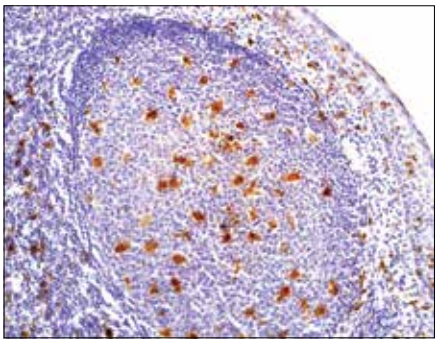
LMO2 is expressed in normal germinal center B-cells and in a subset of lymphomas derived from those cells in addition to bone marrow hematopoietic precursors and endothelial cells. LMO2 protein expression has also been shown to play an important role in the diagnosis of diffuse large B-cell lymphomas, regardless of rituximab treatment. It also plays a role in angiogenesis and hematopoiesis. It is weakly expressed in mantle zone B-cells but not in mantle cell or marginal zone lymphomas. Younes et al. have demonstrated LMO2 expression in 70% of follicular lymphomas. These data suggest that anti-LMO2 is a useful adjunct in the diagnosis of follicular lymphoma (FL). As LMO2 appears not to be down regulated in higher grade FL or the interfollicular and diffuse components of FL, its utility in variant immunoarchitectural patterns of FL and in cases that lack CD10 and BCL2, is similar to that of HGAL. One advantage of anti-LMO2 is its crisp nuclear localization that allows for easier interpretation than the diffuse cytoplasmic staining pattern of anti-HGAL.

Mature B-cell Lymphomas

	LMO2	HGAL	CD20	CD5	CD23	CD10	BCL2
Follicular Lymphoma	+	+	+	-	-	+/-	+/-
Diffuse Large B-cell Lymphoma	+	+	+	-/+	-	+/-	+
Small Lymphocytic Lymphoma	-	-	+	+	+	-	+
Mantle Cell Lymphoma	-	-	+	+	-	-	+
Marginal Zone Lymphoma	-	-	+	-	-	-	+

Reference

1. Younes SF, et al. Am J Surg Pathol. 2010; 34:1266-76.



Lysozyme (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45151	IMPATH Lysozyme RTU R (Poly)	50 Tests
44329	Lysozyme RTU R (Poly)	7 ml Ready To Use
44680	Lysozyme 0,1 R (Poly)	100 µl liquid Concentrated
44681	Lysozyme 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-lysozyme stains myeloid cells, histiocytes, granulocytes, macrophages, and monocytes. It is an important marker that may demonstrate the myeloid or monocytic nature of acute leukemia. The restrictive nature of anti-lysozyme staining suggests that lysozyme may be synthesized predominantly in reactive histiocytes rather than in resting, unstimulated phagocytes. Anti-lysozyme may aid in the identification of histiocytic neoplasias, large lymphocytes, and classifying lymphoproliferative disorders.

Acute Myeloid Leukemia

	Lysozyme	MPO	CD68	Factor VIII	CD61	BOB.1	Oct-2	Glyco-phorin A	CD34
Acute Myeloid, M0	+	-	-	-	-	-	-	-	+
Acute Myeloid, M1&2	+	+	+	-	-			-	+
Promyelocytic, M3	-	+	-	-	-	+	+	-	-
Myelomonocytic, M4	+	+	+	-	-	-	+	-	+
Monoblastic, M5	+	+	+	-	-	-	+	-	-/+
Acute Erythroid, M6		+	-	-	-	-	-	+	-/+
Megakaryoblastic, M7		-	-	+	+	+/-	-	-	-

Lymph Node

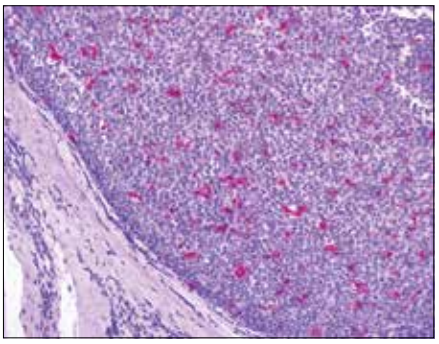
	Lysozyme	CD68	S-100	CD1a	CD21/CD35	PD-1
Reactive Histiocytosis	+	+	-	-	-	-
Langerhans Cell Histiocytosis	+	+	+	+	-	-
Sinus Histiocytosis with Massive Lymphadenopathy	+	+	+	-	-	-
Follicular Dendritic Cell Sarcoma	-	-	-	+/-	+	-
Dermatopathic Lymphadenitis	+	-	+	+	-	-

Histiocytic Lesions

	Lysozyme	CD45	CD4	CD68	CD163	Factor XIIIa	CD20	CD3
Histiocytic Lesions	+	+	+	+	+	+	-	-

Reference

1. Morsky P. Clin Chim Acta. 1988; 178:327-36.



Macrophage (HAM-56)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45225	IMPATH Macrophage RTU M (HAM-56)	50 Tests
44330	Macrophage Marker RTU M (HAM-56)	7 ml Ready To Use
44682	Macrophage Marker 0,1 M (HAM-56)	100 µl liquid Concentrated
44683	Macrophage Marker 1 M (HAM-56)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgM/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Macrophages comprise many forms of mononuclear phagocytes found in tissues. Mononuclear phagocytes arise from hematopoietic stem cells in the bone marrow. After passing through the monoblast and promonocyte states to the monocyte stage, they enter the blood, where they circulate for about 40 hours. They then enter tissues and increase in size, phagocytic activity, and lysosomal enzyme content becoming macrophages. When a monocyte enters damaged tissue through the endothelium of a blood vessel (known as the leukocyte extravasation), it undergoes a series of changes to become a macrophage. Monocytes are attracted to a damaged site by chemical substances through chemotaxis, triggered by a range of stimuli including damaged cells, pathogens, and cytokines released by macrophages already at the site. At some sites such as the testis, macrophages have been shown to populate the organ through proliferation. Unlike short-lived neutrophils, macrophages survive longer in the body up to a maximum of several months.

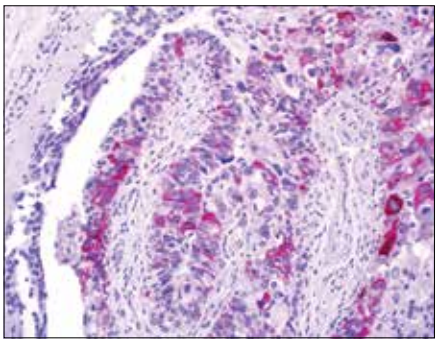
Anti-HAM-56 reacts with tingible macrophages, interdigitating macrophages of lymph nodes, and tissue macrophages, e.g. Kupffer cells of the liver and alveolar macrophages of the lung. The antibody also stains a subpopulation of endothelial cells, most prominently those of the capillaries and smaller blood vessels. Anti-HAM-56 reacts with monocytes, but is unreactive with B- and T-lymphocytes.

Histiocytic Proliferation

	HAM-56	S-100	CD68	Vimentin	Lysozyme	CD1a	Factor XIIIa
Juvenile Xanthogranuloma	+	-	+	+	+	-	+
Langerhans Cell Histiocytosis	+	+	+	+	+	+	-
Dermatofibroma	-	-	+	+	-	-	+

Reference

1. Gown AM, et al. Am J Pathol. 125:191-207.
2. Alpers CE, et al. Am J Pathol. 92:662-665.
3. Bosman C, et al. J Pediatr Hematol Oncol. 1999 Jan-Feb; 21(1):31-7.
4. Soini Y, Miettinen M. Pathol Res Pract. 1990 Dec; 186(6):759-67.



Mammaglobin (31A5)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45650	IMPATH Mammaglobin RTU C (304-1A5/31A5)	50 Tests
44331	Mammaglobin RTU R (31A5)	7 ml Ready To Use
44684	Mammaglobin 0,1 R (31A5)	100 µl liquid Concentrated
44685	Mammaglobin 1 R (31A5)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Breast Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Mammaglobin is a 10 kDa glycoprotein with unknown function identified in a substantial proportion of primary and metastatic breast carcinomas. Mammaglobin mRNA is present in high levels in human breast cancer cell lines and primary breast cancers. High levels of mRNA have been detected in normal human sweat glands as well, and anti-mammaglobin may label sweat gland tumors. Anti-mammaglobin has been shown to be effective in detecting up to 85% of breast carcinomas via immunohistochemistry on paraffin-embedded tissues. Anti-mammaglobin is higher in sensitivity and lower in specificity for primary and metastatic breast carcinoma, in comparison to anti-GCDFP-15.

Carcinoma: Differential Diagnosis

	Mammaglobin	Androgen Receptor	BCA-225	GCDFP-15	ER/PR	PSA/PSAP	CD44
Salivary Duct Carcinoma	-	+	+	+	-	-	-
Breast Carcinoma	+	+(apocrine)	+	+	+/-	-	-
Prostate Carcinoma	-	+	-	-	-	+	+

Breast Lesion

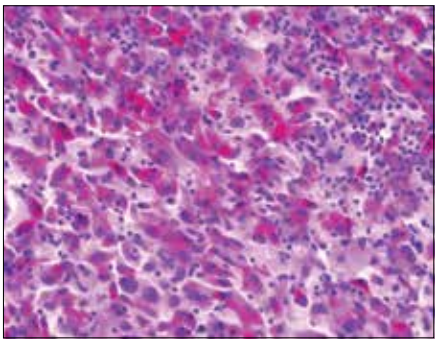
	Mammaglobin	GCDFP-15	β-Catenin	E-cadherin	CK, 34βE12	p120
Lobular	+	+	-	-	+	+(cytoplasmic)
Ductal	+	+	+(membranous)	+	-	+(membranous)

Breast vs. Lung vs. Prostate Carcinoma

	Mammaglobin	GCDFP-15	PSA	TTF-1	Napsin A
Breast Carcinoma	+	+	-	-	-
Lung Carcinoma	-	-	-	+	+
Prostate Carcinoma	-	-	+	-	-

Reference

1. Watson MA, et al. Cancer Research. 1999 July; 59:3028-3031.
2. Fleming TP. Ann N Y Acad Sci. 2000; 923:78-89.
3. Han JH, et al. Arch Pathol Lab Med. 2003 Oct; 127:1330-1334.
4. Bhargava R, et al. Am J Clin Pathol. 2007 Jan; 127(1):103-13.
5. Sasak E, et al. Mod Pathol. 2007 Feb; 20 (2):208-14.
6. Wang Z, et al. Int J Clin Exp Pathol. 2009; 2(4):384-9.



MART-1 (Melan A) (A103)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45152	IMPATH MART-1 (Melan A) RTU M (A103)	50 Tests
44332	MART-1 (Melan A) RTU M (A103)	7 ml Ready To Use
44686	MART-1 (Melan A) 0,1 M (A103)	100 µl liquid Concentrated
44687	MART-1 (Melan A) 1 M (A103)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Melanoma, Skin
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

MART-1 (also known as Melan A) is a melanocyte differentiation antigen. It is present in melanocytes of normal skin, retina, nevi, and in more than 85% of melanomas. This antibody is very useful in establishing the diagnosis of metastatic melanomas.

Adrenal Tumors

	MART-1	Inhibin	Calretinin	Synaptophysin	Chromogranin A	CD56
Pheochromocytoma	-	-	-	+	+	+
Adrenal Carcinoma	+	+	+	-/+	-	+
Adrenal Adenoma	+	+	+	-/+	-	+

Melanotic Lesions

	MART-1	S-100	SOX-10	HMB-45	Tyrosinase	MiTF	CD63	Factor XIIIa
Adult Melanocytes	+	+	+	-	+	+	+	-
Junctional Nevus	+	+	+	+	+	+	-	-
Interdermal Nevus	+	+	+	-	+	+	-	-
Primary Melanoma	+	+	+	+	+	+	+	-
Metastatic Melanoma	+	+	+	+	+	+	+	-
Spindle Cell Melanoma	+	+	+	+	+	+	+	-
Angiomyolipoma	+	+	+	+	-	+	+	-
Adrenal Cortical	+	+		-	-	-	-	-
Intranodal Nevus Cells	+	+	+	-	+	+	-	-
Dermatofibroma	-	-	-	-	-	-	-	+

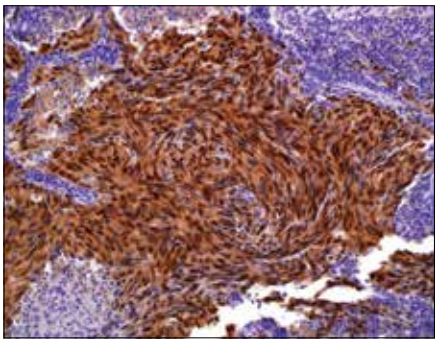
PEComa

	MART-1	HMB-45	CD63	S-100	Tyrosinase	SM Actin	Calponin	Caldesmon	Desmin	CD68
Angiomyolipoma	+	+	+	-	-	+	+	+	-	+
Lymphangiomyomatosis	+	+	+	-	-	+	+	+	-	-
Extrapulmonary Clear Cell Tumor	+	+	+	+	-	+	-	-	-	-
Primary Cutaneous PEComa	+	+	+	-	-	-	-	-	-	+/-
Pulmonary Clear Cell Sugar Tumor	+	+	+	+/-	-	-	-	-	-	+/-

Reference

1. Kageshita T, et al. J Immunother. 1997 Nov; 20(6):460-5.

A.MENARINI diagnostics



Microphthalmia Transcription Factor (MiTF) (C5/D5)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45226	IMPATH MITF RTU M (C5/D5)	50 Tests
44336	MITF RTU M (C5/D5)	7 ml Ready To Use
44692	MITF 0,1 M (C5/D5)	100 µl liquid Concentrated
44693	MITF 1 M (C5/D5)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Melanoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

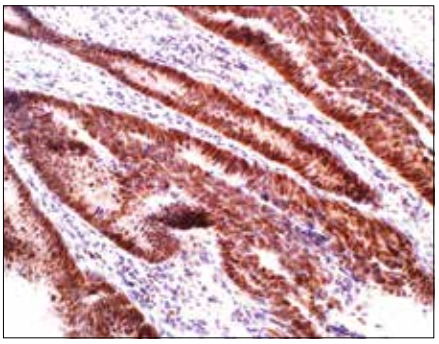
Product Description

Microphthalmia (MiTF) is a transcription factor implicated in pigmentation, bone development, and in mast cells. Various forms of MiTF exist ranging from 50 -70 kD in size. This antibody targets the 52 - 56 kD range and has been useful in identifying malignant melanoma and distinguishing mast cell lesions from lesions of myeloid derivation. A relatively rare class of tumors known as PEComas (tumors showing perivascular epithelioid cell differentiation) express MiTF in a high percentage of cases (~90%).

Melanotic Lesions	MiTF	S-100	SOX-10	HMB-45	MART-1	Tyrosinase	CD63	Factor XIIIa
Adult Melanocytes	+	+	+	-	+	+	+	-
Junctional Nevus	+	+	+	+	+	+	-	-
Interdermal Nevus	+	+	+	-	+	+	-	-
Primary Melanoma	+	+	+	+	+	+	+	-
Metastatic Melanoma	+	+	+	+	+	+	+	-
Spindle Cell Melanoma	+	+	+	+	+	+	+	-
Angiomyolipoma	+	+	+	+	+	-	+	-
Adrenal Cortical	-	+		-	+	-	-	-
Intranodal Nevus Cells	+	+	+	-	+	+	-	-
Dermatofibroma	-	-	-	-	-	-	-	+

Reference

1. Liegl B, et al. Am J Surg Pathol. 2008 Apr; 32(4):608-14.
2. Righi A, et al. Int J Surg Pathol. 2008 Jan; 16(1):16-20.
3. Weinreb I, et al. Virchows Arch. 2007 Apr; 450(4):463-70. Epub 2007 Feb 15.
4. Ohsie SJ, et al, Binder SW. J Cutan Pathol. 2008 May; 35(5):433-44. Review.
5. Hornick JL, Fletcher CD. Am J Surg Pathol. 2008 Apr; 32(4):493-501.



MLH1 (G168-728)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45227	IMPATH MLH1 RTU M (G168-728)	50 Tests
44337	MLH1 RTU M (G168-728)	7 ml Ready To Use
44694	MLH1 0,1 M (G168-728)	100 µl liquid Concentrated
44695	MLH1 1 M (G168-728)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Colon, Colon Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

MutL homolog 1, colon cancer, nonpolyposis type 2 (E. coli), also known as MLH1, is a human gene which has been identified as a locus frequently mutated in hereditary nonpolyposis colon cancer (HNPCC). It is a human homolog of the E. coli DNA mismatch repair gene mutL, consistent with the characteristic alterations in microsatellite sequences (RER+ phenotype) found in HNPCC. Microsatellites are repetitive DNA sequences dispersed throughout the genome. The repetition renders them susceptible to slippage mutations. To counter this, there are families of mismatch repair (MMR) genes which correct these errors. These repair genes include MLH1, PMS2, MSH2, and MSH6. Defective MMR genes lead to accumulation of mutations in microsatellite regions, known as microsatellite instability (MSI). Colonic and endometrial carcinomas in HNPCC can be demonstrated to have MSI. MSI can also be found in 17% to 23% of non-familial endometrial carcinomas: this MSI is attributable to silencing of the MLH1 gene by promoter methylation.

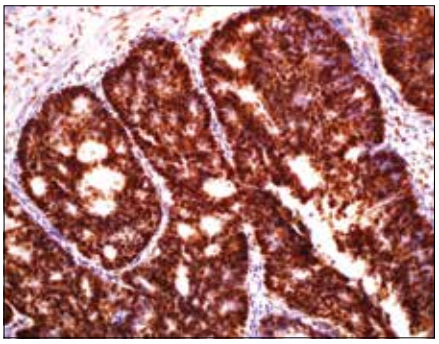
HNPCC is characterized by an increased risk of colon cancer and other cancers (e.g., of the endometrium, ovary, stomach, small intestine, hepatobiliary tract, upper urinary tract, brain, and skin). Individuals with HNPCC have an approximately 80% lifetime risk for colon cancer. Women with HNPCC have a 20-60% lifetime risk of endometrial cancer. Among women with HNPCC who develop both colon cancer and endometrial cancer, approximately 50% present first with endometrial cancer. 90% of patients with HNPCC have mutations of either MLH1 or MSH2. Mutations in MSH6 have been reported in approximately 7% - 10% of families with HNPCC. Mutations in PMS2 account for fewer than 5% of mutations in families with HNPCC.

MSI testing can be demonstrated by polymerase chain reaction, a molecular genetic test, and methylation analysis of tumor tissue. However, in routine diagnostic practice, IHC is the most common clinically available method for detection of the proteins encoded by MLH1, MSH2, and MSH6. IHC is more feasible for large scale screening programs as it is more available than MSI testing.

Microsatellite Instability				
	MLH1	MSH2	MSH6	PMS2
Mismatch Repair Mutations	-	+	+	-

Reference

1. Wright CL, et al. Am J Surg Pathol. 2003; 27:1393-1406.
2. Brueckl WM, et al. Anticancer Research. 2003; 23:1773-1778.
3. Rigau V, et al. Arch Pathol Lab Med. 2003 June; 127:694-700.
4. Renkonen E, et al. J Clin Oncol. 2003; 21:3629-3637.
5. Hoedema R, et al. The American Surgeon. 2003 May; 69(5):387-92.
6. Christensen M, et al. Cancer. 2002; 95:2422-30.
7. Wahlberg SS, et al. Cancer Research. 2002 June 15; 62:3485-3492.
8. Lanza G, et al. Modern Pathology. 2002; 15:741-749.



MSH2 (G219-1129)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45228	IMPATH MSH2 RTU M (G219-1129)	50 Tests
44338	MSH2 RTU M (G219-1129)	7 ml Ready To Use
44696	MSH2 0,1 M (G219-1129)	100 µl liquid Concentrated
44697	MSH2 1 M (G219-1129)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Colon carcinoma, Colon mucosa
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

MSH2 is a locus frequently mutated in hereditary nonpolyposis colon cancer (HNPCC). When cloned, it was discovered to be a human homolog of the E. coli mismatch repair gene mutS, consistent with the characteristic alterations in microsatellite sequences (RER+ phenotype) found in HNPCC. Microsatellites are repetitive DNA sequences dispersed throughout the genome. The repetition renders them susceptible to slippage mutations. To counter this, there are families of mismatch repair (MMR) genes which correct these errors. These repair genes include MLH1, PMS2, MSH2, and MSH6. Defective MMR genes lead to accumulation of mutations in microsatellite regions, known as microsatellite instability (MSI). Colonic and endometrial carcinomas in HNPCC can be demonstrated to have MSI. MSI can also be found in 17% to 23% of non-familial endometrial carcinomas; this MSI is attributable to silencing of the MLH1 gene by promoter methylation.

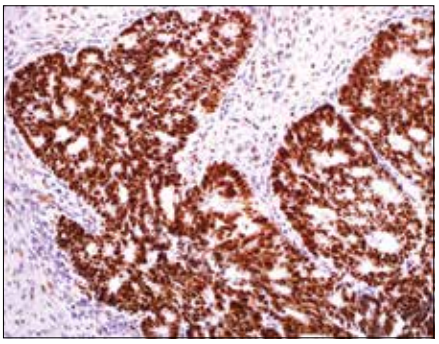
HNPCC is characterized by an increased risk of colon cancer and other cancers (e.g., of the endometrium, ovary, stomach, small intestine, hepatobiliary tract, upper urinary tract, brain, and skin). Individuals with HNPCC have an approximately 80% lifetime risk for colon cancer. Women with HNPCC have a 20-60% lifetime risk of endometrial cancer. Among women with HNPCC who develop both colon cancer and endometrial cancer, approximately 50% present first with endometrial cancer. 90% of patients with HNPCC have mutations of either MLH1 or MSH2. Mutations in MSH6 have been reported in approximately 7-10% of families with HNPCC. Mutations in PMS2 account for fewer than 5% of mutations in families with HNPCC.

MSI testing can be demonstrated by polymerase chain reaction, molecular genetic testing, and methylation analysis of tumor tissue. However, in routine diagnostic practice, IHC is the most common clinically available method for detection of the proteins encoded by MLH1, MSH2, and MSH6. IHC is more feasible for large scale screening programs as it is more available than MSI testing.

Microsatellite Instability				
	MSH2	MLH1	MSH6	PMS2
Mismatch Repair Mutations	-	+	-	+

Reference

1. Wright CL, et al. Am J Surg Pathol. 2003; 27:1393-1406.
2. Brueckl WM, et al. Anticancer Research. 2003; 23:1773-1778.
3. Rigau V, et al. Arch Pathol Lab Med. 2003 June; 127(6):694-700.
4. Renkonen E, et al. J Clin Oncol. 2003; 21:3629-3637.
5. Hoedema R, et al. The American Surgeon. 2003 May; 69(5):387-92.
6. Christensen M, et al. Cancer 2002; 95:2422-30.
7. Wahlberg SS, et al. Cancer Research. 2002 June 15; 62:3485-3492.
8. Lanza G, et al. Modern Pathology. 2002; 15:741-749.



MSH6 (44)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45229	IMPATH MSH6 RTU M (44)	50 Tests
44339	MSH6 RTU M (44)	7 ml Ready To Use
44698	MSH6 0,1 M (44)	100 µl liquid Concentrated
44699	MSH6 1 M (44)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Colon, Colon carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

This gene encodes a protein similar to the MutS protein. In E. coli, the MutS protein helps in the recognition of mismatched nucleotides, prior to their repair. A highly conserved region of approximately 150 aa, called the Walker-A adenine nucleotide binding motif, exists in MutS homologs. The encoded protein of this gene combines with MSH2 to form a mismatch recognition complex that functions as a bidirectional molecular switch that exchanges ADP and ATP as DNA mismatches are bound and dissociated. Mutations in this gene have been identified in individuals with hereditary nonpolyposis colon cancer (HNPCC) and endometrial cancer. Microsatellites are repetitive DNA sequences dispersed throughout the genome. The repetition renders them susceptible to slippage mutations. To counter this, there are families of mismatch repair (MMR) genes which correct these errors. These repair genes include MLH1, PMS2, MSH2, and MSH6. Defective MMR genes lead to accumulation of mutations in microsatellite regions, known as microsatellite instability (MSI). Colonic and endometrial carcinomas in HNPCC can be demonstrated to have MSI. MSI can also be found in 17% to 23% of non-familial endometrial carcinomas: this MSI is attributable to silencing of the MLH1 gene by promoter methylation.

HNPCC is characterized by an increased risk of colon cancer and other cancers (e.g., of the endometrium, ovary, stomach, small intestine, hepatobiliary tract, upper urinary tract, brain, and skin). Individuals with HNPCC have an approximately 80% lifetime risk for colon cancer. Women with HNPCC have a 20-60% lifetime risk of endometrial cancer. Among women with HNPCC who develop both colon cancer and endometrial cancer, approximately 50% present first with endometrial cancer. 90% of patients with HNPCC have mutations of either MLH1 or MSH2. Mutations in MSH6 have been reported in approximately 7-10% of families with HNPCC. Mutations in PMS2 account for fewer than 5% of mutations in families with HNPCC.

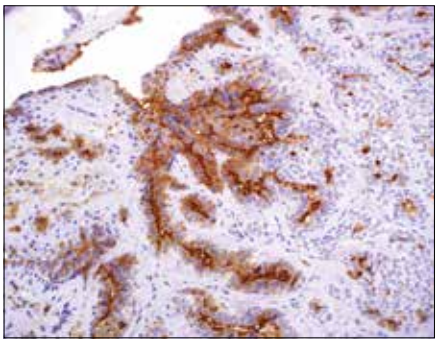
MSI testing can be demonstrated by polymerase chain reaction, molecular genetic testing, and methylation analysis of tumor tissue. However, in routine diagnostic practice, IHC is the most common clinically available method for detection of the proteins encoded by MLH1, MSH2, and MSH6. IHC is more feasible for large scale screening programs because it is more available than MSI testing.

Microsatellite Instability

	MSH6	MLH1	MSH2	PMS2
Mismatch Repair Mutations	-	+	+	+

Reference

1. Lagerstedt RK, et al. J Natl Cancer Inst. 2007 Feb 21; 99(4):291-9.
2. Niessen RC, et al. Gut. 2006 Dec; 55(12):1781-8.
3. Hansen TP, et al. Appl Immunohistochem Mol Morphol. 2006 March; 14(1):115-21.
4. Lawes DA, et al. Br J Cancer. 2005 Aug 22; 93(4):472-7.
5. Stormorken AT, et al. J Clin Oncol. 2005 Jul 20; 23(21):4705-12.
6. Rigau V, et al. Arch Pathol Lab Med. 2003; 127:694-700.



MUC1 (MRQ-17)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45230	IMPATH MUC1 RTU M (MRQ-17)	50 Tests
44340	MUC1 RTU M (MRQ-17)	7 ml Ready To Use
44700	MUC1 0,1 M (MRQ-17)	100 µl liquid Concentrated
44701	MUC1 1 M (MRQ-17)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Associated adenocarcinomas, Breast, Colon
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Mucins are high molecular weight glycoproteins which constitute the major component of the mucus layer that protects the gastric epithelium. The heterogeneous pattern of mucin expression, including the expression of the intestinal mucin MUC2, may provide new insights into the differentiation pathways of gastric carcinoma. Pinto-de-Sousa et al. Have shown, in a comprehensive study of gastric carcinomas evaluated for expression of several mucins (MUC1, MUC2, MUC5AC, and, MUC6), that: (1) mucin expression is associated with tumor type (MUC5AC with diffuse and infiltrative carcinomas and MUC2 with mucinous carcinomas) but not with the clinico-biological behavior of the tumors; and (2) mucin expression is associated with tumor location (MUC5AC with antrum carcinomas and MUC2 with cardia carcinomas), indirectly reflecting differences in tumor differentiation according to tumor location.

The following generalities apply to the patterns of MUC1 expression: Apical surfaces of most epithelial cells in breast, GI, respiratory, and GU tracts.

Mucin Expression in Neoplasms

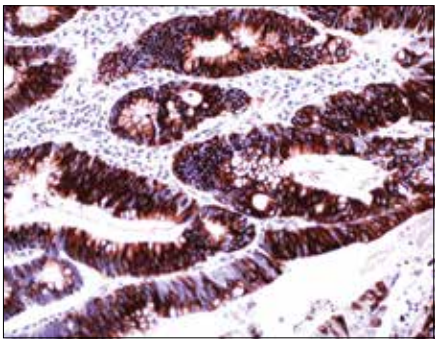
	MUC1	MUC2	MUC5AC	MUC6
Pancreatic Adenocarcinoma	+	-	+	-
Cervical Adenocarcinoma	+	-	+	-
Paget Extramammary	+	-	+	-
Cholangiocarcinoma	+	-	+/-	-
Breast Carcinoma	+	-	-	-
Endometrial Carcinoma	+	-	-	-
Barrett Esophagus	+	+	+	-
Breast Colloid Carcinoma	+	+	-	+

Mucins Expression in Organs

	MUC1	MUC2	MUC4	MUC5AC	MUC6
Stomach	+	-	+	+	+
Small Intestine	-	+	-	-	+
Colon	-	+	-	-	
Pancreas	+	-	-	-	+

Reference

1. Chaves P, et al. Dis Esophagus. 2005; 18(6):383-7.
2. Leteurtre E, et al. World J Gastroenterol. 2006 Jun 7; 12(21):3324-31.



MUC2 (MRQ-18)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45231	IMPATH MUC2 RTU M (MRQ-18)	50 Tests
44341	MUC2 RTU M (MRQ-18)	7 ml Ready To Use
44702	MUC2 0,1 M (MRQ-18)	100 µl liquid Concentrated
44703	MUC2 1 M (MRQ-18)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Colon
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Mucins are high molecular weight glycoproteins which constitute the major component of the mucus layer that protects the gastric epithelium. The heterogeneous pattern of mucin expression, including the expression of the intestinal mucin MUC2, may provide new insights into the differentiation pathways of gastric carcinoma. Pinto-de-Sousa et al. have shown, in a comprehensive study of gastric carcinomas evaluated for expression of several mucins (MUC1, MUC2, MUC5AC and MUC6), that: (1) mucin expression is associated with tumor type (MUC5AC with diffuse and infiltrative carcinomas and MUC2 with mucinous carcinomas) but not with the clinico-biological behavior of the tumors; and (2) mucin expression is associated with tumor location (MUC5AC with antrum carcinomas and MUC2 with cardia carcinomas), indirectly reflecting differences in tumor differentiation according to tumor location. The following generalities apply to the patterns of MUC2 expression: Specifically expressed in goblet cells of the small intestine & colon; colonic carcinomas – 65%, gastric carcinomas – 42%. MUC2 is rarely expressed outside of the GI tract with exceptions of mucinous carcinoma of breast and clear cell-type carcinomas of the ovary.

Mucin Expression in Neoplasms

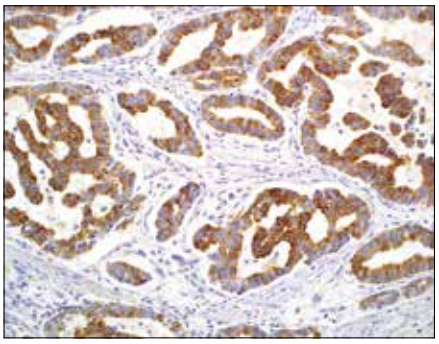
	MUC2	MUC1	MUC5AC	MUC6
Salivary Duct ACA	+	-	-	+
Colon Carcinoma, Signet Ring	+	-	-	-
Prostate Carcinoma	+/-	-	-	-
Pan Intraductal Pap Ca	+	-	+	+
Adrenocortical Carcinoma	-	-	-	-
Breast Carcinoma	-	+	-	-
Endometrial Carcinoma	-	+	-	-
Appendiceal Adenocarcinoma	+	-	+	-
Barrett Esophagus	+	+	+	-
Breast Colloid Carcinoma	+	+	-	+

Mucins Expression in Organs

	MUC2	MUC1	MUC4	MUC5AC	MUC6
Stomach	-	+	+	+	+
Small Intestine	+	-	-	-	+
Colon	+	-	-	-	
Pancreas	-	+	-	-	+

Reference

1. Chaves P, et al. Dis Esophagus. 2005; 18(6):383-7.
2. Leteurtre E, et al. World J Gastroenterol. 2006 Jun 7; 12(21):3324-31.



MUC5AC (MRQ-19)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45232	IMPATH MUC5AC RTU M (MRQ-19)	50 Tests
44342	MUC5AC RTU M (MRQ-19)	7 ml Ready To Use
44704	MUC5AC 0,1 M (MRQ-19)	100 µl liquid Concentrated
44705	MUC5AC 1 M (MRQ-19)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Stomach
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Mucins are high molecular weight glycoproteins which constitute the major component of the mucus layer that protects the gastric epithelium. The heterogeneous pattern of mucin expression, including the expression of the intestinal mucin MUC2, may provide new insights into the differentiation pathways of gastric carcinoma. Pinto-de-Sousa et al. have shown, in a comprehensive study of gastric carcinomas evaluated for expression of several mucins (MUC1, MUC2, MUC5AC and MUC6), that: (1) mucin expression is associated with tumor type (MUC5AC with diffuse and infiltrative carcinomas and MUC2 with mucinous carcinomas) but not with the clinico-biological behavior of the tumors; and (2) mucin expression is associated with tumor location (MUC5AC with antrum carcinomas and MUC2 with cardia carcinomas), indirectly reflecting differences in tumor differentiation according to tumor location. The following generalities apply to the patterns of MUC5AC expression: Preferentially expressed in the normal stomach and respiratory tract; esophageal carcinomas – 67%, gastric carcinomas – 58%, colonic carcinomas – 6%-25%, pancreatic ductal carcinomas – 73%, cholangiocarcinomas – 45%, endocervical adenocarcinomas – 70%, endometrial adenocarcinomas – 22%, and lung adenocarcinomas – 14%.

Mucin Expression in Neoplasms

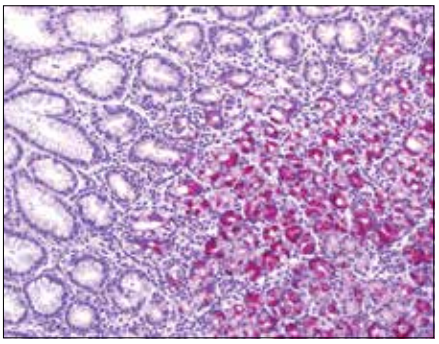
	MUC5AC	MUC1	MUC2	MUC6
Pancreatic Adenocarcinoma	+	+	-	-
Cervical Adenocarcinoma	+	+	-	-
Paget Extramammary	+	+	-	-
Cholangiocarcinoma	+/-	+	-	-
Pan Intraductal Pap Ca	+	-	+	+
Appendiceal Adenocarcinoma	+	-	+	-
Barrett Esophagus	+	+	+	-
Panc. Mucinous Cystic	+	-	-	-
Breast Colloid Carcinoma	-	+	+	+

Mucins Expression in Organs

	MUC5AC	MUC1	MUC2	MUC4	MUC6
Stomach	+	+	-	+	+
Small Intestine	-	-	+	-	+
Colon	-	-	+	-	
Pancreas	-	+	-	-	+

Reference

1. Chaves P, et al. Dis Esophagus. 2005; 18(6):383-7.



MUC6 (MRQ-20)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45233	IMPATH MUC6 RTU M (MRQ-20)	50 Tests
44343	MUC6 RTU M (MRQ-20)	7 ml Ready To Use
44706	MUC6 0,1 M (MRQ-20)	100 µl liquid Concentrated
44707	MUC6 1 M (MRQ-20)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Stomach
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Mucins are high molecular weight glycoproteins which constitute the major component of the mucus layer that protects the gastric epithelium. The heterogeneous pattern of mucin expression, including the expression of the intestinal mucin MUC2, may provide new insights into the differentiation pathways of gastric carcinoma. Pinto-de-Sousa et al. have shown, in a comprehensive study of gastric carcinomas evaluated for expression of several mucins (MUC1, MUC2, MUC5AC and MUC6), that: (1) mucin expression is associated with tumor type (MUC5AC with diffuse and infiltrative carcinomas and MUC2 with mucinous carcinomas) but not with the clinico-biological behavior of the tumors; and (2) mucin expression is associated with tumor location (MUC5AC with antrum carcinomas and MUC2 with cardia carcinomas), indirectly reflecting differences in tumor differentiation according to tumor location.

Mucin Expression in Neoplasms

	MUC6	MUC1	MUC2	MUC5AC
Pancreatic Adenocarcinoma	-	+	-	+
Cervical Adenocarcinoma	-	+	-	+
Cholangiocarcinoma	-	+	-	+/-
Salivary Duct ACA	+	-	+	-
Colon Carcinoma, Signet Ring	-	-	+	-
Pan Intraductal Pap Ca	+	-	+	+
Breast Carcinoma	-	+	-	-
Endometrial Carcinoma	-	+	-	-
Barrett Esophagus	-	+	+	+
Breast Colloid Carcinoma	+	+	+	-

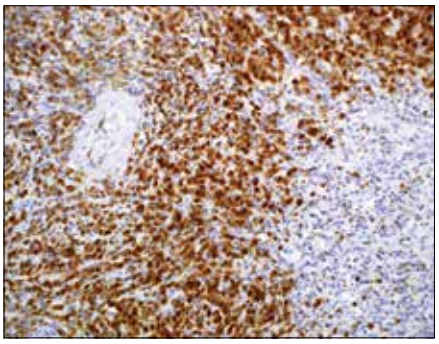
Mucins Expression in Organs

	MUC6	MUC1	MUC2	MUC4	MUC5AC
Stomach	+	+	-	+	+
Small Intestine	+	-	+	-	-
Colon		-	+	-	-
Pancreas	+	+	-	-	-

Reference

1. Chaves P, et al. Dis Esophagus. 2005; 18(6):383-7.
2. Leteurtre E, et al. World J Gastroenterol. 2006 Jun 7; 12(21):3324-31.

A.MENARINI diagnostics



MUM1 (MRQ-43)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45234	IMPATH MUM1 RTU R (MRQ-43)	50 Tests
44344	MUM1 RTU R (MRQ-43)	7 ml Ready To Use
44708	MUM1 0,1 R (MRQ-43)	100 µl liquid Concentrated
44709	MUM1 1 R (MRQ-43)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control Diffuse large B-cell lymphoma, Plasmacytoma, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

MUM1 (multiple myeloma oncogene-1)/IRF4 (interferon regulatory factor 4) is a 50 kDa protein encoded by MUM1 gene, and a member of the interferon regulatory factor family of transcription factors. MUM1/IRF4 is expressed in the nuclei of plasma cells and a small percentage of germinal center (GC) B-cells located in the “light zone”. This antibody stains MUM1 protein, which is expressed in a subset of B-cells in the light zone of the germinal center, plasma cells, activated T-cells, and a wide spectrum of related hematolymphoid neoplasms derived from these cells. Therefore, this antibody is useful for the subclassification of lymphoid malignancies and an excellent marker for Reed-Sternberg cells of classic Hodgkin disease in combination with anti-CD30.

B-cell Lymphomas

	MUM1	CD20	CD5	BCL2	BCL6	TCL1	CD10	CD23	Cyclin D1	PU.1
Follicular	-	+	-	+	+	+	+	-	-	+
CLL/SLL	+	+	+	+	-	+	-	+	-	+
Mantle Cell	-/+	+	+	+	-	+	-	-	+	+
Marginal Zone	+	+	-	+	-	-	-	-	-	+
Lymphoplasmacytic	+	+	-	+	-	+	-	-	-	
Diffuse Large Cell	+	+	-/+	+	+	+	-/+	-	-	+
Burkitt	-	+	-	-	+	+	+	-	-	

Hodgkin vs. Non-Hodgkin Lymphomas

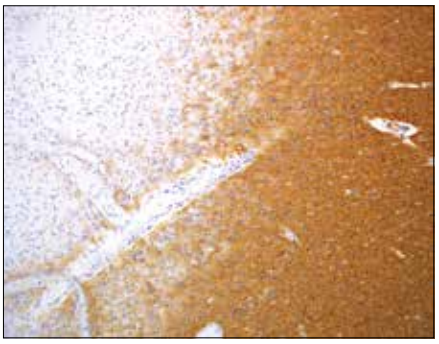
	MUM1	CD79a	CD15	CD30	Fascin	Granzyme B	BCL6	PU.1	ALK-1	EMA
Hodgkin Lymphoma, Classic	+	-	+	+	+	-	-	-	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	-/+	+	-	-	-	-	+	+	-	+
T-cell Rich LBCL	+	+	-	-	-	-	+	-	-	-
Anaplastic Large Cell Lymphoma	-	-	-	+	-	+	+/-	-	+	+

Plasma Cells

	MUM1	CD138	CD79a	EMA	CD56	Cyclin D1	CD43	CD20	CD19
Plasma Cell Neoplasm	+	+	+	+	+	-/+	-	-/+	-

Reference

1. Falini B, et al. Blood. 2000; 95:2084-92.



Myelin Basic Protein (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45236	IMPATH Myelin Basic Protein RTU R (Poly)	50 Tests
44346	Myelin Basic Protein RTU R (Poly)	7 ml Ready To Use
44712	Myelin Basic Protein 0,1 R (Poly)	100 µl liquid Concentrated
44713	Myelin Basic Protein 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Brain
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

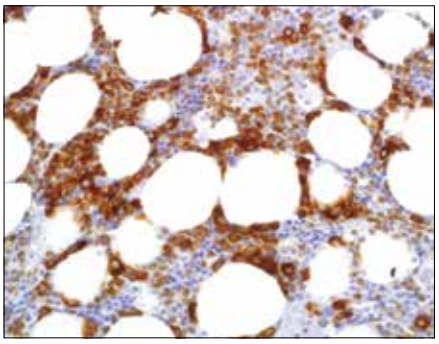
Myelin basic protein (MBP) is a protein believed to be important in the process of myelination of nerves in the central nervous system (CNS). MBP is present in the central and peripheral nervous system. The pool of MBP in the central nervous system is very diverse, with several splice variants being expressed and a large number of post-translational modifications on the protein, which include phosphorylation, methylation, deamidation and citrullination.

MBP has been demonstrated in neuromas, neurofibromas, and neurogenic sarcomas; other spindle cell neoplasms do not stain with this antibody. Immunoreactivity for anti-MBP in granular cell tumors strengthens the concept of a Schwann cell derivation of these lesions. Unlike other nervous system proteins, e.g. GFAP and S-100, MBP has not been demonstrated in melanocytes or tumors derived from them.

Neuroid Skin Lesions				
	Myelin BP	S-100	CD57	GFAP
Neuroma	+	+	+	-
Neurotised Nevi	-	+	-	-
Neurofibroma	+	+	+	-

Reference

1. Martenson RE, et al. J Neurochem. 1981; 36:1543-1560.
2. Uyemura K, et al. Adv Exp Med Biol. 1977; 100:95-11.
3. Buss A, et al. Brain. 2004 Jan; 127(Pt 1):34-44. Epub 2003 Oct 08.
4. Neuen-Jacob E, et al. Int J Legal Med. 1993; 105(6):339-50.



Myeloperoxidase (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45237	IMPATH Myeloperoxidase RTU R (Poly)	50 Tests
44347	Myeloperoxidase RTU R (Poly)	7 ml Ready To Use
44714	Myeloperoxidase 0,1 R (Poly)	100 µl liquid Concentrated
44715	Myeloperoxidase 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Bone Marrow
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-myeloperoxidase detects granulocytes and monocytes in blood and precursors of granulocytes in the bone marrow. This antibody can detect myeloid cell populations of the bone marrow as well as in other sites.

Acute Myeloid Leukemia

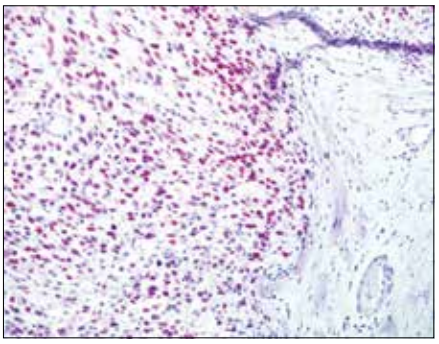
	MPO	CD68	Factor VIII	CD61	Lysozyme	BOB.1	Oct-2	Glyco-phorin A	CD34
Acute Myeloid, M0	-	-	-	-	+	-	-	-	+
Acute Myeloid, M1&2	+	+	-	-	+			-	+
Promyelocytic, M3	+	-	-	-	-	+	+	-	-
Myelomonocytic, M4	+	+	-	-	+	-	+	-	+
Monoblastic, M5	+	+	-	-	+	-	+	-	-/+
Acute Erythroid, M6	+	-	-	-		-	-	+	-/+
Megakaryoblastic, M7	-	-	+	+		+/-	-	-	-

Histiocytic Neoplasms

	MPO	CD45	CD4	CD68	Lysozyme	CD163	Factor XIIIa	CD20	CD3
Histiocytic Neoplasms	+	+	+	+	+	+	+	-	-

Reference

1. Pinkus GS, Pinkus JL. Mod Pathol. 1991 Nov; 4(6):733-41.
2. Hudock J, et al. Am J Clin Pathol. 1994 Jul; 102(1):55-60.
3. Hamoudi WH, et al. Arch Pathol Lab Med. 2000 Feb; 124(2):315-8.
4. Arber DA, et al. Am J Clin Pathol. 1996 Oct; 106(4):462-8.
5. Chang CC, et al. Am J Clin Pathol. 2000 Nov; 114(5):807-11.
6. Kaleem Z, White G. Am J Clin Pathol. 2001 Jun; 115(6):876-84.
7. Audouin J, et al. Int J Surg Pathol. 2003 Oct; 11(4):271-82.
8. Kojima M, et al. APMIS. 2003 Dec; 111(12):1133-6.



MyoD1 (EP212†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45638	MyoD1 RTU R (EP212)	7 ml Ready To Use
45620	MyoD1 0,1 R (EP212)	100 µl liquid Concentrated
45621	MyoD1 1 R (EP212)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Rhabdomyosarcoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

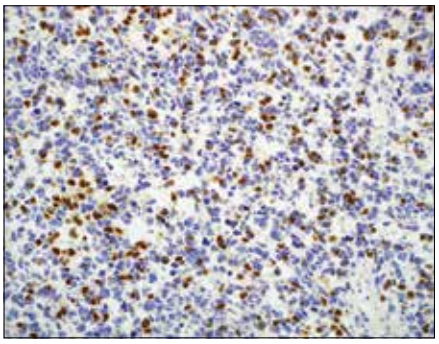
Rhabdomyosarcomas (RMS) are the most frequent malignant soft tissue tumors of childhood. The spectrum of histological differentiation of this tumor varies, as better differentiated RMS have cross-striations or rhabdomyoblasts that allow for a confident morphologic diagnosis without adjunct studies. However, less differentiated RMS resemble other small blue round cell tumors. In at least 20% of RMS cases, IHC has been reported to be a valuable tool in helping to make the definitive diagnosis. MyoD1, one of the MyoD family of myogenic helix-loop-helix transcription factors, combined with myogenin, plays a role in coordinating the myogenic differentiation pathway from the determination of mesodermal precursors into myoblasts, the differentiation of myoblasts into myotubes, and finally the maturation of myotubes into skeletal myofibers. MyoD1 is expressed in myoblasts before differentiation while myogenin has post-differentiation functions. The anti-MyoD1 immunostain identifies cells committed to myogenesis in their earliest phase. Anti-MyoD1 has shown high sensitivity and specificity for RMS. Only intranuclear staining should be considered as positive, since occasionally this antibody can produce a cytoplasmic staining pattern. Anti-MyoD1 could also be useful in separating alveolar RMS from embryonal RMS. Anti-MyoD1 should be used along with anti-myogenin and anti-desmin as a trio of markers since RMS is virtually never negative for all three of these markers. MyoD1 also stains the rhabdomyoblastic component in pleuropulmonary blastomas and germ cell tumors, as well as reactive/regenerative myocytes in patients with other lesions such as post-chemotherapy tissue or ulcer bed in which residual tumor was not identified.

Neoplasms

	MyoD1	Myogenin	Desmin	MSA	SMA	GATA3	PAX-8	CK Cocktail	SOX-10
Rhabdomyosarcoma	+	+	+	+	-	-	-	-	-
Leiomyosarcoma	-	-	+	+	+	-	-	-	-
Epithelioid Sarcoma	-	-	-	-	-	-	-	+	-
Carcinosarcoma	-	-	-	-	-	-	-	+	-
Malignant Peripheral Nerve Sheath Tumor	-	-	-	-	-	-	-	-	+
Ewing's Sarcoma	-	-	+/-	-	-	-	-	-/+	-
Sarcomatoid Urothelial Carcinoma	-	-	-	-	-	+/-	-	+/-	-
Sarcomatoid Renal Cell Carcinoma	-	-	-	-	-	-	+	+/-	-

Reference

1. Morotti RA, et al. Am J SurgPathol. 2006; 30:962-968.
2. Sebire NJ, et al. J. Clin. Pathol. 2003; 56:412-416.



Myogenin (F5D)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45238	IMPATH Myogenin RTU M (F5D)	50 Tests
44348	Myogenin RTU M (F5D)	7 ml Ready To Use
44716	Myogenin 0,1 M (F5D)	100 µl liquid Concentrated
44717	Myogenin 1 M (F5D)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Rhabdomyosarcoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-myogenin labels the nuclei of myoblasts in developing muscle tissue, and is expressed in tumor cell nuclei of rhabdomyosarcoma and some leiomyosarcomas. Positive nuclear staining may occur in Wilms' tumor.

Small, Round Blue Cell Tumors

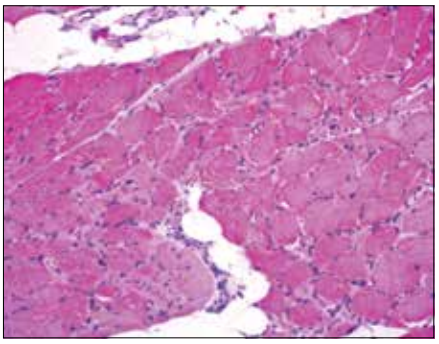
	Myogenin	MS Actin	SM Actin	CD45	CK Cocktail	CD99	PGP 9.5	FLI-1	Vimentin	CD57
Lymphoblastic Lymphoma	-	-	-	+	-	-		+	+	-
Leiomyosarcoma	-	+	+	-	-/+	-	-	-	+	+/-
Rhabdomyosarcoma	+	+	-	-	-	-	+	-	+	-
Neuroblastoma	-	-	-	-	-	-	+	-	+	+
Embryonal Carcinoma	-	-	-	-	+	-	+	-	-	+
PNET/ES	-	-	-	-	-/+	+	+	+	+	+
DSRCT	-	-	-	-	+	-	-	+	+	+/-
Medulloblastoma	-	-	-	-	-	-		-	-	+

Spindle Cell Tumors

	Myogenin	β-Catenin	PGP 9.5	CD117	ALK	CD34	CK Cocktail	Calponin	MS Actin	CD56
Myofibroblastic Tumor	-	-	-	-	+	-	-	+	+	+
Spindle Cell Carcinoma	-	+/-	+	-	-	-	+	-	-	-
Neurofibroma	-	-	+	-	-	-	-	-	-	+
Rhabdomyosarcoma	+	-	-	+	-	-	-	-	+	-
Endometrial Stromal Tumor	-	+/-	+	-	-	-	-	+	+	-
Smooth Muscle	-	-	-	-	-	-	-	+	+	-
Fibromatosis	-	+	+	-	-	-	-	-	-	-
GIST	-	-	-	+	-	+	-	-	-	-
Schwannoma	-	-	-	-	-	-	-	-	-	+
Leiomyosarcoma	+/-	-	-	-	-	-	-/+	+	+	+

Reference

1. Miller JB. J Cell Biol. 1990 Sep; 111(3):1149-59.
2. Wang NP, et al. Am J Pathol. 1995 Dec; 147(6):1799-810.
3. Cui S, et al. Pathol Int. 1999 Jan; 49(1):62-8.



Myoglobin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45239	IMPATH Myoglobin RTU R (Poly)	50 Tests
44349	Myoglobin RTU R (Poly)	7 ml Ready To Use
44718	Myoglobin 0,1 R (Poly)	100 µl liquid Concentrated
44719	Myoglobin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Skeletal Muscle
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

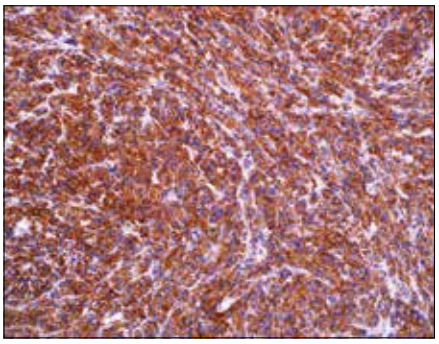
Immunostaining with anti-myoglobin provides a specific, sensitive, and practical procedure for the identification of tumors of muscle origin. Since myoglobin is found exclusively in skeletal and cardiac muscle and is not present in any other cells of the human body, it may be used to distinguish rhabdomyosarcoma from other soft tissue tumors. Anti-myoglobin staining is also useful when demonstrating rhabdomyoblastic differentiation in other tumors, e.g. neurogenic sarcomas and malignant mixed mesodermal tumors of the uterus and ovary.

Small, Round Blue Cell Tumors

	Myoglobin	MS Actin	SM Actin	Myogenin	CK Cocktail	CD99	FLI-1	INI-1	CD57	PGP 9.5
Lymphoblastic Lymphoma	-	-	-	-	-	+	+	+	-	
Rhabdomyosarcoma	+	-/+	-/+	+	-	-	-	+	-	+
Neuroblastoma	-	-	-	-	-	-	-	+	+	+
Embryonal Carcinoma	-	-	-	-	+	-	-	+	+	+
PNET/ES	-	-	-	-	-/+	+	+	+	+	+
DSRCT	-	-	-	-	+	-	+	+	+/-	-
Medulloblastoma	-	-	-	-	-	-	-	+	+	

Reference

1. Furlong MA, et al. Mod Pathol. 2001 Jun; 14(6):595-603.



Myosin, Smooth Muscle (SMMS-1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45240	IMPATH Myosin Smooth Muscle RTU M (SMMS-1)	50 Tests
44350	Myosin, Smooth Muscle RTU M (SMMS-1)	7 ml Ready To Use
44720	Myosin, Smooth Muscle 0,1 M (SMMS-1)	100 µl liquid Concentrated
44721	Myosin, Smooth Muscle 1 M (SMMS-1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Breast
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Smooth Muscle Myosin, heavy chain (SMMS-1) is a cytoplasmic structural protein that is a major component of the contractile apparatus of the smooth muscle cells. SMMS-1 is also a myoepithelium-associated protein. Anti-SMMS-1 is a mouse monoclonal antibody to smooth muscle myosin, heavy chain that reacts with human visceral and vascular smooth muscle cells. The antibody also reacts with human myoepithelial cells. It is very helpful in distinguishing between benign sclerosing breast lesions and infiltrating carcinomas in difficult cases since it strongly stains the myoepithelial layer in the benign lesions while it is negative in the infiltrating carcinomas.

Breast Carcinoma in-situ vs. Infiltrating Breast Carcinoma

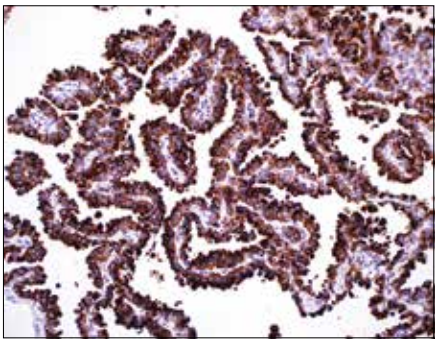
	SM Myosin	Calponin	p63
Breast Carcinoma *in-situ* (Myoepithelial Cells)	+	+	+
Infiltrating Breast Carcinoma	-	-	-

Spindle Cell Tumors

	SM Myosin	β-Catenin	PGP 9.5	DOG1	CD34	CK Cocktail	Calponin	ALK	MS Actin	CD56
Myofibroblastic Tumor	-	-	-	-	-	-	+	+	+	+
Spindle Cell Carcinoma	-	+/-	+	-	-	+	-	-	-	-
Neurofibroma	-	-	+	-	-	-	-	-	-	+
Rhabdomyosarcoma	-	-	-	-	-	-	-	-	+	-
Endometrial Stromal Tumor	-	+/-	+	-	-	-	+	-	+	-
Smooth Muscle	-	-	-	-	-	-	+	-	+	-
Fibromatosis	-	+	+	-	-	-	-	-	-	-
GIST	-	-	-	+	+	-	-	-	-	-
Schwannoma	-	-	-	-	-	-	-	-	-	+
Leiomyosarcoma	+	-	-	-	-	-/+	+	-	+	+

Reference

1. Werling RW, et al. Am J Surg Pathol. 2003 Jan; 27(1):82-90.
2. Agoff SN, et al. Appl Immunohistochem Mol Morphol. 2001 Jun; 9(2):164-9.
3. Popnikolov NK, et al. Am J Clin Pathol. 2003 Aug; 120(2):161-7.



Napsin A (MRQ-60)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45241	IMPATH Napsin A RTU M (MRQ-60)	50 Tests
44351	Napsin A RTU M (MRQ-60)	7 ml Ready To Use
44722	Napsin A 0,1 M (MRQ-60)	100 µl liquid Concentrated
44723	Napsin A 1 M (MRQ-60)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Kidney, Lung Adenocarcinoma, Renal Cell Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Napsin is a pepsin-like aspartic proteinase, in the A1 clan of the AA clade of proteinases. There are two closely related napsins, napsin A and napsin B. Napsin A is expressed as a single chain protein with the molecular weight of approximately 38 kDa. Immunohistochemical studies revealed high expression levels of napsin A in human lung and kidney but low expression in spleen. Napsin A is expressed in type II pneumocytes and in adenocarcinomas of lung. The high specificity expression of napsin A in adenocarcinomas of lung is useful to distinguish primary lung adenocarcinomas from adenocarcinomas of other organs.

Breast vs. Lung vs. Prostate Carcinoma

	Napsin A	GCDFP-15	Mammaglobin	PSA	TTF-1
Breast Carcinoma	-	+	+	-	-
Lung Carcinoma	+	-	-	-	+
Prostate Carcinoma	-	-	-	+	-

Pleura: Adenocarcinoma vs. Mesothelioma

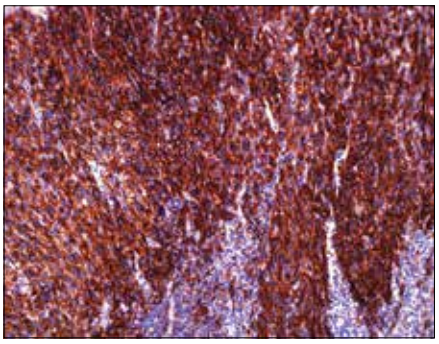
	Napsin A	Calretinin	CK 5&6	HBME-1	WT1	Caldesmon	Ep-CAM	TTF-1	TAG-72	CEA
Adenocarcinoma	+	-	-	-	-	-	+	+	+	+
Mesothelioma	-	+	+	+	+	+	-	-	-	-

Lung Squamous Cell Carcinoma vs. Adenocarcinoma

	Napsin A	TTF-1	p63	CK 5&6	SOX-2	Desmocollin3
Lung Squamous Cell Carcinoma	-	-	+	+	+	+
Adenocarcinoma	+	+	-	-	-	-

Reference

1. Jagirdar J. Arch Pathol Lab Med. 2008; 132:384-96.
2. Dejmek A, et al. Diagn Cytopathol. 2007; 35:493-7.
3. Inamura K, et al. Am J Surg Pathol. 2005; 29:660-5.
4. Bishop JA, et al. Hum Pathol. 2010; 41:20-5.
5. Ye J, et al. Appl Immunohistochem Mol Morphol. 2011; 19:313–317.



Nerve Growth Factor Receptor (NGFR) (MRQ-21)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45244	IMPATH NGFR RTU M (MRQ-21)	50 Tests
44354	NGFR RTU M (MRQ-21)	7 ml Ready To Use
44728	NGFR 0,1 M (MRQ-21)	100 µl liquid Concentrated
44729	NGFR 1 M (MRQ-21)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Breast
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

NGFR is expressed not only in sympathetic and sensory neurons, but also in various neural crest cell or tumor derivatives such as melanocytes, melanomas, neuroblastomas, pheochromocytomas, neurofibromas, and neurotized nevi (type C melanocytes). Anti-NGFR has been shown to be a reliable marker for desmoplastic and neurotropic melanoma. All reported cases of desmoplastic melanomas are positive with this antibody. This staining property of desmoplastic melanoma cells can be useful in diagnosing challenging cases. It is now apparent that expression of NGFR is ubiquitous and not limited to the nervous system, being expressed in mature nonneural cells such as perivascular cells, dental pulp cells, lymphoidal follicular dendritic cells, basal epithelium of oral mucosa and hair follicles, prostate basal cells, and myoepithelial cells. Anti-NGFR labels the myoepithelial cells of breast ducts and intralobular fibroblasts of breast ducts and thus is an aid in the diagnosis of malignancy in the breast.

Skin: Spindle Cell Tumors

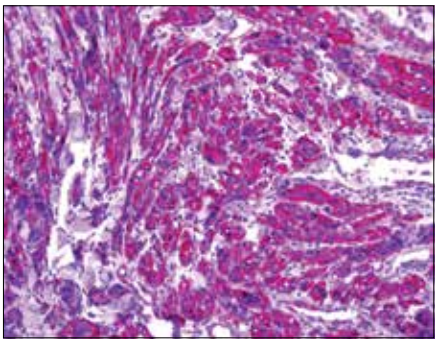
	NGFR	FLI-1	Collagen IV	S-100	CD10	Factor XIIIa	CD34	D2-40
Spindle Cell Melanoma	+	+	-	+	-	-	-	+
Dermatofibrosarcoma Protuberans	+	-	-	-	+/-	-	+	-
Dermatofibroma Fibrous Histiocytoma	-	-	-	-	+	+	-	-
PNST	+		+	+				

CNS Tumors

	NGFR	GFAP	Neuro-filament	Synapto-physin	S-100	CK Cocktail	PR	EMA	Vimentin	INI-1
Astrocytoma	+	+	-	-	+	-	-	-	+	+
Ependymoma	+	+	-	-	+	-	-	-	-/+	+
Choroid Plexus Carcinoma	-	-/+	-	+	+	+	-	-		+
Central Neurocytoma	+	-	-	+	-	-	-	-	-	+
Neuroblastoma	+	+/-	+	+	+/-	-	-	-	+	+
Pineocytoma	-	-	-	+	-	-	-	-		+
Meningioma	-	-	-	-	-	-	+	+	+	+
Schwannoma	+	+	-	-	+	-	-	-	+	+
Metastatic Carcinoma	-	-	-	-	-	+	-/+	+	-/+	+

Reference

1. Laskin WB, et al. Hum Pathol. 2000 Oct; 31(10):1230-41.



Nestin (10C2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45653	IMPATH Nestin RTU M (10C2)	50 Tests
45640	Nestin RTU M (10C2)	7 ml Ready To Use
45624	Nestin 0,1 M (10C2)	100 µl liquid Concentrated
45625	Nestin 1 M (10C2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Nestin is a class VI intermediate filament (IF) protein. It has been reported that nestin expression is significantly increased in melanoma and correlated with more advanced stages of the disease. An immunohistochemical analysis identified nestin-positive cells in 84% (35/42) of primary melanoma and 83% (10/12) of metastatic melanoma. Nestin immunoreactivity was also observed in melanoma cells in all (10/10) cases of HMB-45-negative amelanotic and melanotic, non-desmoplastic melanoma. Nestin expression has been reported in tumors of the CNS, including astrocytoma, ependymoma, oligodendroglioma, glioblastoma, and primitive neuroectodermal tumors. Nestin has been detected in human gliomas, including low and high grade, but its expression is observed more frequently in high grade than in low grade gliomas. Nestin overexpression is seen in carcinomas, including prostatic adenocarcinoma, pancreatic ductal carcinoma, thyroid carcinoma, and in mesenchymal tumors such as GIST and DFSP. Among the breast carcinoma subtypes, nestin is highly expressed in basal breast cancer subtype (ERα-/PR-/Her2-) but not in the Her2 subtype (ERα-/PR-/Her2+) or luminal epithelial phenotype (ERα+/PR+). Only cytoplasmic staining is considered positive, whereas any nuclear staining is considered as background artifact. In normal skin, nestin is observed in endothelial cells and the bulge area of hair follicles.

Melanomas				
	Nestin	SOX-10	HMB-45	S-100
Desmoplastic Melanoma	+	+	-	+
Spindle Cell Melanoma	+	+	-/+	+
Conventional Melanoma	+	+	+	+

Reference

1. Brychtova S, et al. J CutanPathol. 2007; 34:370-375.
2. Maho KANOH, et al. Journal of Dermatology. 2010; 37:505-511.
3. Toshiyuki Ishiwata, et al. World J Gastroenterol. 2011; 17:409-418.
4. LI H, et al. Cancer Res. 2007; 67:501-510.

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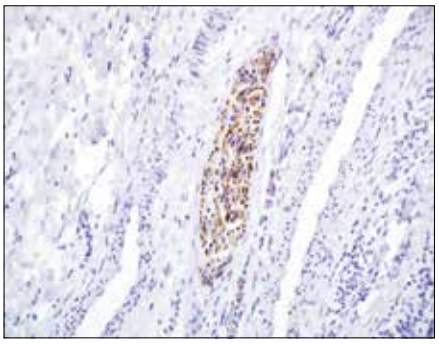


Neurofilament (2F11)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45242	IMPATH Neurofilament RTU M (2F11)	50 Tests
44352	Neurofilament RTU M (2F11)	7 ml Ready To Use
44724	Neurofilament 0,1 M (2F11)	100 µl liquid Concentrated
44725	Neurofilament 1 M (2F11)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Brain
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-neurofilament stains an antigen localized in a number of neural, neuroendocrine, and endocrine tumors. Neuromas, ganglioneuromas, gangliogliomas, ganglioneuroblastomas, and neuroblastomas stain positively for anti-neurofilament. Neurofilaments are also present in paragangliomas as well as adrenal and extra-adrenal pheochromocytomas. Carcinoids, neuroendocrine carcinomas of the skin, and oat cell carcinomas of the lung also express neurofilament.

Retroperitoneal Neoplasms

	Neuro-filament	NSE	Synapto-physin	Chromo-granin A	PGP 9.5	S-100	GFAP	CD99
Neuroblastoma	+	+	+	+	+	-	+/-	-
Ganglioneuroblastoma	+	+	+	+	+	+	+	-
Ganglioneuroma	+	+	+	+	+	+	+	-

Small Cell Carcinoma vs. Merkel Cell Carcinoma

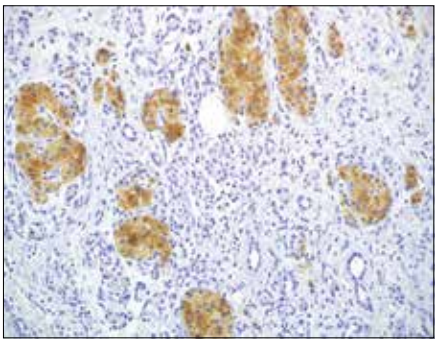
	Neuro-filament	TTF-1	CEA	CK 20	Chromo-granin A	E-cadherin	CD117	Synapto-physin
Merkel Cell Carcinoma	+	-	-	+	+	+(nuclear)	+	+
Small Cell Carcinoma	-	+	-	-	-	-	+/-	+

CNS Tumors

	Neuro-filament	GFAP	Synapto-physin	S-100	CK Cocktail	PR	EMA	Vimentin	NGFR	INI-1
Astrocytoma	-	+	-	+	-	-	-	+	+	+
Glioblastoma	-	+	-	+	-	-	-	+	-	+
Oligodendriglioma	-	-	-	+	-	-	-	+	-	+
Ependymoma	-	+	-	+	-	-	-	-/+	+	+
Choroid Plexus Carcinoma	-	-/+	+	+	+	-	-		-	+
Central Neurocytoma	-	-	+	-	-	-	-	-	+	+
Neuroblastoma	+	+/-	+	+/-	-	-	-	+	+	+
Pineocytoma	-	-	+	-	-	-	-		-	+
Meningioma	-	-	-	-	-	+	+	+	-	+
Schwannoma	-	+	-	+	-	-	-	+	+	+
Rhabdoid Tumors	+/-	-		+/-	+		+	+		-
Metastatic Carcinoma	-	-	-	-	+	-/+	+	-/+	-	+

Reference

1. Wood JN, et al. Biosci. 1981; Rep, 1:263.



NSE (MRQ-55)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45243	IMPATH NSE RTU M (MRQ-55)	50 Tests
44353	NSE RTU M (MRQ-55)	7 ml Ready To Use
44726	NSE 0,1 M (MRQ-55)	100 µl liquid Concentrated
44727	NSE 1 M (MRQ-55)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Carcinoid tumor, Pancreas
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

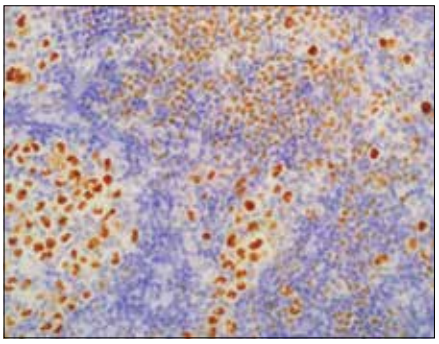
Neuron-specific enolase (NSE) is the glycolytic isoenzyme of the enolase gamma-gamma dimer specifically detected in neurons of neuroendocrine cells, and their corresponding tumors. In addition, NSE has been demonstrated immunohistochemically in the non-neoplastic cells of the pituitary, peptide secreting tissues, pineolocytes, neuroendocrine cells of the lung, thyroid, parafollicular cells, adrenal medulla, islets of Langerhans, Merkel cells of the skin, and melanocytes. Anti-NSE immunostaining is also positive in normal striated muscle, hepatocytes and, to a lesser extent, smooth muscle. Anti-NSE is a useful marker to identify peripheral nerves. When used for the identification of neuroendocrine differentiation, it is necessary that it be employed in a panel with more specific markers such as anti-synaptophysin, anti-chromogranin, and anti-neurofilament.

Retroperitoneal Lesions

	NSE	Synapto-physin	Chromo-granin A	Neuro-filament	PGP 9.5	S-100	GFAP	CD99
Neuroblastoma	+	+	+	+	+	-	-	-
Ganglioneuroblastoma	+	+	+	+	+	+	+	-
Ganglioneuroma	+	+	+	+	+	+	+	-
Leiomyosarcoma	-/+	-	-	-	-/+	-	-	-
Rhabdomyosarcoma	-	-	-	-	+	-	-	-
Synovial Sarcoma	-	-	-	-		-/+	-	+/-

Reference

1. Wick MR, et al. American Journal of Clinical Pathology. 1983; 29:703-7.
2. Venores SA, et al. Archives of Pathology and Laboratory Medicine. 1984; 108:536-40.
3. Leong AS-Y, et al. Pathology. 1986; 18:393-9.
4. Cooper EH. International Journal of Biological Markers. 1994; 9:205-10.
5. Loenard N, et al. Gut. 1995; 37:763-5.



Oct-2 (MRQ-2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45160	IMPATH Oct-2 RTU M (MRQ-2)	50 Tests
44355	OCT-2 RTU M (MRQ-2)	7 ml Ready To Use
44730	OCT-2 0,1 M (MRQ-2)	100 µl liquid Concentrated
44731	OCT-2 1 M (MRQ-2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Lymph Node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Oct-2 is a transcription factor of the POU homeo-domain family that regulates B-cell-specific genes. It has been shown that this factor participates in transcriptional regulation during T-cell activation. The following show high levels of Oct-2 expression: Germinal center B-cells, mantle B-cells, monocytoid B-cells, and plasma cells. Various lymphomas are also positive for this marker including the following: B-chronic lymphocytic leukemia, mantle cell lymphoma, follicular lymphoma, marginal zone lymphoma, plasmacytoma, Burkitt lymphoma, diffuse large B-cell lymphoma, T-cell rich B-cell lymphoma, and nodular lymphocyte predominant Hodgkin lymphoma.

B-cell Lymphomas

	Oct-2	CD20	CD79a	TCL1	BCL6	CD5	CD10	CD23	Cyclin D1	PU.1
Follicular	+	+	+	+	+	-	+	-	-	+
CLL/SLL	+	+	+	+	-	+	-	+	-	+
Mantle Cell	+	+	+	+	-	+	-	-	+	+
Marginal Zone	+	+	+	-	-	-	-	-	-	+
Diffuse Large Cell	+	+	+	+	+	-/+	-/+	-	-	+

Hodgkin vs. Non-Hodgkin Lymphomas

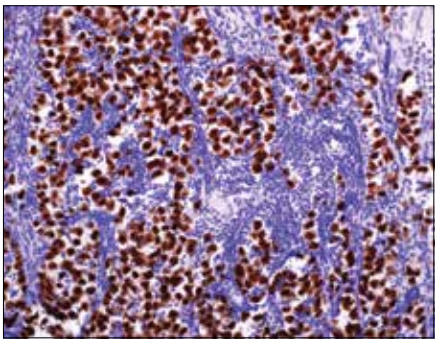
	Oct-2	MUM1	EMA	CD79a	CD15	CD30	Fascin	Granzyme B	BCL6	PU.1
Hodgkin Lymphoma, Classic	-	+	-	-	+	+	+	-	-	-
Hodgkin Lymphoma, Lymphocyte Predominant	+	-/+	+	+	-	-	-	-	+	+
T-cell Rich BCL	+	+	-	+	-	-	-	-	+	-
Non-Hodgkin BCL	+	+	-	+	-	-	-	-	+	+

Acute Myeloid Leukemia

	Oct-2	MPO	CD68	CD34	CD43	Lysozyme	BOB.1	CD74	CD45	CD138
Acute Myeloid, M0	-	-	-	+	+	+	-	+	+	+
Promyelocytic, M3	+	+	-	-	+	-	+		-	
Myelomonocytic, M4	+	+	+	+	+	+	-	+	+	
Monoblastic, M5	+	+	+	-/+	+	+	-	+	+	

Reference

1. Browne P, et al. Am J Clin Pathol. 2003 Nov; 120(5):767-77.
2. García-Cosío M, et al. Mod Pathol. 2004 Dec; 17(12):1531-8.



Oct-4 (MRQ-10)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45245	IMPATH OCT-4 RTU M (MRQ-10)	50 Tests
44356	OCT-4 RTU M (MRQ-10)	7 ml Ready To Use
44732	OCT-4 0,1 M (MRQ-10)	100 µl liquid Concentrated
44733	OCT-4 1 M (MRQ-10)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Seminoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

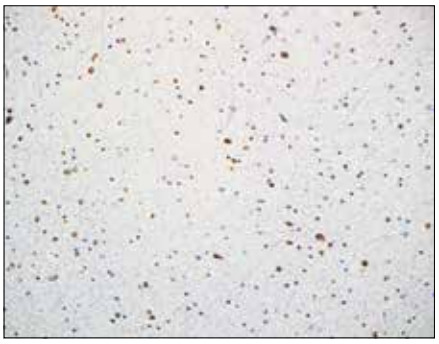
Oct-4 is a transcription factor that maintains and regulates pluripotency in embryonic stem and germ cells. Anti-Oct-4 has shown a very high sensitivity and specificity in seminoma/dysgerminoma, embryonal carcinoma, and the germ cell component of gonadoblastoma by nuclear immunostaining. Clear cell carcinoma may enter the differential diagnosis of dysgerminoma as both may grow in nests or tubules, contain clear cells, and have a prominent inflammatory infiltrate (lymphocytes in dysgerminoma and plasma cells in clear cell carcinoma). In one study that looked at anti-Oct-4 staining in clear cell carcinomas, 4 of 14 tumors were found to be focally positive. In another study, 49 endometrioid carcinomas were Oct-4 negative. Rarely dysgerminoma may have a morphologic appearance that overlaps with sex cord-stromal tumors, especially poorly differentiated Sertoli cell tumors. In two studies however, all sex cord-stromal tumors of the testis and granulosa cell tumors of the ovary were Oct-4 negative.

Germ Cell Tumors

	Oct-4	AFP	Vimentin	EMA	Inhibin	hPL	CD30	Glypican-3	CD117	PLAP
Seminoma	+	-	+	-	-	-	-	-	+	+
Embryonal Carcinoma	+	-	-	-	-	-	+	-	-	+
Choriocarcinoma	-	-	-/+	+	-	+	-	+	-	+
Yolk Sac Tumor	-	+	-	-	-	-	-	+	-	+
Granulosa Cell Tumor	-	-	+	-	+	-	-	-	-	-
Hypercalcaemic Small Cell Carcinoma	-	-	-	+	-	-	-	-	-	-

Reference

1. Baker PM, Oliva E. Int J Gynecol Pathol. 2005 Jan; 24(1):39-55. Review.
2. Biermann K, et al. Histopathology. 2006 Sep; 49(3):290-7.
3. Cheng CJ, et al. J Biomed Sci. 2007 Nov; 14(6):797-807. Epub 2007 Aug 8.
4. Cools M, et al. J Clin Endocrinol Metab. 2006 Jun; 91(6):2404-13. Epub 2006 Apr 11.



Olig2 (211F1.1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45641	OLIG2 RTU M (211F1.1)	7 ml Ready To Use
45626	OLIG2 0,1 M (211F1.1)	100 µl liquid Concentrated
45627	OLIG2 1 M (211F1.1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Astrocytoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

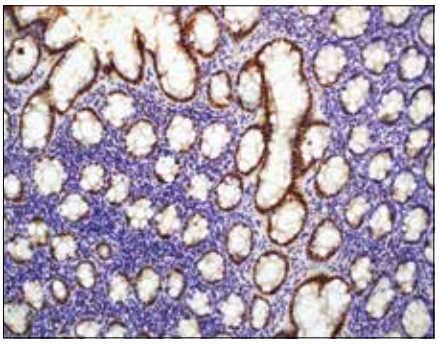
Product Description

Olig2, a basic helix–loop–helix transcription factor, is involved in oligodendroglial specification. Olig2 expression has been reported in most glial tumors, such as oligodendrogliomas and astrocytomas. Although more than half of glioblastomas are positive for Olig2, expression is very weak in terms of both percentage of labeled cells and intensity. No Olig2 expression has been found in the non-glial tumors including neuroepithelial tumors, ependymomas, subependymomas, medulloblastomas, and nonneuroepithelial tumors, such as CNS lymphomas, meningiomas, schwannomas, atypical teratoid/rhabdoid tumor, and haemangioblastomas. Compared to the strong staining seen in glioma samples, a weak expression is observed in non-tumoral brain tissue (gliosis). In order to characterize cellular subtypes that constitute astrocytomas, oligoastrocytomas and oligodendrogliomas, double labeling of Olig2 and GFAP has been performed which identified two phenotypically distinct tumor populations. The first is Olig2+/GFAP– which has an oligodendroglial morphology, corresponding to pure oligodendrogliomas that contain only oligodendroglial cells; the second is Olig2–/GFAP+ which has an astrocytic phenotype, including not only oligoastrocytomas, but also WHO astrocytomas. Depending on proportion and spatial clustering of the two phenotypically distinct tumor populations, the tumor (Olig2-/GFAP+) is classified either as an astrocytoma when both populations are intermingled with a dominance of GFAP+ cells or oligoastrocytoma when there is some degree of spatial clustering of the GFAP+ cells.

Tumors				
	Olig2	GFAP	S-100	EMA
Pilocytic Astrocytoma	+/-	+	+	-
Gemistocytic Astrocytoma	+/-	+	+	-
Oligodendrocytoma	+	-	-	-
Ependymoma	-	+/-	+	-
Glioblastoma	+	+/-	+	-
Meningioma	+/-	+/-	-/+	+

Reference

1. Mokhtari K,et al. Neuropathol Appl Neurobiol. 2005; 31:62 – 9.
2. OteroJJ, et al. Journal of Neuro-Oncology. 2011; 104:423-438.



p21^{WAF1} (DCS-60.2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44358	p21 RTU M (DCS-60.2)	7 ml Ready To Use
44736	p21 0,1 M (DCS-60.2)	100 µl liquid Concentrated
44737	p21 1 M (DCS-60.2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Colon
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

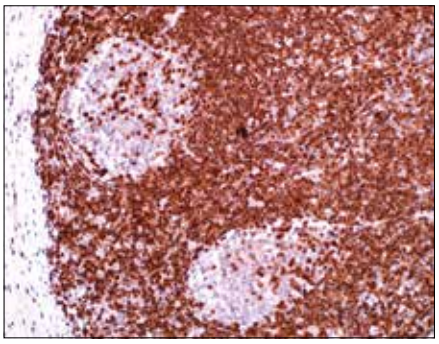
**Please refer to product insert for complete protocol.*

Product Description

p21 is a nuclear 21 kD protein, a product of the WAF1/CIP1 gene. It is a cyclin-dependent kinase inhibitor 1A (p21, Cip1), also known as CDKN1A, which in humans is encoded by the CDKN1A gene located on chromosome (6p21.2). It is a constituent of a large complex of nuclear proteins, including cyclins, cyclin dependent kinases, and PCNA. Cell cycle progression is regulated by cyclins and their cognate Cdks. p21 inhibits the activity of each member of the cyclin/Cdk family. The expression of this gene acts as an inhibitor of the cell cycle during G1 phase and is tightly controlled by the tumor suppressor protein p53. Normal cells generally display a rather intense nuclear p21 expression. Loss of p21 expression has been reported in many carcinomas (gastric carcinoma, non-small cell lung carcinoma, thyroid carcinoma).

Reference

1. DiGiuseppe JA, et al. Am J Pathol. 1995; 147:884-8.
2. Yoshitito Gomyo, et al. Cancer. 1997; 79:2067-2072.
3. Ikeguchi M, et al. Dig Dis Sci. 1998; 43:964-70.
4. Marone M, et al. Leuk Lymphoma. 2003; 43(1):51-7.
5. Kwon MS, et al. Pathol Res Pract. 2006; 202(12):849-56.
6. Elettra Merola, et al. J Cell Physi. 2006; 207:512-519.
7. Yoo J, et al. J Korean Med Sci. 2007 Apr; 22:318-25.
8. Tamura M, et al. Ann Thorac Cardiovasc Surg. 2007 Feb; 13(1):9-14.



p27^{Kip1} (SX53G8)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44359	p27 RTU M (SX53G8)	7 ml Ready To Use
44738	p27 0,1 M (SX53G8)	100 µl liquid Concentrated
44739	p27 1 M (SX53G8)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Cyclin-dependent kinase inhibitor 1B (p27, Kip1), also known as CDKN1B, is a human gene, which encodes a protein belonging to the Cip/Kip family of cyclin dependent kinase (Cdk) inhibitors. The encoded protein binds to and prevents the activation of cyclin E-CDK2 or cyclin D-CDK4 complexes and thus controls the cell cycle progression at G1. It is often referred to as a cell cycle inhibitor protein because its major function is to stop or slow down the cell division cycle.

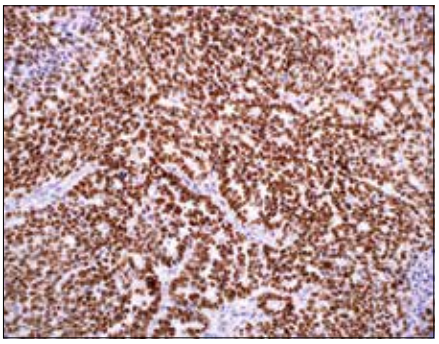
Studies have shown that low p27 expression has been associated with unfavorable prognosis in renal cell carcinoma, colon carcinoma, breast carcinomas, non-small-cell lung carcinoma, hepatocellular carcinoma, multiple myeloma, and lymph node metastases in papillary carcinoma of the thyroid, as well as a more aggressive phenotype in carcinoma of the cervix.

Thyroid: Malignant vs. Benign

	p27	Thyroglobulin	Calcitonin	CK 19	Galectin-3	TTF-1	HBME-1
Papillary Carcinoma	-/+	+	-	+	+	+	+
Follicular Carcinoma	-	+	-	-	+	+	+/-
Medullary Carcinoma	+/-	-	+	+	-	+	+
Benign Thyroid	+	+	-	-	-	+	-

Reference

1. Lloyd Ricardo V, et al. Am J Pathol. 1999; 154:313-323.
2. Migita Toshiro, et al. Cancer. 2002; 94:973-9.
3. Haitel Andrea, et al. Urology. 2001; 58:477-481.
4. Tan Puay, et al. Cancer Research. 1997 April 1; 57:1259-1263.
5. Esposito Vincenzo, et al. Cancer Research. 1997 August 15; 57:3381-3385.
6. Khoo Mark L. C., et al. J Clin Endocrinol Metab. 2002; 87:1814-1818.
7. Huang, Lee-Wen et al. Gynecologic Oncology. 2002; 85:524-528.
8. Khoo Mark L., et al. Arch Otolaryngol Head Neck Surg. 2002; 128:253-257.
9. Ribal MJ, et al. Anticancer Res. 2003 Nov-Dec; 23(6D):5101-6.
10. Freedland SJ, et al. Urology. 2003 Jun; 61(6):1187-92.
11. Armengol C, et al. J Hepatol. 2003 May; 38(5):591-7.



p53 (DO7)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45154	IMPATH p53 RTU M (DO7)	50 Tests
44361	p53 RTU M (DO7)	7 ml Ready To Use
44742	p53 0,1 M (DO7)	100 µl liquid Concentrated
44743	p53 1 M (DO7)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Breast Carcinoma, Colon Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-p53 tumor suppressor protein recognizes a 53 kDa phosphoprotein, identified as a p53 suppressor gene product. It reacts with the mutant as well as wild form of p53. Positive nuclear staining with this antibody has been shown to be a negative prognostic factor in breast carcinoma, lung carcinoma, colorectal, and urothelial carcinoma. Anti-p53 positivity has also been used to differentiate uterine serous carcinoma from endometrioid carcinoma as well as to detect intratubular germ cell neoplasia.

Bladder: Dysplasia vs. Reactive

	p53	CK 20	CD44	Ki-67
Carcinoma *in-situ*	+	+	-	+
Reactive Atypia	-	-	+ (all cell layers)	+
Normal Urothelium	-	+ (umbrella cells)	+ (umbrella cells)	-

Liver: Malignant vs. Benign

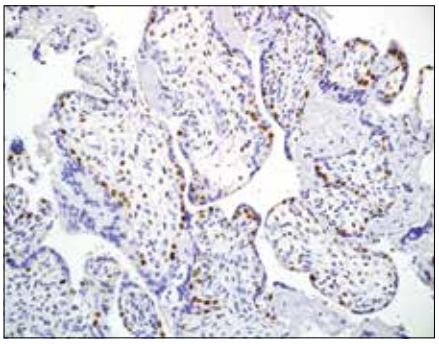
	p53	Hep-Par1	Glypican-3	CD34	AFP	A1AT	pCEA	mCEA	TTF-1
Hepatocellular Carcinoma	+	+	+	+	-/+	-/+	+	-	+ (cytoplasmic)
Hepatoblastoma	+	+	+	-	+	+	+	-	-
Benign Liver Nodules	-	+	-	-	-	+/-	-	-	+ (cytoplasmic)

Mesothelial Cells: Malignant vs. Benign

	p53	GLUT1	Mesothelin	Calretinin
Malignant	+	+	+	+
Reactive Benign	-	-	+	+

Reference

1. Moore BE, et al. Applied Immunohistochemistry and Molecular Morphology. 2001; 9(3):203 –206.
2. Mauri FA, et al. Int J Oncol. 1999 Dec; 15(6):1137-47.
3. Caffo O, et al. Clin Cancer Res. 1996 Sep; 2(9):1591-9.
4. Bebenek M, et al. Anticancer Res. 1998 Jan-Feb; 18(1B):619-23.
5. Midulla C, et al. Anticancer Res. 1999 Sep-Oct; 19(5B):4033-7.



p57^{Kip2} (Kp10)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45248	IMPATH P57 RTU M (Kp10)	50 Tests
44362	p57 RTU M (Kp10)	7 ml Ready To Use
44744	p57 0,1 M (Kp10)	100 µl liquid Concentrated
44745	p57 1 M (Kp10)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Placenta
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

p57KIP2 is a cyclin-dependent kinase inhibitor, cell cycle inhibitor and tumor suppressor gene, located at 11p15.5. p57KIP2 shows strong paternal genomic imprinting, resulting in expression predominantly from the maternal allele.

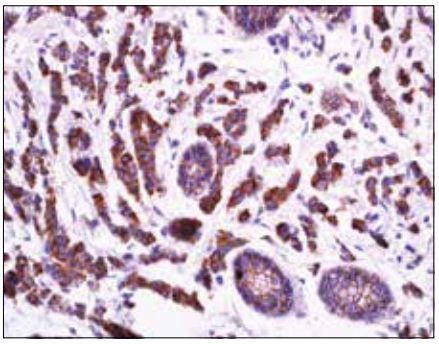
Anti-p57 has been used as an aide in identification of complete hydatidiform mole (CHM) (no nuclear labeling of cytotrophoblasts and stromal cells) from partial hydatidiform mole (PHM) in which both cytotrophoblasts and stromal cells stain. The histological differentiation of complete mole, partial mole, and hydropic spontaneous abortion is problematic. Most complete hydatidiform moles are diploid, whereas most partial moles are triploid. Ploidy studies will identify partial moles, but will not differentiate complete moles from non-molar gestations. Complete moles carry a high risk of persistent disease and choriocarcinoma, while partial moles have a very low risk. In normal placenta, many cytotrophoblast nuclei and stromal cells are labeled with this antibody. Similar findings apply to PHM and hydropic abortus tissues. Intervillous trophoblastic islands (IVTIs) demonstrate nuclear labeling in all three entities and serve as an internal control. Other markers which may be useful in a panel for differentiating the various forms of gestational trophoblastic disease are anti-hCG, anti-placental alkaline phosphatase, and anti-hPL.

Uterus: Trophoblastic Proliferations

	p57	hCG	PLAP	hPL	CK Cocktail	Vimentin
Partial Mole	+	Weak, diffuse	+	Weak, diffuse	Strong, diffuse	-
Complete Mole	-	Strong, diffuse	Weak, focal	Weak, focal	Strong, diffuse	-
Choriocarcinoma	-	Strong, diffuse	Weak, focal	Weak, focal	Strong, diffuse	-/+
Placental Site Tumor		Strong, focal	Strong, diffuse	Strong, diffuse	Strong, diffuse	Strong, diffuse

Reference

1. Kihara M, et al. J Reprod Med. 2005 May; 50(5):307-12.
2. Romaguera RL, et al. Fetal PediatrPathol. 2004 Mar-Jun; 23(2-3):181-90.
3. Marjoniemi VM. Pathology. 2004 Apr; 36(2):109-19. Review.
4. Jun SY, et al. Histopathology. 2003 Jul; 43(1):17-25.



p120 Catenin (MRQ-5)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45320	IMPATH p120 Catenin RTU M (MRQ-5)	50 Tests
44357	p120 Catenin RTU M (MRQ-5)	7 ml Ready To Use
44734	p120 Catenin 0,1 M (MRQ-5)	100 µl liquid Concentrated
44735	p120 Catenin 1 M (MRQ-5)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Lobular Breast Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

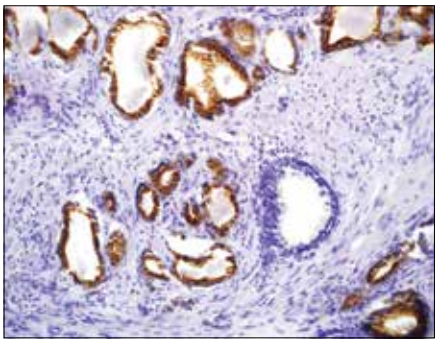
p120 catenin is encoded on chromosome 11q11. Alpha-catenin and beta-catenin bind to the intracellular domain of E-cadherin while p120 catenin binds E-cadherin at a juxta-membrane site. The complex stabilizes tight junctions. In the cell, p120 catenin localized to the E-cadherin/catenins cell adhesion complex, directly associates with cytoplasmic C-terminus of E-cadherin and may similarly interact with other cadherins. A deficiency of E-cadherin results in the intracytoplasmic accumulation of p120 catenin. Lobular carcinoma of the breast shows intracytoplasmic accumulation of p120 catenin while ductal carcinoma shows reduced membrane p120 catenin without cytoplasmic accumulation. In gastric and colonic carcinoma, strong cytoplasmic p120 catenin is associated with discohesive infiltrative morphology.

Breast Lesion

	p120	GCDFP-15	Mammaglobin	β-Catenin	E-cadherin	CK, 34βE12
Lobular	+(cytoplasmic)	+	+	-	-	+
Ductal	+(membranous)	+	+	+(membranous)	+	-

Reference

1. Reynolds AB, et al. Oncogene. 1992; 7:2439-2445.
2. Thoreson MA, et al. Mol Cell Biol. 1994; 14:8333-8342.
3. Daniel JM, et al. Hybridoma. 2001 May; 20:159-165.
4. Mayerle J, et al. Gastroenterology. 2003; 124:949-960.
5. Sarrio D, et al. Oncogene. 2004 Apr 22; 23(19):3272-83.



P504s (13H4)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45288	IMPATH P504s RTU R (13H4) RUO	50 Tests
44360	P504s RTU R (13H4) RUO	7 ml Ready To Use
44740	P504s 0,1 R (13H4) RUO	100 µl liquid Concentrated
44741	P504s 1 R (13H4) RUO	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Prostate Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Alpha-Methylacyl-CoA Racemase (also known as AMACR or P504s) is an essential enzyme in the β-oxidation of branched-chain fatty acids. AMACR over-expression has been demonstrated in several cancers including colorectal, prostate, bladder, renal cell carcinomas, and lymphoma. Staining with the antibody to this enzyme has been useful in identifying prostate carcinoma and prostatic intraepithelial neoplasia, as well as atypical adenomatous hyperplasia in formalin-fixed, paraffinized tissue in morphologically difficult cases.

Prostate: Malignant vs. Benign

	P504s	PSA/PSAP	Androgen Receptor	CK, 34βE12	p63	CK 5	CK 14
Prostate Carcinoma	+	+	+	-	-	-	-
Benign Prostate	-/+	+	+	+	+	+	+

Prostate Lesions

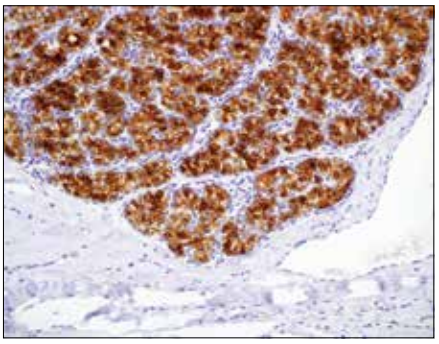
	P504s	PSA/PSAP	CK, 34βE12	p63	CK 7	Thrombo-modulin	Uroplakin III	PAX-2
Prostate Carcinoma	+	+	-	-	-	-	-	-
Urothelial Carcinoma	-	-	+	+	+	+	+	-
Nephrogenic Adenoma	+	-	+/-	-	+	-	-	+

Colon vs. Prostate Adenocarcinoma

	P504s	CDX-2	CK 20	CEA	CA19-9	PSA
Colon Adenocarcinoma	+	+	+	+	+	-
Prostate Adenocarcinoma	+	-	-	-	-	+

Reference

1. Browne TJ, et al. Hum Pathol. 2004 Dec; 35(12):1462-8.
2. Wu CL, et al. Hum Pathol. 2004 Aug; 35(8):1008-13.
3. Evans AJ. J Clin Pthol. 2003 Dec; 56(12):892-7.
4. Beach R, et al. Am J Surg Pathol. 2002 Dec; 26(12):1588-96.
5. Jiang Z, et al. Am J Surg Pathol. 2002 Sep; 26(9):1169-74.
6. Jiang Z, et al. Am J Surg Pathol. 2001 Nov; 25(11):1397-404.
7. Zhou M, et al. Am J Surg Pathol. 2002 Jul; 26(7):926-31.
8. Jun Luo, et al. Cancer Research. 2002 April 15; 62, 2220-2226.



Parathyroid Hormone (PTH) (MRQ-31)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45249	IMPATH PTH RTU M (MRQ-31)	50 Tests
44363	PTH RTU M (MRQ-31)	7 ml Ready To Use
44746	PTH 0,1 M (MRQ-31)	100 µl liquid Concentrated
44747	PTH 1 M (MRQ-31)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Parathyroid Tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Surgical pathologists are familiar with the ability of parathyroid proliferations to assume a variety of histological guises, posing difficulty to categorize any given lesion as hyperplastic, adenomatous, or carcinomatous in nature. This is usually resolved with macroscopic appearance of the remaining parathyroid glands as assessed by the surgeon. The role of the surgical pathologist is to identify the lesion as parathyroid in nature and to assess whether it is normocellular or hypercellular. Although easily accomplished in the majority of instances, rare examples of parathyroid hyperplasia/adenoma showing a follicular/trabecular arrangement may cause concern over the alternative diagnosis of a thyroid adenoma. This becomes more pertinent when the parathyroid lesion abuts into the thyroid gland or lies within the thyroid capsule. Immunostaining for thyroglobulin and parathyroid hormone (PTH) is especially useful to resolve the problem.

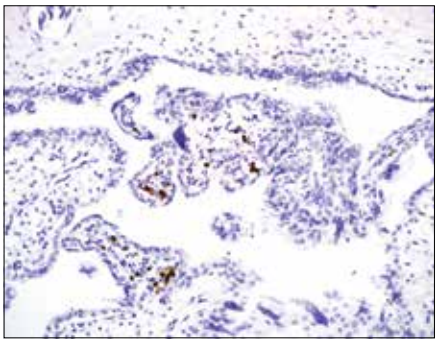
Anti-PTH antibody is also useful to distinguish parathyroid hyperplasia/neoplasms from thyroid and metastatic neoplasms although the pathologist is typically aware of the preoperative hypercalcemic status. Occasionally when the surgeon does not supply this information, PTH immunohistochemistry is essential. Even more problematic are situations in which clear cell parathyroid carcinomas are nonsecretory without an abnormality in mineral metabolism. In such situations, metastatic renal cell carcinoma or metastatic clear cell carcinoma of the lung is evident warranting PTH immunohistochemistry to arrive at the correct diagnosis. The other instance in which PTH antibodies are useful is in the consideration of parathyroid carcinomas located primarily in the anterior mediastinum (intrathymically). In this situation, distinction from primary thymic metastatic carcinomas, non-Hodgkin lymphoma, and germ cell tumors is necessary.

Differential Diagnosis of Parathyroid Tumors

	PTH	Chromogranin A	Synaptophysin	S-100	TTF-1	Calcitonin
Parathyroid Tumors	+	+	+	-	-	-
Follicular Cell Tumors	-	-	-	+/-	+	-
Medullary Thyroid Carcinoma	-	+	+	-	+	+

Reference

1. Aldinger KA, et al. Cancer. 1982; 49:388-97.
2. Brown EM. Mineral Electrolyte Metal. 1982; 8:130-50.
3. Chen HL, et al. Journal of Biology and Chemistry. 2002; 277:19374-81.
4. Habener JF, et al. Physiology Reviews. 1984; 64:985-1053.
5. Murphy MN, et al. Cancer. 1986; 58:2468-76.
6. Permanetter W, et al. American Journal of Surgical Pathology. 1983; 7:535-46.
7. Wick MR, et al. Seminars in Diagnostic Pathology. 1997; 14:183-202.



Parvovirus B19 (R92F6)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45250	IMPATH Parvovirus RTU M (R92F6)	50 Tests
44364	Parvovirus RTU M (R92F6)	7 ml Ready To Use
44748	Parvovirus 0,1 M (R92F6)	100 µl liquid Concentrated
44749	Parvovirus 1 M (R92F6)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control Parvovirus infected tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

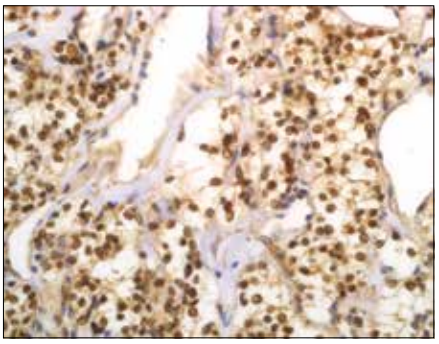
**Please refer to product insert for complete protocol.*

Product Description

Anti-parvovirus targets the capsid proteins VP1 and VP2 on human parvovirus. Parvovirus B19 infection has been implicated as a cause in spontaneous abortion in humans. Parvovirus B19 is also associated with erythema infectiosum (fifth disease) in children and acute arthritis in adults, as well as chronic hemolytic anemia, with some patients experiencing aplastic crisis.

Reference

1. Loughrey AC, et al. J Med Vir. 1993; 39:97-100.
2. Moore L, et al. Med J Australia. 1993; 159:344-345.
3. Morey AL, et al. J Path. 1992; 166:105-108.
4. O'Neill HJ, et al. 1992; 123:125-134.



PAX-2 (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
44365	PAX-2 RTU R (Poly)	7 ml Ready To Use
44750	PAX-2 0,1 R (Poly)	100 µl liquid Concentrated
44751	PAX-2 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Renal Cell Carcinoma
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

PAX-2 is a homeogene strongly expressed during kidney development. PAX-2 gene is expressed in the metanephric mesenchyma after ureter bud induction and is a key factor for the mesenchyma-epithelium conversion. Animals transgenic for PAX-2 have severe renal abnormalities and cysts but no solid tumoral features. The oncogenic potential of the PAX gene family has been reported in vitro with transformation of cell cultures and in vivo with cell injections in nude mice. Gnarra et al. showed PAX-2 expression in renal carcinoma cell lines and underlined its potential role in cell proliferation in these lines. Mazal et al. demonstrated anti-PAX-2 nuclear expression in 88% of clear cell renal cell carcinomas as well as 18% of papillary renal cell carcinoma, and 13% of chromophobe renal cell carcinomas. More recently, O'Connor et al. demonstrated utility in distinguishing ovarian serous papillary carcinoma (anti-PAX-2 positive) from primary breast carcinoma (anti-PAX-2 negative). Anti-PAX-2 has also been used to distinguish hepatocellular carcinoma (anti-PAX-2 negative) from clear cell renal cell carcinoma.

Prostate Lesions

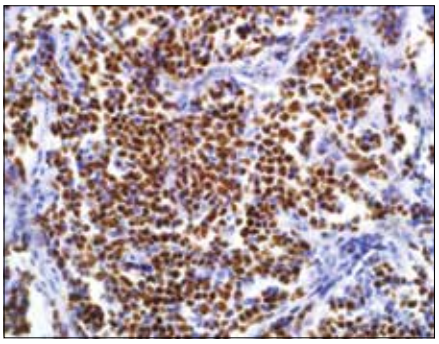
	PAX-2	PSA/PSAP	P504s	CK, 34βE12	p63	CK 7	Thrombo-modulin	Uroplakin III
Prostate Carcinoma	-	+	+	-	-	-	-	-
Urothelial Carcinoma	-	-	-	+	+	+	+	+
Nephrogenic Adenoma	+	-	+	+/-	-	+	-	-

Kidney: Renal Epithelial Tumors

	PAX-2	RCC	CD10	Vimentin	Ksp-cadherin	Parvalbumin	CD117	Ep-CAM
Clear Cell RCC	+	+	+	+	-	-	-	-
Chromophobe RCC	+	-/+	-/+	-	+	+	+	+
Oncocytoma	+	-	+/-	-	+/-	+	+	-

Reference

1. Daniel L, et al. Hum Pathol. 2001 Mar; 32(3):282-7.
2. Gnarra JR, Dressler GR. Cancer Res. 1995 Sep 15; 55(18):4092-8.
3. Mazal PR, et al. Mod Pathol. 2005 Apr; 18(4):535-40.



PAX-5 (EP156†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45642	PAX-5 RTU R (EP156)	7 ml Ready To Use
44366	PAX-5 0,1 R (EP156)	100 µl liquid Concentrated
45628	PAX-5 1 R (EP156)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

PAX-5 encodes for B-cell-specific activator protein (BSAP), a marker for B-cells, including B-lymphoblastic neoplasms and maturation stage. It is found in most cases of mature and precursor B-cell non-Hodgkin lymphomas/leukemias. In approximately 97% of cases of classic Hodgkin lymphoma, Reed-Sternberg cells express PAX-5. PAX-5 is not detected in multiple myeloma and solitary plasmacytoma, making it useful for such differentiation. Diffuse large B-cell lymphomas do express PAX-5, save for those with terminal B-cell differentiation. T-cell neoplasms do not stain with anti-PAX-5. There is a strong association with CD20 expression.

B-cell Lymphomas

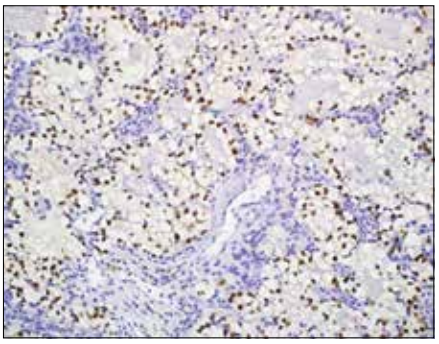
	PAX-5	CD10	CD20	CD79a	BCL2	BCL6	TCL1	Annexin A1	CD23	Cyclin D1
Follicular	+	+	+	+	+	+	+	-	-	-
CLL/SLL	+	-	+	+	+	-	+	-	+	-
Mantle Cell	+	-	+	+	+	-	+	-	-	+
Marginal Zone BCL	+	-	+	+	+	-	-	-	-	-
Lymphoplasmacytic	+	-	+	+	+	-	+	-	-	-
Diffuse Large Cell Lymphoma	+	+	+	+	+	+	-/+		-	-
Burkitt Lymphoma	+	+	+	+	-	+	+		-	-
Hairy Cell Leukemia	+	-	+	+	+	-	+	+	-	+(weak)/-

Lymphoblastic Lymphomas, B-cell vs. T-cell

	PAX-5	TdT	CD10	CD20	CD19	CD3	CD5	CD7	CD117	CD1a
B-cell	+	+	+	+/-	+	-	-	-	-	+
T-cell	-	+	+/-	-	-	+	+/-	+/-	-/+	+/-

Reference

1. Torlakovic E, et al. Am J Surg Pathol. 2002 Oct; 26(10):1343-50.
2. Willenbrock K, et al. Lab Invest. 2002 Sep; 82(9):1103-9.
3. Falini B, et al. Blood. 2002 Jan 15; 99(2):409-26.
4. Blood. 2003 Feb 15; 101(4):1505-12.



PAX-8 (MRQ-50)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45322	IMPATH PAX-8 RTU M (MRQ-50)	50 Tests
44367	PAX-8 RTU M (MRQ-50)	7 ml Ready To Use
44753	PAX-8 0,1 M (MRQ-50)	100 µl liquid Concentrated
44754	PAX-8 1 M (MRQ-50)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Ovarian carcinoma (non-mucinous carcinoma), Renal cell carcinoma, Thyroid carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

This protein is a member of the paired box (PAX) family of transcription factors. Members of this gene family typically encode proteins which contain a paired box domain, an octapeptide, and a paired-type homeodomain. This nuclear protein is involved in thyroid follicular cell development and expression of thyroid-specific genes. Mutations in this gene have been associated with thyroid dysgenesis, thyroid follicular carcinomas and atypical thyroid adenomas.

PAX-8 is expressed in the thyroid (and associated carcinomas), non-ciliated mucosal cells of the fallopian tubes and simple ovarian inclusion cysts, but not normal ovarian surface epithelial cells. PAX-8 is expressed in a high percentage of ovarian serous, endometrioid, and clear cell carcinomas, but only rarely in primary ovarian mucinous adenocarcinomas. Studies have also found PAX-8 expression in renal tubules as well as renal carcinoma, nephroblastoma, and seminoma. Studies have shown that 98% of clear cell RCCs, 90% of papillary RCCs, and 95% of oncocytomas are positive for anti-PAX-8, frequencies which are similar to or better than those for anti-PAX-2. Therefore, anti-PAX-8 can be used as an additional immunohistochemical marker for renal epithelial tumors. Normal lung and lung carcinomas do not express PAX-8. Anti-PAX-8, combined with organ system-specific markers such as anti-uroplakin, anti-mammaglobin, and anti-TTF-1 can be a very useful panel to determine the primary site of invasive micropapillary carcinomas from ovary (positive staining) or from bladder, lung, and breast (negative staining). Anti-PAX-8 is also useful in distinguishing ovarian serous carcinoma from malignant mesothelioma of peritoneum.

Ovarian Carcinomas

	PAX-8	WT1	CA-125	CEA
Ovarian CA, Serous	+	+	+	+
Ovarain CA, Mucinous	-	-	-	-
Ovarian CA, Endometrioid	+	-	+	-
Ovarian CA, Clear Cell	+	-	+	-

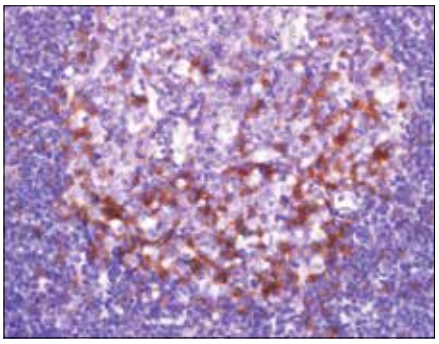
Micropapillary Carcinomas

	PAX-8	Uroplakin III	CK 20	CK 7	CK, HMW	ER	Mamma-globin	WT1	TTF-1	EMA
Bladder	-	+	+	+	-	-	-	-	-	-
Breast	-	-	-	+	-	+	+	-	-	+
Lung	-	-	-	+	-	-	-	-	+	+
Ovary	+	-	-	+	+	+	-	+	-	-

Reference

1. Daisuke N, et al. Mod Pathol. 2008; 21:192-200.

A.MENARINI diagnostics



PD-1 (NAT105)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45323	IMPATH PD1 RTU M (NAT105)	50 Tests
44368	PD-1 RTU M (NAT105)	7 ml Ready To Use
44755	PD-1 0,1 M (NAT105)	100 µl liquid Concentrated
44756	PD-1 1 M (NAT105)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Lymph node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Programmed death-1 (PD-1) is expressed on activated T-cells, B-cells, and myeloid cells. Anti-PD-1 is a marker of angioimmunoblastic lymphoma and suggests a unique cell of origin for this neoplasm. Unlike CD10 and BCL6, PD-1 is expressed by few B-cells, so anti-PD-1 may be a more specific and useful diagnostic marker in angioimmunoblastic lymphoma. In addition, PD-1 expression provides evidence that angioimmunoblastic lymphoma is a neoplasm derived from germinal center-associated T-cells. PD-1 expression in angioimmunoblastic lymphoma lends further support to this model of T-cell oncogenesis, in which specific subtypes of T-cells may undergo neoplastic transformation and result in specific distinct histologic, immunophenotypic, and clinical subtypes of T-cell neoplasia.

T-cell Lymphomas

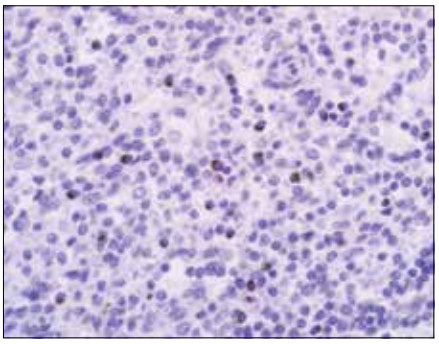
	PD-1	CD45	CD2	CD3	CD4	CD5	CD7	CD8	CD25	CD45RO
Angioimmunoblastic	+	+	+	+	+	+	+	-	+	+
Lymphoblastic	-	+	+/-	+	+/-	+	+	+/-	+	+
Subcutaneous Panniculitis-Like	-	+	+	+	-	+	+	+/-	-	+
NK	-	+	+	+	-	-	-/+	-	+	+
Cutaneous	-/+	+	+	+	+	-	+	-	-	-
Peripheral, NOS	-	+	+	+	+/-	+/-	+/-	-/+	+	+
Mycosis Fungoides	-	+	+	+	+	+	-	-	+	+

Lymph Node

	PD-1	S-100	CD1a	Lysozyme	CD21/CD35
Follicular Dendritic Cell Sarcoma	-	-	+/-	-	+
Dermatopathic Lymphadenitis	-	+	+	+	-

Reference

1. Bolstad AI, et al. Arthritis Rheum. 2003 Jan; 48(1):174-85.
2. Dorfman DM, et al. Am J Surg Pathol. 2006 Jul; 30(7):802-10.
3. Hamanishi J, et al. Proc Natl Acad Sci U S A. 2007 Feb 27; 104(9):3360-5. Epub 2007 Feb 21.



Perforin (MRQ-23)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45155	IMPATH Perforin RTU M (MRQ-23)	50 Tests
44369	Perforin RTU M (MRQ-23)	7 ml Ready To Use
44757	Perforin 0,1 M (MRQ-23)	100 µl liquid Concentrated
44758	Perforin 1 M (MRQ-23)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Spleen
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Perforin is a pore-forming protein that leads to osmotic lysis of the target cells and subsequently enables granzymes to enter the target cells and activate apoptosis, the cell death program. The expression of perforin is upregulated in activated CD8+T-cells, but in NK cells the expression is constitutively very high and stable. Perforin expression can also be stimulated in some activated CD4+ T-cells.

Although some investigators report a cytolytic potential of CD4+ T-cells, it appears more likely that CD8+ T-cells are the major effector population in Th1-associated inflammatory skin diseases. The role of perforin-mediated cytotoxicity has been demonstrated in various autoimmune diseases. In vitro and in vivo studies suggest that the cytotoxicity of CTLs may be mediated by cytotoxic granules in certain inflammatory diseases in humans. In addition, it seems that T-cell cytotoxicity against keratinocytes is mediated by perforin in some inflammatory skin diseases.

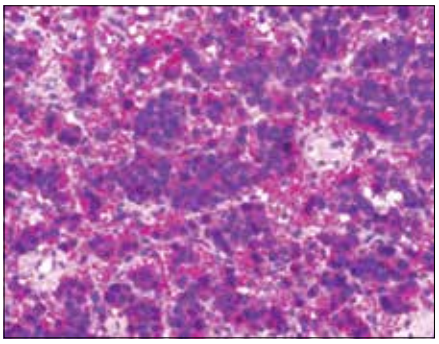
Other authors suggest that perforin may have a dual role in alloimmune response (organ transplant applications). In one regard, it has a cytolytic function in acute rejection and, in contrast, it may be responsible for downregulating both CD4- and CD8-mediated alloimmune response.

T-cell Lymphomas

	Perforin	CD2	CD3	CD4	CD5	CD7	CD8	CD25	CD45RO	PD-1
Angioimmunoblastic		+	+	+	+	+	-	+	+	+
Lymphoblastic		+/-	+	+/-	+	+	+/-	+	+	-
Subcutaneous Panniculitis-Like	+	+	+	-	+	+	+/-	-	+	-
NK	+	+	+	-	-	-/+	-	+	+	-
Cutaneous	+	+	+	+	-	+	-	-	-	-/+
Peripheral, NOS	-/+	+	+	+/-	+/-	+/-	-/+	+	+	-
Mycosis Fungoides	-	+	+	+	+	-	-	+	+	-

Reference

1. Chu PG, et al. Ann Diagn Pathol. 1999 Apr; 3(2):104-33. Review.
2. Bittmann I, et al. Virchows Arch. 2004 Oct; 445(4):375-81. Epub 2004 Jul 29.
3. d'Amore ES, et al. Pediatr Dev Pathol. 2007 May-Jun; 10(3):181-91.



PGP 9.5 (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45256	IMPATH PGP9.5 RTU R (Poly)	50 Tests
44380	PGP9.5 RTU R (Poly)	7 ml Ready To Use
44779	PGP9.5 0,1 R (Poly)	100 µl liquid Concentrated
44780	PGP9.5 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Nerve Tissue
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Protein gene product 9.5 (PGP 9.5), also known as ubiquitin carboxyl-terminal hydrolase-1 (UCHL-1), is a 27 kDa protein originally isolated from whole brain extracts. Although PGP 9.5 expression in normal tissues was originally felt to be strictly confined to neurons and neuroendocrine cells, it has been subsequently documented in distal renal tubular epithelium, spermatogonia, Leydig cells, oocytes, melanocytes, prostatic secretory epithelium, ejaculatory duct cells, epididymis, mammary epithelial cells, Merkel cells, and dermal fibroblasts. LK Campbell et al. demonstrated immunostaining of a plethora of different mesenchymal neoplasms with this antibody.

Retroperitoneal Lesions

	PGP 9.5	NSE	Synaptophysin	Chromogranin A	Neurofilament	S-100	GFAP
Neuroblastoma	+	+	+	+	+	-	+/-
Ganglioneuroblastoma	+	+	+	+	+	+	+
Ganglioneuroma	+	+	+	+	+	+	+

Small, Round Blue Cell Tumors

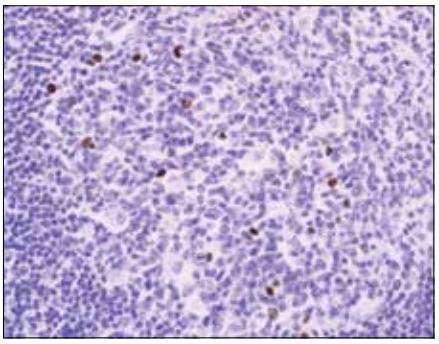
	PGP 9.5	MS Actin	Myoglobin	Myogenin	CK Cocktail	CD99	FLI-1	Vimentin	CD57
Rhabdomyosarcoma	+	-/+	+	+	-	-	-	+	-
Neuroblastoma	+	-	-	-	-	-	-	+	+
Embryonal Carcinoma	+	-	-	-	+	-	-	-	+
PNET/ES	+	-	-	-	-/+	+	+	+	+

Spindle Cell Tumors

	PGP 9.5	β-Catenin	MS Actin	SM Actin	CD56	EMA	CK Cocktail	Calponin	BCL2	S-100
Spindle Cell Carcinoma	+	+/-	-	-	-	+/-	+	-	-	-
Neurofibroma	+	-	-	-	+	-	-	-	+	+
Endometrial Stromal Tumor	+	+/-	+	+	-	-	-	+	-	-
Fibromatosis	+	+	-	+	-	-	-	-	-	-

Reference

1. Bassotti G, et al. J Clin Pathol. 2005 Sep; 58(9):973-7.
2. Campbell LK, et al. Mod Pathol. 2003 Oct; 16(10):963-9.
3. Kasprzak A, et al. Pol J Pathol. 2007; 58(1):23-33. Review.
4. Mahalingam M, et al. J Cutan Pathol. 2001 Jul; 28(6):282-6.



Phosphohistone H3 (PHH3) (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45324	IMPATH Phosphohistone H3 RTU R (PHH3)	50 Tests
44370	Phosphohistone H3 RTU R (PHH3)	7 ml Ready To Use
44759	Phosphohistone H3 0,1 R (PHH3)	100 µl liquid Concentrated
44760	Phosphohistone H3 1 R (PHH3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Phosphohistone H3 (PHH3) is a core histone protein, which together with other histones, forms the major protein constituents of the chromatin in eukaryotic cells. In mammalian cells, phosphohistone H3 is negligible during interphase but reaches a maximum for chromatin condensation during mitosis. Immunohistochemical studies showed anti-PHH3 specifically detected the core protein histone H3 only when phosphorylated at serine 10 or serine 28. Studies have also revealed no phosphorylation on the histone H3 during apoptosis. Therefore, anti-PHH3 can serve as a mitotic marker to separate mitotic figures from apoptotic bodies and karyorrhectic debris, which may be a very useful tool in diagnosis of tumor grading and staging, especially in central nervous system tumors, melanomas, soft tissue sarcomas, and gastrointestinal stromal tumor. PHH3 index is a sensitive measure of mitotic activity and has several technical advantages over the currently existing methods.

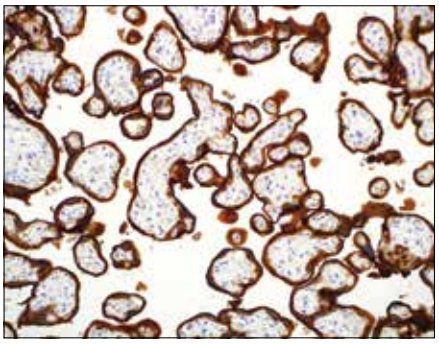
The PHH3 mitotic index method provides a true index, is independent of tumor cellularity (which can confound the scoring of mitoses per unit area), and greatly facilitates the identification of mitotic figures compared to the traditional H&E staining method. Because it stains only cells in mitosis, PHH3 offers the possibility of obtaining a true mitotic index, compared to Ki-67 proliferation index, which is positively stained in cells in all phases of the cell cycle, except G0. This feature of PHH3 staining also makes it less susceptible to variation based on antibody dilution or labeling intensity, as the pathologist can confirm that PHH3-labeled cells are also mitotic based on nuclear morphology.

Comparison of immunoreactivity of PHH3 and Ki-67 in cell cycle

Cell Cycle	PHH3	Ki-67
G0 phase	-	-
Interphase		
G1 phase	-	+
S phase	-	+
G2 phase	-	+
Mitosis phase		
Prophase	+	+
Metaphase	+	+
Anaphase	+	+
Telophase	+	+

Reference

1. Gurley LR, et al. Eur J Biochem. 1978; 84:1-15.
2. Hendzel MJ, et al. J Biol Chem. 1998; 273:24470-8.
3. Colman H, et al. Am J Surg Pathol. 2006; 30:657-64.
4. Nasr MR, El-Zammar 0. Am J Dermatopathol. 2008; 30:117-22.
5. Kim YJ, et al. Am J Clin Pathol. 2007; 128:118-25.



PLAP (NB10)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45252	IMPATH PLAP RTU M (NB10)	50 Tests
44371	PLAP RTU M (NB10)	7 ml Ready To Use
44761	PLAP 0,1 M (NB10)	100 µl liquid Concentrated
44762	PLAP 1 M (NB10)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Placenta
Stability Up to 36 mo. at 2-8°C
Isotype IgG/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-PLAP immunoreacts with germ cell tumors and can discriminate between these and other neoplasms. Somatic neoplasms e.g. breast, gastrointestinal, prostatic, and urinary cancers may also immunoreact with antibodies to PLAP. Anti-PLAP positivity in conjunction with anti-keratin negativity favors seminoma over carcinoma. Germ cell tumors are usually anti-keratin positive, but they regularly fail to stain with anti-EMA, whereas most carcinomas stain with anti-EMA. Anti-PLAP has been useful in the diagnosis of gestational trophoblastic disease. This antibody has shown cross-reaction with human intestinal alkaline phosphatase.

Germ Cell Tumors

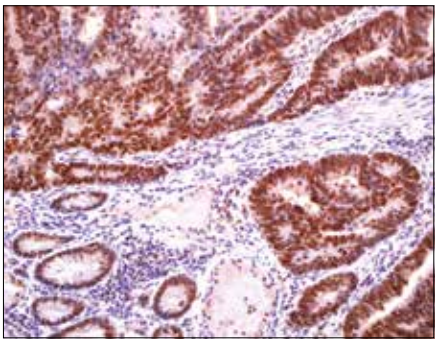
	PLAP	Oct-4	AFP	Vimentin	EMA	Inhibin	hPL	CD30	Glypican-3	CD117
Seminoma	+	+	-	+	-	-	-	-	-	+
Embryonal Carcinoma	+	+	-	-	-	-	-	+	-	-
Choriocarcinoma	+	-	-	-/+	+	-	+	-	+	-
Yolk Sac Tumor	+	-	+	-	-	-	-	-	+	-
Granulosa Cell Tumor	-	-	-	+	-	+	-	-	-	-
Hypercalcaemic Small Cell Carcinoma	-	-	-	-	+	-	-	-	-	-

Uterus: Trophoblastic Proliferations

	PLAP	p57	hCG	hPL	CK Cocktail	Vimentin
Partial Mole	+	+	Weak, diffuse	Weak, diffuse	Strong, diffuse	-
Complete Mole	Weak, focal	-	Strong, diffuse	Weak, focal	Strong, diffuse	-
Choriocarcinoma	Weak, focal	-	Strong, diffuse	Weak, focal	Strong, diffuse	-/+
Placental Site Tumor	Strong, diffuse		Strong, focal	Strong, diffuse	Strong, diffuse	Strong, diffuse

Reference

1. Jacobsen GK, et al. Acta Path Microb Immuno Scand Sect A. 1984; 92:323-329.
2. Paiva J, et al. Am J Pathol. 1984; 111:156-165.
3. Burke, AP, et al. Hum Path. 1988; 19:663-670.
4. Manivel JC, et al. Am J Surg Path. 1987; 11:21-29.
5. Wick MR, et al. Hum Path. 1987; 18:946-954.
6. Saad RS, et al. Appl Immunohistochem Mol Morphol. 2003 Jun; 11(2):107-12.
7. Goldsmith JD, et al. Am J Surg Pathol. 2002 Dec; 26(12):1627-33.
8. Losh A, Kainz C. Acta Obstet Gynecol Scand. 1996 Sep; 7598):753-6.



PMS2 (MRQ-28)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45253	IMPATH PMS2 RTU M (MRQ-28)	50 Tests
44372	PMS2 RTU M (MRQ-28)	7 ml Ready To Use
44763	PMS2 0,1 M (MRQ-28)	100 µl liquid Concentrated
44764	PMS2 1 M (MRQ-28)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Colon
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Microsatellite instability (MSI) is characterized by genome-wide alterations in short, repetitive DNA sequences. It is caused by defects in the nucleotide mismatch repair (MMR) system. Biologically, defective MMR results in a general increase in the mutation rate and the development of a “mutator phenotype.”

In colorectal cancer (CRC), high-level MSI was first described in tumors from patients with hereditary non-polyposis colorectal cancer (HNPCC). In about 70% of cases, the HNPCC syndrome develops as a result of an inherited germline mutation of one allele, followed by a somatic mutation of the other allele in one of several mismatch repair genes: hMSH2, hMLH1, hPMS1, hPMS2, hMSH6, and hMLH3. Ninety-five percent of the mutations occur in hMSH2 or hMLH1.

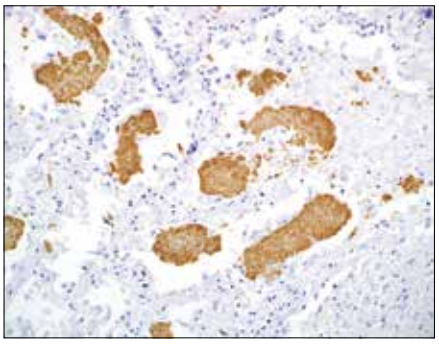
Most colorectal carcinomas are thought to be of the chromosomal instable (CIN) or microsatellite stable (MSS) genotype. However, approximately 15% are thought to be of the MSI genotype, of which the HNPCC cases represent less than one-third. The MSS and MSI tumors also seem to differ in clinicopathologic features. The MSI tumors are more often located in the proximal colon and may be synchronous. On histologic examination, they are more often mucinous or poorly differentiated. The patients with MSI-type colorectal carcinomas are generally thought to have a better prognosis than patients with MSS-type colorectal carcinomas. On the other hand, MSS tumors are more often located in the distal colon and represent typical adenocarcinomas. Although the results published so far have been conflicting, some studies suggest that patients with MSI-type colorectal carcinomas seem to have a greater benefit from adjuvant chemotherapy than patients with MSS-type colorectal carcinomas.

Microsatellite Instability

	PMS2	MLH1	MSH2	MSH6
Mismatch Repair Mutations	-	+	+	+

Reference

1. Chen JR, et al. Br J Surg. 2008 Jan; 95(1):102-10.
2. de Jong AE, et al. Clin Cancer Res. 2004 Feb 1; 10(3):972-80.
3. Fallik D, et al. Cancer Res. 2003 Sep 15; 63(18):5738-44.
4. Gill S, et al. Clin Cancer Res. 2005 Sep 15; 11(18):6466-71.



Pneumocystis jiroveci (carinii) (3F6)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45325	IMPATH Pneumocystis jirovecci RTU M (3F6)	50 Tests
44373	Pneumocystis jirovecci (carini) RTU M (3F6)	7 ml Ready To Use
44765	Pneumocystis jirovecci (carini) 0,1 M (3F6)	100 µl liquid Concentrated
44766	Pneumocystis jirovecci (carini) 1 M (3F6)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control P.jiroveci Infected Tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgM/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

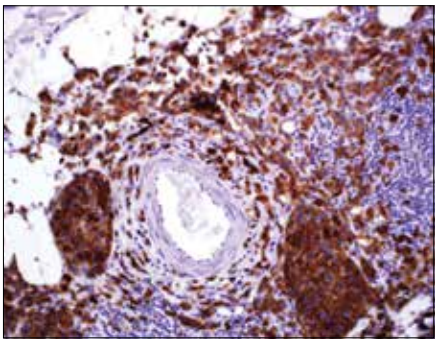
**Please refer to product insert for complete protocol.*

Product Description

Pneumocystis jiroveci (carinii) is a fungal organism which is detected in human tissues (typically in lung in immunocompromised patients) in the trophozoite stage. Anti-pneumocystis jiroveci reacts with an epitope on the organism which is resistant to formalin, picric acid, paraffin, as well as alchohol and xylene. No cross-reactivity has been demonstrated with other fungi or parasitic organisms.

Reference

1. Silverberg SG, et al. Principles and Practice of Surgical Pathology and Cytopathology, 3rd edition. 1997; 182-185.
2. Linder E, et al. J Immunol Methods. 1987; 98:57-62.
3. Elvin KM, et al. L Br Med J. 1988; 297:381-4.
4. Radio SJ, et al. Modern Pathol. 1990; 3:462-9.



PNL2 (PNL2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45326	IMPATH PNL2 RTU M (PNL2)	50 Tests
44374	PNL2 RTU M (PNL2)	7 ml Ready To Use
44767	PNL2 0,1 M (PNL2)	100 µl liquid Concentrated
44768	PNL2 1 M (PNL2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Melanoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-PNL2 is a novel monoclonal antibody, which has recently been introduced as an immunohistochemical reagent to stain melanocytes and tumors derived therefrom. Anti-PNL2 may be most useful because of its high sensitivity for metastatic melanoma (87%), as opposed to 76% for anti-HMB-45 and 82% for anti-MART-1. Anti-PNL2 yields a strong cytoplasmic staining of skin and oral mucosal melanocytes, and staining of granulocytes when used at high concentration. Anti-PNL2 labels intraepidermal nevi while the dermal component of compound nevi are largely non-reactive with anti-PNL2. Antibodies against PNL2, MART-1 (Melan A) and HMB-45 stain most clear cell sarcoma cells and a few cells in angiomyolipomas and lymphangioleiomyomatosis. Non-melanocytic lesions found to be positive with this marker include PEComas and melanotic Schwannoma. Anti-PNL2 is a useful antibody for the identification of melanomas and clear cell sarcomas. Differential diagnosis is aided by the results from a panel of antibodies, including antibodies against HMB-45, MART-1, tyrosinase, and MiTF.

Melanotic Lesions

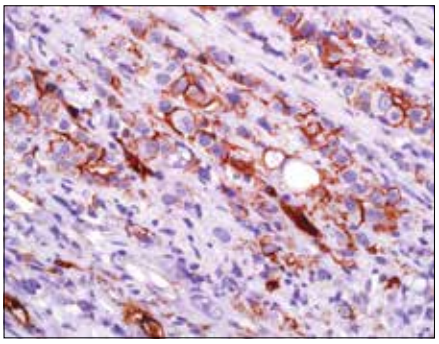
	PNL2	S-100	HMB-45	MART-1	Tyrosinase	MiTF	CD63	Factor XIIIa	WT1	KBA.62
Adult Melanocytes	+	+	-	+	+	+	+	-		+
Junctional Nevus	+	+	+	+	+	+	-	-	+/-	+
Interdermal Nevus	+	+	-	+	+	+	-	-	+/-	+
Primary Melanoma	+	+	+	+	+	+	+	-		+
Metastatic Melanoma	+	+	+	+	+	+	+	-	+	+
Spindle Cell Melanoma	+	+	+	+	+	+	+	-	+	+
Angiomyolipoma	+	+	+	+	-	+	+	-		-
Adrenal Cortical Lesions	-	+	-	+	-	-	-	-		-
Intranodal Nevus Cells	+	+	-	+	+	+	-	-		+
Dermatofibroma	-	-	-	-	-	-	-	+		-

Spindle Cell Melanoma vs. Epithelioid Peripheral Nerve Sheath Tumor

	PNL2	S-100	HMB-45	Tyrosinase	NGFR	Collagen IV
Spindle Cell Melanoma	+	+	+	+	+	-
PNST	-	+	+	+	+	+
Adrenal Adenoma		+	+	+	-/+	+

Reference

1. Philippe Rochaix, et al. Mod Pathol. 2003; 16(5):481-490.
2. Klaus J, et al. Am J Surg Pathol. 2005 March, 29(3):400-406.
3. Luc G Morris, et al. Head Neck. 2008; 30:771-775



Podoplanin (D2-40)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45327	IMPATH Podoplanin RTU M (D2-40)	50 Tests
44375	Podoplanin RTU M (D2-40)	7 ml Ready To Use
44769	Podoplanin 0,1 M (D2-40)	100 µl liquid Concentrated
44770	Podoplanin 1 M (D2-40)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Podoplanin is a transmembrane mucoprotein (38 kD) recognized by the D2-40 monoclonal antibody. Podoplanin is selectively expressed in lymphatic endothelium as well as lymphangiomas, Kaposi sarcomas, and in a subset of angiosarcomas with probable lymphatic differentiation. Podoplanin has also been shown to be expressed in epithelioid mesotheliomas, hemangioblastomas, and seminomas.

Pleura: Adenocarcinoma vs. Mesothelioma

	D2-40	Calretinin	CK 5&6	HBME-1	WT1	Caldesmon	CEA	Ep-CAM	TAG-72	TTF-1
Adenocarcinoma	-	-	-	-	-	-	+	+	+	+
Mesothelioma	+	+	+	+	+	+	-	-	-	-

Skin: Spindle Cell Tumors

	D2-40	FLI-1	NGFR	MS Actin	Factor VIII	HHV-8	CK 8 & 18	CD34	CD31	Collagen IV
Spindle Squamous Cell Carcinoma	+	-	-	-	-	-	+	-	-	-
Spindle Cell Melanoma	+	+	+	-	-	-	-	-	-	-
Peripheral Nerve Sheath	+	-	-	+	-	-	-	-	-	-
Angiosarcoma	+/-	+	-	-	+	-	-	+	+	+/-
Kaposi's Sarcoma	+	+	-	-	+	+	-	+	+/-	+/-

Gonads: Germ Cell Tumors vs. Somatic Adenocarcinoma

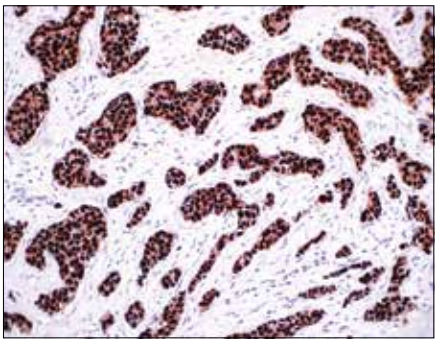
	D2-40	Oct-4	CK Cocktail	EMA	CD117	PLAP	Vimentin
Seminoma	+	+	-	-	+	+	+
Hypercalcaemic Small Cell Carcinoma	+	-	+	+	-	-	-

Renal Cell Carcinoma vs. Hemangioblastoma

	D2-40	FLI-1	CD31	CK Cocktail	CD10
Metastatic RCC	-	-	-	+	+
Hemangioblastoma	+	+	+	-	-

Reference

1. Ordonez N. Adv Anat Pathol. 2006 Mar; 13(2):83-8.
2. Ordonez N. Hum Pathol. 2005 Apr; 36(4):372-80.
3. Niakosari F, et al. Arch Dermatol. 2005 Apr; 141(4):440-4.
4. Galambos C, Nodit L. Pediatr Dev Pathol. 2005 Mar-Apr; 8(2):191-9.
5. Fukunaga M. Histopathology. 2005 Apr; 46(4):396-402.



Progesterone Receptor (Y85†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44376	Progesterone Receptor RTU R (Y85)	7 ml Ready To Use
44771	Progesterone Receptor 0,1 R (Y85)	100 µl liquid Concentrated
44772	Progesterone Receptor 1 R (Y85)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Breast, Breast Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

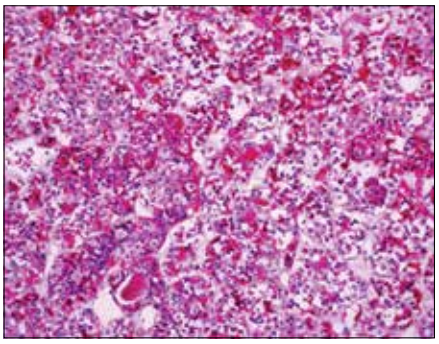
**Please refer to product insert for complete protocol.*

Product Description

This anti-progesterone receptor reacts with progesterone receptor forms alpha and beta. This antibody stains nuclei in breast, ovarian and endometrial epithelia, as well as myometrial nuclei.

Reference

1. Dunnwald LK, et al. Breast Cancer Res. 2007; 9(1):R6
2. Leong A S-Y, et al. Manual of diagnostic immunohistochemistry, 2nd edition. p 375-76.



Prolactin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45328	IMPATH Prolactin RTU R (Poly)	50 Tests
44377	Prolactin RTU R (Poly)	7 ml Ready To Use
44773	Prolactin 0,1 R (Poly)	100 µl liquid Concentrated
44774	Prolactin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pituitary
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

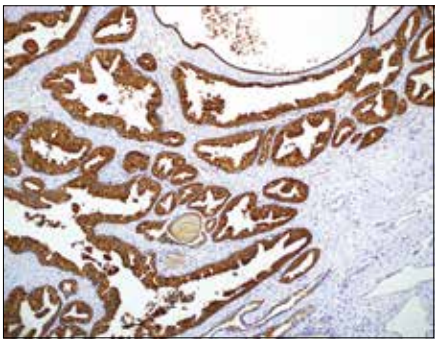
Prolactin (PRL) is a single-chain polypeptide of 226 amino acids with a molecular weight of about 24 kD. Prolactin plays a role in multiple processes including cell growth, reproduction, and immune function. The pituitary hormone PRL is involved in tumorigenesis in rodents and humans. PRL promotes proliferation, survival, and migration of cancer cells acting via the PRL receptor.

Anti-prolactin is a useful marker in classification of pituitary tumors and the study of pituitary disease. It reacts with prolactin-producing cells. Such prolactin-producing cells can also be found in prostate epithelium.

Pituitary Panel						
	Prolactin	ACTH	FSH	GH	LH	TSH
Pituitary	+	+	+	+	+	+

Reference

1. Asa SL, et al. Arch Pathol Lab Med. 1982; 106:360.
2. Duello TM, et al. Amer J Anat. 1980; 158:463.
3. Minniti G, et al. Surg Neurol. 2002 Feb; 57(2):99-103.
4. Popadic A, et al. Surg Neurol. 1999 Jan; 51(1):47-54.
5. Nevalainen MT, et al. J Clin Invest. 1997 Feb 15; 99(4):618-2.



PSA (ER-PR8)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45254	IMPATH PSA RTU M (ER-PR8) RUO	50 Tests
44378	PSA RTU M (ER-PR8) RUO	7 ml Ready To Use
44775	PSA 0,1 M (ER-PR8) RUO	100 µl liquid Concentrated
44776	PSA 1 M (ER-PR8) RUO	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Prostate, Prostate carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

PSA is an antigen present in prostate tissue and in the majority of prostate carcinomas. This antibody recognizes primary and metastatic prostatic neoplasms and rarely tumors of nonprostatic origin. These include breast and a minority of salivary gland tumors. The antigen is a 33-34 kD glycoprotein that is restricted to epithelial cells of the prostate. An immunohistochemical study showed more than 95% of prostatic carcinomas stained with anti-PSA. PSA is demonstrable in the cytoplasm of acinar and ductal cells of benign prostate and prostate adenocarcinoma.

Prostate: Malignant vs. Benign

	PSA	PSAP	Androgen Receptor	P504s	CK, 34βE12	p63	CK 5	CK 14
Prostate Carcinoma	+	+	+	+	-	-	-	-
Benign Prostate	+	+	+	-/+	+	+	+	+

Colon vs. Prostate Adenocarcinoma

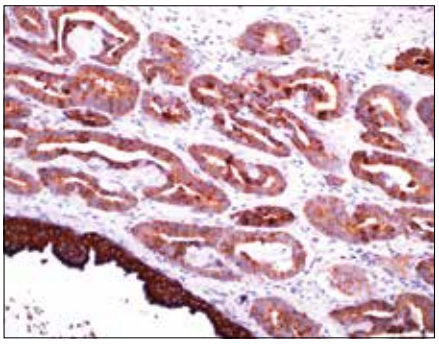
	PSA	CDX-2	CK 20	CEA	CA19-9	P504s
Colon Adenocarcinoma	-	+	+	+	+	+
Prostate Adenocarcinoma	+	-	-	-	-	+

Breast vs. Lung vs. Prostate Carcinoma

	PSA	GCDFP-15	Mammaglobin	TTF-1	Napsin A
Breast Carcinoma	-	+	+	-	-
Lung Carcinoma	-	-	-	+	+
Prostate Carcinoma	+	-	-	-	-

Reference

1. Polascik TJ, et al. J Urol. 1999; 162:293.
2. Stenman U-H, et al. Cancer Biol. 1999; 9:83-93.
3. Alanen KA, et al. Path Res Pract. 1996; 192:233-237.
4. Varma M, Jasani B. Histopathology. 2005; 47:1-16.



PSAP (PASE/4LJ)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45255	IMPATH PSAP RTU M (PASE/4LJ)	50 Tests
44379	PSAP RTU M (PASE/4LJ)	7 ml Ready To Use
44777	PSAP 0,1 M (PASE/4LJ)	100 µl liquid Concentrated
44778	PSAP 1 M (PASE/4LJ)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Prostate
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-PSAP reacts with prostatic acid phosphatase in the glandular epithelium of normal and hyperplastic prostate, carcinoma of the prostate, and metastatic cells of prostatic carcinoma. This marker may be helpful in pinpointing the site of origin in cases of metastatic carcinoma of the prostate, and is considered a more sensitive marker than PSA. However, it also offers less specificity. Nevertheless, PSAP complements PSA in the right clinical context.

Prostate: Malignant vs. Benign

	PSAP	PSA	Androgen Receptor	P504s	CK, 34βE12	p63	CK 5	CK 14
Prostate Carcinoma	+	+	+	+	-	-	-	-
Benign Prostate	+	+	+	-/+	+	+	+	+

Carcinoma: Differential Diagnosis

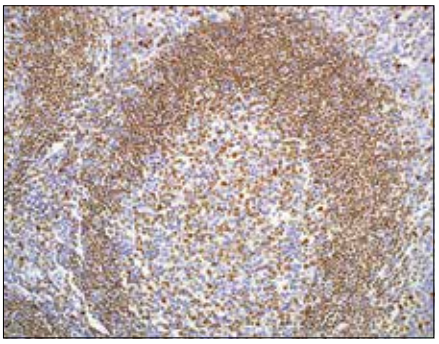
	PSAP	Androgen Receptor	BCA-225	GCDFP-15	ER/PR	Mamma-globin	PSA	CD44
Salivary Duct Carcinoma	-	+	+	+	-	-	-	-
Breast Carcinoma	-	+(apocrine)	+	+	+/-	+	-	-
Prostate Carcinoma	+	+	-	-	-	-	+	+

Prostate Lesions

	PSAP	PSA	P504s	CK, 34βE12	p63	CK 7	Thrombo-modulin	Uroplakin III	PAX-2
Prostate Carcinoma	+	+	+	-	-	-	-	-	-
Urothelial Carcinoma	-	-	-	+	+	+	+	+	-
Nephrogenic Adenoma	-	-	+	+/-	-	+	-	-	+

Reference

1. Ansari MA, et al. Am J Clin Path. 1981; 76:94-98.
2. Nadji M, Morales AR. Ann NY Acad Sci. 1982; 390:133-141.
3. Kimura N, et al. Virchows Arch A. 1986; 4:247-251.
4. Kidwai N, et al. Breast Cancer Res. 2004; 6(1):R18-23.
5. Kuroda N, et al. Pathol Int. 1999 May; 4 9(5):457-61.
6. Elgamal AA, et al. Urology. 1994 Jul; 44(1):84-90.
7. Gatalica Z, et al. Appl Immunohistochem Mol Morphol. 2000 Jun; 8(2):158-61.



PU.1 (EPR3158Y†)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44381	PU.1RTU R (EPR3158Y)	7 ml Ready To Use
44781	PU.1 0,1 R (EPR3158Y)	100 µl liquid Concentrated
44782	PU.1 1 R (EPR3158Y)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

PU.1 is a transcription factor that has been shown to be important for normal B-cell development. PU.1 belongs to the Ets family of transcription factors. It is expressed in the myeloid lineage and in immature as well as mature B-lymphocytes, with the exception of plasma cells. PU.1 is essential during early B-cell differentiation. The absence of PU.1 results in total block of B-cell development at the pre-pro stage. PU.1 is expressed in germinal center B-cells and mantle B-cells. Various lymphomas are also positive for anti-PU.1 including the following: B-chronic lymphocytic leukemia, mantle cell lymphoma, follicular lymphoma, marginal zone lymphoma, diffuse large cell lymphoma, diffuse large B-cell lymphoma, and nodular lymphocyte predominant Hodgkin lymphoma. Torlakovic et al. have demonstrated a quantitative positive association between a high level of expression of germinal center antigens (including PU.1) and a longer overall survival and progression-free survival in the case of follicular lymphoma.

B-cell Lymphomas

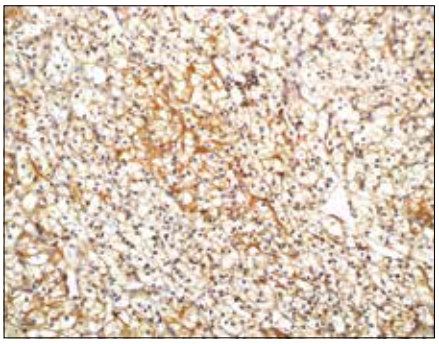
	PU.1	CD79a	BCL6	Oct-2	CD5	MUM1	CD10	CD23	Cyclin D1	TRAcP
Follicular	+	+	+	+	-	-	+	-	-	-
CLL/SLL	+	+	-	+	+	+	-	+	-	-
Mantle Cell	+	+	-	+	+	-/+	-	-	+	-
Marginal Zone	+	+	-	+	-	+	-	-	-	+/-
Lymphoplasmacytic		+	-		-	+	-	-	-	-
Diffuse Large Cell	+	+	+	+	-/+	+	-/+	-	-	-
Burkitt		+	+		-	-	+	-	-	-
Hairy Cell Leukemia		+	-		-		-	-	+(weak)/-	+

Hodgkin vs. Non-Hodgkin Lymphomas

	PU.1	CD79a	CD15	CD30	Fascin	Granzyme B	BCL6	MUM1	ALK-1	EMA
Hodgkin Lymphoma, Classic	-	-	+	+	+	-	-	+	-	-
Hodgkin Lymphoma, Nodular Lymphocyte Predominant	+	+	-	-	-	-	+	-/+	-	+
T-cell Rich LBCL	-	+	-	-	-	-	+	+	-	-
Anaplastic Large Cell Lymphoma	-	-	-	+	-	+	+/-	-	+	+

Reference

1. Hoefnagel JJ, et al. Mod Pathol. 2006 Sep; 19(9):1270-6. Epub 2006 Jun 16.
2. Hromas R, et al. Blood. 1993 Nov 15; 82(10):2998-3004.



Renal Cell Carcinoma (PN-15)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44382	Renal Cell Carcinoma RTU M (PN-15)	7 ml Ready To Use
44783	Renal Cell Carcinoma 0,1 M (PN-15)	100 µl liquid Concentrated
44784	Renal Cell Carcinoma 1 M (PN-15)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Renal Cell Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

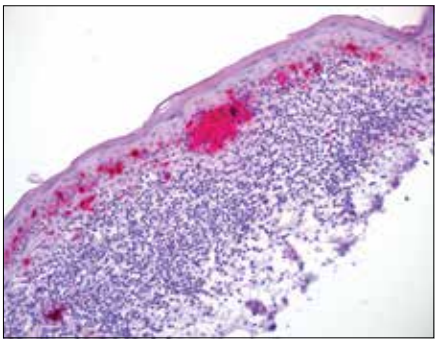
Anti-renal cell carcinoma (RCC) recognizes a 200 kD glycoprotein localized in the brush border of the proximal renal tubule.

This antibody immunoreacts with approximately 90% of primary renal cell carcinomas and approximately 85% of metastatic renal cell carcinomas. Therefore, anti-RCC is a reliable tool for differentiating primary or metastatic renal cell carcinoma from non-renal tumors. It may be utilized as a marker for the differential diagnosis of eosinophilic renal tumors-granular variant of renal cell carcinoma, chromophobe renal cell carcinoma, and oncocytoma. Other tumors that may react with this antibody are parathyroid adenoma and an occasional breast carcinoma. Nephroblastoma, oncocytoma, mesoblastic nephroma, transitional cell carcinoma, and angiomyolipoma are not labeled with this antibody.

Kidney: Renal Epithelial Tumors								
	RCC	CD10	PAX-2	Vimentin	Ksp-cadherin	Parvalbumin	CD117	Ep-CAM
Clear Cell RCC	+	+	+	+	-	-	-	-
Chromophobe RCC	-/+	-/+	+	-	+	+	+	+
Oncocytoma	-	+/-	+	-	+/-	+	+	-

Reference

1. Avery AK, et al. Am J Surg Pathol. 2000; 24(2):203-210.
2. McGregor DK, et al. Am J Surg Pathol. 2001; 25(12):1485-1492.
3. Gokden N, et al. Appl Immunohistochem Mol Morphol. 2003 Jun; 11(2):116-9.



S-100 (4C4.9)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45258	IMPATH S-100 RTU M (4C4.9)	50 Tests
44383	S-100 RTU M (4C4.9)	7 ml Ready To Use
44785	S-100 0,1 M (4C4.9)	100 µl liquid Concentrated
44786	S-100 1 M (4C4.9)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control Melanoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

S-100 protein has been found in normal melanocytes, Langerhans cells, histiocytes, chondrocytes, lipocytes, skeletal and cardiac muscle, Schwann cells, epithelial and myoepithelial cells of the breast, salivary and sweat glands, as well as in glial cells. Neoplasms derived from these cells also express S-100 protein, albeit non-uniformly. A large number of well differentiated tumors of the salivary gland, adipose and cartilaginous tissue, and Schwann cell-derived tumors express S-100 protein. Almost all malignant melanomas and cases of histiocytosis X are positive for S-100 protein. Despite the fact that S-100 protein is an ubiquitous substance, its demonstration is of great value in the identification of several neoplasms, particularly melanomas.

Melanotic Lesions

	S-100	SOX-10	HMB-45	MART-1	Tyrosinase	MiTF	CD63	WT1	NGFR
Junctional Nevus	+	+	+	+	+	+	-	+/-	
Interdermal Nevus	+	+	-	+	+	+	-	+/-	
Primary Melanoma	+	+	+	+	+	+	+		-
Spindle Cell Melanoma	+	+	+	+	+	+	+	+	+
Angiomyolipoma	+	+	+	+	+	+	+		

Lymph Node

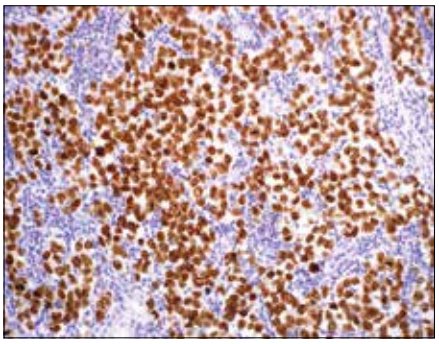
	S-100	CD68	CD1a	Lysozyme
Langerhans Cell Histiocytosis	+	+	+	+
Sinus Histiocytosis with Massive Lymphadenopathy	+	+	-	+
Dermatopathic Lymphadenitis	+	-	+	+

CNS Tumors

	S-100	GFAP	Vimentin	NGFR	CK Cocktail	INI-1
Astrocytoma	+	+	+	+	-	+
Glioblastoma	+	+	+	-	-	+
Ependymoma	+	+	-/+	+	-	+
Schwannoma	+	+	+	+	-	+

Reference

1. Nakajima, et al. Ad J Surg Path. 1982; 6:715-727.
2. Kuhn, et al. Am J Clin Path. 1983; 79:341-347.



SALL4 (6E3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45690	IMPATH SALL4 RTU M (6E3)	50 Tests
45643	SALL4 RTU M (6E3)	7 ml Ready To Use
45629	SALL4 0,1 M (6E3)	100 µl liquid Concentrated
45630	SALL4 1 M (6E3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Seminoma, dysgerminoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

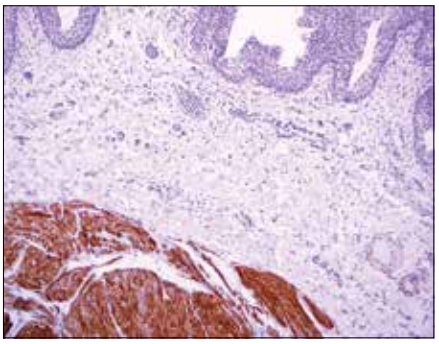
Product Description

SALL4 is a zinc finger transcription factor. Anti-SALL4 demonstrates 100% sensitivity and stains more than 90% tumor cells in all intratubular germ cell neoplasia, seminomas/dysgerminomas, embryonal carcinomas, and yolk sac tumor (YST) (both pediatric and postpubertal). Anti-SALL4 also stains most cases of teratoma and the mononucleated trophoblastic cells in choriocarcinomas. In contrast, non-germ cell tumors show no anti-SALL4 staining. Most non-testicular tumors from various organs and sites are negative for anti-SALL4, though an occasional carcinoma or sarcoma may show weak anti-SALL4 staining in less than 25% of tumor cells. In normal testicular tissue, positive, weak anti-SALL4 staining is observed in spermatogonia. In addition, a few (<5%) primary spermatocytes showed dot-like weak anti-SALL4 staining. Secondary spermatocytes, spermatids, spermatozoa, and Sertoli cells are negative for anti-SALL4. Leydig cells, rete testis, epididymis, spermatic cord fibroblasts, blood vessels, and hematopoietic cells are negative for anti-SALL4.

Germ Cell Tumors	SALL4	SOX-2	Oct-4	PLAP	CD117	CD30	AFP	Beta-hCG	Synapto-physin	Glypican
Seminoma/Dysgerminoma	+	-	+	+	+	-	-	-	-	-
Embryonal Carcinoma	+	+	+	+	-	+	-	-	-	-
Yolk Sac Tumor	+	-	-	-/+	-/+	-	+	-	-	+
Choriocarcinoma	-	-	-	+/-	-	-	-	+	-	-
Mature Teratoma	-	+/-	-	+/-	-	-	+/-	-	-	-
Immature Teratoma	+/-	+	-	-	+/-	-	-	+/-	-	-
Carcinoid	-	-	-	-	-	-	-	-	+	-

Reference

1. Cui W, et al. Mod. Pathol. 2006; 19:1585–1592.
2. Cao D, et al. Am J Surg Pathol. 2009; 33:894–904.
3. Cao D, et al. Am J Surg Pathol. 2009; 33:1065-1077.



Smoothelin (R4A)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45331	IMPATH Smoothelin RTU M (R4A)	50 Tests
44385	Smoothelin RTU M (R4A)	7 ml Ready To Use
44789	Smoothelin 0,1 M (R4A)	100 µl liquid Concentrated
44790	Smoothelin 1 M (R4A)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Cytoplasmic, Nuclear
Control Bladder, Leiomyoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

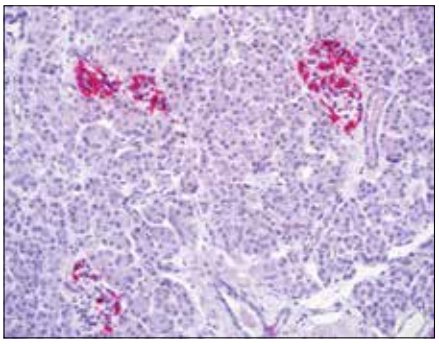
Smoothelin is a constituent of the smooth muscle cell cytoskeleton protein exclusively found in differentiated smooth muscle cells (SMC). Cells with SMC-like characteristics, such as myofibroblasts and myoepithelial cells, as well as skeletal and cardiac muscle do not contain smoothelin.

Distinguishing between bladder muscularis mucosae (MM) and muscularis propria (MP) muscle bundles is crucial for accurate staging of bladder carcinoma. Strong smoothelin expression is nearly exclusively observed in muscularis propria. The staining pattern of MP (strongly positive) and MM (negative or weakly positive) makes this technique an attractive diagnostic tool for the sometimes difficult task of staging bladder urothelial carcinoma, such as in transurethral resection specimens of urinary bladder tumors. Differentiating between smooth muscle tumors and other mesenchymal neoplasms of the GI tract can be challenging in small biopsies. Anti-smoothelin immunostaining can be helpful in differentiating benign (+) from malignant smooth muscle tumors (-), and other mimics(-).

Bladder Tissue					
	Smoothelin	Actin, SM	Actin, MS	SMMHC	Calponin
Muscularis Mucosae	-	+	+	+	+
Muscularis Propria	+	+	+	+	+

Reference

1. Kramer J, et al. J Mol Med. 1999; 77:294-8.
2. van der Loop FT, et al. J Cell Biol. 1996; 134:401-411.
3. Maake C, et al. J Urol. 2006; 175:1152-1157.
4. Jimenez RE, et al. Adv Anat Pathol. 2000; 7:13-25.
5. Kuijpers, et al. Eur Urol. 2007; 52:1213-21.
6. Paner GP, et al. Am J Surg Pathol. 2009; 33:91-8.
7. Paner GP, et al. Am J Surg Pathol. 2010; 34:792-9.
8. Council L, et al. Mod Pathol. 2009; 22:639-650.
9. Coco DP, et al. Am J Surg Pathol. 2009 Dec; 33(12):1795-801.



Somatostatin (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45259	IMPATH Somatostatin RTU R (Poly)	50 Tests
44386	Somatostatin RTU R (Poly)	7 ml Ready To Use
44791	Somatostatin 0,1 R (Poly)	100 µl liquid Concentrated
44792	Somatostatin 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pancreas
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

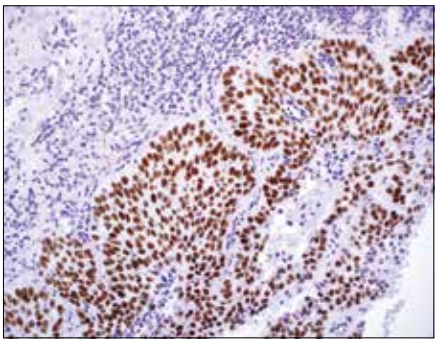
Somatostatin (also known as growth hormone inhibiting hormone (GHIH) or somatotropin release-inhibiting factor (SRIF)) is a peptide hormone widely distributed throughout the body and is an important regulator of endocrine and nervous system function. Somatostatin can also be found in gastrointestinal and bronchopulmonary endocrine cells, thymic endocrine cells, and thyroid C-cells. Somatostatin suppresses gastric acid secretion, gallbladder contractions, and pancreatic enzyme secretion. This antibody specifically stains the D-cells of the pancreatic islets of Langerhans and tumors arising from these cells. It recognizes somatostatin-containing cells in pancreatic tumors, islet cell hyperplasia, and islet cells originating in pancreatic ductules.

Pancreas

	Somato-statin	Synapto-physin	Chromo-granin A	Gastrin	CD56	β-Catenin	CK 19	CA19-9	E-cadherin	CD10
Ductal Adenocarcinoma	-	-	-	-	-	+/-	+	+	+/-	+/-
Neuroendocrine Tumor	+/-	+	+	+/-	+	+	+/-	+/-	-	-
Solid Pseudopapillary Tumor		+	-	-	+	+	-	-	+(nuclear)	+
Acinic Cell Carcinoma		-	-	-	-	+	+	-/+	+	+/-
Pancreatoblastoma	-	-	+	-	+	+	-	-	-	-
Normal Pancreas	+	+	+	-	-	+	-	-	-	-

Reference

1. Krejs GJ, et al. N Eng J Med. 1979; 301:285-292.
2. Somers G, et al. Gastroenterology. 1983; 85:1192-1198.
3. Erlandsen SL. Williams and Wilkins, Baltimore. 1980. pp140-155.
4. Friesen SR. N Eng J Med. 1982; 306:580-590.
5. Tzaneva MA. Acta Histochem. 2003; 105(2):191-201.
6. Quartu M, et al. J Chem Neuroanat. 1993 Mar-Apr; 6(2):79-99.
7. Fried G, et al. Cancer. 1994 Jul 1; 74(1):142-51.
8. Waldum HL, et al. Cancer Detect Prev. 1994; 18(6):431-6.
9. Kanavaros P, et al. Histol Histopathol. 1990 Jul; 593):325-8.
10. Chejfec G, et al. Ultrastruct Pathol. 1992 Sep-Oct; 16(5):537-45.



SOX-2 (SP76)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45334	IMPATH SOX-2 RTU R (SP76)	50 Tests
44389	SOX-2 RTU R (SP76)	7 ml Ready To Use
44797	SOX-2 0,1 R (SP76)	100 µl liquid Concentrated
44798	SOX-2 1 R (SP76)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Lung Squamous Carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

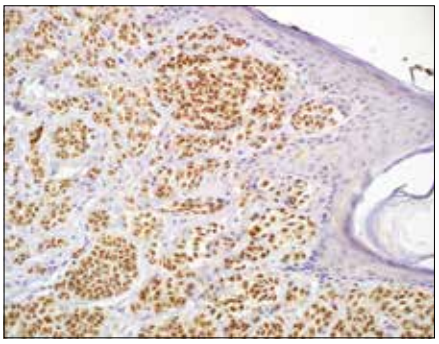
Anti-SOX-2 recognizes lung squamous cell carcinoma (LSCC). Extensive anti-SOX-2 staining is seen in over 90% of LSCC and largely parallels p63 expression. However, only 4.5% of lung adenocarcinoma (LACA) is positive for SOX-2. In a study by Sholl et al. 29% of LACA cases exhibited at least focal p63 expression. Combined p63 and SOX-2 expression was seen in 94% of LSCC and 12% of LACA with a statistically significant difference (P<0.0001) versus p63 alone. Anti-CK 5&6 had a good sensitivity but poor specificity for LSCC. Combined anti-CK 5&6 and anti-p63 positivity was seen in 93% of LSCC and 24% of LACA. Anti-CK 5&6+/anti-p63+/anti-SOX-2+ was detected in 93% of LSCC and only 9% of LACA. These results indicate that the sensitivity of anti-p63 is equally high but its specificity is similarly variable; it was seen at least focally in close to 30% of LACA. When used together, anti-p63+/anti-SOX-2+ applied to the same tumor cell population is >90% specific for LSCC. Anti-SOX-2 produced moderate-to-intense staining in all 50 cases of embryonal carcinoma components with strong anti-SOX-2 positivity and moderate-to-intense staining. The only other component that showed reactivity was the primitive neuroectodermal component in 11 of 14 (79%) of immature teratomas. In each of these positive staining foci, the staining varied from moderate-to-strong. Yolk sac tumor, seminoma, mature teratoma, choriocarcinoma, and IGCNU were uniformly negative, as were all the non-neoplastic parenchymal and stromal structures.

Lung				
	SOX-2	p63	Napsin A	TTF-1
Lung Adenocarcinoma	-	-/+	+	+
Lung SQ Carcinoma	+	+	-	-
Lung NET	-/+	-	-	+

Germ Cell Tumor						
	SOX-2	Oct-4	SALL4	CD117	CD30	PLAP
Seminoma	-	+	+	+	-	+
Embryonal Carcinoma	+	+	+	-	+	-

Reference

1. Sholl LM, et al. Appl Immunohistochem Mol Morphol. 2010; 18:55–61.
2. Tsuta K, et al. J Thorac Oncol. 2011; 6:1190– 1199.
3. Gopalan A, et al. Mod Pathol. 2009; 22:1066–1074.



SOX-10 (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45332	IMPATH SOX-10 RTU R (Poly)	50 Tests
44387	SOX-10 RTU R (Poly)	7 ml Ready To Use
44793	SOX-10 0,1 R (Poly)	100 µl liquid Concentrated
44794	SOX-10 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Melanoma, Schwannoma, Skin Melanocytes
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Sry-related HMG-BOX gene 10, (SOX-10), a nuclear transcription factor that participates in neural crest development and in the specification and differentiation of cells of melanocytic lineage, has been recently shown to be a sensitive marker of melanoma, including conventional, spindled, and desmoplastic subtypes. SOX-10 nuclear expression was found in 76 of 78 melanomas (97%) and 38 of 77 malignant peripheral nerve sheath tumors (49%), whereas S100 protein was expressed in 71 melanomas (91%) and 23 malignant peripheral nerve sheath tumors (30%). SOX-10 was expressed by metastatic melanomas and nodal capsular nevus in sentinel lymph nodes, but not by other lymph node components such as dendritic cells which usually express S100 protein. It is known that the commonly used melanoma markers, anti-HMB-45 and anti-Melan-A, are poorly expressed in desmoplastic melanomas while it has been reported that anti-SOX-10 was moderately to strongly expressed in all of the 28 desmoplastic melanomas tested. SOX-10 is less likely expressed by background fibrocytes and histiocytes in exicion scar than S100 and MiTF. Therefore, anti-SOX-10 is considered a very reliable marker for recognizing residual demoplastic melanoma. SOX-10 is diffusely expressed in schwannomas and neurofibromas. SOX-10 reaction is not identified in any other mesenchymal and epithelial tumors except for myoepitheliomas and diffuse astrocytomas. SOX-10 expression is seen in sustentacular cells of pheochromocytomas and paragangliomas, and occasionally carcinoid tumors from various organs, but not in the tumor cells. In normal tissues, SOX-10 is expressed in Schwann cells, melanocytes, and myoepithelial cells of salivary, bronchial, eccrine, and mammary glands. SOX-10 expression is also observed in mast cells in a variety of tissues and organs in both nuclear and cytoplasmic reaction.

Cutaneous Lesion

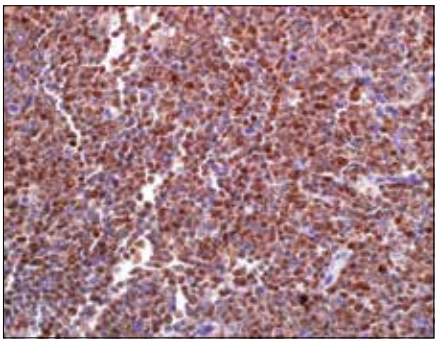
	SOX-10	CK Cocktail	HMB-45	S-100	MART-1 (Melan A)
Conventional Melanoma	+	-/+	+	+	+
Desmoplastic Melanoma	+	-	-	+/-	-
Squamous Cell Carcinoma	-	+	-	-/+	-
Basal Cell Carcinoma	-	+	-	-	-
Merkel Cell Carcinoma	-	-/+	-	-/+	-

Lymph Node

	SOX-10	CK Cocktail	HMB-45	S-100	MART-1 (Melan A)
Metastatic Melanoma	+	-	+	+	+
Nevus Cell	+	-	+	+	+
Interdigitating Dendritic Cells	-	-	-	+	-

Reference

1. Kelsch RN. BioEssays. 2006; 28:788.



SOX-11 (MRQ-58)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44388	SOX-11 RTU M (MRQ-58)	7 ml Ready To Use
44795	SOX-11 0,1 M (MRQ-58)	100 µl liquid Concentrated
44796	SOX-11 1 M (MRQ-58)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Mantle cell lymphoma, Normal Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

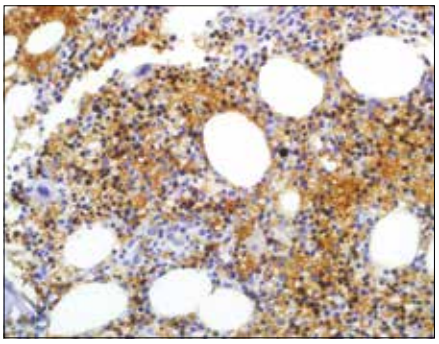
Product Description

Mantle cell lymphoma (MCL) accounts for 5% to 10% of mature B-cell neoplasms and is an aggressive disease genetically characterized by overexpression of cyclin D1 (CCND1), an important regulator of the G1/S phase of the cell cycle, due to the specific translocation t(11;14) (q13;q32). Cyclin D1 overexpression is the hallmark of MCL. However, approximately 5%-10% of MCLs lack cyclin D1 expression and may be misdiagnosed by overreliance on cyclin D1 IHC. Recently, SOX-11 protein expression in MCL has been investigated by immunohistochemistry. Two studies have evaluated SOX-11 expression in MCL and found strong nuclear expression of SOX-11 in almost all cyclin D1-positive MCL (93%-100%). In all 13 cases of cyclin D1-negative MCL, SOX-11 was strongly expressed. The authors also found that blastoid variant of MCL can be differentiated from CD5+ diffuse large B cell lymphoma, which was negative for SOX-11. In summary, nuclear protein expression of SOX-11 is highly associated with cyclin D1-positive and negative MCL. The detection of this transcription factor is a useful biomarker for identifying true cyclin D1-negative MCL. SOX-11 IHC is of value in further defining pathologic features of CD5+ DLBCL. Routine use of SOX-11 in cases of suspected CD5+ DLBCL might help identify additional cases of cyclin D1-negative blastoid MCL. SOX-11 can also be detected in some BL, LBL and T-PLL, although the different morphological and phenotypic features of these malignancies allow differentiation from cyclin D1-negative MCL.

Neoplasm						
	SOX-11	CD20	CD5	CD10	CD23	Cyclin D1
MCL	+	+	+	-	-	+
FL	-	+	-	+	-	-
SLL/CLL	-	+	+	-	+	-
MZL	-	+	-	-	-	-
LBL	+	+	-	+/-	-	-
BL	-/+	+	-	-	-	-
CD5+ DLBCL	-	+	+	+	-	-
Blastoid Variant MCL	+	+	+	-	-	+

Reference

1. Salaverria I, et al. Haematologica 2006; 91:11-6.
2. Fu K, et al. Blood 2005; 106:4315-21.
3. Katzenberger T, et al. Br J Haematol. 2008; 142:538-50.
4. Mozos A, et al. Haematologica. 2009; 94:1555-1562.
5. Wlodarska I, et al. Blood 2008; 111:5683-90.
6. Hargrave M, et al. Dev Dyn. 1997; 210:79-86.
7. Lee CJ, et al. J Neurooncol. 2002; 57:201-14.
8. Weigle B, et al. Oncol Rep. 2005; 13:139-44.



Spectrin (RBC2/3D5)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44390	Spectrin RTU M (RBC2/3D5)	7 ml Ready To Use
44799	Spectrin 0,1 M (RBC2/3D5)	100 µl liquid Concentrated
44800	Spectrin 1 M (RBC2/3D5)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Membranous
Control Bone Marrow
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

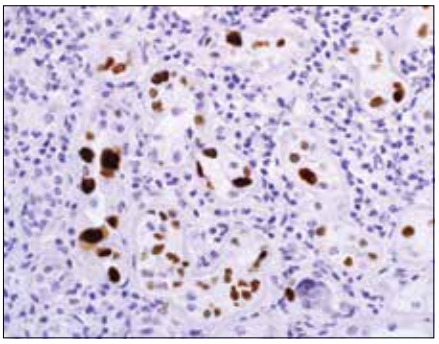
Spectrin is an actin-crosslinking and molecular scaffold protein that links the plasma membrane to the actin cytoskeleton and functions in the determination of cell shape, arrangement of transmembrane proteins, and organization of organelles. It is a tetramer made up of alpha-beta dimers linked in a head-to-head arrangement. The gene is one member of a family of alpha-spectrin genes. The encoded protein is primarily composed of 22 spectrin repeats which are involved in dimer formation. It forms weaker tetramer interactions than non-erythrocytic alpha spectrin, which may increase the plasma membrane elasticity and deformability of red blood cells. Mutations in the gene result in a variety of hereditary red blood cell disorders, including elliptocytosis type 2, pyropoikilocytosis, and spherocytic hemolytic anemia.

Anti-spectrin is useful in the diagnosis of erythroid leukemias.

Acute Myeloid Leukemia										
	Spectrin	MPO	CD68	Factor VIII	CD61	BOB.1	Oct-2	CD34	CD43	Lysozyme
Acute Myeloid, M0	-	-	-	-	-	-	-	+	+	+
Acute Myeloid, M1&2	-	+	+	-	-			-	+	+
Promyelocytic, M3	-	+	-	-	-	+	+	-	+	-
Myelomonocytic, M4	-	+	+	-	-	-	+	+	+	+
Monoblastic, M5	-	+	+	-	-	-	+	-/+	+	+
Acute Erythroid, M6	+	+	-	-	-	-	-	-/+		
Megakaryoblastic, M7	-	-	-	+	+	+/-	-	-		

Reference

1. Sadahira Y, et al. J Clin Pathol. 1999 Dec; 52(12):919-21.
2. Nehls V, et al. Am J Pathol. 1993 May; 142(5):1565-73.
3. Muller M, et al. J Vet Med A Physiol Pathol Clin Med. 2001 Feb; 48(1):51-7.
4. Terada N, et al. J Anat. 1997 Apr; 190(Pt 3):397-404.



SV40 (MRQ-4)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45335	IMPATH SV-40 RTU M (MRQ-4)	50 Tests
44391	SV-40 RTU M (MRQ-4)	7 ml Ready To Use
44801	SV-40 0,1 M (MRQ-4)	100 µl liquid Concentrated
44802	SV-40 1 M (MRQ-4)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control SV-40 infected tissue
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

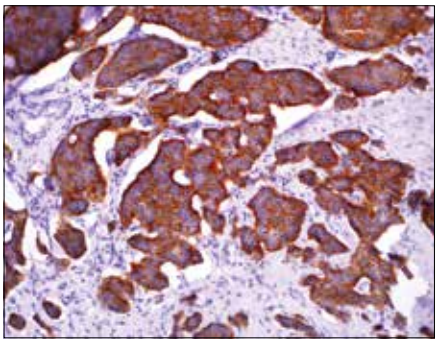
**Please refer to product insert for complete protocol.*

Product Description

SV40, Simian Virus 40, is a polyomavirus that is found in both monkeys and humans. Like other polyomaviruses, SV40 is a DNA virus that has the potential to cause tumors. SV40 is believed to suppress the transcriptional properties of tumor-suppressing p53 in humans through the SV40 large T-antigen and SV40 small T-antigen. It is generally assumed that large T-antigen is the major protein involved in neoplastic processes and the large T-antigen predominantly exerts its effect through deregulation of tumor suppressor p53, which is responsible for initiating regulated cell death (“apoptosis”), or cell cycle arrest when a cell is damaged. A mutated p53 gene may contribute to uncontrolled cellular proliferation, leading to a tumor. The hypothesis that SV40 might cause cancer in humans has been a particularly controversial area of research. Some research has suggested that SV40 is associated with brain tumors, bone cancers, non-Hodgkin lymphoma, and malignant mesothelioma. Anti-SV40 recognizes the large T-antigen of SV40.

Reference

1. Gurney EG, et al. J Virl. 1980; 34:752-763.
2. Huang H, et al. Brain Pathol. 1999; 9:33-42.
3. Arrington AS, Butel JS. Molecular and Clinical Perspectives. 2001; 461-489.
4. Pershouse M, et al. Inhal Toxicol. 2006 Nov; 18(12):995-1000.
5. Kroczynska B, et al. PNAS. 2006 Sep 19; 103(38):14128-33.
6. Poulin DL, DeCaprio JA. J Clini Oncology. 2006; 24:4356-65.



Synaptophysin (MRQ-40)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45260	IMPATH Synaptophysin RTU R (MRQ40)	50 Tests
44392	Synaptophysin RTU R (MRQ-40)	7 ml Ready To Use
44803	Synaptophysin 0,1 R (MRQ-40)	100 µl liquid Concentrated
44804	Synaptophysin 1 R (MRQ-40)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pancreatic islet cells
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-synaptophysin reacts with neuroendocrine cells of human adrenal medulla, carotid body, skin, pituitary, thyroid, lung, pancreas, and gastrointestinal mucosa. Positive staining is seen in neurons of the brain, spinal cord, retina, Paneth cells in the gastrointestinal tract, and gastric parietal cells. This antibody identifies normal neuroendocrine cells and neuroendocrine neoplasms. Diffuse, finely granular cytoplasmic staining is observed, which probably correlates with the distribution of the antigen within neurosecretory vesicles. The expression of synaptophysin is independent of the presence of NSE or other neuroendocrine markers. Anti-synaptophysin is an independent, broad-range marker of neural and neuroendocrine differentiation.

Adrenal Tumors

	Synaptophysin	Inhibin	Calretinin	MART-1	Chromogranin A	CD56
Pheochromocytoma	+	-	-	-	+	+
Adrenocortical Carcinoma	-/+	+	+	+	-	+
Adrenocortical Adenoma	-/+	+	+	+	-	+

CNS Tumors

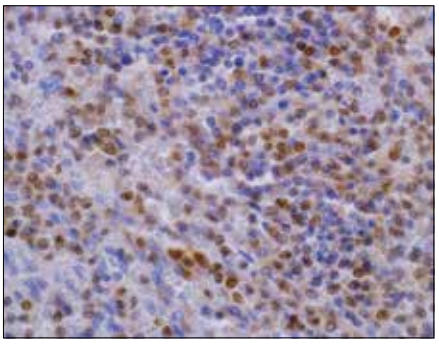
	Synapto-physin	GFAP	Neuro-filament	S-100	CK Cocktail	EMA	Vimentin	NGFR	INI-1
Central Neurocytoma	+	-	-	-	-	-	-	+	+
Neuroblastoma	+	+/-	+	+/-	-	-	+	+	+
Pineocytoma	+	-	-	-	-	-		-	+
Metastatic Carcinoma	-	-	-	-	+	+	-/+	-	+

Pancreas

	Synapto-physin	Chromo-granin A	Insulin	Glucagon	Gastrin	Somato-statin	CD10	CD56	β-Catenin	PGP 9.5
Neuroendocrine Tumor	+	+	+/-	+/-	+/-	+/-	-	+	+	+
Solid Pseudopapillary Tumor	+	-	-	-	-		+	+	+	-
Normal Pancreas	+	+	+	+	-	+	-	-	+	-

Reference

1. Navone F, et al. J Cell Biol. 1986; 103:2511-2527.
2. Wiedenmann B, et al. Cell. 1985; 41:1017-1028.
3. Kayser K, et al. Path Res Pract. 1988; 183:412-417.



T-bet (MRQ-46)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
44394	T-Bet RTU R (MRQ-46)	7 ml Ready To Use
44807	T-Bet 0,1 R (MRQ-46)	100 µl liquid Concentrated
44808	T-Bet 1 R (MRQ-46)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Hairy Cell Leukemia, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

T-bet, a T-box transcription factor, is expressed in CD4+ T-lymphocytes committed to T-helper (Th)1 T-cell development from naïve T-helper precursor cells (Thp) and redirects Th2 T cells to Th1 development.

Anti-T-bet is a marker of mature T-cells and is expressed at very low levels in Th cells and is absent in precursor T-lymphoblastic leukemia/lymphoma cells. Scattered small lymphocytes in the interfollicular T-cell zone of lymphoid tissue, including tonsil, lymph node, and spleen exhibit nuclear staining for T-bet, with no T-bet staining being observed in germinal centers, mantle or marginal zones.

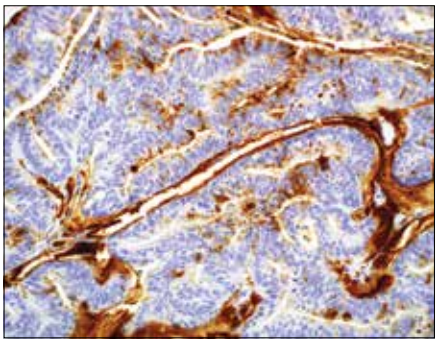
T-bet is expressed in a significant subset of B-cell lymphoproliferative disorders, particularly at an early stage of B-cell development (precursor B-cell lymphoblastic leukemia/lymphoblastic lymphoma), and B-cell neoplasms derived from mature B cells, including CLL/SLL, marginal zone lymphoma, and hairy cell leukemia. In contrast, B-cell neoplasms derived from pregerminal center or germinal center B-cells, including mantle cell lymphoma, follicular lymphoma, diffuse large B-cell lymphoma, and Burkitt lymphoma are negative for T-bet. Anti-T-bet is a useful marker for the diagnosis and subtyping of B-cell and T-cell lymphoproliferative disorders. T-bet is not expressed in precursor T-cell lymphoblastic lymphoma/leukemia.

B-cell Lymphomas

	T-bet	CD79a	BCL2	BCL6	CD10	CD23	Cyclin D1	IgD	MUM1
Follicular	-	+	+	+	+	-	-	+	-/+
CLL/SLL	+/-	+	+	-	-	+	-	+	+
Mantle Cell	-	+	+	-	-	-	+	+	-
Marginal Zone BCL	+	+	+	-	-	-	-	-/+	+
Lymphoplasmacytic	+	+	+	-	-	-	-	-	+
Diffuse Large Cell Lymphoma	-	+	+	+	-	-	-	-	+
Burkitt Lymphoma	-	+	-	+	+	-	-	-	-
Hairy Cell Leukemia	+	+	+	-	-	-	+(weak)/-	-	

Reference

1. Szabo SJ, et al. Cell. 2000; 100(6):665-69.
2. Zhang WX, et al. Genomics. 2001; 70(1):41-8.
3. Johrens K, et al. Am J Surg Pathol. 2007 Aug; 31(8):1181-1185.
4. Atayar C, et al. Am J Pathol. 2005; 166:127-134.
5. Dorfman DM, et al. Am J Clin Pathol. 2004; 122:292-297.
6. Harashima A, et al. Leuk Res. 2005 Jul; 29(7):841-8.
7. Marafioti T, et al. Am J Pathol. 2003; 162:861-871.



TAG-72 (B72.3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45336	IMPATH TAG-72 RTU M (B72.3)	50 Tests
44393	TAG-72 RTU M (B72.3)	7 ml Ready To Use
44805	TAG-72 0,1 M (B72.3)	100 µl liquid Concentrated
44806	TAG-72 1 M (B72.3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Lung Adenocarcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-TAG-72 (B72.3) is monoclonal antibody directed against a high molecular weight glycoprotein known as tumor-associated glycoprotein-72 (TAG-72). The antigen is expressed in a limited range of benign tissue but a wide range of adenocarcinomas.

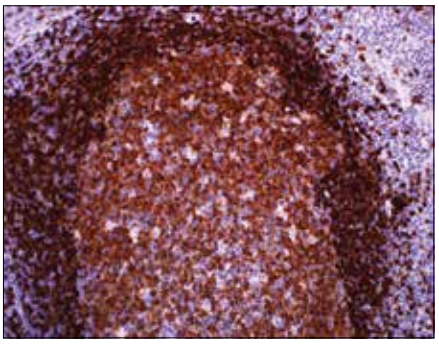
The antigen is usually expressed by adenocarcinomas, but is usually negative in mesotheliomas. Studies have shown that this antibody has 80% sensitivity and 93% specificity for pulmonary adenocarcinoma. Therefore, TAG-72 is a useful marker to distinguish between mesothelioma and adenocarcinoma. However, false positive reactions can occur so results must be interpreted with the utmost caution. This antibody may be useful in the differentiation of non-small cell carcinomas from small cell carcinomas of the lung. The combined use of anti-TAG-72 and anti-GCDFP-15 is valuable in the diagnosis of apocrine carcinoma.

Pleura: Adenocarcinoma vs. Mesothelioma

	TAG-72	Calretinin	CK 5&6	D2-40	HBME-1	Caldesmon	Ep-CAM	E-cadherin	TTF-1	CEA
Adenocarcinoma	+	-	-	-	-	-	+	+	+	+
Mesothelioma	-	+	+	+	+	+	-	-	-	-

Reference

1. Thor A, et al. Cancer Res. 1986; 46:3118.
2. Schlom J, et al. Tumormarker Oncology. 1987; 2:3.
3. Johnston WW, et al. Hum Pathol. 1986; 17:501-513.
4. Lundy J, et al. Ann Aurg. 1986; 203:399-402.
5. Kline TS, et al. Cancer. 1989; 63:2253-2256.
6. Chhieng DC, et al. Hum Pathol. 2003 Oct; 34(10):1016-21.
7. Ordonez NG. Am J Surg Pathol. 1998 Oct; 22(10):1203-14.
8. Osteen KG, et al. In J Gynecol Pathol. 1992 Jul; 11(3):216-20.



TCL1 (MRQ-7)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45338	IMPATH TCL1 RTU M (MRQ-7)	50 Tests
44395	TCL1 RTU M (MRQ-7)	7 ml Ready To Use
44809	TCL1 0,1 M (MRQ-7)	100 µl liquid Concentrated
44810	TCL1 1 M (MRQ-7)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Nuclear
Control B-cell Lymphoma, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

T-cell leukemia/lymphoma protein 1 (TCL1, TCL1A, p14TCL1) is a 14 kDa product of the TCL1 gene that is involved in T-cell prolymphocytic leukemia (T-PLL). TCL1 protein is normally found in the nucleus and cytoplasm of lymphoid lineage cells during early embryogenesis. Chromosomal translocations may lead to overexpression of TCL1, resulting in T-cell leukemia and B-cell lymphoma. TCL1 binds to a novel site in the pleckstrin homology (PH) domain, resulting in activation and nuclear translocation of Akt by overexpressed TCL1 which may promote an anti-apoptotic response; this may normally serve to promote growth during development but may lead to malignancy when TCL1 is overexpressed. TCL1 is expressed in differentiated B-cells under both reactive and neoplastic conditions, antigen committed B-cells, and in germinal center B-cells. TCL1 is down-regulated in the latest stage of B-cell differentiation.

TCL1 is overexpressed in Burkitt lymphoma, the majority of AIDS-related non-Hodgkin lymphoma-designated immunoblastic plasmacytoid lymphoma, lymphoblastic lymphoma, chronic lymphocytic leukemia, mantle cell lymphoma, follicular lymphoma, diffuse large B-cell lymphoma, and primary cutaneous B-cell lymphoma. Therefore, the most useful application of anti-TCL1 is the discrimination of B-cell lymphomas from T-cell lymphomas, CD30+ anaplastic large cell lymphomas, multiple myeloma, and marginal zone B-cell lymphoma.

B-cell Lymphomas

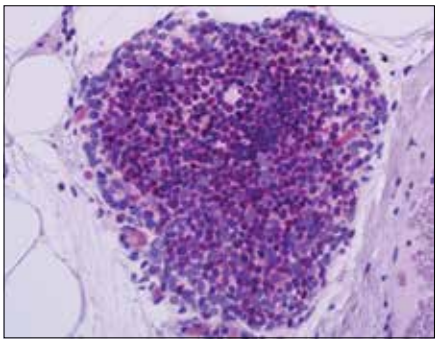
	TCL1	Annexin A1	CD79a	PAX-5	BCL6	CD5	CD10	CD23	Cyclin D1	MUM1
Follicular	+	-	+	+	+	-	+	-	-	-
CLL/SLL	+	-	+	+	-	+	-	+	-	+
Mantle Cell	+	-	+	+	-	+	-	-	+	-/+
Marginal Zone	-	-	+	+	-	-	-	-	-	+
Lymphoplasmacytic	+	-	+	+	-	-	-	-	-	+
Diffuse Large Cell	+	-	+	+	+	-/+	-/+	-	-	+
Burkitt	+	-	+	+	+	-	+	-	-	-
Hairy Cell Leukemia		+	+	+	-	-	-	-	+(weak)/-	

T-cell Lymphomas

	TCL1	CD2	CD3	CD25	CD45RO	CD7	CD8	CD4	CD5	PD-1
NK	+	+	+	+	+	-/+	-	-	-	-

Reference

1. Roos J, et al. Pathobiology. 2001; 69(2):59-66.
2. Pescarmona E, et al. Histopathology. 2006 Oct; 49(4):343-8.



TdT (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45261	IMPATH TdT RTU R (Poly)	50 Tests
44396	TdT RTU R (Poly)	7 ml Ready To Use
44811	TdT 0,1 R (Poly)	100 µl liquid Concentrated
44812	TdT 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Thymus
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

TdT (terminal deoxynucleotidyl transferase) gene is a member of the DNA polymerase type-X family and encodes a template-independent DNA polymerase that catalyzes the addition of deoxynucleotides to the 3'-hydroxyl terminus of oligonucleotide primers. TdT protein is expressed in a restricted population of normal and malignant pre-B and pre-T lymphocytes during early differentiation, where it generates antigen receptor diversity by synthesizing non-germ line elements (N-regions) at the junctions of rearranged Ig heavy chain and T-cell receptor gene segments.

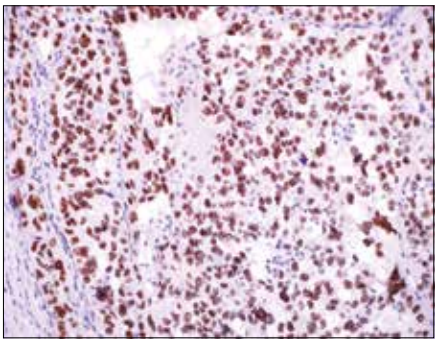
TdT expression occurs in over 90% of acute lymphoblastic lymphoma/leukemia cases with the exception of pre-B-cell ALL. TdT expression does not occur in normal mature T-or B-lymphocytes. Therefore, anti-TdT is a useful tool in diagnosis of T-ALL/T-lymphoblastic lymphoma and B-ALL/B-lymphoblastic lymphoma. Anti-TdT labels Type B thymoma, thus it can be used as a diagnostic marker for this entity. Anti-TdT is positive for approximately one-third of all cases of chronic myeloid leukemia.

Lymphoblastic Lymphomas, B-cell vs. T-cell

	TdT	CD10	PAX-5	CD20	CD19	CD3	CD5	CD7	CD117	CD1a
B-cell	+	+	+	+/-	+	-	-	-	-	+
T-cell	+	+/-	-	-	-	+	+/-	+/-	-/+	+/-

Reference

1. Arber DA, et al. Am J Clin Pathol. 1996 Oct; 106(4):462-8.
2. Orazi A, et al. Mod pathol. 1994 Jun; 7(5):582-6.



TFE3 (MRQ-37)

Rabbit Monoclonal Antibody

Cat. No.	Description	Volume
45339	IMPATH TFE3 RTU R (MRQ-37)	50 Tests
44397	TFE3 RTU R (MRQ-37)	7 ml Ready To Use
44813	TFE3 0,1 R (MRQ-37)	100 µl liquid Concentrated
44814	TFE3 1 R (MRQ-37)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Melanoma, Testis, Xp11.2 translocation renal cell carcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Xp11 translocation renal cell carcinoma (RCC) is a recently recognized subset of RCC, characterized by chromosome translocations involving the Xp11.2 break point and resulting in gene fusions involving the TFE3 transcription factor gene that maps to this locus. Xp11 translocation RCC represents the most common type of RCC in children, but is less frequent on a percentage basis in adults. Morphologically, the neoplasm frequently shows papillary architecture and clear cytoplasm, and frequently has associated psammoma bodies. Immunohistochemically, the neoplasm under-expresses epithelial markers such as cytokeratin and epithelial membrane antigen compared with typical RCC. The most sensitive and specific immunohistochemical marker for the Xp11 translocation RCC is nuclear labeling of TFE3 protein, which reflects over-expression of the resulting fusion proteins relative to TFE3. Alveolar soft part sarcoma (ASPS) is an uncommon soft tissue sarcoma which affects predominantly young patients, often in the extremities.

ASPS has the specific molecular translocation der(17)t(X;17)(p11.2;q25), which fuses the TFE3 transcription factor gene at 17q25 to ASPL, a gene at 17q25 to form a fusion transcript of ASPL-TFE3. The diagnosis of ASPS can be problematic due to histologic overlap with other tumors, particularly in small biopsies, as well as when the detection of a metastasis is prior to identification of a primary, or when presenting at unusual primary sites such as bone. Moreover, there has previously been a lack of specific diagnostic markers. The differential diagnoses include, in particular, paraganglioma, granular cell tumor, metastatic renal cell carcinoma, hepatocellular carcinoma, melanoma, and adrenal cortical carcinoma. Carcinomas can be separated by the expression of cytokeratins. Paraganglioma shows very strong positivity with anti-synaptophysin. Melanomas can be distinguished by strong positivity with antibodies against HMB-45, S100, and Melan A. These markers generally are all negative in ASPS. Anti-TFE3 has been shown to be highly specific and sensitive for ASPS.

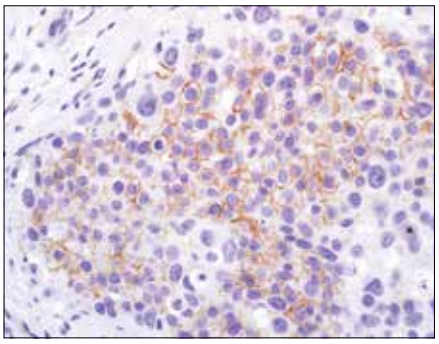
Carcinomas

	TFE3	RCC	CD10	CK 7	Ksp-cadherin	S100P	CD117	CK, HMW
Xp11 Tr RCC	+	+	+	-/+	+	-		
Clear Cell RCC	-	+	+	-/+	-/+	-	-	-
Papillary RCC	-	+	+	+	-/+	-	-	+/-
Chromophobe RCC	-	+	+/-	+	+	-	+	-
Oncocytoma	-	-	+	-/+	+	-	+	-/+
Urothelial Carcinoma	-	-	+	+	-	+	+/-	+/-

Reference

1. Argani P. Am J Clin Pathol. 2006; 126(3):332–334.
2. Argani P, et al. Am J SurgPathol. 2003; 27(6):750–761.
3. Argani P, et al. Clin Lab Med. 2005; 25(2):363–378.
4. Lazar AJ, et al. Histopatholo. 2009; 55:750–755.

A.MENARINI diagnostics



Thrombomodulin (1009)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
44398	Thrombomodulin RTU M (1009)	7 ml Ready To Use
44815	Thrombomodulin 0,1 M (1009)	100 µl liquid Concentrated
44816	Thrombomodulin 1 M (1009)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Bladder, Mesothelioma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

Product Description

Thrombomodulin (TM) is a transmembrane glycoprotein composed of 575 amino acids (molecular weight 75 kD) with natural anticoagulant properties. It is normally expressed by a restricted number of cells such as endothelial and mesothelial cells. In addition, synovial lining and syncytiotrophoblasts of human placenta also express TM. Several immunohistochemical endothelial markers are currently available and anti-thrombomodulin serves as another such marker, staining blood and lymphatic channels consistently. Anti-TM has demonstrated positivity in 100% of benign vascular tumors (pyogenic granuloma and hemangioma) and 94% of malignant vascular tumors (Kaposi's sarcoma, angiosarcoma, and epithelioid hemangioendothelioma). Hence, anti-TM serves as a sensitive marker for lymphatic endothelial cells and their tumors. There has also been recent interest in the use of anti-TM as an immunohistochemical marker for mesothelial cells and malignant mesotheliomas. Anti-TM is immunoexpressed in a variety of other tumors including squamous cell carcinomas of the lung, synovial sarcoma, transitional cell carcinoma, renal cell carcinomas, and thymomas.

Pleura: Adenocarcinoma vs. Mesothelioma

	Thrombo-modulin	Calretinin	CK 5&6	HBME-1	Caldesmon	CEA	TAG-72	Ep-CAM	E-cadherin	TTF-1
Adenocarcinoma	-	-	-	-	-	+	+	+	+	+
Mesothelioma	+	+	+	+	+	-	-	-	-	-

Squamous vs. Transitional Cell Carcinoma

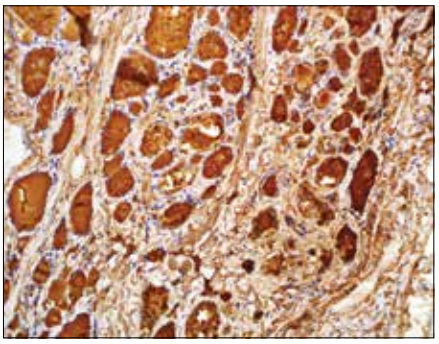
	Thrombo-modulin	CK, 34βE12	p63	CK 5	CK 7	CK 20	Uroplakin III
Squamous Carcinoma	+	+	+	+	-	-	-
Transitional Cell Carcinoma	+	+	+	-/+	+	+	+

Prostate Lesions

	Thrombo-modulin	PSA/PSAP	P504s	CK, 34βE12	p63	CK 7	Uroplakin III	PAX-2
Prostate Carcinoma	-	+	+	-	-	-	-	-
Urothelial Carcinoma	+	-	-	+	+	+	+	-
Nephrogenic Adenoma	-	-	+	+/-	-	+	-	+

Reference

1. Acebo E, et al. Histology and histopathology. 2001; 16:1031-6.
2. Appleton MAC, et al. Histopathology. 1996; 29:153-7.
3. Attanoos RL, et al. Histopathology. 1996; 29:209-15.
4. Attanoos RL, et al. Histopathology. 2001; 39:584-8.



Thyroglobulin (MRQ-41)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45263	IMPATH Thyroglobulin RTU M (MRQ-41)	50 Tests
44399	Thyroglobulin RTU M (MRQ-41)	7 ml Ready To Use
44817	Thyroglobulin 0,1 M (MRQ-41)	100 µl liquid Concentrated
44818	Thyroglobulin 1 M (MRQ-41)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Thyroid
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Thyroglobulin is the glycoprotein precursor of the iodinated thyroid hormones thyroxine (T4) and triiodothyronine (T3). Thyroglobulin is obtained from the thyroid gland and exhibits the general properties of the globulins. Human thyroglobulin (hTG) is a high molecular weight glycoprotein (605 kDa) found in the thyroid follicular cells. It plays a central role in the uptake, incorporation, and regulated biosynthesis of thyroid hormones.

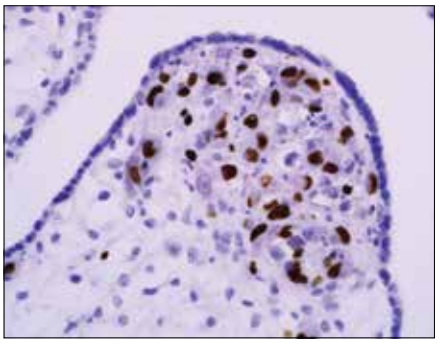
Anti-thyroglobulin reacts with human thyroglobulin as demonstrated by a single band of immunoblotting in a lysate of human thyroid tissue. The vast majority of follicular carcinomas of the thyroid will give positive immunoreactivity for anti-thyroglobulin even though sometimes only focally. Poorly differentiated carcinomas of the thyroid are frequently anti-thyroglobulin negative. Adenocarcinomas of other-than-thyroid origin do not react with this antibody. This antibody is useful in identification of thyroid carcinoma of the papillary and follicular types. Presence of thyroglobulin in metastatic lesions establishes the thyroid origin of tumor. Anti-thyroglobulin, combined with anti-calcitonin, can identify medullary carcinomas of the thyroid. Furthermore, anti-thyroglobulin, combined with anti-TTF1, can be a reliable marker to differentiate between primary thyroid and lung neoplasms.

Thyroid: Malignant vs. Benign

	Thyroglobulin	Calcitonin	CK 19	Galectin-3	TTF-1	HBME-1
Papillary Carcinoma	+	-	+	+	+	+
Follicular Carcinoma	+	-	-/+	+	+	+/-
Medullary Carcinoma	-	+	+/-	-	+	+
Benign Thyroid	+	-	-	-	+	-

Reference

1. Bejarano PA, et al. 2000 Sep; 8(3):189-94.
2. Bellet D, et al. J clin Endocrin Metab. 1983; 56:530-533.
3. Heffess CS, et al. Cancer. 2002 Nov; 195(9):1869-78.



Toxoplasma Gondii (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45266	IMPATH Toxoplasma Gondii RTU R (Poly) RUO	50 Tests
44402	Toxoplasma gondii RTU R (Poly) RUO	7 ml Ready To Use
44823	Toxoplasma gondii 0,1 R (Poly) RUO	100 µl liquid Concentrated
44824	Toxoplasma gondii 1 R (Poly) RUO	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cell Wall
Control Toxoplasma Gondii infected tissue
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

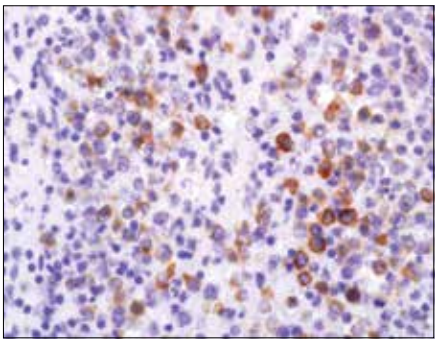
**Please refer to product insert for complete protocol.*

Product Description

Toxoplasma gondii is a spindle-to-oval-shaped protozoan which presents as an infection in humans. The cyst (30 um) and trophozoite (7 um) stages can be identified in humans in such cases. This intracellular parasite is transmitted via raw/ undercooked meat, contaminated soil, or by direct contact with an infected host. Infection in humans is usually associated with a variable degree of immunosuppression such as in pregnancy or immunosuppression due to various drugs. Anti-Toxoplasma gondii labels the trophoblasts of Toxoplasma gondii.

Reference

1. Bellet D, et al. J Clin Endocrin Metab. 1983; 56:530-533.
2. Heffess CS, et al. Cancer. 2002 Nov 1; 95(9):1869-78.
3. Bejarano PA, et al. Appl Immunohistochem Mol Morphol. 2000 Sep; 8(3):189-94.



TRAcP (9C5)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45267	IMPATH TRAcP RTU M (9C5)	50 Tests
44403	TRAcP RTU M (9C5)	7 ml Ready To Use
44825	TRAcP 0,1 M (9C5)	100 µl liquid Concentrated
44826	TRAcP 1 M (9C5)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Hairy Cell Leukemia
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2b}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Tartrate resistant acid phosphatase (TRAcP) is a basic, iron-binding protein with high activity towards phosphoproteins, ATP and 4 nitrophenyl phosphate. Expression of TRAcP is reported to be increased in the spleen and monocytes of individuals with Gaucher's disease, splenocytes and circulating white cells of individuals with hairy cell leukemia, spleens of individuals with Hodgkin disease, and the sera of individuals undergoing active bone turnover. Elevated levels are also reported to be associated with various B-cell and T-cell leukemias and lymphomas, placental decidual cells, syncytiotrophoblasts, and some macrophages distributed throughout maternal and embryonic tissues.

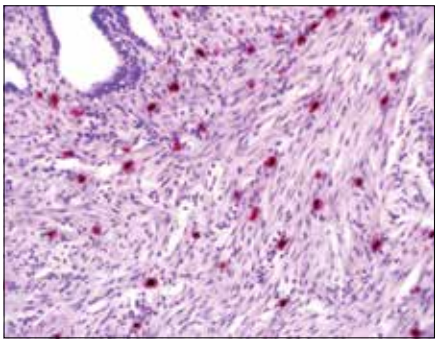
The histochemical identification of hairy cell leukemia via tartrate-resistant acid phosphatase assay has been a standard for over two decades. Anti-TRAcP labels the cells of hairy cell leukemia (HCL) with a high degree of sensitivity and specificity. Worthy also of mention in this regard are anti-annexin A1 and anti-CD11c. Other cells stained with anti-TRAcP are tissue macrophages and osteoclasts, which also express abundant TRAcP activity.

B-cell Lymphomas

	TRAcP	CD79a	BCL2	BCL6	CD10	CD23	Cyclin D1	CD5	IgD	MUM1
Follicular	-	+	+	+	+	-	-	-	+	-
CLL/SLL	-	+	+	-	-	+	-	+	+	+
Mantle Cell	-	+	+	-	-	-	+	+	+	-/+
Marginal Zone	+/-	+	+	-	-	-	-	-	-/+	+
Lymphoplasmacytic	-	+	+	-	-	-	-	-	-	+
Diffuse Large Cell	-	+	+	+	-/+	-	-	-/+	-	+
Burkitt	-	+	-	+	+	-	-	-	-	-
Hairy Cell Leukemia	+	+	+	-	-	-	+(weak)/-	-	-	

Reference

1. Janckila AJ, et al. Blood. 1995 May 15; 85(10):2839-44.
2. Yaziji H, et al. Am J Clin Pathol. 1995 Oct; 104(4):397-402.
3. Janckila AJ, et al. J Histochem Cytochem. 1996 Mar; 44(3):235-44.
4. Janckila AJ, et al. Hybridoma. 1997 Apr; 16(2):175-82.
5. Hoyer JD, et al. Am J Clin Pathol. 1997 Sep; 108(3):308-15.
6. Janckila AJ, et al. Biotech Histochem. 1998 Nov; 73(6):316-24.



Tryptase (G3)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45268	IMPATH Tryptase RTU M (G3)	50 Tests
44404	Tryptase RTU M (G3)	7 ml Ready To Use
44827	Tryptase 0,1 M (G3)	100 µl liquid Concentrated
44828	Tryptase 1 M (G3)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Uterus
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

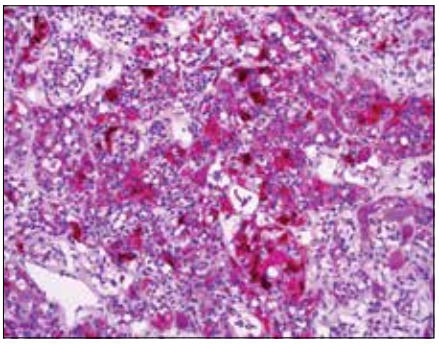
Tryptases comprise a family of trypsin-like serine proteases, the peptidase family S1. Tryptases are stored in mast cell secretory granules and basophils. These enzymes are released into the extracellular environment, and are resistant to all known endogenous proteinase inhibitors. Several tryptase genes are clustered on chromosome 16p13.3. There are two separate genes: alpha and beta 1. Beta tryptases appear to be the main isoenzymes expressed in mast cells whereas in basophils, alpha tryptases predominate. Tryptases have been implicated as mediators in the pathogenesis of asthma and other allergic and inflammatory disorders.

Anti-tryptase is a good marker for mast cells, basophils, and their derivatives. Mastocytosis is a term collectively used for a group of disorders in which there is abnormal accumulation of mast cells in one or multiple organs. Anti-tryptase, combined with anti-CD2, anti-CD25, and anti-CD117, can be useful in the differential diagnosis of reactive mast cell hyperplasia, myelogenous neoplasms, mast cell leukemia, and mastocytosis.

Mastocytosis					
	Tryptase	CD117	CD25	CD163	CD2
Systemic Mastocytosis	+	+	+	-	+
Mast Cell Leukemia	+	+	+	-	+
Reactive Mast Cells	+	+	-	+	-

Reference

1. Fiorucci L, Ascoli F. Cell Mol Life Sci. 2004 Jun; 61(11):1278-95.
2. Li CY. Leuk Res. 2001 Jul; 25(7):537-41.
3. Jordan JH, et al. Hum Pathol. 2001 May; 32(5):545-52.
4. Gordon LK, et al. Clin Immunol. 2000 Jan; 94(1):42-50.
5. Aoki M, et al. Int Arch Allergy Immunol. 2003 Mar; 130(3):216-23.
6. Roberts IS, Brenchley PE. J Clin Pathol. 2000 Nov; 53(11):858-62.
7. Ghott A, et al. Am J Surg Pathol. 2003 Jul; 27(7):1013-9.



TSH (Polyclonal)

Rabbit Polyclonal Antibody

Cat. No.	Description	Volume
45264	IMPATH TSH RTU R (Poly)	50 Tests
44400	TSH RTU R (Poly)	7 ml Ready To Use
44819	TSH 0,1 R (Poly)	100 µl liquid Concentrated
44820	TSH 1 R (Poly)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Pituitary
Stability Up to 36 mo. at 2-8°C

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

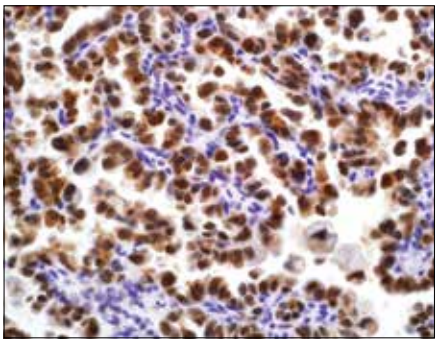
Thyroid-stimulating hormone (also known as TSH or thyrotropin) is a peptide hormone synthesized and secreted by thyrotrope cells in the anterior pituitary gland which regulate the endocrine function of the thyroid gland. TSH is a glycoprotein and consists of two subunits, the alpha and the beta subunit, which are non-covalently bound to one another. The alpha subunit of TSH is also present in two other pituitary glycoprotein hormones: Follicle stimulating hormone and luteinizing hormone and, in primates, in the placental hormone chorionic gonadotropin. Each of these hormones also has a unique beta subunit, which provides receptor specificity. In other words, TSH is composed of alpha subunit bound to the TSH beta subunit, and TSH associates only with its own receptor. Free alpha and beta subunits have essentially no biological activity.

Anti-TSH reacts with TSH-producing cells (thyrotrophs), and is a useful marker in classification of pituitary tumors and the differential identification of primary and metastatic tumors in the pituitary gland.

Pituitary Panel						
	TSH	ACTH	FSH	GH	LH	Prolactin
Pituitary	+	+	+	+	+	+

Reference

1. Batanero E, et al. Brain Behav Immun. 1992 Sep; 6(3):249-64.
2. Kovalic JJ, et al. J Neurooncol. 1993 Jun; 16(3):227-32.
3. Gessl A, et al. J Clin Endocrinol Metab. 1994 Oct; 79(4):1128-34.
4. Sanno N, et al. J Clin Endocrinol Metab. 1995 Aug; 80(8):2518-22.
5. La Rosa S, et al. virchows Arch. 2000 Sep; 437(3):264-9.
6. Kuauya N, et al. J Clin Endocrinol Metab. 1990 Nov; 71(5):1103-11.
7. Clore JN, et al. Am J Med Sci. 1988 Jan; 295(1):3-5.



TTF-1 (8G7G3/1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45265	IMPATH TTF-1 RTU M (8G7G3/1)	50 Tests
44401	TTF-1 RTU M (8G7G3/1)	7 ml Ready To Use
44821	TTF-1 0,1 M (8G7G3/1)	100 µl liquid Concentrated
44822	TTF-1 1 M (8G7G3/1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Lung Adenocarcinoma
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*
- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*
- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-TTF-1 (Thyroid Transcription Factor 1) is useful in differentiating primary adenocarcinoma of the lung from metastatic carcinomas originating in the breast, mediastinal germ cell tumors, and malignant mesothelioma. It can also be used to differentiate small cell lung carcinoma from lymphoid infiltrates. Loss of TTF-1 expression in non-small cell lung carcinoma has been associated with aggressive behavior of such neoplasms. TTF-1 labelling is also seen in thyroid malignancies.

Liver: Malignant vs. Benign

	TTF-1	Hep-Par1	Glypican-3	CD34	p53	AFP	A1AT	pCEA	mCEA
Hepatocellular Carcinoma	+ (cytoplasmic)	+	+	+	+	-/+	-/+	+	-
Hepatoblastoma	-	+	+	-	+	+	+	+	-
Benign Liver Nodules	+ (cytoplasmic)	+	-	-	-	-	+/-	-	-

Thyroid: Malignant vs. Benign

	TTF-1	Thyroglobulin	Calcitonin	CK 19	Galectin-3	HBME-1
Papillary Carcinoma	+	+	-	+	+	+
Follicular Carcinoma	+	+	-	-/+	+	+/-
Medullary Carcinoma	+	-	+	+/-	-	+
Benign Thyroid	+	+	-	-	-	-

Lung Small Cell Carcinoma vs. Merkel Cell Carcinoma

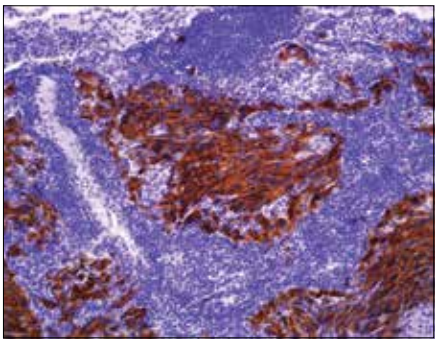
	TTF-1	CEA	CK 20	Chromo-granin A	E-cadherin	Neuro-filament	CD117	Synapto-physin
Merkel Cell Carcinoma	-	-	+	+(nuclear)	+	+	+	+
Lung Small Cell Carcinoma	+	-	-	-	-	-	+/-	+

Breast vs. Lung vs. Prostate Carcinoma

	TTF-1	GCDFP-15	Mammaglobin	PSA	Napsin A
Breast Carcinoma	-	+	+	-	-
Lung Carcinoma	+	-	-	-	+
Prostate Carcinoma	-	-	-	+	-

Reference

1. Ordonez NG. Appl Immunohistochem Mol Morphol. 2012; 20:429-44.



Tyrosinase (T311)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45157	IMPATH Tyrosinase RTU M (T311)	50 Tests
44405	Tyrosinase RTU M (T311)	7 ml Ready To Use
44829	Tyrosinase 0,1 M (T311)	100 µl liquid Concentrated
44830	Tyrosinase 1 M (T311)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Melanoma, Skin
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Tyrosinase is an enzyme, amongst a family of enzymes, which is involved in the biosynthesis of melanin. Anti-tyrosinase has been found to be quite specific for melanotic lesions such as malignant melanoma and melanotic neurofibroma. Essentially no carcinomas express this marker.

Melanotic Lesions

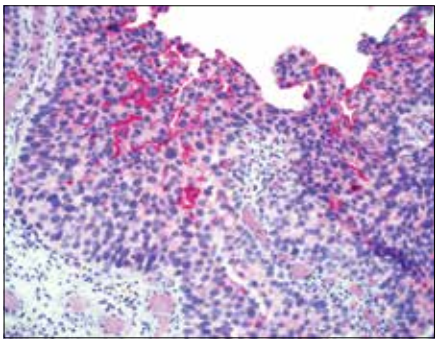
	Tyrosinase	S-100	SOX-10	HMB-45	MART-1	MiTF	CD63	Factor XIIIa	WT1	NGFR
Adult Melanocytes	+	+	+	-	+	+	+	-		
Junctional Nevus	+	+	+	+	+	+	-	-	+/-	
Interdermal Nevus	+	+	+	-	+	+	-	-	+/-	
Primary Melanoma	+	+	+	+	+	+	+	-		-
Metastatic Melanoma	+	+	+	+	+	+	+	-	+	-
Spindle Cell Melanoma	+	+	+	+	+	+	+	-	+	+
Angiomyolipoma	-	+	+	+	+	+	+	-		
Adrenal Cortical	-	+		-	+	-	-	-		
Intranodal Nevus Cells	+	+	+	-	+	+	-	-		
Dermatofibroma	-	-	-	-	-	-	-	+		

PEComa

	Tyrosinase	HMB-45	MART-1	CD63	S-100	SM Actin	Calponin	Caldesmon	Desmin	CD68
Angiomyolipoma	-	+	+	+	-	+	+	+	-	+
Lymphangiomyomatosis	-	+	+	+	-	+	+	+	-	-
Extrapulmonary Clear Cell Tumor	-	+	+	+	+	+	-	-	-	-
Primary Cutaneous PEComa	-	+	+	+	-	-	-	-	-	+/-
Pulmonary Clear Cell Sugar Tumor	-	+	+	+	+/-	-	-	-	-	+/-

Reference

1. Kaufmann O, et al. Mod Pathol. 1998 Aug; 11(8):740-6.
2. Busam KJ, et al. Am J Dermatopathol. 2000 Jun; 22(3):237-41.
3. Jungbluth AA, et al. Pathol Res Pract. 2000; 196(4):235-42.
4. Meije CB, et al. J Pathol. 2000 Apr; 190(5):572-8.
5. Busam KJ, et al. Am J Dermatopathol. 2000 Jun; 22(3):237-41.



Uroplakin III (AU-1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45691	IMPATH Uroplakin III RTU M (AU-1)	50 Tests
44406	Uroplakin RTU M (AU-1)	7 ml Ready To Use
44831	Uroplakin 0,1 M (AU-1)	100 µl liquid Concentrated
44832	Uroplakin 1 M (AU-1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Bladder
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Uroplakins (UPs) are a family of transmembrane proteins (UPs Ia, Ib, II and III) that are specific differentiation products of urothelial cells. In non-neoplastic mammalian urothelium, UPs are expressed in the luminal surface plasmalemma of superficial (umbrella) cells, forming complexes of 16 nm crystalline particles. Moll et al. reported that UPIII was detectable immunohistochemically in 29 of 55 primary (53%) and 23 of 35 metastatic (66%) urothelial carcinomas, whereas many non-urothelial carcinomas were UPIII-negative. The authors concluded that anti-UPIII should be a valuable marker, especially for the specific identification of urothelial carcinomas in patients with metastases of unknown primary site. Subsequently, Olsburgh et al. studied UP gene expression in normal urothelium and bladder cancer specimens, and found that expression was absent after malignant transformation. Ohtsuka et al. concluded in their studies that UPIII expression was strongly associated with lower tumor grades, that lack of UPIII expression in urothelial tumors of the upper urinary tract was associated with much higher rates of metastases, and that five-year specific survival was much worse for UPIII negative tumors (54%) than for UPIII positive tumors (100%). Apparently UPIII expression is a better indicator of the malignant potential of the tumor than the grade of the tumor.

Squamous vs. Transitional Carcinoma

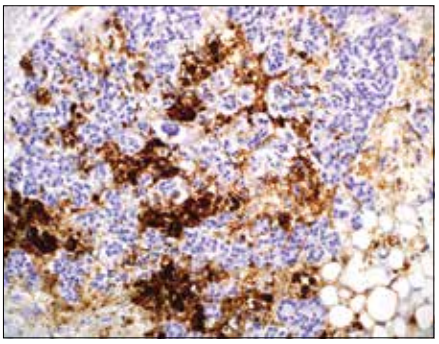
	Uroplakin III	CK, 34βE12	p63	CK 5	Thrombo-modulin	CK 7	CK 20
Squamous Carcinoma	-	+	+	+	+	-	-
Transitional Cell Carcinoma	+	+	+	-/+	+	+	+

Prostate Lesions

	Uroplakin III	PSA/PSAP	P504s	CK, 34βE12	p63	CK 7	Thrombo-modulin	PAX-2
Prostate Carcinoma	-	+	+	-	-	-	-	-
Urothelial Carcinoma	+	-	-	+	+	+	+	-
Nephrogenic Adenoma	-	-	+	+/-	-	+	-	+

Reference

1. Badalament RA, et al. J Urol. 1990; 144:859–63
2. Hall MC, et al. Urology. 1998; 52:594–601.
3. Logani S, et al. Am J Surg Pathol. 2003 Nov; 27(11):1434-41.
4. Moll R, et al. Am J Pathol. 1995; 147:1383–97.
5. Ohtsuka Y, et al. BJU Int. 2006 Jun; 97(6):1322-6.
6. Olsburgh J, et al. J Pathol. 2003; 199:41–9.



Varicella Zoster Virus (SG1-1, SG1-SG4, NCP-1 & IE-62)

Mouse Cocktail Antibody

Cat. No.	Description	Volume
45269	IMPATH Varicella Zoster Virus RTU M (Monocl CKT)	50 Tests
44407	Varicella-zoster virus RTU M (MONOCLONAL CKT)	7 ml Ready To Use
44833	Varicella-zoster virus 0,1 M (MONOCLONAL CKT)	100 µl liquid Concentrated
44834	Varicella-zoster virus 1 M (MONOCLONAL CKT)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Varicella Zoster Virus infected tissue
Stability Up to 36 mo. at 2-8°C
Isotype Mixed

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

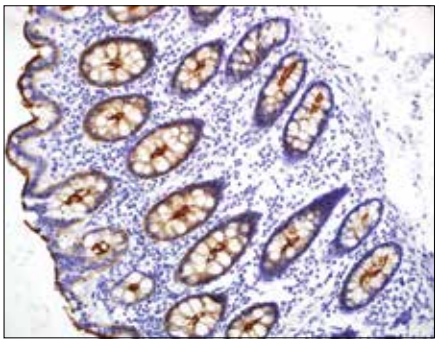
Product Description

Varicella zoster virus (VZV), a member of the human herpes virus family, causes two distinct clinical manifestations: Chickenpox and shingles. Primary VZV infection results in chickenpox (varicella), which may rarely result in complications including encephalitis or pneumonia. Even when clinical symptoms of chickenpox have resolved, VZV remains dormant in the nervous system (virus latency) in the trigeminal and dorsal root ganglia. In about 10%-20% of cases, VZV reactivates later in life producing a disease known as herpes zoster or shingles. Serious complications of shingles include postherpetic neuralgia, zoster multiplex, myelitis, herpes ophthalmicus, or zoster sine herpete.

VZV is closely related to the herpes simplex virus (HSV). Affected skin shares so many histological similarities that distinguishing between them may be difficult. Anti-VZV is directed against the VZV virus.

Reference

1. Kleinschmidt D, et al. J Neurol Sci. 1998 Aug 14; 159(2):213-8.
2. Kaye SB, et al. Br J Ophthalmol. 2000 Jun; 84(6):563-71.
3. A.F. Nikkels, et al. Virchows Archiv. 1993; 422:121-126.



Villin (CWWB1)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45158	IMPATH Villin RTU M (CWWB1)	50 Tests
44408	Villin RTU M (CWWB1)	7 ml Ready To Use
44835	Villin 0,1 M (CWWB1)	100 µl liquid Concentrated
44836	Villin 1 M (CWWB1)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic, Membranous
Control Colon
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Villin is a 95 kD glycoprotein of microvilli associated with rootlet formation in gastrointestinal mucosal epithelium. Anti-villin labels the brush border area in the gastrointestinal mucosal epithelium. This antibody has been useful in differentiating gastrointestinal adenocarcinoma, neuroendocrine carcinomas, and ovarian adenocarcinomas from adenocarcinomas of other organs. This antibody also labels Merkel cells of the skin.

Carcinomas

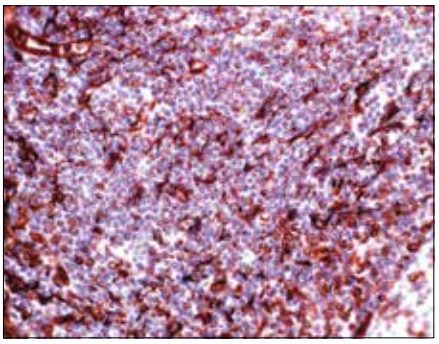
	Villin	Hep-Par1	CK 7	CK 20	pCEA	CK 5	p63	CD10	TTF-1	β-Catenin
Hepatocellular Carcinoma	-	+	-	-	+	-	-	+	+ (cytoplasmic)	-
Bladder Carcinoma	+	-	+	+	+	-	-	+	-	-
Salivary Gland Carcinoma	-	-	+	-	+	+	+			-
Lung Adenocarcinoma	-	-	+	-	+	-	-		+	-
Colorectal Adenocarcinoma	+	-	-	+	+	-	-	+	-	+
Prostate Adenocarcinoma	-	-	-	-	-	-	-	+	-	-
Cervical Carcinoma	-	-	+	-	+	-	-		-	-
Sweat Gland Carcinoma	-	-	+	-	+	+	+			-
Pancreatic Carcinoma	-	-	+	-	+	-	-	+/-	-	-
Gastric Carcinoma	+	-	+	-	+	-	-		-	-

Colon vs. Ovarian Carcinoma

	Villin	CK 7	CK 20	CEA	CDX-2	CA19-9	Ep-CAM	WT1	CA-125	CK 5&6
Ovarian Carcinoma, Serous	+	+	-	+	-	+	+	+	+	-
Ovarian Carcinoma, Mucinous	+	+	-	-	+	+	+	-	-	
Colon Carcinoma	+	-	+	+	+	+	+	-	-	-

Reference

1. Werling RW, et al. Am J Surg. Path. 2003; 27(3):303-310.
2. Jainyou T, et al. Hum Pathol. 29:390-396.
3. Goldstein NS, et al. Am J Clin Pathol. 116:319-325.
4. Lau SK, et al. Hum Pathol. 33:1175-1181.
5. Tamboli P, et al. Arch Pathol Lab Med. 2002; 126:1057-1063.
6. Zhang PJ, et al. Arch Pathol Lab Med. 1999; 123:812-816.



Vimentin (V9)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45159	IMPATH Vimentin RTU M (V9)	50 Tests
44409	Vimentin RTU M (V9)	7 ml Ready To Use
44837	Vimentin 0,1 M (V9)	100 µl liquid Concentrated
44838	Vimentin 1 M (V9)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Lymph Node, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP 2-step Polymer (Universal) or AP 2-step Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

Anti-vimentin is of limited value as a diagnostic tool; however, when used in combination with other antibodies (in panels) it is useful for the subclassification of a given tumor. Expression of vimentin, when used in conjunction with anti-keratin, is helpful when distinguishing melanomas from undifferentiated carcinomas and large cell lymphomas. All melanomas and Schwannomas react strongly with anti-vimentin. This antibody recognizes a 57 kD intermediate filament. It labels a variety of mesenchymal cells, including melanocytes, lymphocytes, endothelial cells, and fibroblasts. Non-reactivity of anti-vimentin is often considered more useful than its positive reactivity, since there are a few tumors that do not contain vimentin, e.g. hepatoma and seminoma. Anti-vimentin is also useful as a tissue process control reagent.

Small, Round Blue Cell Tumors

	Vimentin	MS Actin	PGP 9.5	Myogenin	CK Cocktail	CD99	FLI-1	CD57	WT1	INI-1
Leiomyosarcoma	+	+	-	-	-/+	-	-	+/-	-	
Rhabdomyosarcoma	+	-/+	+	+	-	-	-	-	-	+
Embryonal Carcinoma	-	-	+	-	+	-	-	+	-	+
PNET/ES	+	-	+	-	-/+	+	+	+	-	+
DSRCT	+	-	-	-	+	-	+	+/-	+	+

Kidney: Renal Epithelial Tumors

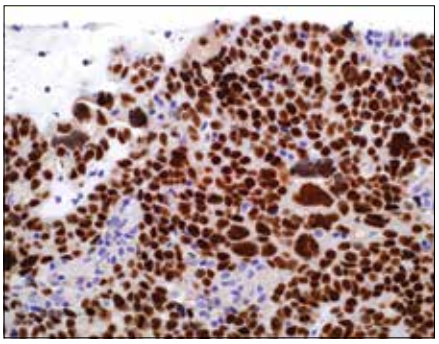
	Vimentin	RCC	CD10	PAX-2	Ksp-cadherin	Parvalbumin	CD117	Ep-CAM
Clear Cell RCC	+	+	+	+	-	-	-	-

CNS Tumors

	Vimentin	GFAP	NGFR	INI-1	S-100	CK Cocktail	PR	EMA
Astrocytoma	+	+	+	+	+	-	-	-
Glioblastoma	+	+	-	+	+	-	-	-
Oligodendriglioma	+	-	-	+	+	-	-	-
Ependymoma	-/+	+	+	+	+	-	-	-
Meningioma	+	-	-	+	-	-	+	+
Schwannoma	+	+	+	+	+	-	-	-

Reference

1. Ishii Y, et al. Clin Exp Immunol. 1984; 58:183-192.
2. Davey FR, et al. Am J Pathol. 1987; 129:54-63.
3. Lane EB, et al. Nature. 1983; 303:701-704.



WT1 (6F-H2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45270	IMPATH WT-1 RTU M (6F-H2)	50 Tests
44410	Wilms' Tumor RTU M (6F-H2)	7 ml Ready To Use
44839	Wilms' Tumor 0,1 M (6F-H2)	100 µl liquid Concentrated
44840	Wilms' Tumor 1 M (6F-H2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Nuclear
Control Kidney, Mesothelioma, Ovarian serous carcinoma, Testis
Stability Up to 36 mo. at 2-8°C
Isotype IgG_1/k

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

WT1 is a suppressor gene located on chromosome 11p13. Wilms' Tumor protein (WT1) has been identified in proliferative mesothelial cells, malignant mesothelioma, ovarian carcinoma, gonadoblastoma, nephroblastoma, and desmoplastic small round cell tumor. Lung adenocarcinomas rarely stain positive with this antibody.

Pleura: Adenocarcinoma vs. Mesothelioma

	WT1	Calretinin	CK 5	D2-40	HBME-1	Caldesmon	TAG-72	Ep-CAM	E-cadherin	TTF-1
Adenocarcinoma	-	-	-	-	-	-	+	+	+	+
Mesothelioma	+	+	+	+	+	+	-	-	-	-

Colon vs. Ovarian Carcinoma

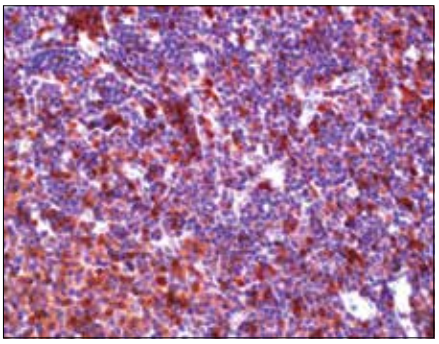
	WT1	CK 7	CK 20	CEA	CDX-2	Villin	CA19-9	Ep-CAM	CA-125	CK 5&6
Ovarian Carcinoma, Serous	+	+	-	+	-	+	+	+	+	-
Ovarian Carcinoma, Mucinous	-	+	-	-	+	+	+	+	-	
Ovarian Endometrioid Ca	-/+	+	-	-	-		+/-	+	+	-
Colon Carcinoma	-	-	+	+	+	+	+	+	-	-

Small, Round Blue Cell Tumors

	WT1	MS Actin	SM Actin	Myogenin	CK Cocktail	CD99	FLI-1	CD57	Vimentin	PGP 9.5
Lymphoblastic Lymphoma	-	-	-	-	-	+	+	-	+	
Leiomyosarcoma	-	+	+	-	-/+	-	-	+/-	+	-
Rhabdomyosarcoma	-	-/+	-/+	+	-	-	-	-	+	+
Neuroblastoma	-	-	-	-	-	-	-	+	+	+
Embryonal Carcinoma	-	-	-	-	+	-	-	+	-	+
PNET/ES	-	-	-	-	-/+	+	+	+	+	+
DSRCT	+	-	-	-	+	-	+	+/-	+	-

Reference

1. Tsuta K, et al. Appl Immunohistochem Mol Morphol. 2009; 17:126–130.
2. Marchevsky AM. Arch Pathol Lab Med. 2008; 132:397-401.
3. Ordonez NG. Am J Surg Pathol. 1998; 22:1203-1214.
4. Ordonez NG. Arch Pathol Lab Med. 2005; 129:1407–1414.



ZAP-70 (2F3.2)

Mouse Monoclonal Antibody

Cat. No.	Description	Volume
45271	IMPATH ZAP-70 RTU M (2F3.2)	50 Tests
44411	Zap-70 RTU M (2F3.2)	7 ml Ready To Use
44841	Zap-70 0,1 M (2F3.2)	100 µl liquid Concentrated
44842	Zap-70 1 M (2F3.2)	1 ml liquid Concentrated

Product Specifications

Designation IVD
Reactivity Paraffin
Visualization Cytoplasmic
Control Chronic lymphocytic leukemia/Small lymphocytic lymphoma, Tonsil
Stability Up to 36 mo. at 2-8°C
Isotype IgG_{2a}

Manual Protocol*

- Pretreatment: Heat Induced Epitope Retrieval (HIER)
- Primary Antibody Incubation Time: 10-30min @ 25-37°C
- 2-step polymer detection

**Please refer to product insert for complete protocol.*

ImPath Protocol*

- Dewax: Dewax Solution 2 (DS2)
- Pretreatment: Retrieval Solution pH 9.0 (TR1) 32min @ 98-103°C
- Primary Antibody Incubation Time: 10-90min @ 25-37°C
- HRP Polymer (Universal) or AP Polymer (Universal) for 12 min

**Please refer to product insert for complete protocol.*

Product Description

ZAP-70 is a 70 kD protein tyrosine kinase found in T-cells and natural killer cells. Control of this protein translation is via the IgVH gene. ZAP-70 protein is expressed in leukemic cells of approximately 25% of chronic lymphocytic leukemia (CLL) cases as well. Anti-ZAP-70 expression is an excellent surrogate marker for the distinction between the Ig-mutated (anti-ZAP-70 negative) and Ig-unmutated (anti-ZAP-70 positive) CLL subtypes and can identify patient groups with divergent clinical courses. The anti-ZAP-70 positive Ig-unmutated CLL cases have been shown to have a poorer prognosis.

B-cell Lymphomas

	ZAP-70	CD79a	BCL2	BCL6	CD10	CD23	Cyclin D1	CD5	MUM1	Annexin A1
Follicular	-	+	+	+	+	-	-	-	-	-
CLL/SLL	+/-	+	+	-	-	+	-	+	+	-
Mantle Cell	-	+	+	-	-	-	+	+	-/+	-
Marginal Zone	-	+	+	-	-	-	-	-	+	-
Lymphoplasmacytic	-	+	+	-	-	-	-	-	+	-
Diffuse Large Cell	-	+	+	+	-/+	-	-	-/+	+	-
Burkitt	-	+	-	+	+	-	-	-	-	-
Hairy Cell Leukemia	-	+	+	-	-	-	+(weak)/-	-		+

Reference

1. Wiestner A, et al. Blood. 2003 June 15; 101(12):4944-4951.
2. Crespo M, et al. N Engl J Med. 2003 May 1; 348(18):1764-1775.
3. Chen L, et al. Blood. 2002 Dec 15; 100(13):4609-14.

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† Rabbit Monoclonals Produced Using Technology from Epitomics, Inc. Under Patent No. 5,675,063

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