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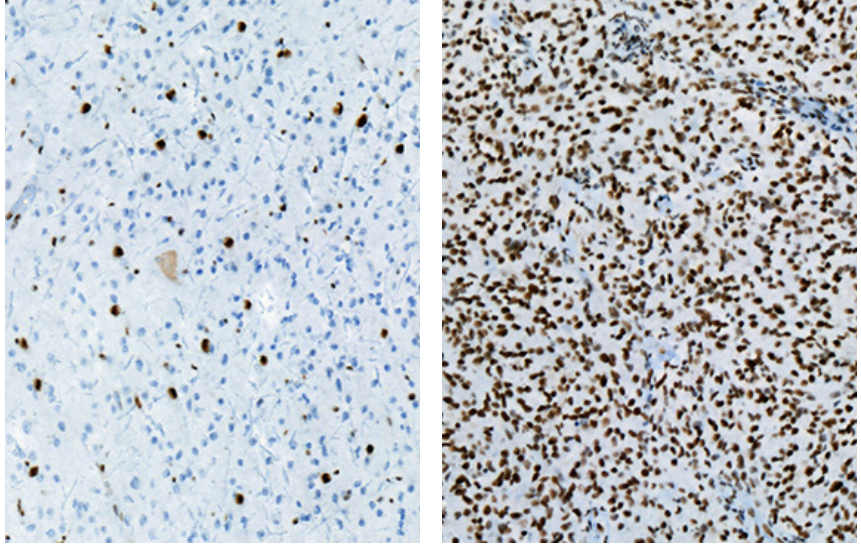
New Antibodies



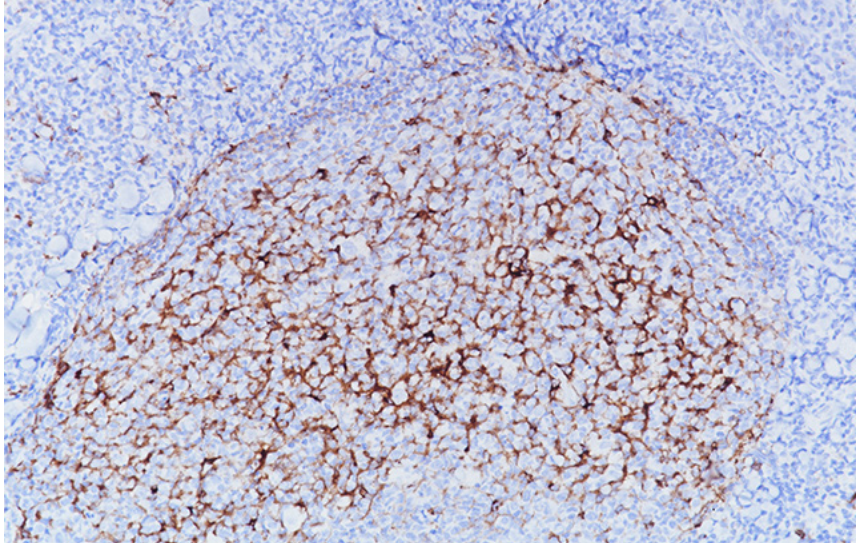
(A) Astrocytoma stained with ATRX antibody; (B) Glioblastoma stained with ATRX antibody

ATRX IVD

Clone	N/A
Isotype	IgG
Reactivity	Human; others not tested
Control	Normal Prostate
Catalog Number	ACI 3251 A, C; API 3251 AA

ATRX plays a role in chromatin regulation and maintenance of telomeres. It regulates incorporation of histone H3.3 into telomeric chromatin.[1] ATRX is also a major component of various essential cellular pathways such as DNA replication and repair, chromatin higher-order structure regulation, gene transcriptional regulation, etc.[2] ATRX loss was observed in grades II/III astrocytomas, oligoastrocytomas, oligodendrogliomas, and glioblastomas. In grades II/III gliomas, most ATRX- loss cases had IDH1/2 mutations.[3] ATRX mutations accompanied by an alternative lengthening of telomeres (ALT), impacted favorable survival of patients with astrocytic tumors.[4] Assessment of ATRX loss by immunohistochemical staining captures the majority of mutations, indicating that the use of immunohistochemical testing in routine neuropathology diagnostics gives a reasonable sensitivity.[5] ATRX mutation is also detected in neuroblastoma, osteosarcoma, and pancreatic neuro-endocrine tumors.[6]

1. Lu HC, et al. Aberrant ATRX protein expression is associated with poor overall survival in NF1-MPNST. Oncotarget. 2018 May; 9:23018-28. 2. Haase S, et al. Mutant ATRX: uncovering a new therapeutic target for glioma. Expert Opin Ther Targets. 2018 Jul;22(7):599-613. 3. Ikemura M, et al. Utility of ATRX immunohistochemistry in diagnosis of adult diffuse gliomas. Histopathology. 2016 Aug;69(2):260-7. 4. Cai J, et al. Detection of ATRX and IDH1-R132H immunohistochemistry in the progression of 211 paired gliomas. Oncotarget. 2016 Mar;7(13):16384- 95. 5. Cai J, et al. ATRX, IDH1-R132H and Ki-67 immunohistochemistry as a classification scheme for astrocytic tumors. Oncoscience. 2016 Sep ;3(7- 8):258-65. 6. Koschmann C, et al. ATRX loss promotes tumor growth and impairs nonhomologous end joining DNA repair in glioma. Sci Transl Med. 2016 Mar;8(328):328ra28. 7. Center for Disease Control Manual. Guide: Safety Management, NO. CDC22, Atlanta, GA. April 30, 1976 “Decontamination of Laboratory Sink Drains to Remove Azide Salts.” 8. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



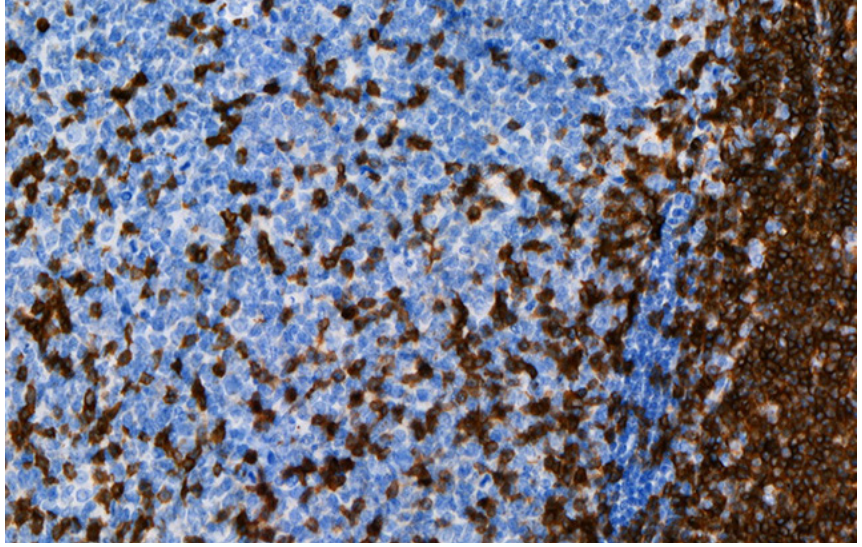
Tonsil stained with CD137 [BLR051F] antibody

CD137 [BLR051F] IVD

Clone	BLR051F
Isotype	IgG
Reactivity	Human; others not tested
Control	Tonsil
Catalog Number	ACI 3264 A, C; API 3264 AA

CD137 (4-1BB), or tumor necrosis factor receptor superfamily member 9 (TNFRSF9), is a promising target for enhancing antitumor immune responses without the autoimmune side effects associated with immunotherapy approaches.[1] CD137 signaling plays a significant role in multiple cells and regulates the activity of many immune cells. It can activate CD8+ T cells, induce cytokine release, and increase Cytotoxic T lymphocyte (CTL) activity. The selective expression of CD137 on cells of the immune system and oncogenic cells in several types of cancers including breast, melanoma and lymphoma leads CD137 to be an attractive target for cancer immunotherapy. Anti-CD137 or anti-CD137L (the ligand of CD137) targeted immunotherapy has been extensively studied, seeking to enhance anticancer immune responses.[2] Specific antibodies against CD137 are currently in clinical trials aiming to activate and enhance anti-cancer immune responses as well as suppress oncogenic cells.[3]

1. Yonezawa A, et al. Boosting cancer immunotherapy with anti-CD137 antibody therapy. Clin Cancer Res. 2015 Jul 15;21(14):3113-20. 2. Ye L, Jia K, Wang L, et al. CD137, an attractive candidate for the immunotherapy of lung cancer. Cancer Sci. 2020;111(5):1461-1467. 3. Chu DT, Bac ND, Nguyen KH, et al. An Update on Anti-CD137 Antibodies in Immunotherapies for Cancer. Int J Mol Sci. 2019;20(8):1822. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 “Decontamination of Laboratory Sink Drains to Remove Azide Salts.” 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



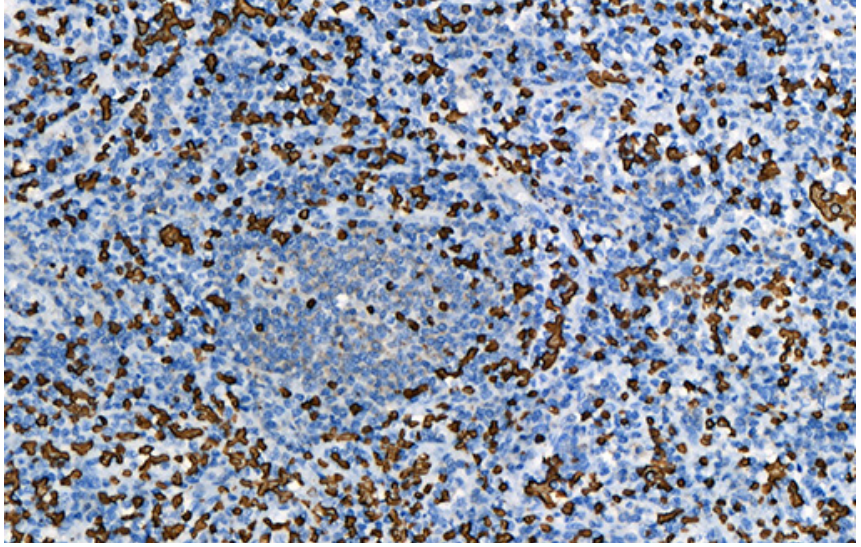
Tonsil stained with CD247 [BL-336-1B2] antibody

CD247 [BL-336-1B2] IVD

Clone	BL-336-1B2
Isotype	IgG
Reactivity	Human; others not tested
Control	Tonsil
Catalog Number	ACI 3268 A, C; API 3268 AA

CD247 is a 16-kDa T-cell surface glycoprotein, also known as CD3 zeta-chain or T-cell antigen receptor (TCR)-Z, which constitutes part of the TCR complex. CD247 is a crucial molecule in the structure, expression, and function of TCR and natural killer (NK) cell-activating receptors. When CD247 is downregulated, T-cell responsiveness, and proliferative capacity will be altered.[1] CD247 staining was observed in various proportions of tumor cells and tumor-infiltrating lymphocytes (TILs), localized in the cytoplasm. Reduced levels of CD247 in both TILs and peripheral blood lymphocytes are associated with many cancers including gastric carcinoma, head and neck cancer, B-cell lymphoma and renal carcinoma. CD247 plays an important role in signal transduction and may be used as a biomarker for evaluating the status of the immune system.[2,3] Studies suggest that CD247 may be a therapeutic target for ovarian cancer treatment.[1]

1. Ye W, Zhou Y, Xu B, et al. CD247 expression is associated with differentiation and classification in ovarian cancer. Medicine (Baltimore). 2019;98(51): e18407. 2. Tartour E, Latour S, Mathiot C, et al. Variable expression of CD3-- chain in tumor- infiltrating lymphocytes (TIL) derived from renal- cell carcinoma: Relationship with TIL phenotype and function. Int. J. Cancer.1995; 63: 205-212. 3. Wang Q, Li P, Wu W. A systematic analysis of immune genes and overall survival in cancer patients. BMC Cancer. 2019;19(1):1225. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



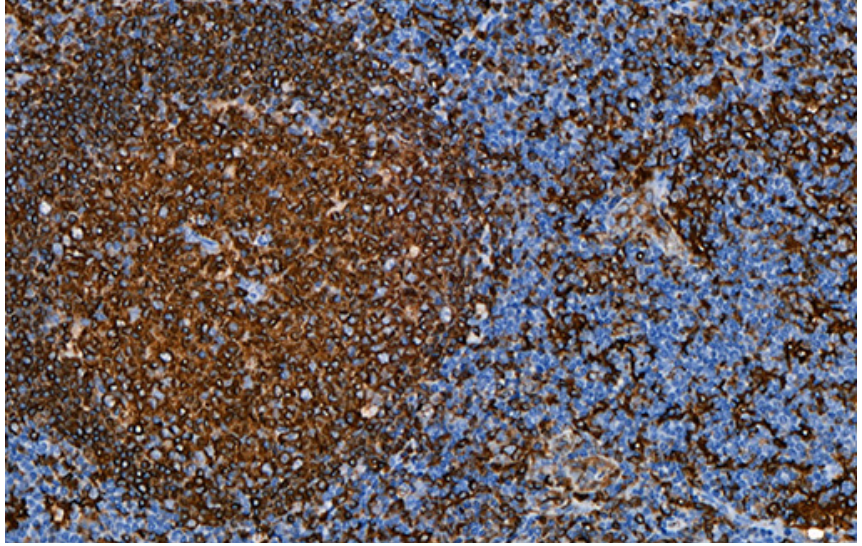
Spleen stained with Glycophorin A [JC159] antibody

Glycophorin A [JC159] IVD

Clone	JC159
Isotype	IgG
Reactivity	Human; others not tested
Control	Spleen
Catalog Number	ACI 3272 A, C; API 3272 AA; OPAI 3272 T60; ALI 3272 G7; AVI 3272 G

Glycophorin A, which is the major membrane sialoglycoprotein of human red cells and their precursors, is a specific and early marker for the normal erythroid lineage.[15] Glycophorin A is expressed at all stages of erythroid differentiation that includes both nucleated and non-nucleated stages of differentiation. Glycophorin A is a very important diagnostic marker of acute erythroid leukemia, being positive in many cases. In approximately 10% of adult acute leukemias the blasts that are classified as lymphoid or undifferentiated myeloid express glycophorin-A on their surface membrane.[16,17]

1. Kiernan JA. Histological and Histochemical Methods: Theory and Practice. New York: Pergamon Press 1981 2. Sheehan DC and Hrapchak BB. Theory and Practice of Histotechnology. St. Louis: C.V. Mosby Co. 1980 3. Clinical Laboratory Improvement Amendments of 1988: Final Rule, 57 FR 7163, February 28, 1992. 4. Shi S-R, Cote RJ, Taylor CR. J Histotechnol. 1999 Sep;22(3):177-92. 5. Taylor CR, et al. Biotech Histochem. 1996 Jan;71(5):263-70. 6. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 7. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014. 8. CLSI Quality Standards for Design and Implementation of Immunohistochemistry Assays; Approved Guideline-Second edition (I/LA28-A2) CLSI Wayne, PA USA (www.clsi.org). 2011 9. College of American Pathologists (CAP) Certification Program for Immunohistochemistry. Northfield IL. Http://www.cap.org (800)



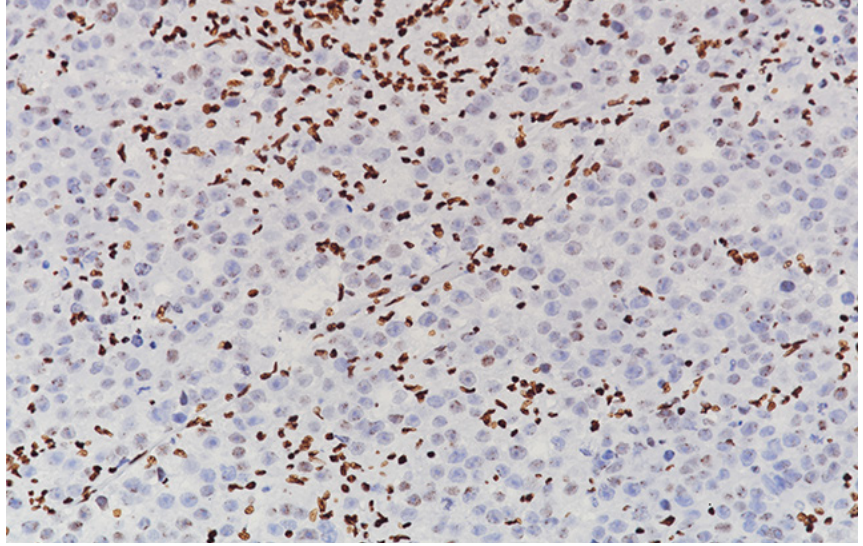
Tonsil stained with HLA-DR [TAL 1B5] antibody

HLA-DR [TAL 1B5] IVD

Clone	BL-336-1B2
Isotype	IgG1
Reactivity	Human; others not tested
Control	Tonsil
Catalog Number	ACI 3273 A, C; API 3273 AA; OPAI 3273 T60; ALI 3273 G7; AVI 3273 G

HLA-DR (Human Leukocyte Antigen – DR isotype) is a major histocompatibility complex (MHC) class II antigen presentation molecule, critical for the activation of lymphocytes and the coordinating of adaptive immune responses. HLA DR antigen is required for tumor associated antigen recognition by CD4+ T cells. It is normally expressed on antigen-presenting cells including monocytes, macrophages, dendritic cells and B cells, but expression can be induced on epithelial cells and tumor cells in response to inflammatory conditions.[15,16]

1. Kiernan JA. Histological and Histochemical Methods: Theory and Practice. New York: Pergamon Press 1981 2. Sheehan DC and Hrapchak BB. Theory and Practice of Histotechnology. St. Louis: C.V. Mosby Co. 1980 3. Clinical Laboratory Improvement Amendments of 1988: Final Rule, 57 FR 7163, February 28, 1992. 4. Shi S-R, Cote RJ, Taylor CR. J Histotechnol. 1999 Sep;22(3):177-92. 5. Taylor CR, et al. Biotech Histochem. 1996 Jan;71(5):263-70. 6. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 7. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014. 8. CLSI Quality Standards for Design and Implementation of Immunohistochemistry Assays; Approved Guideline-Second edition (I/LA28-A2) CLSI Wayne, PA USA (www.clsi.org). 2011 9. College of American Pathologists (CAP) Certification Program for Immunohistochemistry. Northfield IL. Http://www.cap.org (800)



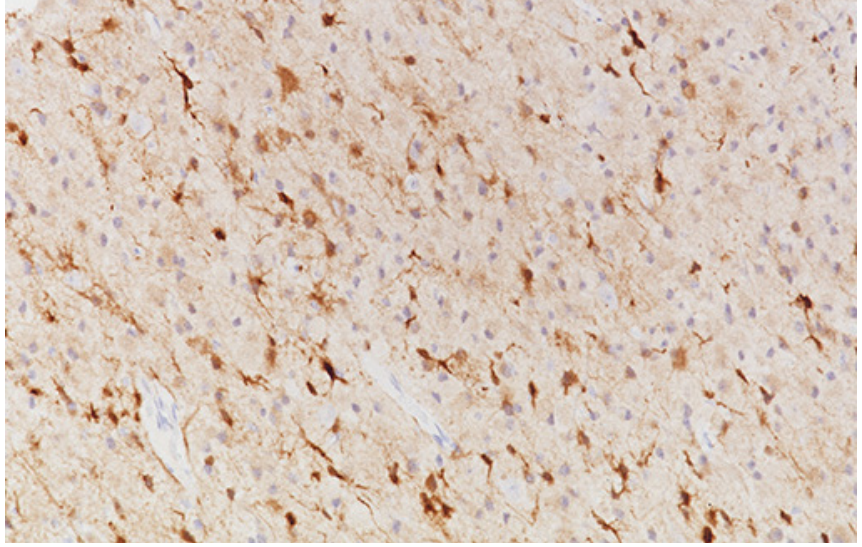
Ovarian cancer stained with H3K27me3 [C36B11] antibody

H3K27me3 [C36B11] IVD

Clone	C36B11
Isotype	IgG
Reactivity	Human; others not tested
Control	Ovarian cancer
Catalog Number	ACI 3249 A, C; API 3249 AA; OPAI 3249 T60; AVI 3249 G; ALI 3249 G7

H3K27me3 (histone 3 lysine 27 trimethylation) is an epigenetic mark that plays a critical role in regulation of gene expression. The dysregulation of H3K27me3 is implicated in the genesis and progression of cancer. Studies indicate that H3K27me3 plays a role in the creation and maintenance of cell type-specific programs of transcriptional control for a wide variety of species and cell fates.[1] H3K27me3 expression was shown to be a significant prognostic indicator in breast, ovarian and pancreatic cancers. Low expression of H3K27me3 correlated with significantly shorter overall survival time compared to individuals with high H3K27me3 expression.[2] H3K27me3 may be a useful marker in diagnosing malignant peripheral nerve sheath tumors (MPNSTs) and providing molecular insight in progression of prostate cancer.[3,4]

1. Arthur RK, et al. Evolution of H3K27me3-marked chromatin is linked to gene expression evolution and to patterns of gene duplication and diversification. Genome Res. 2014 July; 24:1115-24. 2. Wei Y, et al. Loss of trimethylation at lysine 27 of histone H3 is a predictor of poor outcome in breast, ovarian, and pancreatic cancers. Mol Carcinog. 2008 Sep; 47(9):701-06. 3. Prieto-Granada CN, et al. Loss of H3K27me3 Expression Is a Highly Sensitive Marker for Sporadic and Radiation-induced MPNST. Am J Surg Pathol. 2016 Apr; 40(4):479-89. 4. Ngollo M, et al. Global Analysis of H3K27me3 as an Epigenetic Marker in Prostate Cancer Progression. BMC Cancer. 2017; 17:261. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



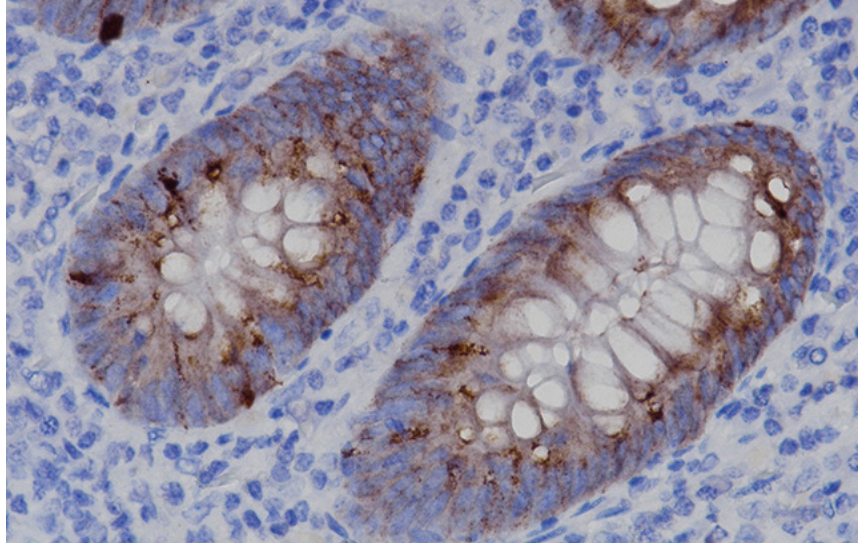
Astrocytoma stained with IDH1 R132H [IHC132] antibody

IDH1 R132H [IHC132] IVD

Clone	IHC132
Isotype	IgG1
Reactivity	Human; others not tested
Control	Astrocytoma
Catalog Number	ACI 3253 A, C; API 3253 AA

Isocitrate dehydrogenase 1 (IDH1) is an enzyme that catalyzes the oxidative decarboxylation of isocitrate to alpha-ketoglutarate, producing NADPH.[1] However, abnormal IDH1 caused by somatic missense mutations may occur when substitution from arginine to histidine at codon 132 (IDH1 R132H) inhibits the wild-type IDH1 enzymatic activity, leading to production of 2-hydroxyglutarate, a possible oncometabolite. The accumulated oncometabolite promotes formation and malignant progression of gliomas.[2] IDH1 R132H detection by immunohistochemistry can be used for the diagnostic differentiation between grade II/III gliomas, secondary glioblastomas and primary glioblastomas. The IDH1 R132H mutation correlates with a positive clinical outcome in patients with astrocytic tumors. Recently, studies indicated that IDH mutations along with ATRX status, and in combination with other classical biomarkers, helped refine the molecular classification of adult gliomas, providing a prognostic tool for clinicians.[3] Data indicate that IDH1 R132H expression could be used as a predictive marker of prognosis for patients with gastrointestinal cancer.[1]

1. Li J, Huang, et al. Decreased expression of IDH1-R132H correlates with poor survival in gastrointestinal cancer. Oncotarget 2016 Nov; 8;7(45): 73638-50. 2. Newton H. Handbook of Brain Tumor Chemotherapy, Molecular Therapeutics and Immunotherapy (Second Edition). 2018: 557-68. 3. Cai J, et al. ATRX, IDH1-R132H and Ki-67 immunohistochemistry as a classification scheme for astrocytic tumors. Oncoscience. 2016 Sep; 3(7-8):258-65. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



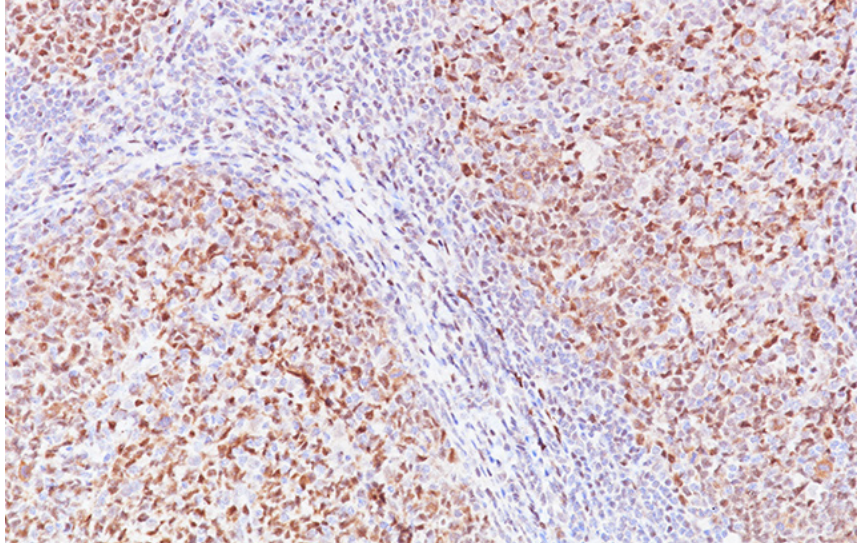
Appendix stained with IFNG [IFNG/3996R] antibody

IFNG [IFNG/3996R] IVD

Clone	IFNG/3996R
Isotype	IgG
Reactivity	Human; others not tested
Control	Appendix, Thyroid
Catalog Number	ACI 3264 A, C; API 3264 AA

Interferon-gamma (IFNG) is a cytokine secreted predominantly by activated lymphocytes such as CD4 T helper type 1 (Th1) cells and CD8 cytotoxic T cells, natural killer cells, B cells, and antigen-presenting cells. IFNG expression is induced by mitogens and cytokines.[1] The downstream target genes of IFNG signaling pathway regulate several biological functions, including cell cycle, apoptosis, and inflammation.[2] In adaptive immunity, IFNG directly regulates the differentiation, activation, and homeostasis of Th1 cells; inhibits Th2 cell development; promotes regulatory T cell development and natural killer cell activity; and induces class I MHC expression.[3]

1. Castro F, Cardoso AP, Gonçalves RM, et al. Interferon-gamma at the crossroads of tumor immune surveillance or evasion. Front Immunol. 2018; 9:847. 2. Zaidi MR. The interferon-gamma paradox in cancer. J Interferon Cytokine Res. 2019;39(1):30-38. 3. Benci JL, Johnson LR, Choa R, et al. Opposing functions of interferon coordinate adaptive and innate immune responses to cancer immune checkpoint blockade. Cell. 2019;178(4):933-948. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



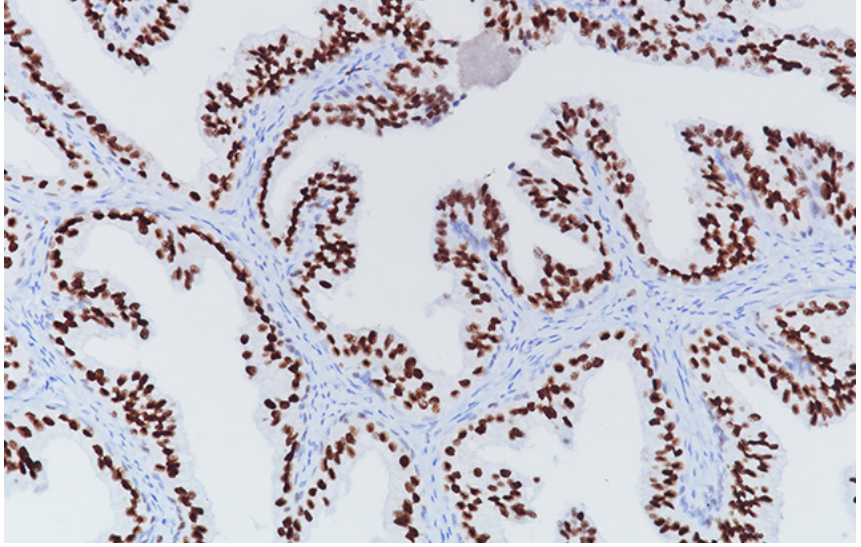
Tonsil stained with LMO2 [SP51] antibody

LMO2 [SP51] IVD

Clone	BL-336 SP51-1B2
Isotype	IgG
Reactivity	Human; others not tested
Control	Tonsil or Lymphoma
Catalog Number	ACI 3262 A, C; API 3262 AA

LMO2 is part of the LIM-only family of proteins which has four members (LMO1-4) that are implicated in a variety of cancers. LMO2 is linked to diffuse large B cell lymphoma (DLBCL) and prostate cancer.[1] LMO2 protein is a nuclear marker, expressed in normal germinal-center (GC) B cells and in a subset of GC-derived B-cell lymphomas. LMO2 is also expressed in bone marrow hematopoietic precursors and endothelial cells.[2] By immunohistochemistry (IHC) staining, LMO2 displays a crisp nuclear localization that allows for easier interpretation of the stain on paraffin sections in comparison to the diffuse cytoplasmic staining pattern of Human Germinal center Associated Lymphoma (HGAL).[3] LMO2 serves as one of the best prognostic markers of longer survival following immunochemotherapy for DLBCL patients. Additionally, LMO2 expression in DLBCL cells results in genomic instability, which suggests that LMO2 may affect DNA repair efficiency and potentially exploited as a biomarker to stratify patients for therapy.[4]

1. Sewell H, et al. Conformational flexibility of the oncogenic protein LMO2 primes the formation of the multi-protein transcription complex. Sci Rep. 2014;4:3643. 2. Natkunam Y, et al. The oncoprotein LMO2 is expressed in normal germinal-center B cells and in human B-cell lymphomas. Blood. 2007;109(4):1636-42. 3. Younes SF, et al. Immunoarchitectural patterns in follicular lymphoma: efficacy of HGAL and LMO2 in the detection of the interfollicular and diffuse components. The American Journal of Surgical Pathology. 2010 Sep;34(9):1266-76. 4. Parvin S, et al. LMO2 Confers Synthetic Lethality to PARP Inhibition in DLBCL. Cancer Cell. 2019;36(3):237-49. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



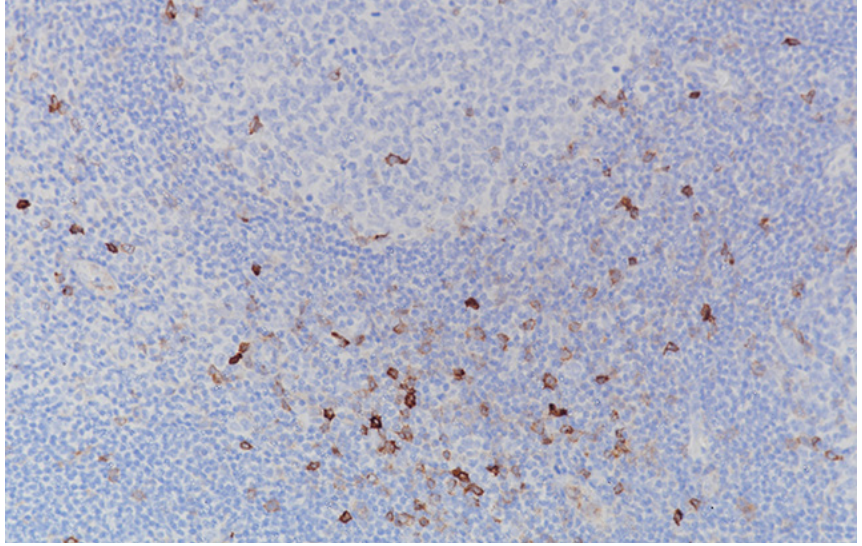
Prostate cancer stained with NKX3.1 [D2Y1A] antibody

NKX3.1 [D2Y1A] IVD

Clone	D2Y1A
Isotype	IgG
Reactivity	Human; others not tested
Control	Normal prostate or prostate cancer
Catalog Number	ACI 3260 A, B; API 3260 AA; AVI 3260 G

NKX3.1 is located in chromosome 8p and encodes a homeodomain transcription factor whose expression is largely restricted to the prostate and controlled by the androgen hormone.[1] Loss of function of NKX3.1 results in human prostrate carcinoma and prostatic intraepithelial neoplasia (PIN). NKX3.1 stains nuclei in both normal and prostate cancer providing a robust stain that is easy to interpret.[2] Studies show that NKX3.1 is highly sensitive and specific for high-grade prostatic adenocarcinoma and highly sensitive for metastatic prostatic adenocarcinoma. The sensitivity for identifying metastatic prostatic adenocarcinomas overall was 98.6% (68/69 cases positive) for NKX3.1 compared to 94.2% (65/69 cores positive) for PSA. In the appropriate clinical setting, the addition of IHC staining for NKX3.1, along with other prostate-restricted markers, may help to definitively determine prostatic origin in poorly differentiated metastatic carcinomas.[3]

1. He WW, et al. A novel human prostate-specific, androgen-regulated homeobox gene (NKX3.1) that maps to 8p21, a region frequently deleted in prostate cancer. Genomics. 1997; 43 (1):69–77. 2. Le Magnen C, et al. Cooperation of loss of NKX3.1 and inflammation in prostate cancer initiation. Dis Model Mech. 2018;11(11). 3. Gurel B, et al. NKX3.1 as a marker of prostatic origin in metastatic tumors. Am J Surg Pathol. 2010;34(8):1097-1105. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



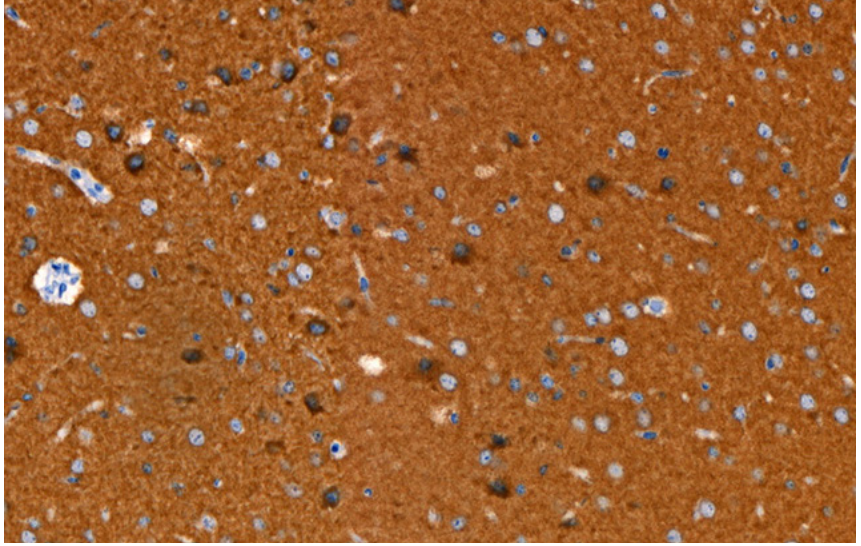
Tonsil stained with OX40/CD134 antibody

OX40/CD134 IVD

Clone	EPR23001-88
Isotype	IgG
Reactivity	Human; others not tested
Control	Tonsil
Catalog Number	ACI 3245 A, C; API 3245 AA; AVI 3245 G

The OX40 receptor, also known as CD134, is a tumor necrosis superfamily receptor (TNSFR4) that is recognized as a costimulatory receptor for T cells. OX40 is predominantly expressed on activated CD4 T cells. OX40 has been shown to be essential for the regulation, differentiation, and survival of conventional CD4 and CD8 T cells.[1] Multiple studies have demonstrated that activation of the OX40 receptor via ligand or agonist (antibody) binding enhances T cell-mediated antitumor immunity.[2-4] Based on its critical co-stimulatory role in T-cell based anti-tumor immunity, OX40 has been identified as a promising therapeutic target in late stage cancers. Additional studies have suggested the utility of combination therapies involving OX40 activation in conjunction with CTLA-4 or PD-1 suppression: enabling the proliferation of T-cells while removing the suppressive action of "immune checkpoint inhibitors".[3,4]

1. Toennies HM, et al. Expression of CD30 and Ox40 on T lymphocyte subsets is controlled by distinct regulatory mechanisms. J Leukoc Biol. 2004 Feb;75(2):350-7. 2. Curti BD, et al. OX40 is a potent immune-stimulating target in latestage cancer patients. Cancer Res. 2013 Dec 15; 73(24):7189-98. 3. Linch SN, et al. OX40 Agonists and Combination Immunotherapy: Putting the Pedal to the Metal. Front Oncol. 2015; 5:34. 4. Jeong S, Park SH. Co-Stimulatory Receptors in Cancers and Their Implications for Cancer Immunotherapy. Immune Netw. 2020 Feb; 20(1):e3. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



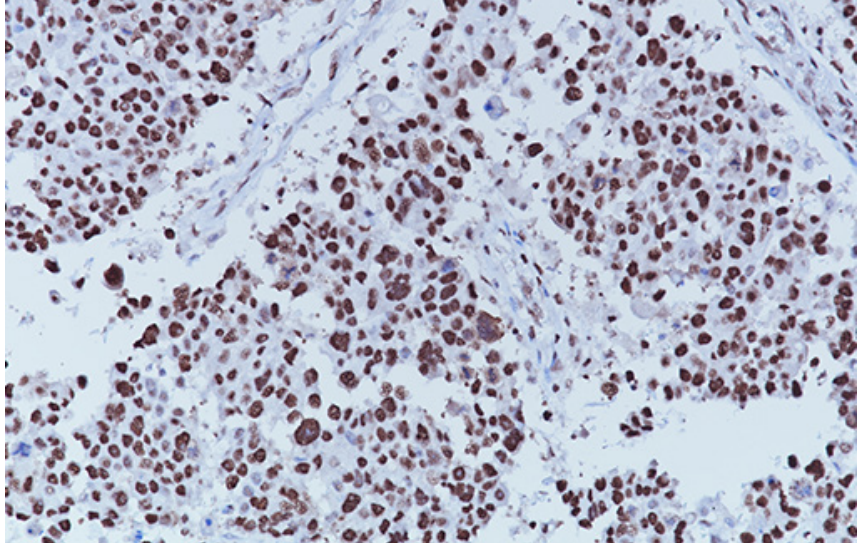
Brain stained with Pan TRK [RM423] antibody

Pan TRK [RM423] IVD

Clone	RM423
Isotype	IgG
Reactivity	Human; others not tested
Control	Brain
Catalog Number	ACI 3267 A, C; API 3267 AA; OPAI 3267 T60; AVI 3267 G; ALI 3267 G7

Neurotrophic tyrosine receptor kinase (NTRK) proto-oncogenes NTRK1, NTRK2, and NTRK3 (that encode TRK A, TRK B, and TRK C proteins, respectively) may form gene fusions through their kinase domains, driving tumor development.[1] TRK A is activated by nerve growth factor (NGF), TRK B by brain-derived neurotrophic factor (BDNF) or neurotrophin-4 (NT-4), and TRK C by neurotrophin3 (NT-3).[2] NTRK fusions are characteristic of a few rare types of cancer, such as secretory carcinoma of the breast or salivary gland and infantile fibrosarcoma, but they are also infrequently seen in some common cancers, such as melanoma, glioma and carcinomas of the thyroid, lung and colon.[3,4] Pan TRK immunohistochemical staining to detect NTRK fusions has become increasingly important as TRK inhibitors, Larotrectinib and Entrectinib, have received regulatory approval and have demonstrated a high response rate in patients with NTRK fusions.[3,5]

1. Hechtman JF, Benayed R, Hyman DM, et al. Pan-Trk immunohistochemistry is an efficient and reliable screen for the detection of NTRK fusions. Am J Surg Pathol. 2017;41(11):1547-1551. 2. Cocco E, Scaltriti M, Drilon A. NTRK fusion-positive cancers and TRK inhibitor therapy. Nat Rev Clin Oncol. 2018;15(12):731-747. 3. Solomon JP, Linkov I, Rosado A, et al. NTRK fusion detection across multiple assays and 33,997 cases: diagnostic implications and pitfalls. Mod Pathol. 2020;33(1):38-46. 4. Solomon JP, Benayed R, Hechtman JF, Ladanyi M. Identifying patients with NTRK fusion cancer. Ann Oncol. 2019;30(Suppl_8): viii16-viii22. 5. Drilon A. TRK inhibitors in TRK fusion-positive cancers. Ann Oncol. 2019;30(Suppl_8): viii23-viii30. 6. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 7. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



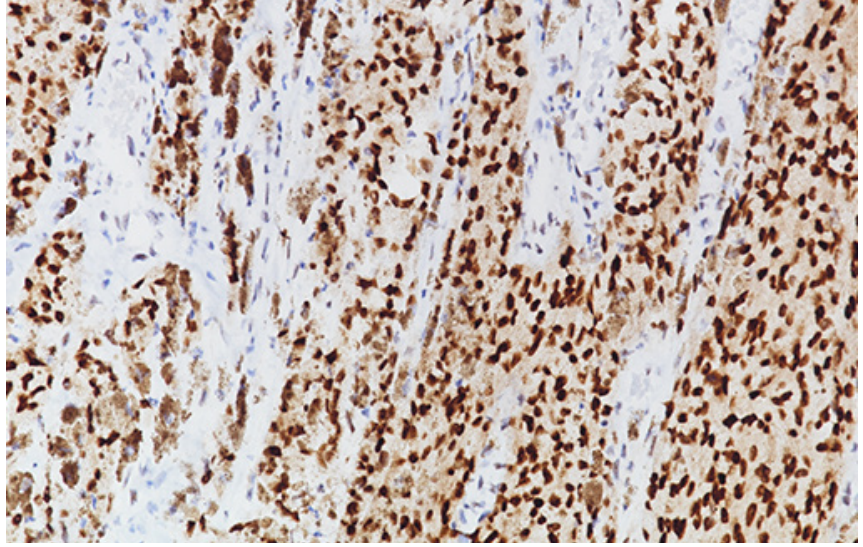
Breast carcinoma stained with PCNA [PC10] antibody

PCNA [PC10] IVD

Clone	PC10
Isotype	IgG2a/kappa
Reactivity	Human; others not tested
Control	Breast cancer and prostate cancer
Catalog Number	ACI 3255 A, C; API 3255 AA; AVI 3255 G

Proliferating cell nuclear antigen (PCNA) is necessary for DNA synthesis and is an accessory protein for DNA polymerase alpha, which is elevated during the G1/S phase of the cell cycle. PCNA forms a ring around a portion of DNA, serving to anchor the various DNA replication and repair proteins and to regulate proliferation throughout the cell cycle. In staining applications, the PCNA antibody exhibits nuclear staining.[1,2] PCNA is overexpressed in many cancer types, and overexpression is correlated with cancer virulence with studies showing that PCNA is directly related to the degree of tumor differentiation, stage of cancer and the prognosis of cancer. PCNA-targeting peptides were shown to inhibit the growth or to induce apoptosis in neuroblastoma, prostate cancer, breast cancer, bladder cancer, and multiple myeloma.[3,4]

1. Guo JL, et al. Evaluation of Clinical Significance of Endoglin Expression During Breast Cancer and Its Correlation with ER and PCNA. Eur Rev Med Pharmacol Sci. 2017 Dec; 21(23):5402-7. 2. Bologna-Molina R, et al. Comparison of the value of PCNA and Ki-67 as markers of cell proliferation in ameloblastic tumor. Med Oral Patol Oral Cir Bucal. 2013 Mar; 18(2):e174–9. 3. Shemesh A, et al. NKp44-Derived Peptide Binds Proliferating Cell Nuclear Antigen and Mediates Tumor Cell Death. Front Immunol. 2018; 9:1114. 4. Zhao H, et al. Interaction of proliferation cell nuclear antigen (PCNA) with c-Abl in cell proliferation and response to DNA damages in breast cancer. PLoS One. 2012; 7(1):e29416. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



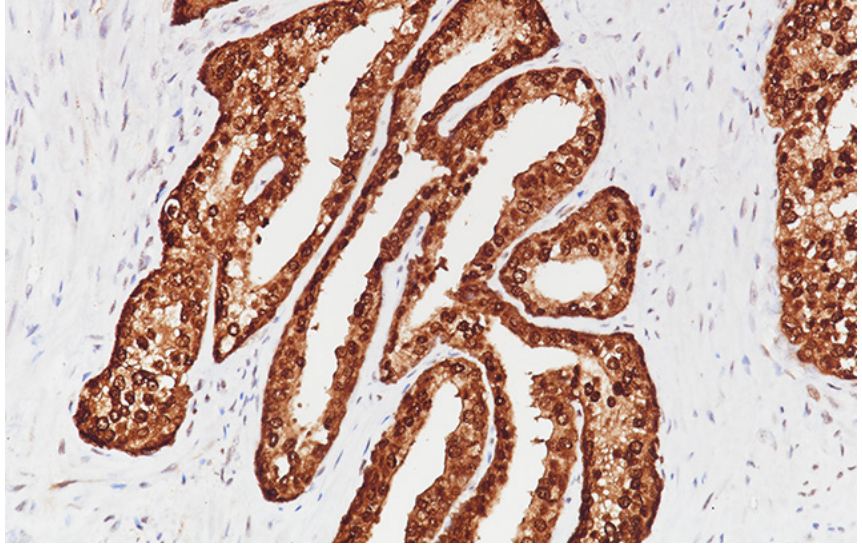
Melanoma stained with PRAME [EPR20330] antibody

PRAME [EPR20330] IVD

Clone	EPR20330
Isotype	IgG
Reactivity	Human; others not tested
Control	Melanoma, normal testis
Catalog Number	ACI 3252 A, B; API 3252 AA, H; OPAI 3252 T60; ALI 3252 G7; AVI 3252 G, G25

PRAME (preferentially expressed antigen in melanoma) is located on chromosome 22q11.22 and encodes a 509 amino acid protein. PRAME is an autosomal cancer-testis antigen (CTA) gene. PRAME is expressed in melanoma, various nonmelanocytic malignant neoplasms, including nonsmall cell lung cancer, breast carcinoma, renal cell carcinoma, ovarian carcinoma, leukemia, synovial sarcoma, and myxoid liposarcoma. Normal healthy tissues are not known to express PRAME except for testis, ovary, placenta, adrenals, and endometrium.[1,2] PRAME is one of the most widely studied CTAs and has been associated with the outcome and risk of metastasis. PRAME is currently being investigated as a novel immunotherapy target and diagnostic marker with ongoing clinical trials that include Hodgkin's disease, leukemia, multiple myeloma, breast cancer, pancreatic cancer, brain cancer.[3,4]

1. Zhang W, et al. PRAME expression and promoter hypermethylation in epithelial ovarian cancer. Oncotarget, 2016 Jul; 7(29):45352-69. 2. Lezcano C, et al. PRAME expression in melanocytic tumors. Am J Surg Pathol. 2018 Nov; 42(11):1456–65. 3. Salmaninejad A, et al. Cancer/testis antigens: expression, regulation, tumor invasion and use in immunotherapy cancers. Immunol Invest. 2016 Oct; 45(7):619-40. 4. Al-Khadairi G, Decock J. Cancer testis antigens and immunotherapy: where do we stand in the targeting of PRAME? Cancers. 2019 Jul; 11(7):984. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



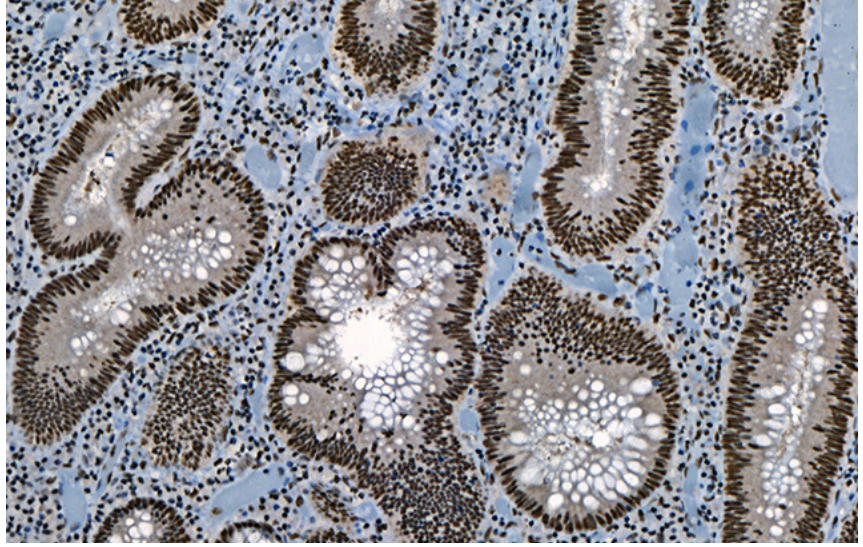
Prostate stained with PSAP [rACPP/1338] antibody

PSAP [rACPP/1338] IVD

Clone	rACPP/1338
Isotype	IgG1, Kappa
Reactivity	Human; others not tested
Control	Normal prostate, prostate carcinoma
Catalog Number	ACI 3263 A, C; API 3263 AA; OPAI 3263 T60; AVI 3263 G; ALI 3263 G7

Prostate-specific acid phosphatase (PSAP) is an enzyme produced in prostate epithelial cells. PSAP expression levels proportionally increase with prostate cancer progression.[1] PSAP IHC staining is often used in conjunction with prostate specific antigen (PSA) staining to help distinguish poorly differentiated carcinomas. For instance, PSAP is commonly used to help differentiate prostate adenocarcinoma and urothelial carcinoma which may appear microscopically similar; prostate adenocarcinoma often stains with PSA and/or PSAP, while urothelial carcinoma does not.[2] PSAP has a significantly higher correlation with the morphological characteristics of prostate cancer and can provide a more accurate predictive prognosis than other markers currently available. Since PSAP detection is a proportional measure of prostate cancer progression, it can also be used as an immunotherapy target for treatment of prostate cancer.[1] Due to its prostate specificity, PSAP may also be a useful marker for excluding metastases from a prostatic primary, particularly in male breast cancer.[3]

1. Kong HY, Byun J. Emerging roles of human prostatic acid phosphatase. Biomol Ther (Seoul). 2013;21(1):10-20. 2. Genega EM, Hutchinson B, Reuter VE, Gaudin PB. Immunophenotype of high-grade prostatic adenocarcinoma and urothelial carcinoma. Mod Pathol. 2000 Nov;13(11):1186-91. 3. Kidwai N, Gong Y, Sun X, et al. Expression of androgen receptor and prostate-specific antigen in male breast carcinoma. Breast Cancer Res. 2004;6(1): R18-R23. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



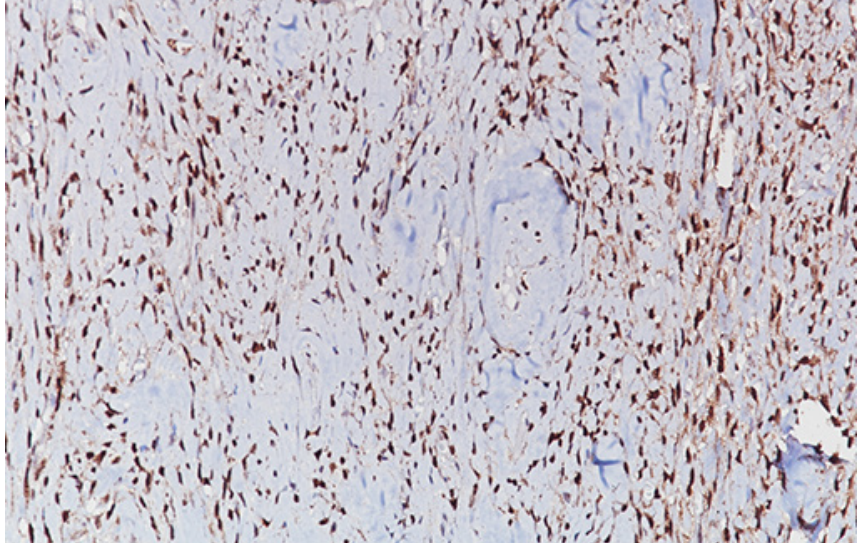
Colon stained with STAG1 antibody

STAG1 IVD

Clone	N/A
Isotype	IgG
Reactivity	Human; others not tested
Control	Colon, Prostate
Catalog Number	API 3250 AA; OPAI 3250 T60; AVI 3250 G; ALI 3250 G7

STAG1 is a component of cohesin, a ring-shaped protein complex involved in sister chromatid cohesion (SCC) that also plays important roles in the maintenance of chromatin structure, gene expression, and DNA repair. Cohesin consists of a core trimer and one of two mutually exclusive variant STAG subunits, STAG1 and STAG2. STAG1 is thought to primarily regulate telomeric cohesion, whereas STAG2 is primarily involved in centromeric cohesion.[1, 2] STAG2 mutations were detected in bladder cancer, Ewing sarcoma and acute myeloid leukemia. Targeting STAG1 represents a therapeutic opportunity in the treatment of STAG2-mutant cancers. Studies demonstrate that partial suppression of STAG1 triggers strong and selective anti-proliferative effects in STAG2-mutant cancer models.[3]

1. Hill VK, Kim JS, Waldman T. Cohesin mutations in human cancer. Biochim Biophys Acta. 2016;1866(1):1-11. 2. Arruda NL, Carico ZM, Justice M, Liu YF, Zhou J, Stefan HC, Dowen JM. Distinct and overlapping roles of STAG1 and STAG2 in cohesin localization and gene expression in embryonic stem cells. Epigenetics Chromatin. 2020 Aug 10;13(1):32. 3. van der Lelij P, Newman JA, Lieb S, et al. STAG1 vulnerabilities for exploiting cohesin synthetic lethality in STAG2-deficient cancers. Life Sci Alliance. 2020;3(7): e202000725. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



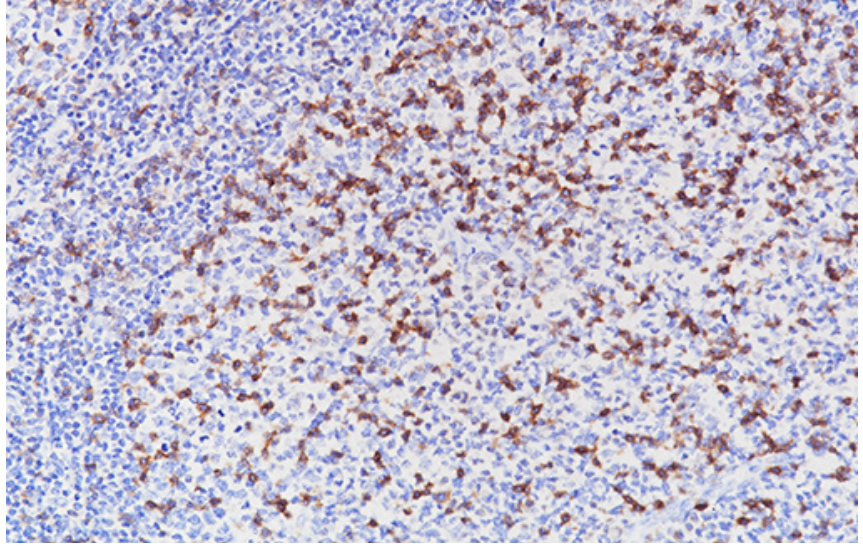
Solitary fibrous tumor stained with STAT6 [YE361] antibody

STAT6 [YE361] IVD

Clone	YE361
Isotype	IgG
Reactivity	Human; others not tested
Control	Solitary Fibrous Tumor
Catalog Number	ACI 3244 A, C; API 3244 AA

STAT6 (signal transducer and activator of transcription 6) is a member of the STAT family of cytoplasmic transcription factors, which regulate gene expression by transmitting signals to the nucleus and binding to specific DNA promoter sequences. STAT6 is composed of a DNA-binding domain, a C-terminal transcriptional activation domain, and a SH2 domain. STAT signaling is critical for cellular processes such as embryonic development, immune tolerance and tumor surveillance, and regulation of cell differentiation, growth, and apoptosis.[1,2] Nuclear expression of STAT6 is found in nearly all cases of solitary fibrous tumor (SFT) and is very limited in other soft tissue neoplasms making it a highly sensitive and specific immunohistochemical marker for SFT and may help to distinguish this tumor type from histologic mimics. Recently, STAT6 has received considerable attention in the area of tumor growth and metastasis. Significantly higher STAT6 immunoexpression level was observed in non-small-cell lung cancer (NSCLC); specifically, higher expression was found in squamous cell carcinoma than in large-cell carcinoma.[2,3]

1. Ahmad Z, Tariq MU, Din NU. Meningeal solitary fibrous tumor/hemangiopericytoma: Emphasizing on STAT 6 immunohistochemistry. Pathological Panorama. 2018; 66(5) 1419-26. 2. Doyle L, et al. Nuclear expression of STAT6 distinguishes solitary fibrous tumor from histologic mimics. Mod Pathol. 2014 Mar; 27(3):390-5. 3. Fu C, et al. Activation of the IL-4/STAT6 Pathway promotes lunch cancer progression by increasing M2 myeloid cells. Front Immunol. 2019 Nov; 10:2368. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 “Decontamination of Laboratory Sink Drains to Remove Azide Salts.” 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



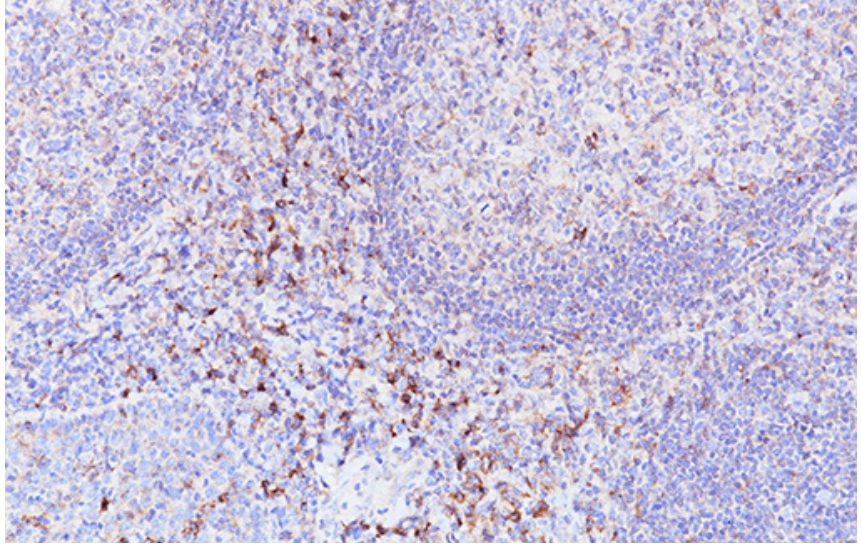
Tonsil stained with TIGIT [BC41] antibody

TIGIT [BC41] IVD

Clone	BC41
Isotype	Ig1/kappa
Reactivity	Human; others not tested
Control	Tonsil
Catalog Number	ACI 3254 A, C; API 3254 AA

T-cell immunoglobulin and immunoreceptor tyrosine-based inhibitory domain (TIGIT) is a transmembrane glycoprotein receptor expressed in regulatory and memory T cells, natural killer (NK), and activated T cells.[1] As a member of the immunoglobulin superfamily, TIGIT has coinhibitory effects on T-cell dependent immune responses, playing an important role in transplantation tolerance and tumor immune surveillance.[2,3] Several studies indicate that TIGIT exhibits synergistic function with the PD-1/PD-L1 pathway in the inhibition of Tcell proliferation. Co-blockade of TIGIT in conjunction with other checkpoint receptors, such as PD-1, has been investigated as a promising immunotherapy in multiple ongoing clinical trials.[4]

1. Kurtulus S, et al. TIGIT predominantly regulates the immune response via regulatory T cells. J Clin Invest. 2015;125:4053–4062. 2. Johnston RJ, et al. The immunoreceptor TIGIT regulates antitumor and antiviral CD8(+) T cell effector function. Cancer Cell. 2014;26:923– 937. 3. Zhang Q, et al. Blockade of the checkpoint receptor TIGIT prevents NK cell exhaustion and elicits potent anti-tumor immunity. Nat Immunol. 2018;19:723–732. 4. Qin S, et al. Novel immune checkpoint targets: moving beyond PD-1 and CTLA-4. Mol Cancer. 2019;18(1):155. 2019 Nov 6. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 “Decontamination of Laboratory Sink Drains to Remove Azide Salts.” 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



Tonsil stained with TIM3 [BLR033F] antibody

TIM3 [BLR033F] IVD

Clone	BLR033F
Isotype	IgG
Reactivity	Human; others not tested
Control	Tonsil
Catalog Number	ACI 3258 A, C; API 3258 AA

TIM3 or T-cell Immunoglobulin domain and Mucin domain 3 can be expressed on both tumor and immune cells including T helper type 1 (Th1) cells, Th17 and CD8+ T cells, tumor infiltrating lymphocytes (TILs), regulatory T cells and innate immune cells.[1] TIM3 acts as a negative regulator of Th1/Tc1 (T cytotoxic type 1) function by triggering cell death upon interaction with its ligand, galectin-9.[2,3] Co-blockade of TIM3 and programmed cell death 1 (PD1) can result in tumor regression in preclinical models of melanoma, colorectal cancer, and acute myeloid leukemia (AML). In patients with more advanced cancers, co-blockade of TIM3 and PD1 can improve anticancer T cell response.[4] An increasing number of preclinical studies have reported that TIM3 may improve immunotherapy outcomes in various cancers including melanoma, ovarian cancer, colon cancer, AML, and gastric cancer.[5]

1. Friedlaender A, et al. New emerging targets in cancer immunotherapy: the role of TIM3. ESMO Open. 2019;4(Suppl 3): e000497. 2. Zhu C, et al. TIM-3 and its regulatory role in immune responses. Curr Top Microbiol Immunol. 2010 Aug, 350: 1–15. 3. Syn, et al. De-novo and acquired resistance to immune checkpoint targeting. The Lancet Oncology 2017; 18 (12): e731–e41. 4. Wolf Y, et al. TIM3 comes of age as an inhibitory receptor. Nat Rev Immunol. 2020;20(3):173-85. 5. He Y, et al. TIM-3, a promising target for cancer immunotherapy. Onco Targets Ther. 2018; 11:7005-09. 6. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 7. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.

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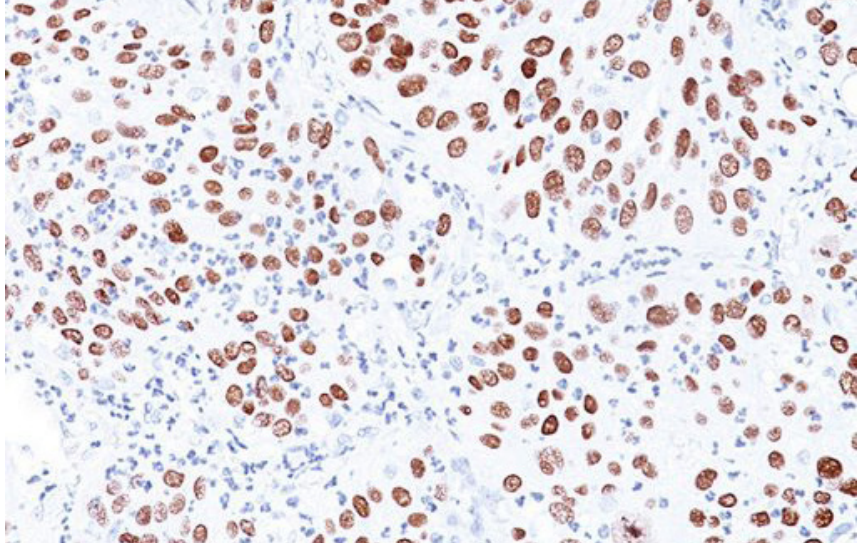
Top Antibodies



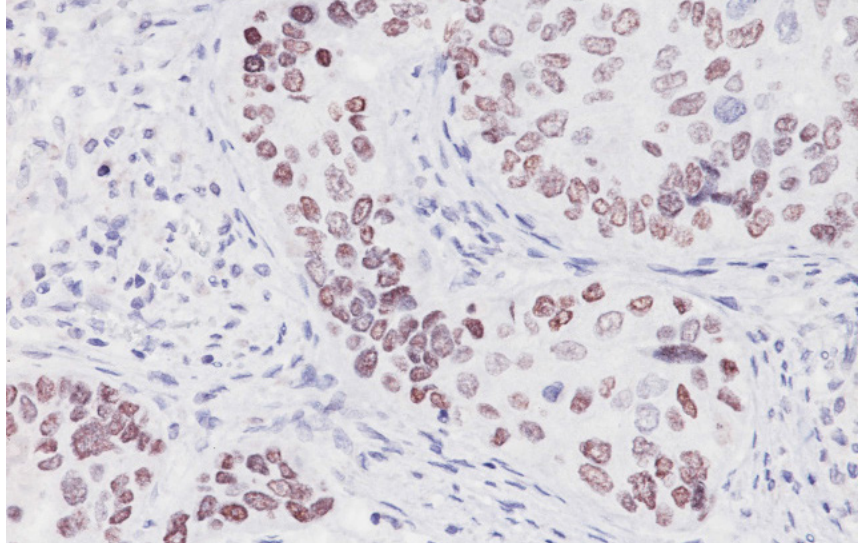
Lung squamous cell carcinoma stained with p40 (M) antibody

p40 (M) IVD

Clone	BC28
Isotype	IgG1
Reactivity	Human; others not tested
Control	Lung squamous cell carcinoma
Catalog Number	ACI 3066 A, C; API 3066 AA, H; AVI 3066 KG; IPI 3066 G10

The mouse monoclonal antibody p40 [BC28] recognizes an epitope unique to the p40 protein and may have applications in cases where p63 has traditionally been used. p63 [4A4] recognizes both the p63 and p40 proteins. As a result, p63 suffers from specifi city limitations due to reactivity in a subset of lung adenocarcinomas (ADC). In contrast, p40 is selectively expressed in lung squamous cell carcinoma (SqCC), offering an opportunity for improved specifi city. p40 (M) [BC28] recognizes an epitope unique to p40, which may result in diminished reactivity in lung ADC and increased specifi city. Studies have supported routine use of p40 as an alternative for p63. In contrast to the rabbit polyclonal p40, p40 [BC28] does not stain macrophages.

1. Bishop JA, et al. Mod Pathol. 2012 Mar; 25(3):405-15. 2. Hibi K, et al. Proc Natl Acad Sci U S A. 2000 Mar; 97(10):5462-7. 3. Pelosi G, et al. J Thorac Oncol. 2012 Feb; 7(2):281-90. 4. Brown AF, et al. Arch Pathol Lab Med. 2013 Sep; 137(9):1274-81. 5. Sailer V, et al. Histopathology. 2013 Jul; 63(1):50-6.



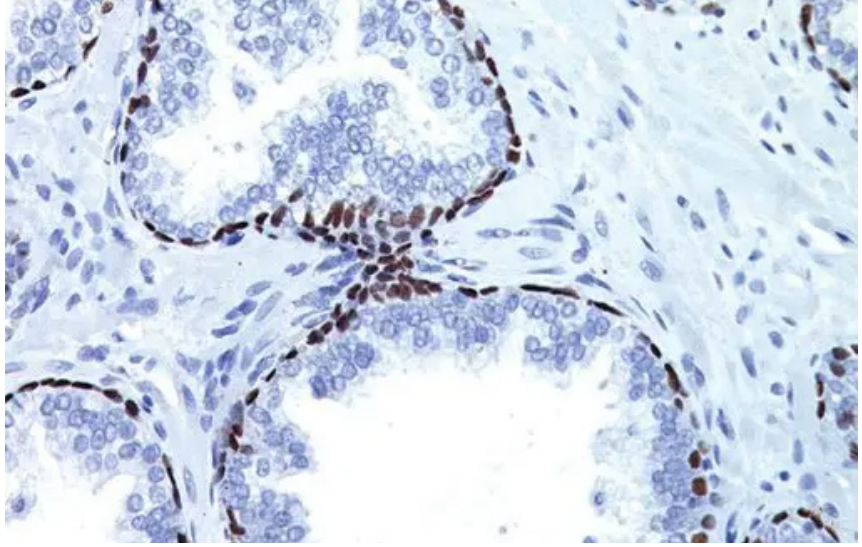
Lung squamous cell carcinoma stained with p40 (P) antibody

p40 (P) IVD

Clone	N/A
Isotype	IgG
Reactivity	Human; others not tested
Control	Lung squamous cell carcinoma
Catalog Number	3030

p40 recognizes the shortest variant of human p53 and may be a valuable marker in cases where p63 has traditionally been used. At present, p63 is the frequently used marker for lung squamous cell carcinoma (SqCC) and is extremely sensitive; however it suffers from specifi city limitations due to its reactivity in a subset of lung adenocarcinomas (ADC) p40 may prove to be an important antibody in the differential diagnosis of lung ADC vs. lung SqCC. In a study, p40 staining was equivalent to p63 in sensitivity for SqCC, but exhibited markedly superior specifi city vs. p63, minimizing misinterpreting a p63-positive adenocarcinoma as squamous cell carcinoma.

1. Bishop JA, et al. Mod Pathol. 2012 Mar; 25(3):405-15. 2. Pelosi G, et al. J Thorac Oncol. 2012 Feb; 7(2):281-90. 3. Hibi K, et al. Proc Natl Acad Sci USA. 2000 may; 97(10):5462-7. 4. Brown AF, et al. Arch Pathol Lab Med. 2013 Sep; 137(9):1274-81. 5. Sailer V. et al. Histopathology. 2013 Jul; 63(1):50-6.



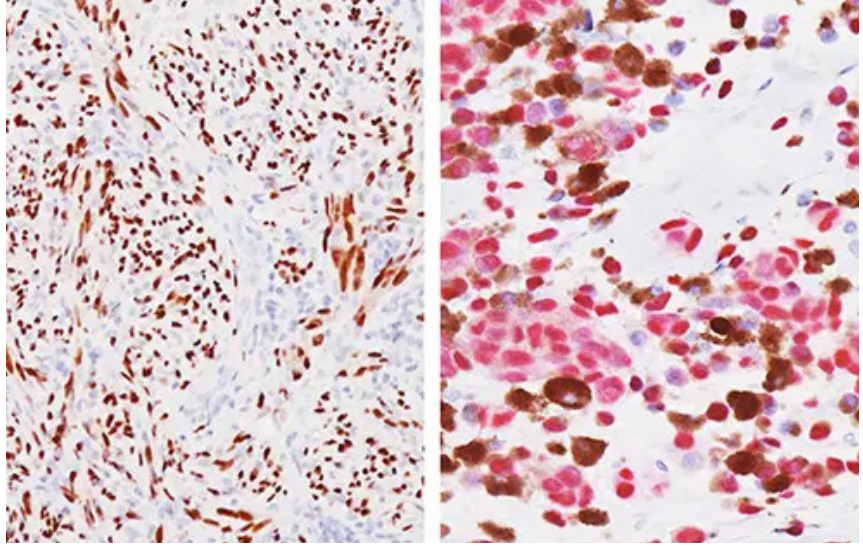
Prostate tissue stained with p63 antibody

p63 IVD

Clone	4A4
Isotype	IgG2a/kappa
Reactivity	Human, mouse and rat
Control	Normal prostate
Catalog Number	CM 163 A, B, C; PM 163 AA, H; IP 163 G10; VP 163 G, G25; OAI 163 T60

p53 homologue p63 encodes for different isotypes able to either transactivate p53 reporter genes (TAp63) or act as p53-dominant-negatives. p63 is detected in prostatic basal cells in normal prostate; however, it is negative in malignant tumors of the prostate gland. Thus p63 may be a valuable tool in the differential diagnosis of benign and malignant tumors of prostate gland and can be used in a panel of antibodies such as HMW CK [34 E12], PSA and PSAP. p63 may play a signifi cant role in prostate development by maintaining a prostate stem cell population. Striated muscle staining may be observed with p63.

1. Signoretti S, et al. Am J Pathol. 2000 Dec; 157(6):1769-75. 2. Yang A, et al. Mol Cell. 1998 Sept; 2(3):305-16. 3. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012 May; 20(3):201-7. 4. Pignon JC, et al. Proc Natl Acad Sci U S A. 2013 May; 110(20):8105-10.



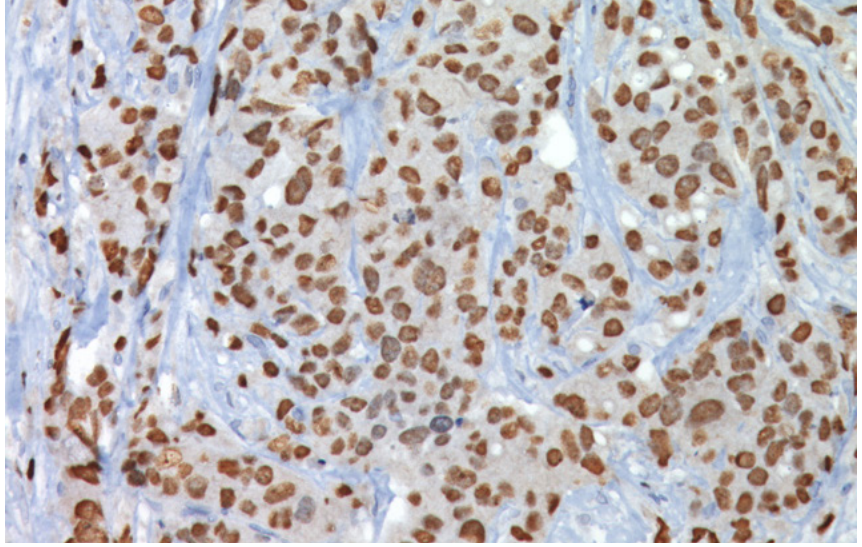
(Left) Spindle cell melanoma (DAB); (Right) Pigmented melanoma (Fast red)

SOX10 (M) IVD

Clone	BC34
Isotype	IgG1
Reactivity	Human; others not tested
Control	Melanoma
Catalog Number	ACI 3099 A, C; API 3099 AA, H; AVI 3099 G; IPI 3099 G10; OAI 3099 T60

The SOX10 protein is widely expressed in normal human tissues including melanocytes and breast tissue. It is also an important marker in malignant tumors such as melanoma, breast carcinoma, gliomas and benign tumors such as schwannomas. SOX10 has been shown to be expressed in 97-100% of desmoplastic and spindle cell melanomas and was also shown to be expressed in 100% of nevi. The majority of oligodendrogliomas but also a large percentage of astrocytomas and poorly differentiated glioblastomas have also been shown to express SOX10. Patent Pending.

1. Mohamed A, et al. Appl Immunohistochem Mol Morphol. 2013 Dec; 21(6):506-10. 2. Pusch C, et al. Hum Genet. 1998 Aug; 103(2):115-23. 3. Mollaaghababa R, Pavan WJ. Oncogene. 2003 May; 22(20):3024-34. 4. Bondurand N, et al. FEBS Lett. 1998 Aug; 432(3):168-72. 5. Bannykh SI, et al. J Neurooncol. 2006 Jan; 76(2):115-27. 6. Britsch S, et al. Genes Dev. 2001 Jan; 15(1):66-78. 7. Feng Z, et al. J Cutan Pathol. 2011 Aug; 38(8):616-24.



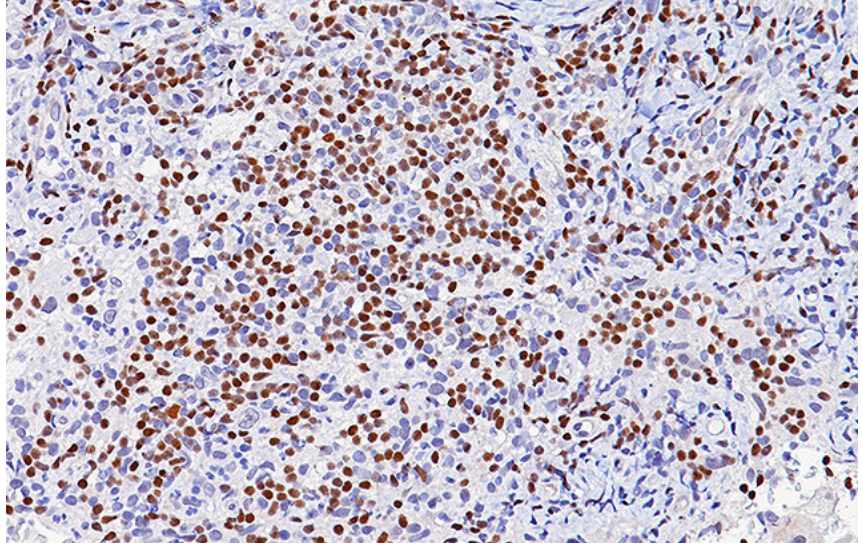
Breast cancer stained with GATA-3 antibody

GATA-3 IVD

Clone	L50-823
Isotype	IgG1/kappa
Reactivity	Human; others not tested
Control	Bladder cancer and breast cancer
Catalog Number	CM 405 A, B; PM 405 AA; OAI 405 T60

GATA-3 (GATA binding protein 3) is a member of the GATA family of transcription factors. GATA-3 appears to control a set of genes involved in the differentiation and proliferation of breast cancer. The expression of GATA-3 has a strong association with estrogen receptoral-pha expression in breast cancer and evidence exists that GATA-3 may be used to predict response to hormonal therapy of breast cancer patients. GATA-3 has also been shown to be a novel marker for bladder cancer. In one study, GATA-3 stained 67% of 308 urothelial carcinomas but no prostate or renal carcinomas.

1. Raspollini MR, et al. Pathologica. 2010 Feb; 102(1):33-5. 2.Esheba GE, et al. Am J Surg Pathol. 2009 Mar; 33(3):347-53. 3. Albergaria A, et al. Breast Cancer Res. 2009; 11(3):R40. 4. Kouros-Mehr H, et al. Cancer Cell. 2008 Feb; 13(2):141-52. 5. Voduc D, et al. Cancer Epidemiol Biomarkers Prev. 2008 Feb; 17(2):365-73. 6. Parikh P, et al. J Am Coll Surg. 2005 May; 200(5):705-10.



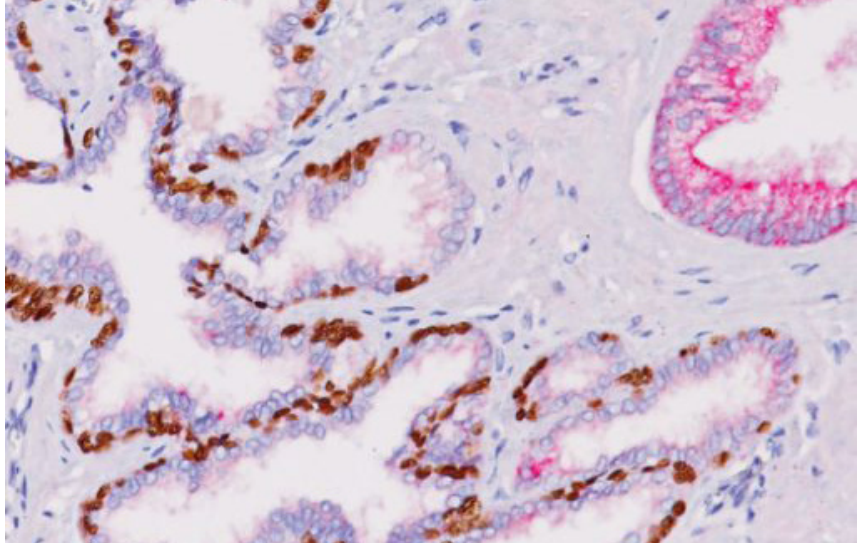
Renal biopsy stained with PAX8 antibody

PAX8 (M) IVD

Clone	BC12
Isotype	IgG1
Reactivity	Human, mouse, rat, cat and dog
Control	Normal kidney, renal cell or serous ovarian carcinomas
Catalog Number	ACI 438 A, B, C; API 438 AA; AVI 438 G; OAI 438 T60

PAX8 is expressed in a high percentage of renal cell carcinomas and ovarian cancers. PAX8 [BC12] has been designed to target restricted epitopes and exhibits higher specifi city and provides sharper staining than the PAX8 rabbit polyclonal antibody. PAX8(M) stains nuclei exclusively and does not stain B-cells, nor does it recognize epitopes of pancreatic origin and neuroendocrine cells in stomach and colon. The expression of the mouse monoclonal PAX8 target antigens was found in normal kidney, thyroid and cervix, but was not identifi ed in normal ovary. By western blot, [BC12] has been shown to recognize PAX8 and not PAX2, PAX5 or PAX6 proteins. U.S. Patent 8,852,592 and patents pending.

1. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2011 Jul; 19(4):293-9. 2. Lotan TL, et al. Am J Surg Pathol. 2009 Jul; 33(7):1037-41-3. Viktorova T, et al. Diagn Cytopathol. 2008 Aug; 36(8):568-73. 4. Narlis M, et al. J Am Soc Nephrol. 2007 Apr; 18(4):1121-9. 5. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2013 Jan;21(1);59- 63. 6. Moretti L, et al. Mod Pathol. 2012 Feb; 25(a):231-6. 7. Lorenzo PI, et al. Histochem Cell Biol. 2011 Nov; 136(5):595-607.



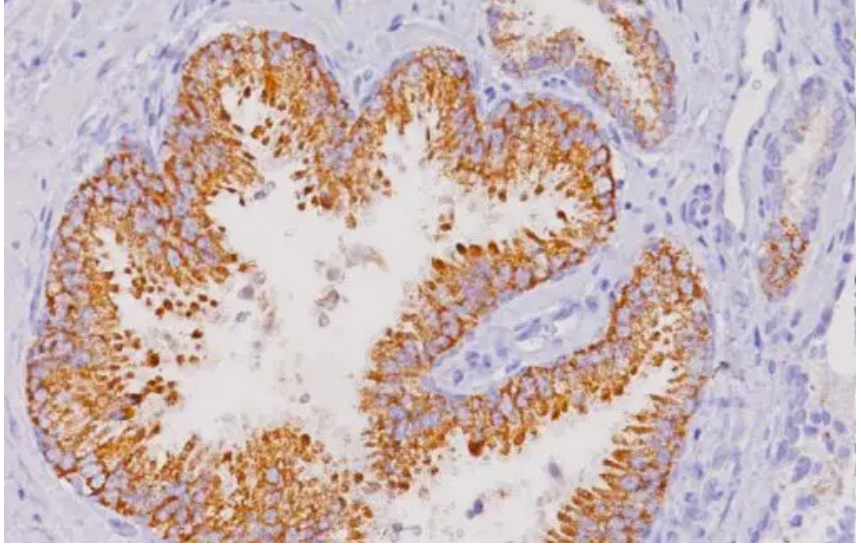
Prostate cancer stained with p63 + P504S antibody

p63 + P504S (PIN) RUO

Clone	4A4 + N/A
Isotype	IgG2a/kappa + IgG
Reactivity	Human; others not tested
Control	Normal prostate and prostate adenocarcinoma
Catalog Number	PPM 201 AA, H; IPR 201 G10; VP 201 G, G25

P504S is an enzyme in the -oxidation of branched-chain fatty acids. Expression of P504S protein is found in prostatic adenocarcinoma but not in benign prostatic tissue. p63, a homolog of the tumor suppressor p53, encodes for different isotypes able to either transactivate p53 reporter genes (TAp63) or act as p53-dominant-negatives. Expression of p63 is detected in prostate basal epithelial nuclei in normal prostate; however, is negative in malignant tumors of the prostate gland. The combination of p63 + P504S may be an extremely useful aid in diagnosing prostatic intraepithelial neoplasia (PIN), especially in diffi cult and limited tissue cases.

1. Yang A, et al. p63, a p53 Homolog at 3q27–29, Encodes Multiple Products with Transactivating, Death-Inducing, and DominantNegative Activities. Mol Cell. 1998 Sep; 2(3):305-16. 2. Signoretti S, et al. p63 Is a Prostate Basal Cell Marker and Is Required for Prostate Development. Am J Pathol. 2000 Dec; 157(6):1769-75. 3. Ferdinandusse S, et al. Subcellular localization and physiological role of --methylacyl-CoA racemase. J Lipid Res. 2000 Nov; 41(11):1890-6. 4. Xu J, et al. Identification of Differentially Expressed Genes in Human Prostate Cancer Using Subtraction and Microarray. Cancer Res. 2000 Mar 15; 60(6):1677-82. 5. Rubin MA, et al. --Methylacyl Coenzyme A Racemase as a Tissue Biomarker for Prostate Cancer. JAMA. 2002 Apr 3; 287(13):1662-70. 6. Luo J, et al. Alpha-methylacyl-CoA racemase: a new molecular marker for prostate cancer. Cancer Res. 2002 Apr 15; 62(8):2220-6. 7. Zhou M, et al. Alpha-Methylacyl-CoA Racemase A Novel Tumor Marker Overexpressed in Several Human Cancers and Their Precursor Lesions. Am J Surg Pathol. 2002 Jul; 26(7):926-31. 8. Wu CL, et al. Analysis of --Methylacyl-CoA



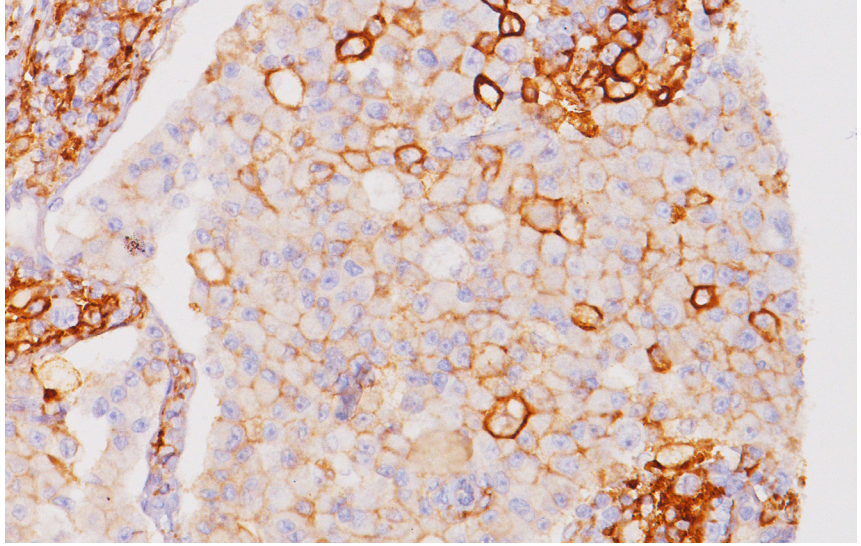
Prostate cancer stained with P504S (P) antibody

P504S RUO

Clone	N/A
Isotype	IgG
Reactivity	Human; others not tested
Control	Prostate cancer
Catalog Number	CP 200 A, B, C; PP 200 AA, H; IPR 200 G10

P504S, also known as α-methylacyl coenzyme A racemase (AMACR), is a peroxisomal and mitochondrial enzyme that plays a role in bile acid synthesis and α-oxidation of branched chain fatty acids. P504S was initially identifi ed from a cDNA library as a gene that is overexpressed in human prostate cancer; with little or no expression in normal prostate. In immunohistochemistry, P504S has been shown to be a specifi c marker of prostatic adenocarcinoma. Additionally, prostate glands involved in PIN have been found to express P504S, whereas P504S was nearly undetectable in benign glands.

1. Ferdinandusse S, et al. Subcellular localization and physiological role of --methylacyl-CoA racemase. J Lipid Res. 2000; 41:1890-6. 2. Xu J, et al. Identification of Differentially Expressed Genes in Human Prostate Cancer Using Subtraction and Microarray. Cancer Res. 2000; 60:1677-82. 3. Rubin MA, et al. --Methylacyl Coenzyme A Racemase as a Tissue Biomarker for Prostate Cancer. JAMA. 2002; 287:1662-70. 4. Luo J, et al. Alpha-methylacyl-CoA racemase: a new molecular marker for prostate cancer. Cancer Res. 2002; 62:2220-6. 5. Zhou M, et al. Alpha-Methylacyl-CoA Racemase A Novel Tumor Marker Overexpressed in Several Human Cancers and Their Precursor Lesions. Am J Surg Pathol. 2002; 26:926-31. 6. Wu CL, et al. Analysis of --Methylacyl-CoA Racemase (P504S) Expression in High-Grade Prostatic Intraepithelial Neoplasia. Hum Pathol. 2004; 35:1008-13. 7. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 “Decontamination of Laboratory Sink Drains to Remove Azide Salts.” 8. Clinical and Laboratory Standards Institute (CLSI). Protection of Labora-



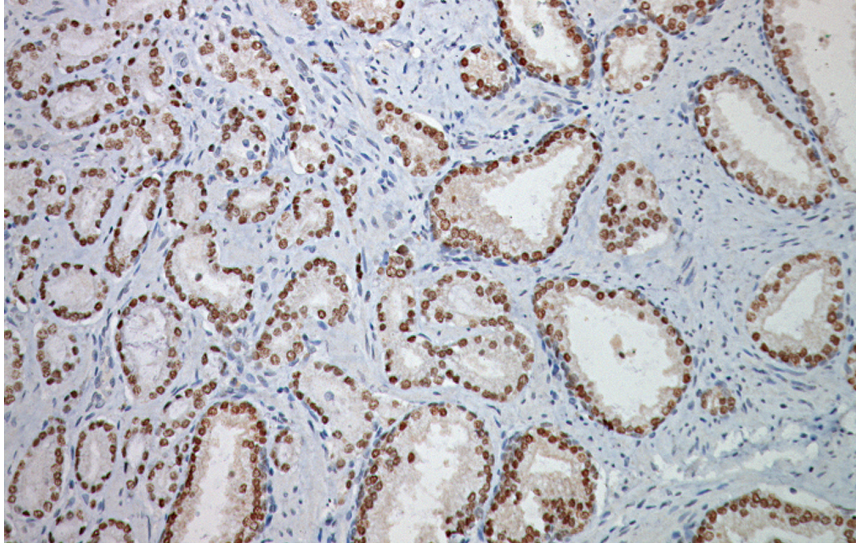
PD-L1 in melanoma

PD-L1 IVD

Clone	CAL10
Isotype	IgG
Reactivity	Human; others not tested
Control	Lung adenocarcinoma or tonsil
Catalog Number	ACI 3171 A, C; API 3171 AA; OPAI 3171 T60; AVI 3171 G

Programmed death-ligand 1 (PD-L1, also known as CD274) inhibits tumor-reactive T-cells via binding to the programmed death-1 (PD-1) receptor, rendering tumor cells resistant to CD8+ T cell-mediated lysis. Studies have shown that the inhibitory receptor PD-1 is expressed on tumor-infiltrating lymphocytes (TIL) while PD-L1 is expressed on tumor cells. Assessment of PD-L1 expression in combination with CD8+ TIL density may be a useful predictive metric in multiple cancers, including stage III NSCLC, hormone receptor-negative breast cancer, and sentinel lymph node melanoma. While identification of PD-L1 overexpression by IHC is not yet standardized, it has become increasingly important to identify these tumors.

1. Hirano T, et al. Lung Cancer. 2003 Aug; 41(2):155-62. 2. Ueno T, et al. Br J Cancer. 2003 Apr; 88(8):1229-333. 3. Suzuki A, et al. Pathol Res Pract. 2005; 201(8-9):579-86. 4. Dejmek A, et al. Diagn Cytopathol. 2007 Aug; 35(8):493- 7. 5. Liu L, Cohen C, Siddiqui MT. Acta Cytol. 2012; 56(4):425-30.



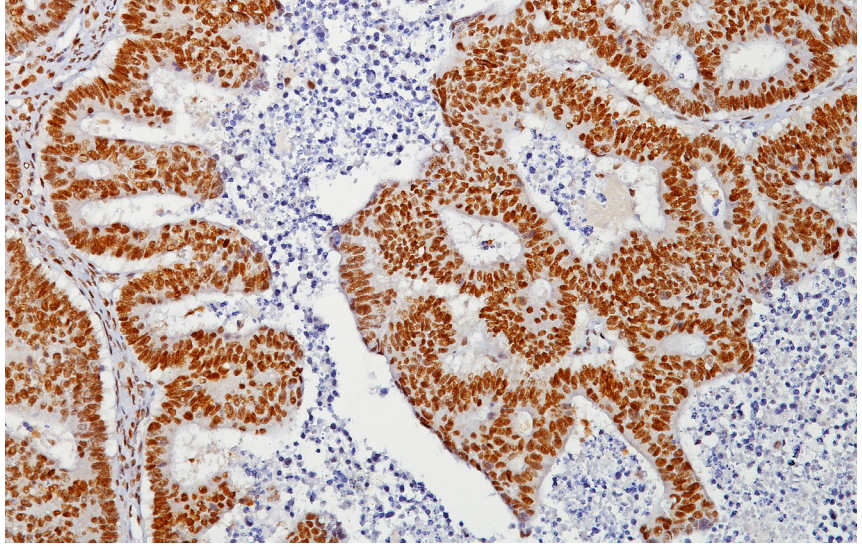
Prostate cancer stained with NKX3.1

NKX3.1 IVD

Clone	N/A
Isotype	N/A
Reactivity	Human; others not tested
Control	Normal prostate or prostate cancer
Catalog Number	CP 422 A, B; PP 422 AA; OPAI 422 T60

NKX3.1 is a protein encoded by the NKX3-1 gene and has been found to be positive in the vast majority of primary prostatic adenocarcinomas. A study has shown the sensitivity for identifying metastatic prostatic adenocarcinomas was 98.6% (68/69 cases positive) for NKX3.1 and 94.2% (65/69 cases positive) for prostate specifi c antigen (PSA). The specifi city of NKX3.1 was 99.7% in various cancers and stains nuclei in both normal and prostate cancer. NKX3.1, used in combination with ERG monoclonal antibody [9FY], may represent a superior combination to aid in identifying tumors of prostatic origin.

1. Bowen C, Gelmann EP. Cancer Res. 2010 Apr; 70(8):3089-97. 2. Gurel B, et al. Am J Surg Pathol. 2010 Aug; 34(8):1097-105. 3. Chuang AY, et al. Am J Surg Pathol. 2007 Aug; 31(8):1246-55. 4. Abate-Shen C, Shen MM, Gelmann E. Differentiation. 2008 Jul; 76(6):717-27. 5. Shen MM, Abate-Shen C. Dev Dyn. 2003 Dec; 228(4):767-78.



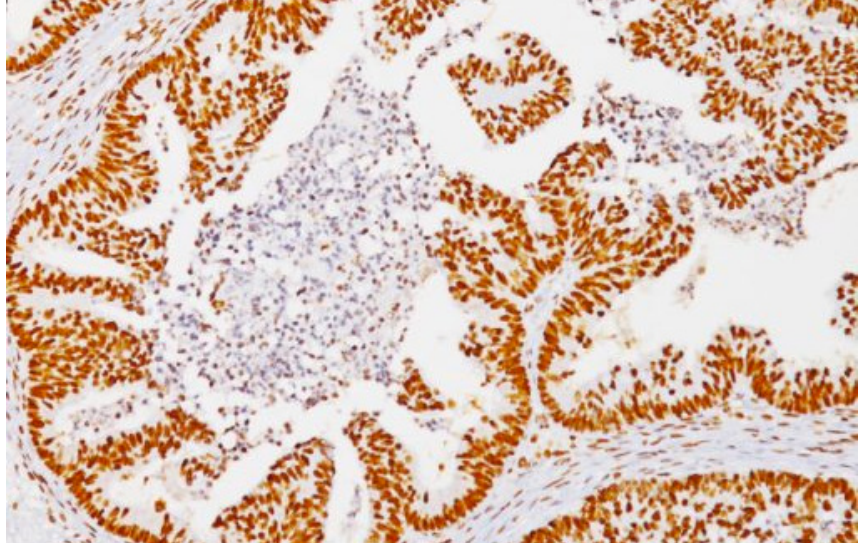
Colon cancer stained with MLH-1

MLH-1 IVD

Clone	G168-15
Isotype	IgG1/kappa
Reactivity	Human, mouse, rat
Control	Colon cancer
Catalog Number	CM 220 AK, BK, CK; PM 220 AA, H; IPI 220 G10; OPAI 220 T60; AVI 220 G

MLH-1 [G168-15] recognizes human and mouse MLH-1 (80-85 kDa). MLH-1 and MSH2 are involved in the DNA mismatch repair (MMR) process. Microsatellite instability (MSI) is an alteration of microsatellite repeats during DNA replication and is a hallmark of the inactivation of the MMR genes. These defects in MMR have been related to human carcinogenesis. Immunostaining for MLH-1 and MSH2 may be useful to aid in identifying the most probable gene responsible for the MSI. Studies have shown that the expression level of MLH-1 may be a survival indicator.

1. Machin P, et al. J Cutan Pathol. 2002 Aug; 29(7):415-20. 2. Shin KH, et al. Int J Oncol. 2002 Aug; 21(2):297-302. 3. Menon AG, et al. Lab Invest. 2002 Dec; 82(12):1725-33. 4. Peiro G, et al. Mod Pathol. 2001 Aug; 14(8):777- 83. 5. Thibodeau SN, et al. Cancer Res. 1996 Nov; 56(21):4836-40. 6. Renkonen E, et al. J Clin Oncol. 2003 Oct; 21(19):3629-37.



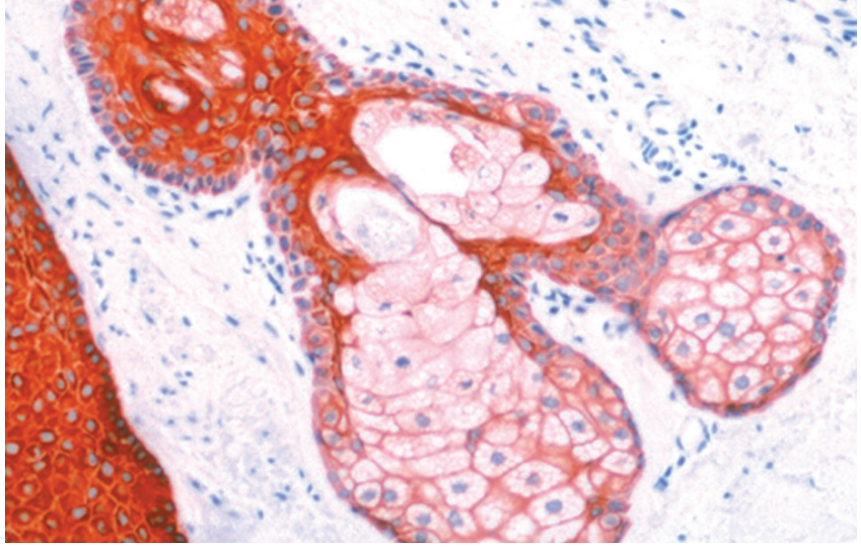
Colon cancer stained with MSH2

MSH2 IVD

Clone	FE11
Isotype	IgG1/kappa
Reactivity	Human, mouse, rat
Control	Colon cancer
Catalog Number	CM 219 AK, BK, CK; PM 219 AA, H; OPAI 219 T60; AVI 219 G; ALI 219 G7

MSH2 is a 100 kDa nuclear antigen and encodes a protein of 934 amino acids. MLH-1 and MSH2 are involved in the DNA mismatch repair (MMR) process. Microsatellite instability (MSI) is an alteration of microsatellite repeats during DNA replication and is a hallmark of the inactivation of the MMR genes. These defects in MMR have been related to human carcinogenesis. Mutations in the MSH2 gene contribute to the development of sporadic colorectal carcinoma. MSI mutations are responsible for 50% of hereditary nonpolyposis colorectal cancer. Immunostaining for MLH-1 and MSH2 may be useful to aid in identifying the most probable gene responsible for the MSI.

1. Machin P, et al. J Cutan Pathol. 2002 Aug; 29(7):415-20. 2. Shin KH, et al. Int J Oncol. 2002 Aug; 21(2):297-302. 3. Menon AG, et al. Lab Invest. 2002 Dec; 82(12):1725-33. 4. Peiro G, et al. Mod Pathol. 2001 Aug; 14(8):777- 83. 5. Thibodeau SN, et al. Cancer Res. 1996 Nov; 56(21):4836-40. 6. Renkonen E, et al. J Clin Oncol. 2003 Oct; 21(19):3629-37.



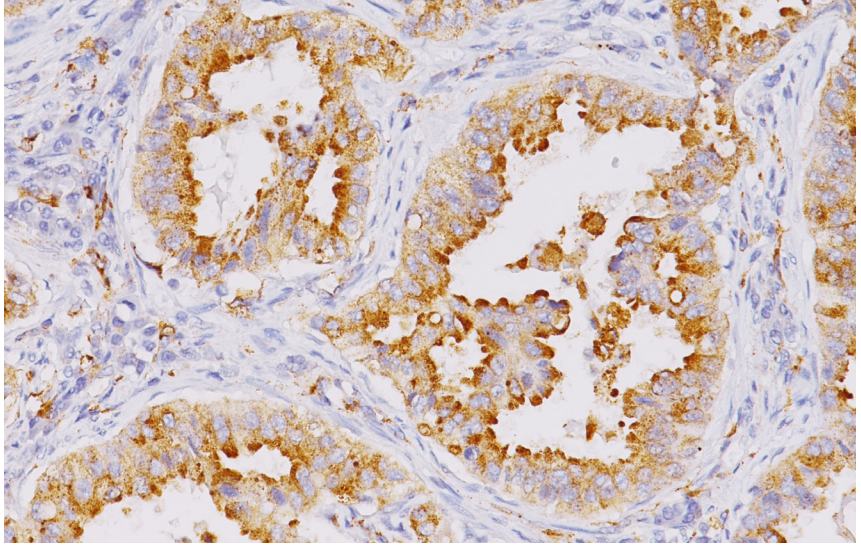
Skin stained with Pan Cytokeratin Plus [AE1/AE3 + 8/18]

Pan Cytokeratin Plus [AE1/AE3 + 8/18] IVD

Clone	AE1/AE3 + 5D3
Isotype	IgG1 + IgG1
Reactivity	Human, mouse, rat
Control	Skin or adenocarcinoma
Catalog Number	CM 162 A, B, C; PM 162 AA, H; IP 162 G10; OPAI 162 T60; AVI 162 G

Pan Cytokeratin Plus is a combination of [AE1/AE3] and Cytokeratin (CK) 8/18 [5D3] and can be used to detect most human epithelia. [AE1/AE3] recognizes acidic and basic subfamilies of cytokeratins, with molecular weights ranging from 40 to 67 kDa. CK8/18 [5D3] recognizes Cytokeratin 8 and 18 intermediate fi lament proteins. In normal tissues, [5D3] recognizes all simple and glandular epithelium. It has been observed that [AE1/AE3] has had problems marking certain tissues types and adenocarcinomas. The addition of CK 8/18 may remedy some of the limitations observed when staining with [AE1/AE3] alone.

1. Seidman JD, Abbondanzo SL, Bratthauer GL. Int J Gynecol Pathol. 1995 Oct; 14(4):331-8. 2. Bunton TE. Vet Pathol. 1993 Sep; 30(5):418-25. 3. Sorensen SC, et al. J Pathol. 1987 Oct; 153(2):151-62. 4. Pinkus GS, Etheridge CL, O'Connor EM. Am J Clin Pathol. 1986 Mar; 85(3):269-77. 5. Pinkus GS, et al. J Histochem Cytochem. 1985 May; 33(5):465-73.



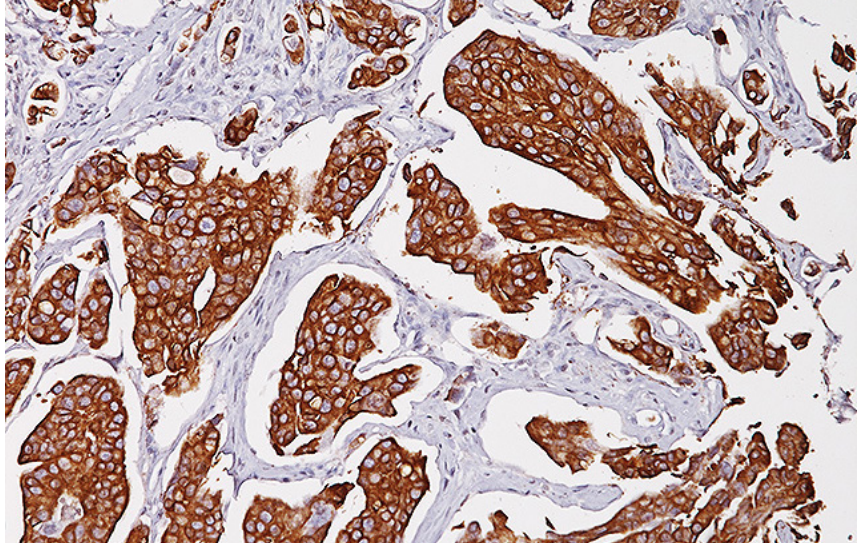
Lung adenocarcinoma stained with Napsin A

Napsin A IVD

Clone	TMU-Ad 02
Isotype	IgG1
Reactivity	Human; others not tested
Control	Lung adenocarcinoma
Catalog Number	CM 388 AK, CK; PM 388 AA; IPI 388 G10; OPAI 388 T60; AVI 388 G

Napsin A is expressed in type II pneumocytes and adenocarcinomas of the lung and kidney. Studies have shown Napsin A to be superior to TTF-1 in sensitivity (87% vs. 64%) with a higher specifi city (94.3% vs. 76.1%) for primary non-small cell lung adenocarcinoma. Napsin A is positive in some renal cell carcinomas and shows low expression in other neoplastic tissues such as ovarian cancers with different staining patterns than primary lung cancer (granular cytoplasmic staining). In studies comparing Napsin A and SP-A, Napsin A stained more tumor cells and a higher percentage of lung adenocarcinomas.

1. Hirano T, et al. Lung Cancer. 2003 Aug; 41(2):155-62. 2. Ueno T, et al. Br J Cancer. 2003 Apr; 88(8):1229-333. 3. Suzuki A, et al. Pathol Res Pract. 2005; 201(8-9):579-86. 4. Dejmek A, et al. Diagn Cytopathol. 2007 Aug; 35(8):493- 7. 5. Turner BM, et al. Arch Pathol Lab Med. 2012 Feb; 136(2):163-71. 6. Liu L, Cohen C, Siddiqui MT. Acta Cytol. 2012; 56(4):425-30. 7. Brown A, et al. Arch Pathol Lab Med. 2013 Sep; 137(9):1274-81.



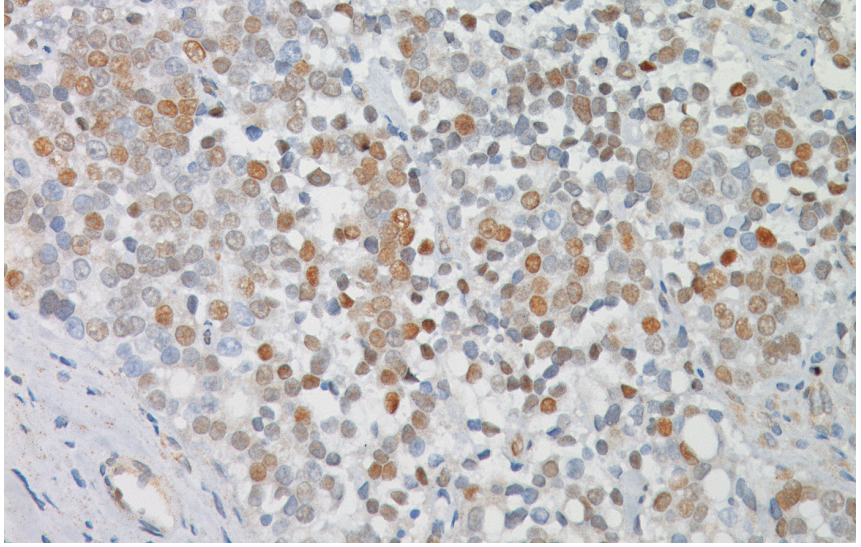
Bladder cancer stained with Uroplakin II

Uroplakin II IVD

Clone	BC21
Isotype	IgG1/kappa
Reactivity	Human; others not tested
Control	Normal bladder or urothelial carcinoma
Catalog Number	ACI 3051 A, C; API 3051 AA; OPAI 3051 T60; AVI 3051 KG

Uroplakin II is a 15 kDa protein component of urothelial plaques. Studies have shown Uroplakin II mRNA was highly specifi c and was expressed in both bladder cancer tissues and peripheral blood of patients with primary and metastatic urothelial carcinoma of the bladder. Uroplakin II [BC21] has exhibited an increased sensitivity (46/59, 78%) when compared to Uroplakin III [AU1] (191/56, 34%) in cases of urothelial carcinoma of the bladder with the exception of bladder and ureter, staining was highly specifi c in various normal and neoplastic tissues in an in-house study. Uroplakin II [BC21] is a highly specifi c antibody that may be useful in identifying tumors of urothelial origin. Patent Pending.

1. Wu XR, et al. Kidney Int. 2009 Jun; 75 (11):1153-65. 2. Wu X, et al. J Urol. 2005 Dec; 174 (6):2138-42. 3. Lu JJ, et al. Clin Cancer Res. 2000 Aug;6 (8):3166-71. 4. Li SM, et al. J Urol. 1999 Sep;162(3 Pt 1):931-5.



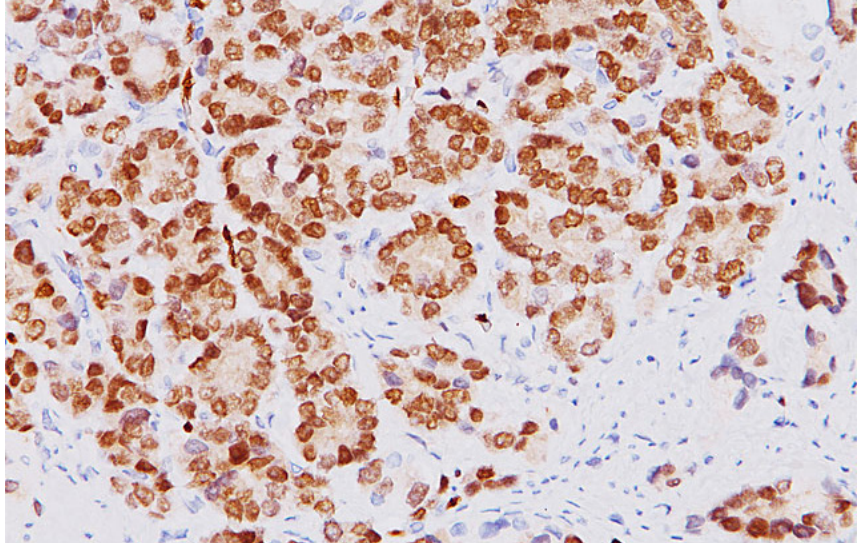
Prostate cancer stained with c-Myc

c-Myc IVD

Clone	EP121
Isotype	IgG1
Reactivity	Human; others not tested
Control	Lung adenocarcinoma
Catalog Number	CME 415 AK, CK; PME 415 AA; AVI 415 G; ALI 415 G7

The oncogene-encoded protein c-Myc is postulated to play a role in activating the transcription of growth related genes. Amplifi cation of the c-Myc gene has been found in several types of human tumors. Studies have shown that c-Myc is essential for vasculogenesis and angiogenesis in neoplastic disease. c-Myc oncogene activity may also be necessary for the translocation(s) seen in human breast tumors identifi ed to have a poor prognosis signature. Over-expression of the c-Myc oncogene has been implicated in the development and progression of human prostate carcinoma.

1. Wolfer A, et al. Proc Natl Acad Sci U S A. 2010 Feb; 107(8):3698-703. 2. Gurel B, et al. Mod Pathol. 2008 Sep; 21(9):1156-67. 3. Park K, et al. Hum Pathol. 2005 Jun; 36(6):634-9. 4. Yang G, et al. Cancer. 2005 Mar; 103(6):1186-94



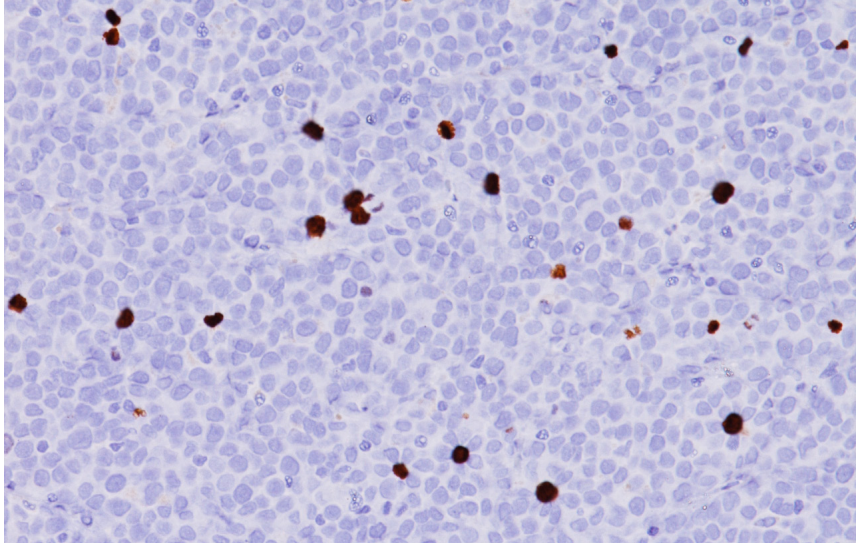
Prostate cancer stained with ERG

ERG IVD

Clone	9FY
Isotype	IgG1
Reactivity	Human; others not tested
Control	ERG positive prostate cancer and/or PIN glands
Catalog Number	CM 421 A, C; PM 421 AA; VP 421 G; OPAI 421 T60; VP 421 G

A mouse monoclonal anti-ERG antibody was developed with 99.9% specifi city for detecting prostatic adenocarcinomas. ERG [9FY] is highly specifi c and does not stain lymphocytes. There is a 96.5% concordance of ERG positive prostatic intraepithelial neoplasia (PIN) and ERG positive carcinoma in prostatectomy specimens. Studies have shown that [9FY] may also have application in detecting endothelial malignancies, including Kaposi sarcoma. Note: ERG [9FY] was developed by the Center for Prostate Disease Research in association with the Henry M. Jackson Foundation, Rockville, Maryland. US Patent: 8,765,916 B2

1. Petrovics G, et al. Oncogene. 24, 2005 May; 24(23):3847-52. 2. Rosen P, et al. Nat Rev Urol. 2012 Feb;9(3):131- 7. 3. Furusato B, et al. Prostate Cancer Prostatic Dis. 2010 Sep; 13(3):228-37. 4. Braun M, et al. Prostate Cancer Prostatic Dis. 2012 Jun;15(2):165-9. 5. Miettinen M, et al. Am J Surg Pathol. 2011 Mar; 35(3):432-41. 6. Mohamed AA, et al. J Cancer. 2010 Oct;1:197-208.



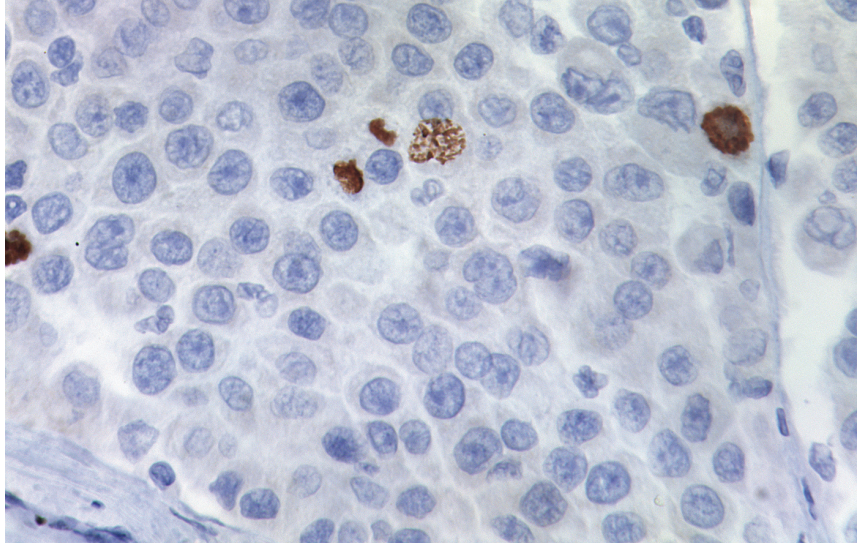
Melanoma stained with pHH3 (RM)

pHH3 (RM) IVD

Clone	BC37
Isotype	IgG
Reactivity	Human; others not tested
Control	Tonsil or melanoma
Catalog Number	ACI 3130 A, C; API 3130 AA

Phospho-Histone H3 (pHH3) is specifi c for cells undergoing mitosis. Serine 10 of Histone H3 is phosphorylated in association with mitotic chromatin condensation in late G2 and M phase of the cell cycle. H&E staining may misclassify mitotic cells as apoptotic bodies or piknotic nuclei, resulting in an underestimation of the mitotic index (MI). IHC with pHH3 may provide a more accurate assessment of all mitotic cells, as well as cells in which Histone H3 has been phosphorylated immediately prior to entering prophase. pHH3 (RM) [BC37] displays stronger staining intensity in mitotic fi gures and does not exhibit granular staining in interphase nuclei compared to the polyclonal pHH3.

1. Ladstein RG, et al. J Invest Dermatol. 2012 Apr; 132(4):1247-52. 2. Jannink I, van Diest PJ, Baak JP. Hum Pathol. 1995 Oct; 26(10):1086-92. 3. Yadav KS, et al. J Contemp Dent Pract. 2012 May 1; 13(3):339-44. 4. Thareja S, et al. Am J Dermatopathol. 2014 Jan; 36(1):64-7. 5. Ikenberg K, et al. J Cutan Pathol. 2012 Mar; 39(3):324-30. 6. Casper DJ, et al. Am J Dermatopathol. 2010 Oct; 32(7):650-4. 7. Veras E, et al. Int J Gynecol Pathol. 2009 Jul; 28(4):316-21. 8. Skaland I, et al. Mod Pathol. 2007 Dec; 20(12):1307-15. 9. Kim YJ, et al. Am J.Clin Pathol. 2007 July; 128(1):118-25.



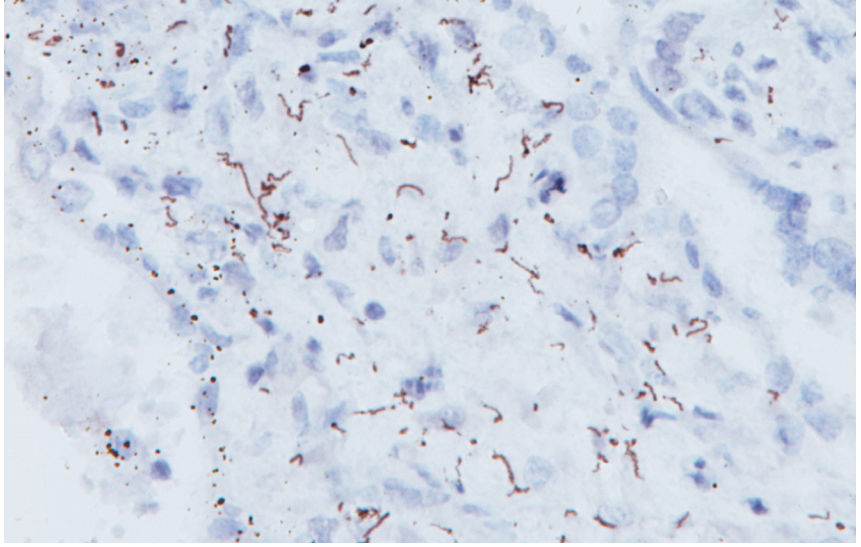
Melanoma stained with Phospho-Histone H3

Phospho-Histone H3 IVD

Clone	N/A
Isotype	N/A
Reactivity	Human; others not tested
Control	Melanoma
Catalog Number	CP 404 A, C; PP 404 AA

Phospho-Histone H3 (pHH3) is an immunomarker specifi c for cells undergoing mitosis. The phosphorylation of histone H3 plays an important role in gene expression, chromatin remodeling, chromosome condensation and cell division. Across different organisms, metaphase chromosomes are always found to be heavily histone H3 phosphorylated. Determination of the mitotic index using pHH3 has been reported to be of prognostic signifi cance in breast cancer, melanoma and meningiomas. pHH3 immunostaining may also provide an accurate proliferation potential which can be relevant to tumor grading.

1. Skaland I, et al. Cell Oncol. 2009; 31(4):261-71. 2. Nasr MR, El-Zammar O. Am J Dermatopathol. 2008 Apr; 30(2):117-22. 3. Skaland I, et al. Mod Pathol. 2007 Dec; 20(12):1307-15. 4. Kim YJ, et al. Am J Clin Pathol. 2007 Jul; 128(1):118-25.



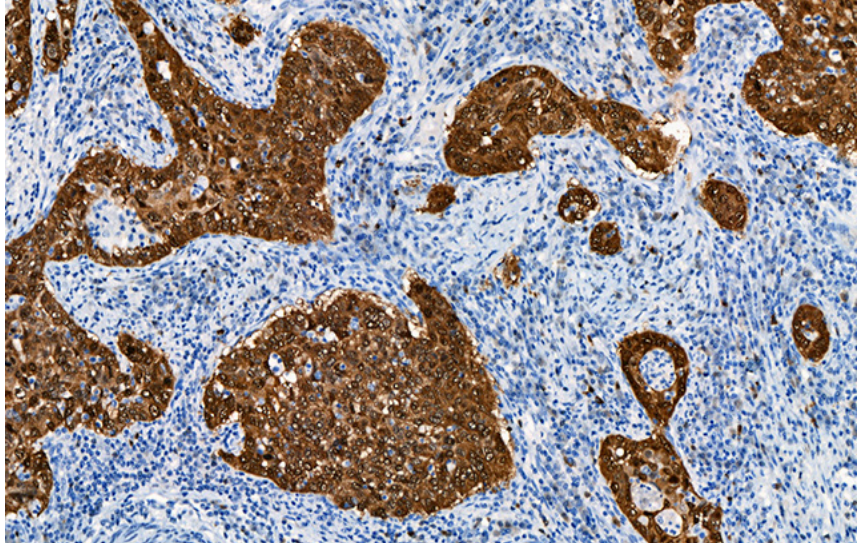
Spirochete infected tissue stained with Treponema pallidum (Spirochete)

Treponema pallidum (Spirochete) IVD

Clone	N/A
Isotype	IgG
Reactivity	N/A
Control	N/A
Catalog Number	ACA 135 A, B, C; APA 135 AA; IPA 135 G10; OPAA 135 T60; ALA 135 G7

Spirochete (Treponema pallidum) is the causative agent of syphilis. In the past, localization of the spirochete agent was achieved with silver stains such as Steiner's and/or Warthin-Starry. Treponema pallidum can now be successfully localized with immunohistochemical techniques in formalin-fi xed, paraffi n-embedded (FFPE) tissue. This offers a substantial advantage over silver techniques. The antibody consists of a rabbit purifi ed IgG fraction and is highly specifi c for spirochete. Treponema pallidum also cross-reacts with burgdorferi (Lyme disease).

1. Hoang MP, High WA, Molberg KH. J Cutan Pathol. 2004 Oct; 31(9):595-9. 2. Phelps RG, et al. Int J Dermatol. 2000 Aug; 39(8):609-13. 3. Quatresooz P, Pierard GE. Appl Immunohistochem Mol Morphol. 2009 Jan; 17(1):47-50. 4. Martin-Ezquerra G, et al. Hum Pathol. 2009 May; 40(5):624-30.



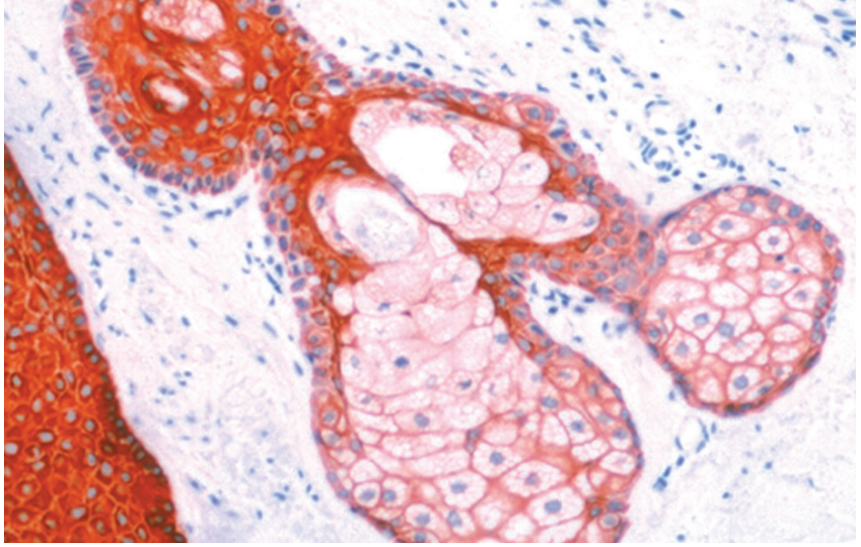
Cervical squamous cell carcinoma stained with p16 INK4a [BC42]

p16 INK4a [BC42] IVD

Clone	BC42
Isotype	IgG1/kappa
Reactivity	Human; others not tested
Control	Normal tonsil, cervical cancer, head and neck cancer and colon cancer
Catalog Number	ACI 3231 A, C; API 3231 AA; OPAI 3231 T60; AVI 3231 G, G25; ALI 3231 G7

p16 INK4a is a tumor suppressor protein involved in the pathogenesis of a variety of malignancies. It is a specific inhibitor of cdk4/cdk6. Recent analyses of the p16 INK4a gene revealed homozygous deletions, nonsense, missense, or frameshift mutations in several human cancers.[1] Although the frequency of p16 INK4a abnormalities is higher in tumor-derived cell lines than in unselected primary tumors, significant subsets of clinical cases with aberrant p16 INK4a gene have been reported among melanomas, gliomas, esophageal, pancreatic, lung, and urinary bladder carcinomas.[2] p16 immunoreactivity in paraffin-embedded tissues has also been shown to be an independent predictor in minimally invasive urothelial bladder cancer; a prognostic factor in non-small cell lung carcinoma; and has been shown to predict a positive response to chemoradiotherapy in Stage IV head and neck squamous cell carcinoma.[3-6]

1. LaPak KM, Burd CE. The molecular balancing act of p16(INK4a) in cancer and aging. Mol Cancer Res. 2014 Feb; 12(2):167-83. 2. Mahajan A. Practical issues in the application of p16 immunohistochemistry in diagnostic pathology. Hum Pathol. 2016 May; 51:64-74. 3. Tong J, et al. Expression of p16 in non-small cell lung cancer and its prognostic significance: A meta-analysis of published literatures. Lung Cancer. 2011 Nov; 74(2):155-63. 4. Chen YJ, et al. High p16 expression predicts a positive response to chemoradiotherapy in stage IVa/b head and neck squamous cell carcinoma. Asian Pac J Cancer Prev. 2011; 12(3):649-55. 5. Snow AN, Laudadio J. Human papillomavirus detection in head and neck squamous cell carcinomas. Adv Anat Pathol. 2010 Nov; 17(6):394- 403. 6. Buza N, et al. Inverse p16 and p63 expression in small cell carcinoma and high-grade urothelial cell carcinoma of the urinary bladder. Int J Surg Pathol. 2010 Apr; 18 (2):94-102. 7. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 “Decontamination of Laboratory Sink Drains to Remove Azide Salts.” 8.



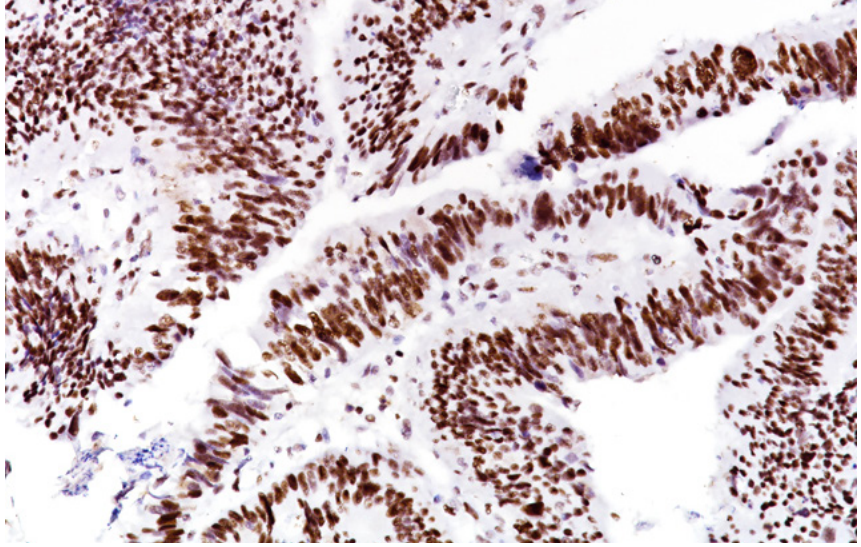
Melanoma stained with MART-1 antibody cocktail

Mart-1 Cocktail IVD

Clone	M2-7C10 + M2-9E3
Isotype	IgG2b + IgG2b
Reactivity	Human; others not tested
Control	Melanoma
Catalog Number	CM 077 A, B, C; PM 077 AA, H; IP 077 G10; OPAI 077 T60

The MART-1/Melan A recognizes a protein of 18 kDa, identified as MART-1 (Melanoma Antigen Recognized by T cells 1) or Melan-A. The MART-1 recognizes a subcellular fraction found in melanosomes. The antibody labels melanomas and tumors showing melanocytic differentiation. It does not mark neoplasms of epithelial origin, lymphomas or mesenchymal tumors. MART-1 is a useful addition to melanoma panels which are specific to melanocytic lesions. Both HMB-45 and MART-1 are coexpressed in the majority of melanomas, as well as solely expressed in certain cases. Studies have shown that MART-1 is more sensitive than HMB-45 when labeling metastatic melanomas.

1. Orchard GE. Melan A (MART-1): a new monoclonal antibody for malignant melanoma diagnosis. Br J Biomed Sci. 1998 Mar; 55(1):8-9. 2. Blessing K, Sanders DS, Grant JJ. Comparison of immunohistochemical staining of the novel antibody Melan-A with S100 protein and HMB-45 in malignant melanoma and melanoma variants. Histopathology. 1998 Feb; 32(2):139-46. 3. Kageshita T, et al. Differential expression of MART-1 in primary and metastatic melanoma lesions. J Immunother. 1997 Nov; 20(6):460-5. 4. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 “Decontamination of Laboratory Sink Drains to Remove Azide Salts.” 5. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



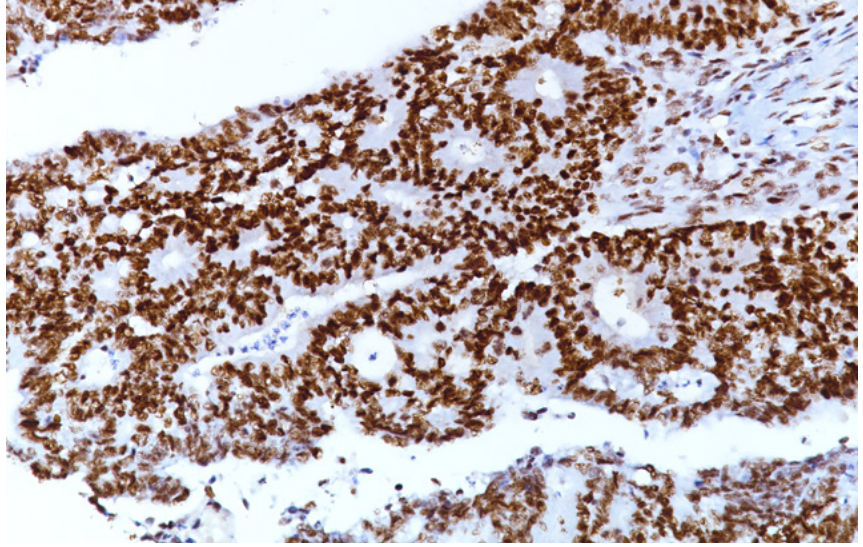
Colorectal carcinoma stained with MSH6 [BC19]

MSH6 [BC19] IVD

Clone	BC19
Isotype	IgG1/Kappa
Reactivity	Human; others not tested
Control	Colon cancer
Catalog Number	ACI 3215 A, C; API 3215 AA, H; AVI 3215 G

MSH6 is a heterodimer of MSH2 and binds to DNA containing G/T mismatches. The MSH2-MSH6 complex recognizes a single-based mispair insertion/deletion loop. An alteration of microsatellite repeats is the result of slippage owing to strand misalignment during DNA replication and is referred to as microsatellite instability (MSI).[1,2] These defects in DNA repair pathways have been related to human carcinogenesis. Studies have shown the mutations in MSH-1, MSH2, MSH6, and PMS2 genes contribute to the development of sporadic colorectal carcinoma. The repair of mismatch DNA is essential to maintaining the integrity of genetic information over time.[1,2] Recently, a heterogeneous pattern of MSH6 expression was described in rare cases of colorectal, endometrial and sebaceous tumors.[1] In this pattern, areas of strong MSH6 expression are juxtaposed with areas of complete loss of expression.

1. Renkonen E, et al. Altered expression of MLH1, MSH2, and MSH6 in predisposition to hereditary nonpolyposis colorectal cancer. J Clin Oncol. 2003; 21:3629-37. 2. Graham RP, et al. Heterogenous MSH6 loss is a result of microsatellite instability within MSH6 and occurs in sporadic and hereditary colorectal and endometrial carcinomas. Am J Surg Pathol. 2015; 39:1370-6. 3. Lee LH, et al. Patterns and prognostic relevance of PD-1 and PD-L1 expression in colorectal carcinoma. Mod Pathol. 2016; 29:1333-42. 4. Le DI, et al. PD-1 blockade in tumors with mismatch-repair deficiency. N Engl J Med. 2015;372:2509-20. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



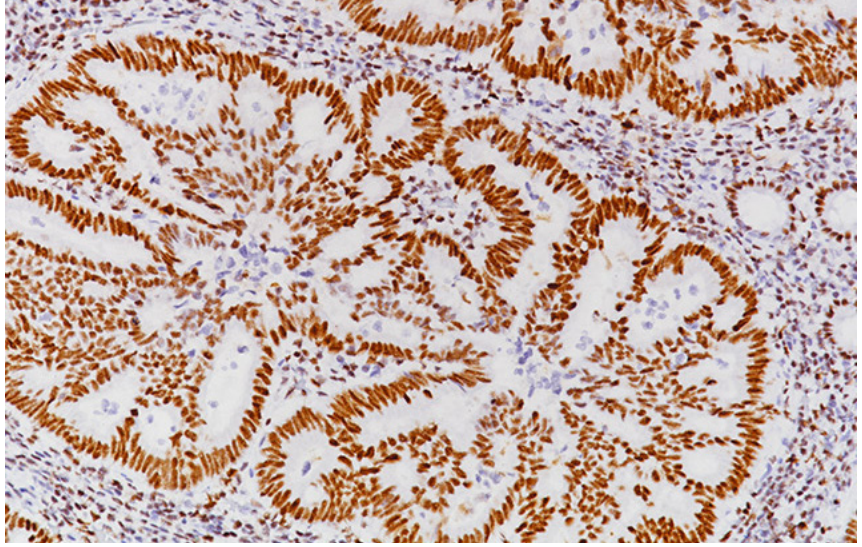
Colorectal carcinoma stained with MLH-1 [BC23] antibody

MLH-1 [BC23] IVD

Clone	BC23
Isotype	IgG1/Kappa
Reactivity	Human; others not tested
Control	Colon cancer
Catalog Number	ACI 3214 A, C; API 3214 AA, H; AVI 3214 G

The BC23 antibody recognizes human and mouse MLH1 (80-85 kDa). The repair of mismatch DNA is essential to maintaining the integrity of genetic information over time. An alteration of microsatellite repeats is the result of slippage owing to strand misalignment during DNA replication and is referred to as microsatellite instability (MSI).[1-3] These defects in DNA repair pathways have been related to human carcinogenesis. The importance of mismatch repair genes became apparent with the identification of the genetic basis for hereditary nonpolyposis colon cancer (HNPC).[1-3] MSH2 is involved in the initial cognition of mismatch nucleotides during the replication mismatch repair process. It is thought that after MSH2 binds to a mismatched DNA duplex it is joined by a heterodimer of MLH1 and PMS2 which together help facilitate the later steps in mismatch repair.[1-3] Patients with colorectal carcinoma that is mismatch-repair-deficient and confirmed with immunohistochemistry

1. Vilkin, A, et al. Immunohistochemistry staining for mismatch repair proteins: the endoscopic biopsy material provides useful and coherent results. Hum Pathol 2015;46:1705–11. 2. Djordjevic B, Broaddus RR. Laboratory assays in evaluation of lynch syndrome in patients with endometrial carcinoma. Surg Pathol Clin 2016;9:289-99. 3. Peiro G, et al. Prognostic relevance of hMLH1, hMSH2, and BAX protein expression in endometrial carcinoma. Mod Pathol. 2001 Aug;14(8):777-83. 4. Lee LH, et al. Patterns and prognostic relevance of PD-1 and PD-L1 expression in colorectal carcinoma. Mod Pathol. 2016;29:1333-42. 5. Le DI, et al. PD-1 blockade in tumors with mismatch-repair deficiency. N Engl J Med. 2015;372:2509-20. 6. Center for Disease Control Manual. Guide: Safety Management, NO. CDC-22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 7. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014.



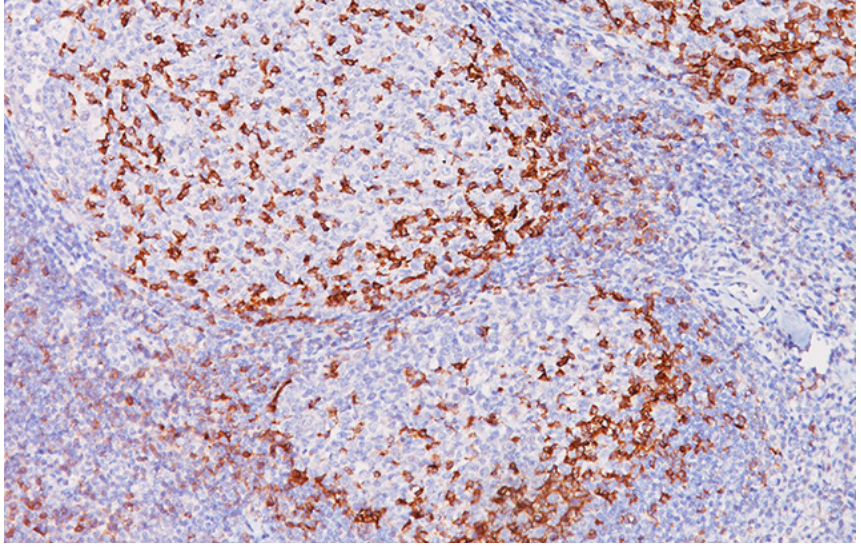
Colon cancer stained with PMS2 antibody

PMS2 IVD

Clone	A16-4
Isotype	IgG1/K
Reactivity	Human; others not tested
Control	Placenta
Catalog Number	CM 344 AK, BK; PM 344 AA, H; IPI 344 G10 OPAI 344 T60; AVI 344 G

The PMS2 post meiotic segregation increased 2 gene is located on chromosome number 7. The gene product of PMS2 forms a heterodimer with MLH1 that interacts with MSH2 bound to mismatched bases in DNA. MSH2 is a protein of 934 aa (100 kDa) localized to the cell nucleus. MSH2 functions as one of the four major DNA mismatch repair genes along with PMS2, MLH1 and PMS1. Mutations in these genes are associated with hereditary nonpolyposis colon cancer (HNPCC), one of the most common hereditary diseases in man. Immunohistochemistry studies have further determined that the microsatellite instability phenotype in endometrial carcinoma is linked to defects in the MLH1/PMS2 gene. Patients with colorectal carcinoma that is mismatch-repair-deficient and confirmed with immunohistochemistry (IHC) (MSH2/MSH6 negative or MLH1/PMS2 deleted) have shown objective response to PD-1 antibody, pembrolizumab.[6] PD-L1 IHC test has been

1. Cohn DE, et al. Correlation between patient weight and defects in DNA mismatch repair: is this the link between an increased risk of previous cancer in thinner women with endometrial cancer? Int J Gynecol Cancer. 2008 Jan-Feb;18(1):136-40. 2. Modica I, et al. Utility of immunohistochemistry in predicting microsatellite instability in endometrial carcinoma. Am J Surg Pathol. 2007 May;31(5):744-51. 3. Sordet C, Goetz J, Sibilia J. Contribution of autoantibodies to the diagnosis and nosology of inflammatory muscle disease. Joint Bone Spine. 2006 Dec;73(6):646-54. 4. Balogh GA, Heulings RC, Russo J. The mismatch repair gene hPMS2 is mutated in primary breast cancer. Int J Mol Med. 2006 Nov;18(5):853-7. 5. Halvarsson B, et al. The added value of PMS2 immunostaining in the diagnosis of hereditary nonpolyposis colorectal cancer. Fam Cancer. 2006;5(4):353-8. 6. Lee, LH, et al. Patterns and prognostic relevance of PD-1 and PD-L1 expression in colorectal carcinoma. Mod Pathol. 2016;29:1333-42. 7. Le, DI, et al. PD-1 blockade in tumors with mismatch-repair deficiency. N Engl J Med. 2015;372:2509-20. 8. Center for



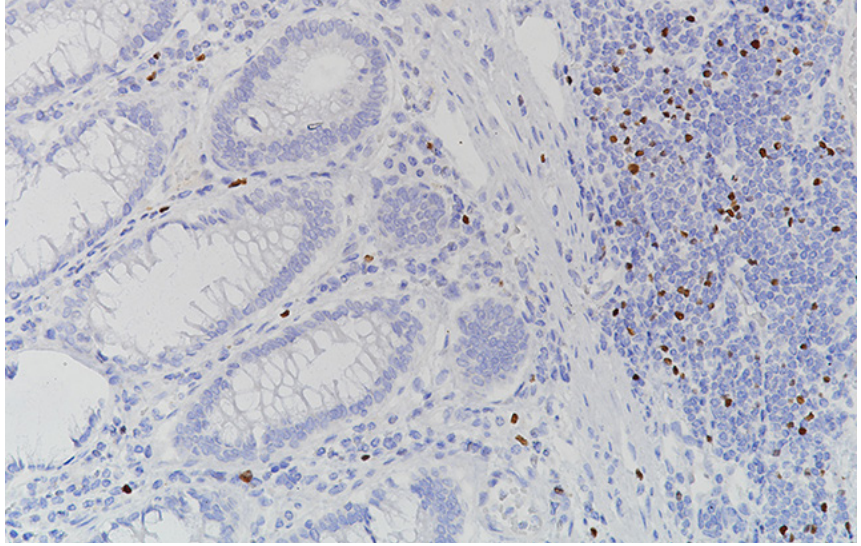
Tonsil stained with PD-1 [CAL20] antibody

PD-1 [CAL20] IVD

Clone	CAL20
Isotype	IgG1
Reactivity	Human; others not tested
Control	Tonsil
Catalog Number	ACI 3224 A, B; API 3224 AA

Programmed death 1 (PD-1) is a cell surface co-receptor member of the CD28/CTLA-4 family, and functions as a downregulator of the immune system through a dual mechanism of inhibition.[1] PD-1 is expressed on the cell surface of activated T- and B-cells. Anti-tumor immunity may be controlled by the PD-1/PD-L1 signaling pathway. PD-L1, one of the ligands associated with PD-1, provides immunity for tumor cells by inducing apoptosis of activated T cells or by inhibiting cytotoxic T cells.[1,2] Therapies that target the PD-1 receptor have shown unprecedented results with high levels of clinical response in patients with various cancer types.[2,3] The presence of PD-1 positive tumorinfiltrating lymphocytes (TIL) has been associated with poor prognosis in human breast cancers and may be useful in antibody therapy targeting the PD-1/PD-L1 signaling pathway.[1] Treatments targeting PD-1 and its ligand, PD-L1, have also shown encouraging results in melanoma, non-small-cell

1. Muenst S, et al. The presence of programmed death 1 (PD-1)-positive tumor-infiltrating lymphocytes is associated with poor prognosis inhuman breast cancer. Breast Cancer Res Treat. 2013 Jun; 139(3):667-76. 2. Kim JW, Eder JP. Prospects for Targeting PD-1 and PD-L1 in Various Tumor Types. Oncology. (Williston Park). 2014 Nov; 28(11 Suppl 3). 3. Tumeh PC, et al. PD-1 blockade induces responses by inhibiting adaptive immune resistance. Nature. 2014 Nov 27; 515(7528):568-71. 4. D'Incecco A, et al. PD-1 and PD-L1 expression in molecularly selected non-small cell lung cancer patients. Br J Cancer. 2015 Jan 6; 112(1):95-102. 5. Tykodi SS. PD-1 as an emerging therapeutic target in renal cell carcinoma: current evidence. Onco Targets Ther. 2014 Jul 25; 7:1349-59. 6. Yang G, et al. A multiplex IHC evaluation of multiple immune checkpoint receptors and mismatch repair proteins in colorectal carcinoma [abstract]. In: Proceedings of the American Association for Cancer Research Annual Meeting 2018; 2018 Apr 14-18; Chicago, IL. Philadelphia (PA): AACR; Cancer Res 2018;78(13 Suppl):Abstract nr 1026. 7. Center for Disease Control



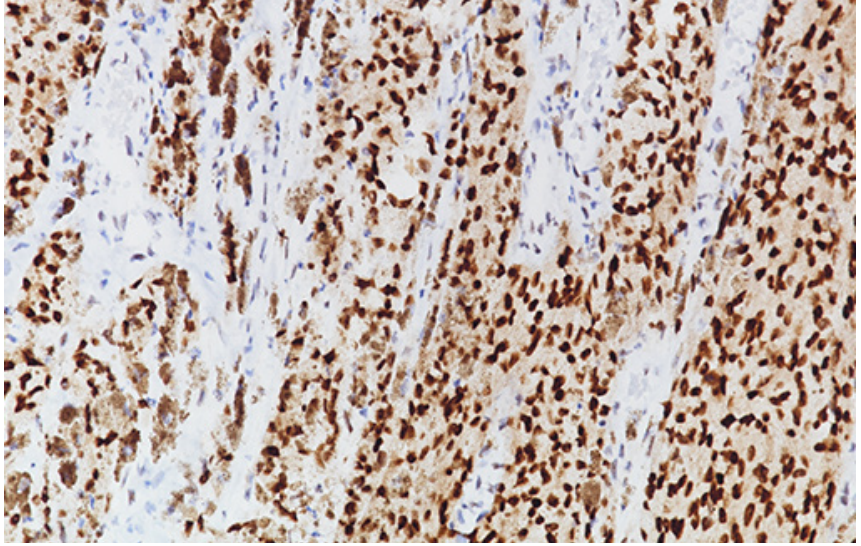
Normal colon stained with FOXP3 [86D] antibody

FOXP3 [86D] IVD

Clone	86D
Isotype	IgG1
Reactivity	Human; others not tested
Control	Colon cancer and tonsil
Catalog Number	ACI 3197 A, C; API 3197 AA

FOXP3 is a forkhead transcription factor family member involved in Tcell regulation, activation and differentiation. FOXP3 has been shown to be a master control gene for the development and function of CD4+/CD25+ regulatory T-cells. In IHC, FOXP3 has been shown to be a specific marker for adult T-cell leukemia/lymphoma.[1] In melanoma and in breast and lung cancers, high numbers of circulating regulatory T cells have been associated with disease progression.[2-5] Conversely, the infiltration of FOXP3+ regulatory T cells into invasive tumors has also been reported to be associated with survival in a variety of cancers.[2-7] In colon cancers, a high frequency of FOXP3+ infiltrates has shown to be a positive indicator.[6-7] Patients with high FOXP3 expression in Crohn's disease have shown a better response to infliximab therapy.[8] In allography recipients, FOXP3 cell levels may also be useful in improving post-transplant management.[9]

1. Roncador G, et al. FOXP3, a selective marker for a subset of adult T-cell leukaemia/lymphoma. Leukemia. 2005 Dec; 19(12):2247-53. 2. Gerber AL, et al. High expression of FOXP3 in primary melanoma is associated with tumor progression. Br J Dermatol. 2014 Jan; 170(1):103-9. 3. Ali HR, et al. Association between CD8+ T-cell infiltration and breast cancer survival in 12,439 patients. Ann Oncol. 2014 Aug; 25(8):1536-43. 4. Liu H, et al. Tumor-infiltrating lymphocytes predict response to chemotherapy in patients with advance non-small cell lung cancer. Cancer Immunol Immunother. 2012 Oct; 61(10):1849-56. 5. Tao H, et al. Density of tumor-infiltrating FOXP3+ T cells as a response marker for induction chemoradiotherapy and a potential prognostic factor in patients treated with trimodality therapy for locally advanced non-small cell lung cancer. Ann Thorac Cardiovasc Surg. 2014; 20(6):980-6. 6. Ling A, et al. The intratumoural subsite and relation of CD8(+) and FOXP3(+) T lymphocytes in colorectal cancer provide important prognostic clues. Br J Cancer. 2014 May 13; 110(10):2551-9. 7. Frey DM, et al. High



Melanoma stained with PRAME [EPR20330] antibody

PRAME [EPR20330] IVD

Clone	EPR20330
Isotype	IgG
Reactivity	Human; others not tested
Control	Melanoma, normal testis
Catalog Number	ACI 3252 A, B; API 3252 AA, H; OPAI 3252 T60; ALI 3252 G7; AVI 3252 G, G25

PRAME (preferentially expressed antigen in melanoma) is located on chromosome 22q11.22 and encodes a 509 amino acid protein. PRAME is an autosomal cancer-testis antigen (CTA) gene. PRAME is expressed in melanoma, various nonmelanocytic malignant neoplasms, including nonsmall cell lung cancer, breast carcinoma, renal cell carcinoma, ovarian carcinoma, leukemia, synovial sarcoma, and myxoid liposarcoma. Normal healthy tissues are not known to express PRAME except for testis, ovary, placenta, adrenals, and endometrium.[1,2] PRAME is one of the most widely studied CTAs and has been associated with the outcome and risk of metastasis. PRAME is currently being investigated as a novel immunotherapy target and diagnostic marker with ongoing clinical trials that include Hodgkin's disease, leukemia, multiple myeloma, breast cancer, pancreatic cancer, brain cancer.[3,4]

1. Zhang W, et al. PRAME expression and promoter hypermethylation in epithelial ovarian cancer. Oncotarget, 2016 Jul; 7(29):45352-69. 2. Lezcano C, et al. PRAME expression in melanocytic tumors. Am J Surg Pathol. 2018 Nov; 42(11):1456–65. 3. Salmaninejad A, et al. Cancer/testis antigens: expression, regulation, tumor invasion and use in immunotherapy cancers. Immunol Invest. 2016 Oct; 45(7):619-40. 4. Al-Khadairi G, Decock J. Cancer testis antigens and immunotherapy: where do we stand in the targeting of PRAME? Cancers. 2019 Jul; 11(7):984. 5. Center for Disease Control Manual. Guide: Safety Management, NO. CDC22, Atlanta, GA. April 30, 1976 "Decontamination of Laboratory Sink Drains to Remove Azide Salts." 6. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline-Fourth Edition CLSI document M29-A4 Wayne, PA 2014

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Product Name	Source	Clone	Status	Catalog Number
Arginase-1		BC28	IVD	AVI 3058 G
bcl-2		100/D5	IVD	AVI 003 G
Bcl-6 [LN22]		LN22	IVD	AVI 410 G
Ber-EP4		Ber-EP4	IVD	AVI 107 G
BRAF V600E [VE1]		VE1	IVD	AVI 3248 G
Breast Cocktail (CKHMW/p63+CK7/8/18)		34βE12 + 4A4 + BC1 + 5D3	IVD	AVI 3203 DSK G; G25
CA19-9		121SLE	IVD	AVI 123 G
CD10		56C6	IVD	AVI 129 G
CD138		B-A38	IVD	AVI167G
CD25 [RM418]		RM418	IVD	AVI 3265 G
CD3		EP41	IVD	AVI 324 G
CD3 (mono)		PS1	IVD	VP 110 G
CD34		QBEnd/10	IVD	AVI 084 G
CD68 (KP1)		KP1	IVD	AVI 033 G
CDH17 (M)		1H3	IVD	AVI 3111 G
CDX2 [BC39]		BC39	IVD	AVI 3184 G
Chromogranin A		LK2H10 + PHE5	IVD	AVI 010 G
CK5/14 + p63 + CK7/18		XM26 + LL002 + 4A4 + BC1 + EP30 or E431-1	IVD	VP 360 DSKG
Cytokeratin HMW [34Be12]		34βE12	IVD	AVI 127 G
Cytokeratin 5/6 (CK 5/6)		CK5/6.007	IVD	AVI 105 G
Cytokeratin LMW (8/18)		5D3	IVD	AVI 056 G
E-Cadherin		HECD-1	IVD	AVI 170 G
ERG		9FY	IVD	VP 421G

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Product Name	Source	Clone	Status	Catalog Number
Factor XIIIa		E980.1	IVD	AVI 357 G
GATA-3 + Uroplakin II Ventana		L50-823 + BC21	IVD	AV 3173 G
Glucagon		N/A	IVD	AVI 3276 G
H3K27ME3 [C36B11]		C36B11	IVD	AVI 3249 G
Herpes Simplex Virus 1 & 2		N/A	RUO	AVR 108 G
HLA-DR [TAL 185]		TAL 1B5	IVD	AVI 3273 G
HMB45 Melanoma		HMB45	IVD	AVI 057 G
HMB45 + MART-1 + Tyrosinase		HMB45 + M2-7C10 + M2-9E3 + T311	IVD	VP 165 G
Ki-67		SP6	IVD	AV 325 G
Ki-67 [MIB-1]		MIB-1	IVD	AVI 3156 G
Mart-1 + Tyrosinase + SOX10		M2-9E3 + T311 + BC34	IVD	AVI 3216 G
Melan A (M)		A103	IVD	AVI 3114 G; G25
Melanoma Cocktail		HMB45 + M2-7C10 + M2-9E3	IVD	VP 078 G
Microphtalmia Transcription Factor (MiTF)		34CA5	IVD	AVI 423 G
MLH-1 [BC23]		BC23	IVD	AVI 3214 G
MLH1		G168-15	IVD	AVI 220 G
MOC-31		MOC-31	IVD	AVI 403 G
MSH2		FE11	IVD	AVI 219 G
MSH6		44	IVD	AVI 265 G
MSH6 [BC19]		BC19	IVD	AVI 3215 G
Napsin A		TMU-Ad02	IVD	AVI 388 G
Napsin A		N/A	IVD	AVI 434 G
NKX3.1 [D2Y1A]		D2Y1A]	IVD	AVI 3260 G

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Product Name	Source	Clone	Status	Catalog Number
OX40/CD134		EPR23001-88	IVD	AVI 324 5G
p16 INK4a		BC42	IVD	AVI 3231 G; G25
p40		N/A	IVD	AVI 3030 G
p40 (M)		BC28	IVD	AVI 3066 K H; G
p53		EP9	IVD	AVI 298 G
p63		4A4	IVD	VP 163 G; G25
p63 + P504S		4A4 + N/A	IVD	VP 201 G; G25
Pan Cyto (AE1-AE111)		AE1 + AE3	IVD	VP 011 G, G25
Pan Cyto (AE1-AE3-5D3)		AE1/AE3 + 5D3	IVD	AVI 162 G
Pan Cytokeratin (Lu-5)		Lu-5	IVD	VP 043 G
Pan Melanoma Cocktail-2		M2-7C10 + M2-9E3 + T311	IVD	AVI 178 G
PAN TRK [RM423]		RM423	IVD	AVI 3267 G
PAX8 (M)		BC12	IVD	AVI 438 G
PCNA (PC10)		PC10	IVD	AVI 3255 G
PD-L1 6ML		CAL10	IVD	AVI 3171 G
PMS2		A16-4	IVD	AVI 344 G
PRAME [EPR20330]		EPR20330	IVD	AVI 3252 G
PRAME [EPR20330]		EPR20330]	IVD	AVI 3252 G25
Prostate Cocktail CK5+CK14+p63		XM26+LL002 +4A4	IVD	AVI 3206 G
PSAP [rACPP/1338]		rACPP/1338	IVD	AVI 3263 G
S100 Protein [4C4.9]		4C4.9	IVD	AVI 3237 G
SALL4		6E3	IVD	AVI 384 G
SOX10		BC34	IVD	AVI 3099 H; G

Product Name	Source	Clone	Status	Catalog Number
SOX11 (M)		SOX11-C1	IVD	AVI 3120 G
STAG1		N/A	IVD	AVI 3250 G
Synaptophysin		27G12	IVD	AVI 371 G
TIA-1		TIA-1	IVD	AVI 130 G
TIGIT [BC41]		BC41	IVD	AVI 3254 G
TTF-1 [SPT24]		SPT24	IVD	AVI 3126 G
Uroplakin II		BC21	IVD	AVI 3051 K G; G25
Vimentin		M9	IVD	AVI 048 G
VP CDX2		CDX2-88	IVD	VP 226 G
WT1		rWT1/857	IVD	AVI 3238 G

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Product Name	Source	Clone	Status	Catalog Number
BAP1		N/A	IVD	ALI 3247 G7
Bcl-6 [LN22]		LN22	IVD	ALI 410 G7
c-Myc		EP121	IVD	ALI 415 G7
CD117/c-kit 7mL		EP10	IVD	ALI 296 G7
CD20 (L26)		L26	IVD	ALI 004 G7
CD25 [RM418]		RM418	IVD	ALI 3265 G7
CD3 [BC33]		BC33	IVD	ALI 3170 G7
CD3 T-cell (M)		PS1	IVD	ALI 110 G7
CD34		QBEnd/10	IVD	ALI 084 G7
CD68 [KP1]		KP1	IVD	ALI 033 G7
CD99		EP8	IVD	ALI 392 G7
CDX2		CDX2-88	IVD	ALI 226 G7
CK HMW + p63 + AMACR (RM)		13H4, 34BE12, 4A4	IVD	ALI 3154 G7
CK5/14 + p63 + CK7/18		XM26 + LL002 + 4A4 + BC1 + EP30 or E43	IVD	ALI 360 G7
Cyclin D1		EP12	IVD	ALI 432 G7
Cyclin D1		SP4	IVD	ALI 307 G7
Cytokeratin 20 (CK20)		Ks20.8	IVD	ALI 062 G7
Cytokeratin 7 (CK7)		OV-TL 12/30	IVD	ALI 061 G7
Cytokeratin HMW (34BE12)		34βE12	IVD	ALI 127 G7
Cytokeratin LMW (8/18)		5D3	IVD	ALI 056 G7
Estrogen Receptor (ER) [SP1]		SP1	ASR RUO	ALA 301 G7
GATA-3		L50-823	IVD	ALI 405 G7
Glucagon		N/A	IVD	ALI 3276 G7

Q Series

Product Name	Source	Clone	Status	Catalog Number
H3K27me3 [C36B11]		C36B11	IVD	ALI 3249 G7
Helicobacter pylori		BC7	ASR	ALA 383 G7
HLA-DR [TAL 185]		TAL 1B5	IVD	ALI 3273 G7
HMB45+MART-1+TYROSINASE		HMB45, M2-7C10 + M2 – 9E3, T311	IVD	ALI 165 G7
HMW CK Cocktail+p63 (Basal Cell Cocktail)		XM26 + LL002 + 4A4	IVD	ALI 210 G7
Ki-67 (R)		SP6	IVD	ALI 325 G7
Ki-67 [MIB-1]		MIB-1	IVD	ALI 3256 G7
MART-1 Cocktail		M2-7C10 + M2-9E3	IVD	ALI 077G7
Melan A		A103	IVD	ALI 3114 G7
MLH-1		G168-15	IVD	ALI 220 G7
MSH2		FE11	IVD	ALI 219 G7
MUM-1		BC5	IVD	ALI 352 G7
NKX3.1 [D2Y1A]		D2Y1A	IVD	ALI 3260 G7
p16 INK4a [BC42] IVD		BC42	IVD	ALI 3231 G7
p40 (P)		N/A	IVD	ALI 3030 G7
p40 (M)		BC28	IVD	ALI 3066 G7
P504S		N/A	ASR	ALA 200 G7
p63		4A4	IVD	ALI 163 G7
Pan Cytokeratin [AE1/AE3]		AE1/AE3	IVD	ALI 011 G7
PAN TRK [RM423]		RM423	IVD	ALI 3267 G7
PAX5		BC/24	IVD	ALI 207 G7
PAX8 (M)		BC12	IVD	ALI 438 G7
PMS2		A16-A	IVD	ALI 344 G7

Q Series

Product Name	Source	Clone	Status	Catalog Number
PRAME [EPR20330]		EPR20330	IVD	ALI 3252 G7
Prostate Specific Antigen (PSA)		EP109	IVD	ALI 390 G7
PSAP [rACPP/1338]		rACPP/1338	IVD	ALI 3263 G7
PTEN		6H2.1	IVD	ALI 278 G7
ROS1 [EPMGHR2]		EPMGHR2	IVD	ALI 3240 G7
S100 Protein [4C4.9] (M)		4C4.9	IVD	ALI 3237 G7
SOX10		IgG1	IVD	ALI 3099 G7
STAG1		N/A	IVD	ALI 3250 G7
Treponema Pallidum		N/A	ASR	ALA 135 G7

BIOCARE
MEDICAL

Instrumentation

ONCORE™ PRO

RELIABLE. AUTOMATED. COMPACT.

Complete Benchtop IHC & ISH Automation

ONCORE Pro expands the possibilities of your laboratory with the capability to perform IHC and ISH (both FISH and CISH) in a single benchtop platform.

The ONCORE Pro Automated Slide Staining System now performs fully automated ISH so you can run your FISH probes and CISH probes with full automation and the convenience of a compact bench-top system.

ONCORE™ PRO

Complete Benchtop IHC Automation

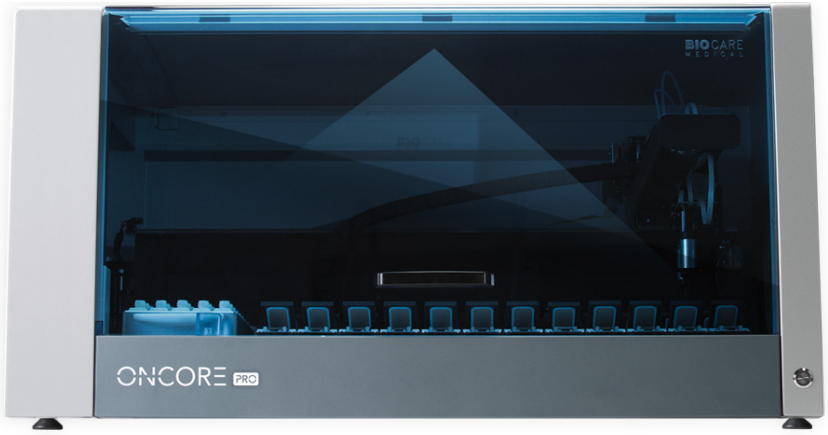
The in vitro diagnostic (IVD) labeled ONCORE Pro Automated Slide Staining System is a compact powerhouse for any clinical laboratory. ONCORE Pro opens a world of possibilities to perform IHC, ISH, FISH, and CISH in a single compact benchtop platform. The ONCORE Pro processes up to 36 slides in a single run, with the ability to perform independent protocols at each slide position for high-throughput slide processing.

Slide processing is facilitated by unique reaction modules that enclose slides between a heated platform and a novel reagent containment chamber. Reagents are dispensed onto slides through a port attached to each chamber, allowing for minimal reagent usage and waste production. These unique chambers provide gentle agitation to enhance incubation throughout the staining procedure, maximizing staining intensity while minimizing background. The ONCORE Pro also accommodates simultaneous Multiplex IHC, allowing fast and efficient processing of multiple IHC markers on a single slide.

ONCORE Pro fully automates the staining process utilizing advanced online antigen retrieval technology, pre-optimized reagents, and ready to use antibodies to enhance laboratory workflow, increase laboratory efficiency, and reduce hands-on processing time. Solve modern-day challenges facing your laboratory now and in the future with the advanced automation of ONCORE Pro.

ONCORE Pro expands the possibilities of your laboratory with the capability to perform IHC and ISH (both FISH and CISH) in a single benchtop platform.

Ordering Information	Catalog Number
ONCORE Pro Automated Slide Staining Platform	ONCPRO0001



Instrument Specifications	
Slide Capacity	36 slides
Reagent Rack	One reagent rack holds a maximum of 40 reagent vials
AR Temperature Range	Room temperature to 103°C; Max 110°C at Sea Level
Multi-Dispensing Syringe Capacity	5mL
Dispense Volume	Antibody: 130uL; Reagent: 65 minimum - 400 µl maximum
DePar Dispense Volume	DS1 - 240uL and DS2 - 200uL
Carboys & Waste	Wash Buffer (2L), Hazardous (4L), Non-Hazardous Waste (4L)
Unit Control	One Instrument Per Computer
Instrument Weight	125lbs (57 kgs)
Instrument Dimensions	36.5" x 22 in x 24 in / 93 cm x 56 cm x 61 cm (Door Closed) 36.5 in x 36 in x 24 in / 93 cm x 91 cm x 61 cm (Door Open)
Electrical Requirements	120V 110/120V (±10%) 60Hz (±2Hz) 850 watts 220V 220/240V (±10%) 50Hz (±2Hz) 850 watts
Voltage Tolerance	100 to 240 AC
Noise Rating	Minimum Noise 47.0 dBA, Maximum Noise 69.6 dBA
Reports	Slide Barcode, Patient Information, Staining Runs
LIS	HL7 Server Connection and MSSQL Database Connection

ONCORE Reagents & Ancillaries

ONCORE Pro Detection	Catalog Number	Volume
ONCORE Pro Universal HRP Detection	OPRI6062T60	60 Tests
ONCORE Pro Rabbit HRP Detection (DAB)	OPRI6008T60	60 Tests
ONCORE Pro Rabbit AP Detection (Fast Red)	OPRI6043T60	60 Tests
ONCORE Pro Multiplex Detection 2	OPRI6045T60	60 Tests
ONCORE Pro Multiplex Detection 1	OPRI6061T60	60 Tests
ONCORE Pro Mouse HRP Detection (DAB)	OPRI6007T60	60 Tests
ONCORE Pro Mouse AP Detection (Fast Red)	OPRI6044T60	60 Tests
ONCORE Pro Mouse AMP HRP Detection (DAB)	OPRI6050T60	60 Tests
ONCORE Pro ISH HRP Detection	OPRI6047KT60	60 Tests
ONCORE Pro Fast Red Chromogen	OPRI6042KT60	60 Tests
ONCORE Pro DAB Chromogen	OPRI6056KT180	180 Tests
ONCORE Pro Ancillaries	**Catalog Number**	**Volume**
ONCORE Pro Wash Buffer	OPRI6012MM	1,000 ml
ONCORE Pro Universal Negative Control Serum	OPRI6013T60	60 Tests
ONCORE Pro Slide Labels (2500)	IPS60040	2,500
ONCORE Pro Slide Labels	ONC172	1000 slide labels
ONCORE Pro Label Printer Ribbon	ONC173	3000 slide labels
ONCORE Pro Improv Reagent Vials (7mL)	ONCPR101JJ/L	50 or 100 vials
ONCORE Pro Improv Reagent Vials (15mL)	ONCPR102JJ/L	50 or 100 vials
ONCORE Pro Dewax Solution Kit	OPRI6004K	60 Tests
ONCORE Pro AR2	OPRI6006T60	60 Tests
ONCORE Pro AR1	OPRI6005T60	60 Tests
CAT Hematoxylin	CATHE-M	500 ml
ONCORE Pro Cleaning	**Catalog Number**	**Volume**
ONCORE Pro Chamber Cleaning Kit	OPRI6031K	Approx. 288 Slides
ONCORE Pro Tubing Cleaning Kit	OPRI6036K	Approx. 500 Slides

ONCORE™ PRO Antibodies

Product Name	Catalog Number
AMACR (RM)	OPAA3024T60
ATRX	OPAI3251T60
Bcl-2	OPAI003T60
Bcl-6 [LN22]	OPAI410T60
Ber-EP4	OPAI107T60
Breast Cocktail (CKHMW/p63 + CK7/8/18)	OPAI3203T60
c-erbB-2/HER2	OPAA342T60
c-Myc	OPAI415T60
Calretinin	OPAI092T60
CD10	OPAI129T60
CD117/c-kit	OPAI296T60
CD20 [L26]	OPAI004T60
CD25 [RM418]	OPAI3265T60
CD3	OPAI324T60
CD3 [BC33]	OPAI3170T60
CD3 T-Cell	OPAI110T60
CD34	OPAI084T60
CD68 [KP1]	OPAI033T60
CD8 [C8/144B]	OPAI3160T60
CD99	OPAI392T60
CDX2	OPAI226T60
Chromogranin A	OPAI010T60
CK HMW + p63 + AMACR (RM)	OPAI3154T60
CK5/14 + p63 + CK7/18	OPAI360T60

Product Name	Catalog Number
CK5/14 + p63 + P504S	OPAI225DST60
CK5+p63	OPAI235T60
Cyclin D1	OPAI432T60
Cyclin D1 Rabbit	OPAI307T60
Cytokeratin 18 (CK18)	OPAI3061T60
Cytokeratin 20 (CK20)	OPAI062T60
Cytokeratin 5/6	OPAI105T60
Cytokeratin 7 (CK7)	OPAI061T60
Cytokeratin HMW [34BE12]	OPAI127T60
Cytokeratin LMW [8/18]	OPAI056T60
Cytomegalovirus (CMV)	OPAA118T60
D2-40	OPAI266T60
E-cadherin	OPAI170T60
ERG	OPAI421T60
Estrogen Receptor (ER)[1D5]	OPAA054T60
Estrogen Receptor (ER)[SP1]	OPAA301T60
Factor XIIIa	OPAI357T60
GATA-3	OPAI405T60
Glucagon	OPAI3276T60
Glycophorin A [JC159]	OPAI3272T60
H3K27ME3 [C36B11]	OPAI3249T60
Helicobacter pylori	OPAI383T60
HLA-DR [TAL 185]	OPAI3273T60
HMB45	OPAI057T60

ONCORE™ PRO Antibodies

Product Name	Catalog Number
HMB45 + MART-1 + Tyrosinase	OPAI165T60
HMW CK Cocktail + p63 (Basal Cell Cocktail)	OPAI210T60
Ki-67	OPAI325T60
Ki-67 [MIB-1]	OPAI3156T60
Leukocyte Common Antigen (LCA) Cocktail	OPAI016T60
MART-1 Cocktail	OPAI077T60
MCM2 + TOP2A	OPAI3181T60
MHL-1	OPAI220T60
MOC-31	OPAI403T60
MSH2	OPAI219T60
MSH6	OPAI265T60
MUM-1	OPAI352T60
Napsin A	OPAI388T60
NKX3.1	OPAI422T60
NKX3.1 [D2Y1A]	OPAI3260T60
NPM1	OPAI3281T60
p16 INK4a [BC42]	OPAI3231T60
p40 (M)	OPAI3066T60
p40 (P)	OPAI3030T60
P504S (P)	OPAA200T60
p53	OPAI298T60
p63	OPAI163T60
Pan Cytokeratin [AE1/AE3]	OPAI011T60
Pan Cytokeratin Plus [AE1/AE3 + 8/18]	OPAI162T60

Product Name	Catalog Number
Pan Melanoma + Ki-67	OPAI362T60
PAN TRK [RM423]	OPAI3267T60
PAX5	OPAI207T60
PAX8	OPAI379T60
PAX8 (M)	OPAI438T60
PD-L1	OPAI3171T60
PMS2	OPAI344T60
PRAME [EPR20330]	OPAI3252T60
Prostate Specific Antigen (PSA)	OPAI390T60
PSAP [rACPP/1338}	OPAI3263T60
PTEN (Tumor Suppressor)	OPAI278T60
S100 Protein [4C4.9]	OPAI3237T60
Smooth Muscle Action (SMA)	OPAI001T60
SOX10 (M)	OPAI3099T60
STAG1	OPAI3250T60
STAT6 [YE361]	OPAI3244T60
Synaptophysin	OPAI371T60
TIA-1	OPAI130T60
TRBC1	OPAI3280T60
Treponema pallidum (Spieochete)	OPAA135T60
TTF-1 [SPT24]	OPAI3126T60
Uroplakin II	OPAI3051T60

ONCORE™ PRO FISH

Dive into in situ hybridization (ISH) with Biocare's new automated FISH probes for ONCORE Pro. Biocare's sequence-specific probes offer superior labeling technology and are available for several cancer and disease states – yielding precise results with less ambiguity. Biocare's del-TECT™ probe design virtually eliminates error due to the truncation artifact in FFPE tissues giving you more confidence in less time. ONCORE Pro gives you the power to automate both your IHC and FISH applications on a single instrument in a single lab. Immediately transition from running IHC to FISH using our automated PathoFISH and CytoFISH kits. Use PathoFISH on FFPE tissues and CytoFISH for urine-based samples. Run times for FISH can be completed in as little as 3.5 hours, making FISH accessible to every laboratory.

FISH Probes

Product Name	Probe Type	Catalog Number
PTEN del-TECT Four Color	PathoFISH	OPPR 7326 T30
TMPRSS2 /ERG del-TECT Four Color	PathoFISH	OPPR 7327 T30
ALK/EML del-TECT Four Color	PathoFISH	OPPR 7328 T30
NKX/MYC del-TECT Four Color	PathoFISH	OPPR 7329 T30
PTEN/ERG 2+2 Multiplex Four Color	PathoFISH	OPPR 7331 T30
ROS1 (6q22) Break Apart Orange/Green	PathoFISH	OPPR 7332 T30
ALK (2p23.2) Break Apart Orange/Green	PathoFISH	OPPR 7333 T30
RET (10q11.21) Break Apart Orange/Green	PathoFISH	OPPR 7334 T30
TP53 (17p13) Orange + Copy Control 17 Green	PathoFISH	OPPR 7339 T30
IGH (14q32) Break Apart Orange/Green	PathoFISH	OPRR 7340 T30
MET (7q31) Orange + Copy Control 7 Green	PathoFISH	OPPR 7341 T30
MYC (8q24) Orange + Copy Control 8 Green	PathoFISH	OPPR 7342 T30
MLL Break Apart Orange/Green	PathoFISH	OPPR 7343 T30
CytoFISH Multiplex FISH Probe	CytoFISH	OPPR 7344 T30

FISH Kits & Ancillaries

Product Name	Product Type	Catalog Number
ONCORE Pro FISH Kit	PathoFISH Reagents	OPRR 6064K T60
ONCORE Pro CytoFISH Kit	CytoFISH Reagents	OPRR 6068K T60
ONCORE Pro ISH Dewax Kit	FISH Reagent	OPRI 6020K T60

ISH Probes

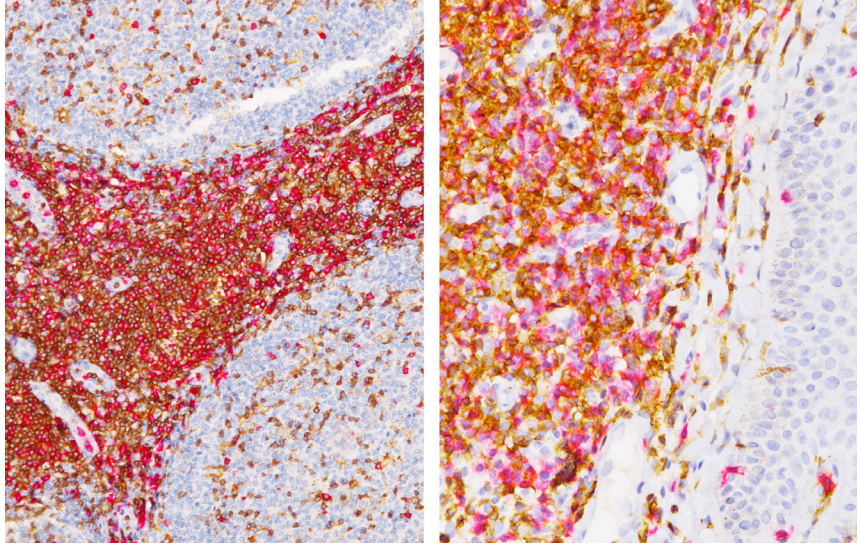
Product Name	Probe Type	Catalog Number
HPV Type 6 Probe (Digoxigenin)	HPV Probe	BPR 4045 T60
HPV Type 11 Probe (Digoxigenin)	HPV Probe	BPR 4046 T60
HPV Type 16 Probe (Digoxigenin)	HPV Probe	BPR 4047 T60
HPV Type 18 Probe (Digoxigenin)	HPV Probe	BPR 4048 T60
HPV Type 31 Probe (Digoxigenin)	HPV Probe	BPR 4051 T60
HPV Type 51 Probe (Digoxigenin)	HPV Probe	BPR 4052 T60

ISH Kits & Ancillaries

Product Name	Product Type	Catalog Number
ISH Retrieval (AR3)	ISH Retrieval	OPRI 6021 T60
ONCORE Pro ISH HRP Detection	ISH Detection	OPRI 6047K T60
ONCORE Pro ISHzyme Kit	ISH Pretreatment	OPRI 6039K T120
ONCORE Pro SSC Wash Buffer	Wash Buffer	OPRI 4039 T60

BIOCARE
MEDICAL

Multiplex IHC



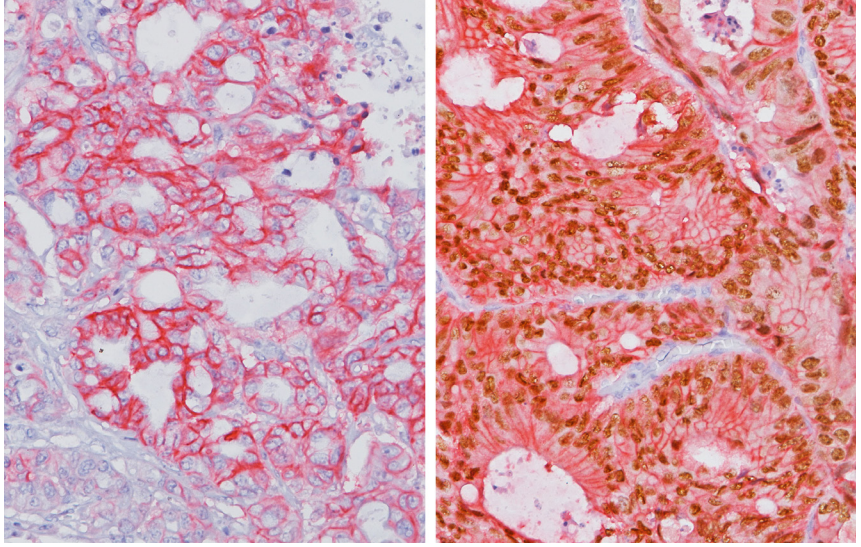
(L) Tonsil stained with CD4 + CD8 / (R) Mycosis fungoides stained with CD4 + CD8

CD4 + CD8 IVD

Clone	4B12 + SP16
Isotype	IgG1/kappa + IgG
Reactivity	Human; others not tested
Control	Mycosis fungoides and normal tonsil
Catalog Number	API 3157DS AA

CD4 + CD8 is helpful in distinguishing mycosis fungoides, a common form of cutaneous T-cell lymphoma. CD4 is found in 80% of thymocytes and in 45% of peripheral blood lymphocytes. CD4 is expressed in the majority of T-cell lymphomas, including mycosis fungoides. CD8 is an important marker in the analysis of T-cell mediated inflammatory dermatoses and for mycosis fungoides. CD8 can be used with CD4, CD56, and TIA-1 for identifying subsets of inflammatory skin diseases. CD4 and CD8 have also been shown to be valuable in squamous cell cervical cancer and gastric mucosa in HIV infection. Multiplex IHC may also give distinct advantages if ratios and/or cell counts on a single slide are desired.

1. Boone SL, Guitart J, Gerami P. G Ital Dermatol Nenereol. 2008 Dec;143(6):409-14. 2. Hodak E , et al. J Am Acad Dermatol. 2006 Aug;55(2):276-84. 3. Tirumalae R, Panjwani PK. Indian J Dermatol. 2012 Nov;57(6):424-7. 4. Harvell JD, Nowfar-Rad M, Sundram U. J Cutan Pathol. 2003 Feb;30(2):108-13. 5. Shi Z, et al. Za Zhi. 2009 Aug;23(4):261-4. 6. Shah W, et al. Cell Mol Immunol. 2011 Jan;8(1):59-66. 7. Barth TF, et al. Virchows Arch. 2000 Apr; 436(4):357-64.



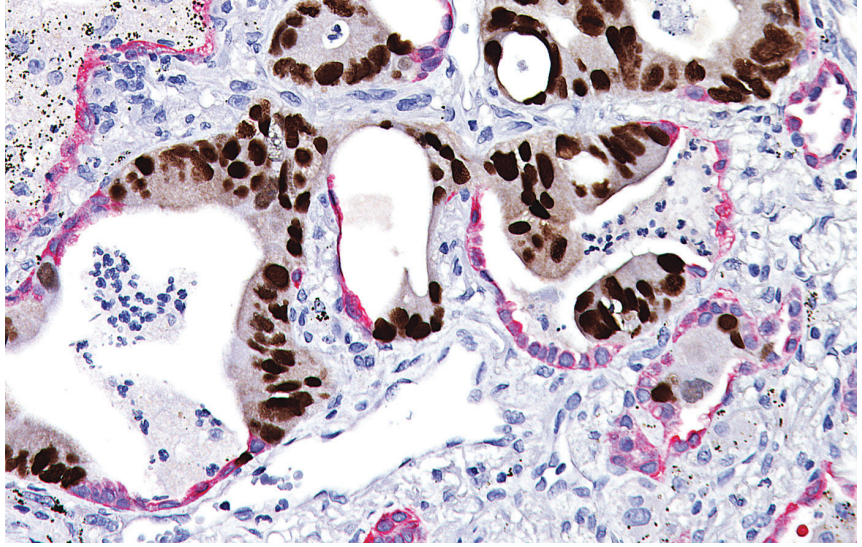
(L) Colon cancer stained with CDH17 (+) and CDX2 (-) / (R) Colon cancer stained with CDH17 (+) and CDX2 (+)

CDX2 (M) + CDH17 (RM) IVD

Clone	CDX2-88 + EP86
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Normal colon or colon cancer
Catalog Number	API 3135DS AA

CDX2 has been useful in establishing gastrointestinal origin of metastatic adenocarcinomas and carcinoids. CDX2 has been shown to be more specifi c and more sensitive than Villin or CK20. CDH17 is a highly specifi c marker in colon cancer and is a more sensitive marker than CDX2 and CK20. Data suggests that the combination of CDX2 and CDH17 along with CK7 may improve specifi city compared to the panel consisting of CK20, CDX2, Villin and CK7. Compared to CDX2 or CK20 alone, the combination of CDX2 and CDH17 is highly sensitive and somewhat specifi c for colorectal and stomach adenocarcinoma in routine immunohistochemistry, especially in cases with a CK7-/CDX2-/CK20- carcinoma.

1. Werling RW, et al. Am J Surg Pathol. 2003 Mar; 27(3):303-10. 2. Saad RS, et al. Appl Immunohistochem Mol Morphol. 2009 May; 17(3):196-201. 3. Bayrak R, Haltas H, Yenidunya S. Diagn Pathol. 2012 Jan 23; 7:9. 4. Panarelli NC, et al. Am J Clin Pathol. 2012 Aug; 138(2):211-22. 5. Lin F, et al. Arch Pathol Lab Med. 2014 Aug; 138 (8):1015-26.



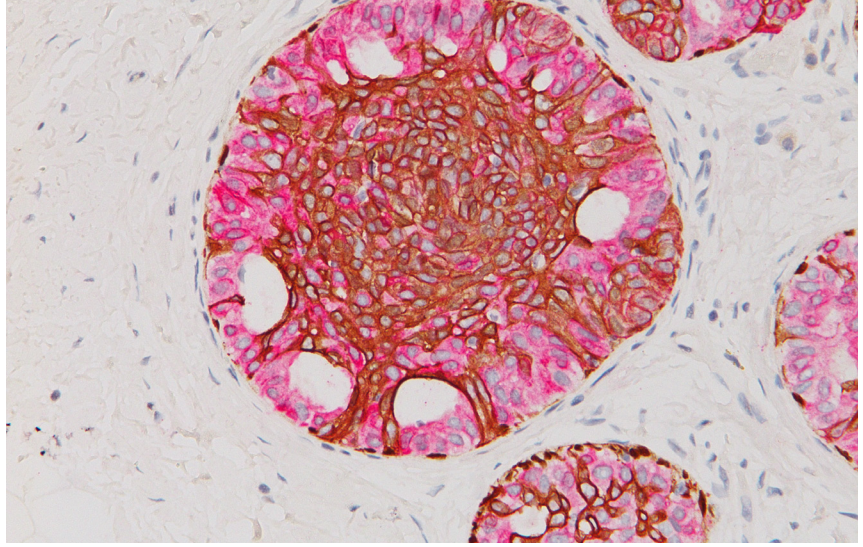
Colon cancer metastasized into lung tissue stained with CDX2 + CK7

CDX2 + CK7 IVD

Clone	CDX2-88 + BC1
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Colon, breast, ovary and lung cancers
Catalog Number	PM 367DS AA, H

Studies show CDX2 is a sensitive marker for colonic carcinoma metastatic to the ovary and is also expressed in mucinous ovarian carcinomas. CDX2 is not expressed by serous and endometrioid carcinomas making it more specific than CK20. CDX2 is reported to be advantageous over CK20 for distinguishing primary ovarian tumors from metastases of upper gastrointestinal tract origin. Cytokeratin 7 (CK7) shows expression in primary ovarian tumors and metastases of upper gastrointestinal tract origin. A CDX2 and CK7 panel may help in distinguishing colonic carcinomas metastatic to the ovaries from primary ovarian carcinomas.

1. Kim MJ. J Korean Med Sci. 2005 Aug; 20(4):643-8. 2. Vang R, et al. Mod Pathol. 2006 Nov; 19(11):1421-8. 3. Werling RW, et al. Am J Surg Pathol. 2003 Mar; 27(3):303-10. 4. Raspollini MR, et al. Appl Immunohistochem Mol Morphol. 2004 Jun; 12(2):127-31. 5. Groisman GM, Meir A, Sabo E. Int J Gynecol Pathol. 2004 Jan; 23(1):52-7.



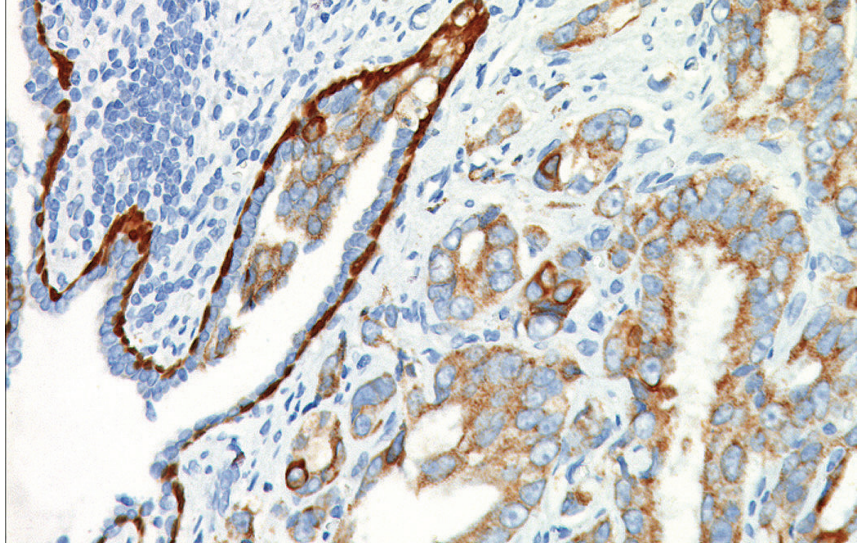
Breast tissue stained with CK5/14 + p63 + CK7/18

CK5/14 + p63 + CK7/18 IVD

Clone	XM26 / LL002 + 4A4 + BC1 / EP30
Isotype	IgG1, kappa / IgG3 + IgG2a, kappa + IgG / IgG
Reactivity	Human; others not tested
Control	Breast carcinoma
Catalog Number	PM 360DS AA, H; VP 360DSK G

IHC markers CK5, CK14, p63, CK7 and CK18 complement morphological evaluation of breast lesions due to the differential expression of the luminal (CK7/8) vs. basal and myoepithelial markers (CK5/14, p63). Usual ductal hyperplasia is associated with positive basal cells markers intermixed with positive luminal cells. Most atypical ductal hyperplasia and low grade ductal carcinoma in situ cases are basal marker negative and luminal marker positive. These antibodies, in combination with hematoxylin and eosin (H&E), have been shown to significantly increase diagnostic inter-observer agreement among pathologists.

1. Hicks DG. Appl Immunohistochem Mol Morph. 2011 Dec; 19(6):501-5. 2. Jain RK, et al. Mod Pathol. 2011 Jul; 24(7):917-23. 3. Tacha DE, et al. Mod Pathol. 2009 Jan; 22(Suppl 1s):388A. 4. Moriya T, et al. Med Mol Morphol. 2006 Mar; 39(1):8-13.



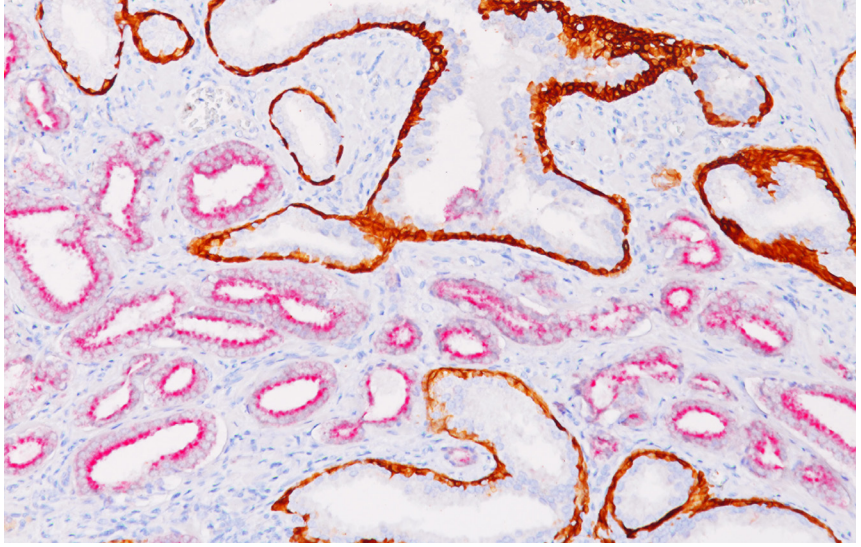
Prostate cancer and PIN stained with CK5/14 + p63 + P504S

CK5/14 + p63 + P504S* IVD

Clone	XM26 / LL002 + 4A4 + N/A
Isotype	IgG1,kappa / IgG3 + IgG2a,kappa + N/A
Reactivity	Human; others not tested
Control	Normal prostate and prostatic adenocarcinoma
Catalog Number	PPM 225DS AA, H; IPR 225DS G10

In prostate tissue, mRNA for CK5 and CK14 has been detected in the basal cells of normal glands and prostatic intraepithelial neoplasia (PIN), a precursor lesion to prostatic adenocarcinoma; however, expression of CK5 or CK14 was not identified in invasive prostatic adenocarcinoma. p63 was detected in the basal epithelium in normal prostate glands but was not expressed in malignant tumors of the prostate. In IHC, P504S has been shown to be a specific marker of prostatic adenocarcinoma. Additionally, prostate glands involved in PIN have been found to express P504S, whereas P504S was nearly undetectable in benign glands. U.S. Patent 8,603,765 and patents pending. *Previously known as PIN-4™

1. Tacha DE, Miller RT. Appl Immunohistochem Mol Morphol. 2004 Mar; 12(1):75-8. 2. Tacha DE, et al. Mod Pathol. 2009 Jan; 22(Supplement 1s):388A. 3. Signoretti S, et al. Am J Pathol. 2000 Dec; 157(6):1769-75. 4. Beach R, et al. Am J Surg Pathol. 2002 Dec; 26(12):1588-96. 5. Luo J, et al. Cancer Res. 2002 Apr; 62(8):2220-6. 6. Wang Y, et al. Differentiation. 2001 Oct; 68(4-5):270-9. 7. Tokar EJ, et al. Differentiation. 2005 Dec; 73(9-10):463-73. 8. Collins AT, et al. J Cell Sci. 2001 Nov; 114(Pt 21):3865-72.



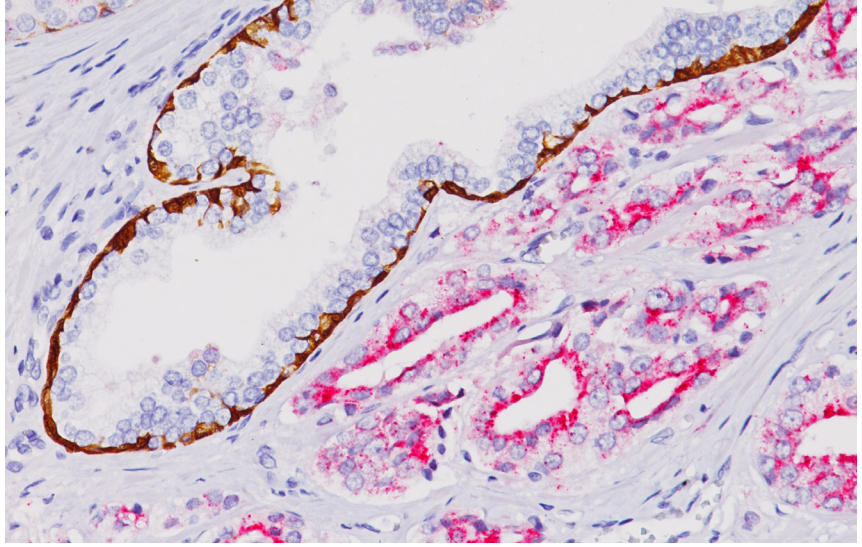
Prostate cancer stained with CK HMW + p63 + AMACR (RM)

CK HMW + p63 + AMACR (RM) IVD

Clone	34-E12 + 4A4 + 13H4
Isotype	IgG1/kappa + IgG2a/kappa + IgG
Reactivity	Human; others not tested
Control	Normal prostate and prostatic adenocarcinoma
Catalog Number	API 3154DS AA, H; IPI 3154DS G10

In prostate, CK HMW [34βE12] has been shown to be a useful marker of basal cells of normal glands and prostatic intraepithelial neoplasia (PIN). p63 was detected in nuclei of the basal epithelium in normal prostate glands but is not expressed in malignant tumors of the prostate. α-Methylacyl coenzyme A racemase (AMACR), also known as P504S, is a specific marker of prostatic adenocarcinoma and was nearly undetectable in benign glands. Combinations of CK HMW [34βE12], p63, and/or AMACR may be useful in the evaluation of normal prostate glands, PIN and prostatic adenocarcinoma.
U.S. Patent 8,603,765 and patents pending.

1. Bostwick DG, Qian J. Mod Pathol. 2004 Mar; 17(3):360-79. 2. Humphrey PA. J Clin Pathol. 2007 Jan; 60(1):35-42. 3. Shah RB, et al. Am J Surg Pathol. 2002 Sep; 26(9):1161-8. 4. Signoretti S, et al. Am J Pathol. 2000 Dec; 157(6):1769-75. 5. Rubin MA, et al. JAMA. 2002 Apr 3; 287(13):1662-70. 6. Zhou M, et al. Am J Surg Pathol. 2002 Jul; 26(7):926-31. 7. Wu CL, et al. Hum Pathol. 2004 Aug; 35(8):1008-13. 8. Shah RB, et al. Am J Clin Pathol. 2004 Oct; 122(4):517 -23. 9. Sung MT, et al. Hum Pathol. 2007 Feb; 38(2):332-41.



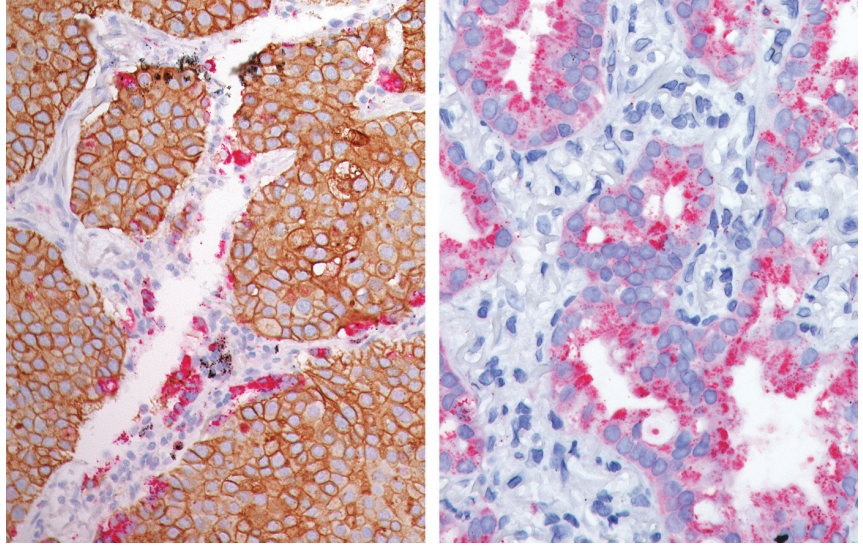
Prostate cancer stained with CK HMW + p63 + AMACR (RM)

CK HMW + p63 + AMACR (RM) RUO

Clone	34βE12 + 4A4 + 13H4
Isotype	IgG1/kappa + IgG2a/kappa + IgG
Reactivity	Human; others not tested
Control	Normal prostate and prostatic adenocarcinoma
Catalog Number	OAR 3123 T60

In prostate, CK HMW [34βE12] has been shown to be a useful marker of basal cells of normal glands and prostatic intraepithelial neoplasia (PIN). p63 was detected in nuclei of the basal epithelium in normal prostate glands but is not expressed in malignant tumors of the prostate. α-Methylacyl coenzyme A racemase (AMACR), also known as P504S, is a specific marker of prostatic adenocarcinoma and was nearly undetectable in benign glands. Combinations of CK HMW [34βE12], p63, and/or AMACR may be useful in the evaluation of normal prostate glands, PIN and prostatic adenocarcinoma.
U.S. Patent 8,603,765 and patents pending.

1. Humphrey PA. J Clin Pathol. 2007 Jan; 60(1):35-42. 2. Signoretti S, et al. Am J Pathol. 2000 Dec; 157(6):1769-75. 3. Wu CL, et al. Hum Pathol. 2004 Aug; 35(8):1008-13. 4. Shah RB, et al. Am J Clin Pathol. 2004 Oct; 122(4):517-23. 5. Sung MT, et al. Hum Pathol. 2007 Feb; 38(2):332-41.



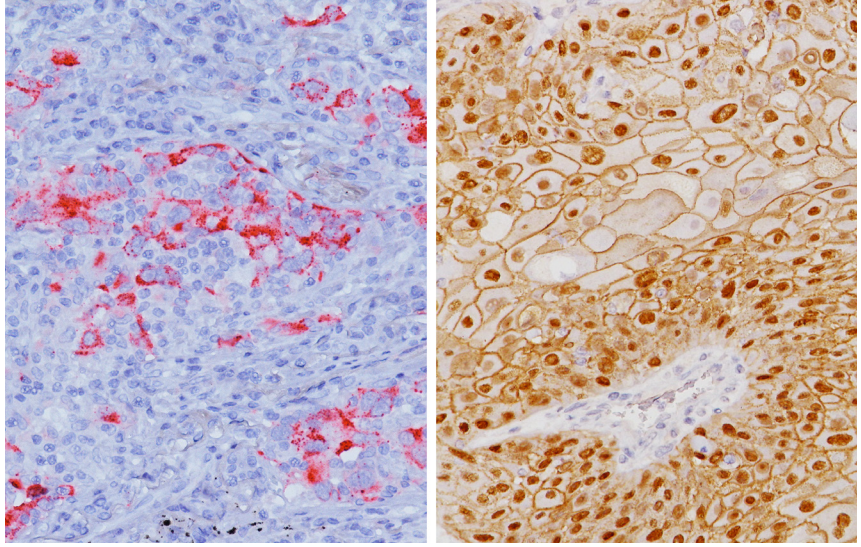
Lung SqCC (L) and Lung ADC (R) stained with Desmoglein 3 + Napsin A

Desmoglein 3 + Napsin A IVD

Clone	BC11 + N/A
Isotype	IgG1 + N/A
Reactivity	Human; others not tested
Control	Lung squamous cell carcinoma or lung adenocarcinoma
Catalog Number	PPM 428DS AA

Desmoglein 3 (DSG3) + Napsin A are very sensitive and specific markers, and may be useful for discriminating between lung SqCC and lung adenocarcinoma. DSG3 is a membrane stain that marks lung SqCC while Napsin A is a cytoplasmic stain that marks lung adenocarcinomas. In the vast majority of lung cancers tested, only a single antibody stain was observed. Coexpression of both antibodies may be observed in adenosquamous cell carcinomas and Napsin A staining is observed in some cases of residual normal lung. In grades 1-2, Desmoglein 3 + Napsin A provide staining sensitivity in the mid 90% range.

1. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012 May; 20(3):201-7. 2. Agackiran Y, et al. Appl Immunohistochem Mol Morphol. 2012 Jul; 20(4):350-5. 3. Tacha D, et al. Mod Pathol. 2011 Feb; 24(Suppl 1s):425A. 4. Tacha D, et al. Mod Pathol. 2010 Feb; 23(Suppl 1s):414A. 5. Terry J, et al. Am J Surg Pathol. 2010 Dec; 34(12):1805-11. 6. Savci-Heijink CD, et al. Am J Pathol. 2009 May; 174(5):1629-37.



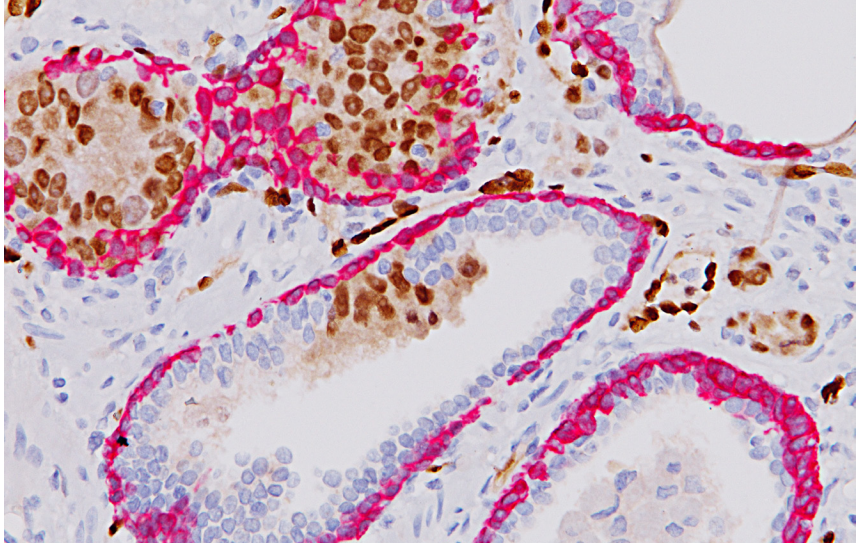
Lung adenocarcinoma (L) and lung squamous cell carcinoma (R) stained with DSG3 + p40 + Napsin A

DSG3 + p40 (M) + Napsin A (RM) IVD

Clone	BC11 + BC28 + BC15
Isotype	IgG1 + IgG1 + IgG
Reactivity	Human; others not tested
Control	Lung squamous cell carcinoma and lung adenocarcinoma
Catalog Number	API 3132DS AA

In lung squamous cell carcinoma (SqCC), Desmoglein 3 (DSG3) has demonstrated a sensitivity of 85-100%, and an ability to discriminate lung adenocarcinoma (ADC) with a specificity of 98-100%. p40 [BC28] is selectively expressed in lung SqCC with diminished reactivity in lung ADC compared to p63. The combination of both membrane (DSG3) and nuclear (p40) staining may increase overall sensitivity for lung SqCC (4,5). Napsin A is extremely specific for lung ADC vs. lung SqCC.

1. Savci-Heijink CD, et al. Am J Pathol. 2009 May; 174(5):1629-37. 2. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012 May; 20(3):201-7. 3. Brown AF, et al. Arch Pathol Lab Med. 2013 Sep; 137(9):1274-81. 4. Agackiran Y, et al. Appl Immunohistochem Mol Morphol. 2012 Jul;20(4):350-5. 5. Bishop JA, et al. Mod Pathol. 2012 Mar; 25(3):405-15. 6. Tacha D, et al. Arch Pathol Lab Med. 2014 Oct; 138(10):1358-64.



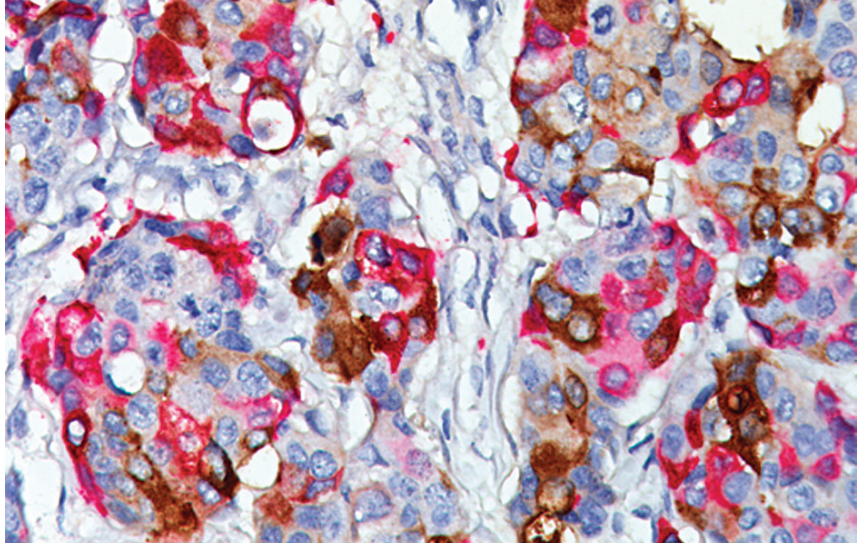
ERG positive prostate cancer stained with ERG-2™ (ERG + CK5)

ERG-2™ (ERG + CK5) IVD

Clone	9FY + EP42
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	ERG positive prostate cancer or PIN glands
Catalog Number	API 437DS AA

Studies show a 96.5% concordance between the TMPRSS2:ERG rearrangement and ERG-positive prostatic intraepithelial neoplasia (PIN) and ERG positive carcinoma in prostatectomy specimens. CK5 stains normal basal cell layers in prostate, benign prostate hyperplasia (BPH) and PIN. The combination of ERG + CK5 provides a unique stain that helps to visualize ERG positive PINs. U.S Patent 8,765,916 and patents pending.
Note: ERG [9FY] was developed by the Center for Prostate Disease Research in association with the Henry M. Jackson Foundation, Rockville, Maryland.

1. Kumar-Sinha C, et al. Nat Rev Cancer. 2008; 8(7):497-511. 2. Furusato B, et al. Prostate Cancer Prostatic Dis. 2010; 13(3):228-37. 3. Mohamed AA, et al. J Cancer. 2010; 1:197-208. 4. Miettinen M, et al. Am J of Surg Pathol. 2011; 25(3):432-41. 5. Dalfior D, et al. Pathology. 2010; 42(1):1-5. 6. Abrahams NA, et al. Am J Clin Pathol. 2003; 120(3):368-76.



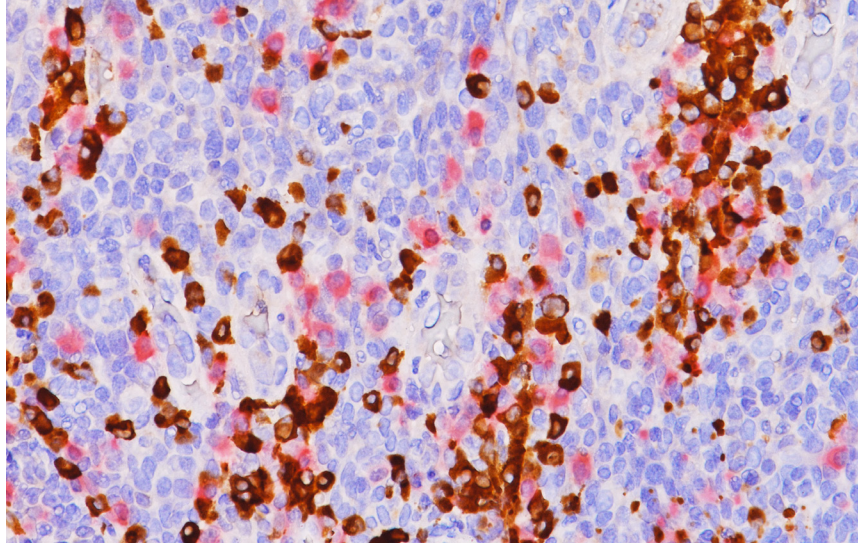
Breast cancer stained with GCDFP-15 + Mammaglobin

GCDFP-15 + Mammaglobin IVD

Clone	D6 + 31A5
Isotype	IgG2a + IgG
Reactivity	Human; others not tested
Control	Breast
Catalog Number	PM 317DS AA

Numerous studies have shown GCDFP-15 to be a specific marker for breast cancer. Mammaglobin is also a specific and sensitive marker known to be overexpressed in human breast cancer. In normal breast tissue, it labels breast ductal and lobular epithelial cells. Mammaglobin is expressed in 50-60% of metastatic breast cancers while GCDFP-15 is expressed in approximately 20-25%. Mammaglobin is reported to be a more sensitive marker than GCDFP-15 for breast carcinoma; however, it lacks the specificity of GCDFP-15. The combination of GCDFP-15 and Mammaglobin may help to establish the correct interpretation of metastatic breast carcinoma. U.S. Patent 8,603,765 and patents pending.

1. Bhargava R, Beriwal S, Dabbs DJ. Am J Clin Pathol. 2007 Jan; 127(1):103-13. 2. Wick MR, et al. Hum Pathol. 1989 Mar; 20(3):281-7. 3. Han JH, et al. Arch Pathol Lab Med. 2003 Oct; 127(10):1330-4.



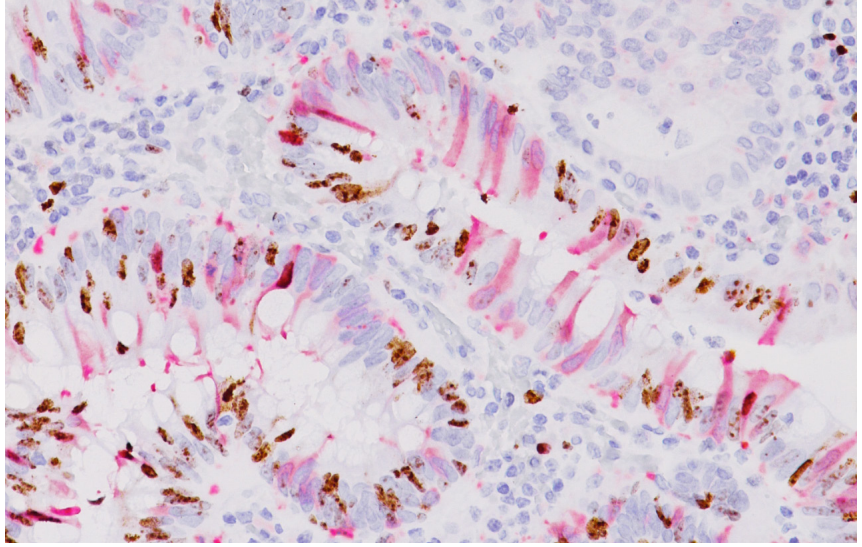
Tonsil stained with Kappa (M) + Lambda (P)

Kappa (M) + Lambda (P) IVD

Clone	L1C1 + N/A
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Tonsil or bone marrow
Catalog Number	API 3159DS AA

Kappa and Lambda antibodies are usually run together on two separate tissues. In normal tissue, the Kappa and Lambda cell ratio is approximately 2:1. The double stain antibody allows the investigator to simultaneously see both Kappa (M) (brown) and Lambda (P) (red) on the same tissue section, thus allowing the end-user a more accurate and easier assessment of both stains. It is reportedly useful in the identification of myelomas, plasmacytomas, and certain non-Hodgkin's lymphomas. The most common feature of these malignancies is the restricted expression of a single light chain class. Demonstration of clonality in lymphoid infiltrates may indicate that the infiltrate is malignant.

1. Samoszuk MK, et al. Diagn Immunol. 1985; 3(3):133-8. 2. Bray M, Alper MG. Am J Clin Pathol. 1983 Oct; 80(4):526-8. 3. Sobol RE, et al. Clin Immunol Immunopathol. 1982 Jul; 24(1):139-44. 4. Falini B, et al. J Histochem Cytochem. 1982 Jan; 30(1):21-6.



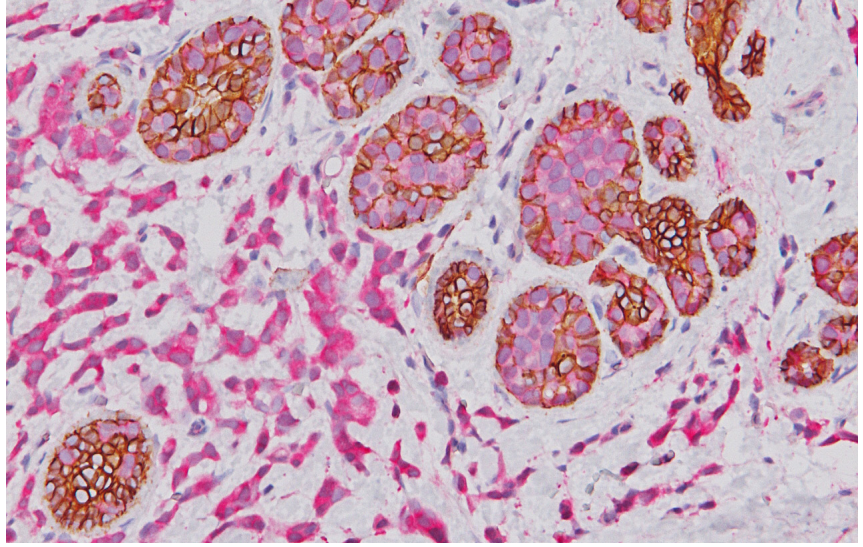
Colon cancer stained with Ki-67 + Caspase-3

Ki-67 + Caspase-3 IVD

Clone	DVB-2 + N/A
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Tonsil or colon cancer
Catalog Number	PPM 240DS AA

Ki-67 + Caspase-3 can provide information on cell proliferation vs. cell death in the same tissue section. Ki-67 is associated with cell proliferation and is used to grade proliferation rates of tumors. Ki-67 is found throughout the cell cycle that includes the G1, S, G2 and M phases; but not the G0 phase. Apoptosis has importance in the study of many biological processes, including neoplasia, neurodegenerative diseases and development. Cleaved Caspase-3 detects endogenous levels of the large fragment of activated Caspase-3, a protease that mediates apoptosis. Caspase-3 does not cross react with other cleaved caspases.

1. Gown AM, Willingham MC. J Histochem Cytochem. 2002 Apr; 50(4):449-54. 2. Bouzubar N, et al. Br J Cancer. 1989 June; 59(6):943-7. 3. Brown RW, et al. Clin Cancer Res. 1996 Mar; 2(3):585-92. 4. Veronese SM, et al. Cancer. 1993 Jun; 71(12):3926-31. 5. Wang L, et al. Zhong Nan Da Xue Xue Bao Yi Xue Ban. 2008 Mar; 33(3):222-6. 6. Chrysomali E, et al. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2003 Nov; 96(5):566-72.



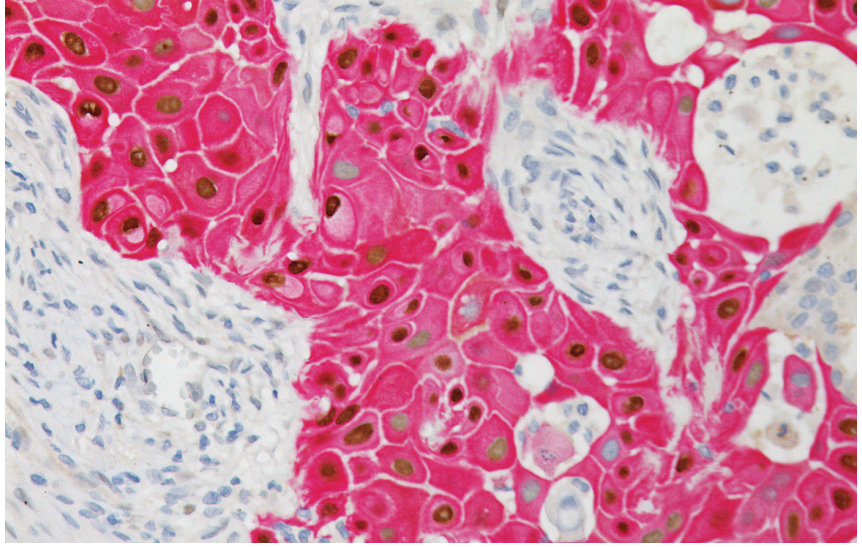
Lobular hyperplasia with invasive lobular carcinoma stained with p120 + E-cadherin

p120 + E-cadherin IVD

Clone	98/pp120 + EP6
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Breast cancer
Catalog Number	API 3011DS AA

Studies have shown that E-cadherin, a negative membrane marker for lobular neoplasia, is useful in the distinction of ductal neoplasia vs. lobular neoplasia; however as a negative marker for lobular carcinoma, it can be difficult to interpret. p120 displays membrane staining in ductal cell carcinoma and cytoplasmic staining in lobular carcinoma. Studies have shown accurate categorization of ductal vs. lobular neoplasia in the breast with p120 Catenin + E-cadherin and helped give further clarification in the separation of low-grade ductal carcinoma in situ from lobular neoplasia.

1. Esposito NN, et al. Mod Pathol. 2007 Jan; 20(1):130-8. 2. Dabbs DJ, et al. Am J Surg Pathol. 2007 Mar; 31(3):427-37. 3. Bellovin DI, et al. Cancer Res. 2005 Dec; 65(23):10938-45. 4. de Dues Moura R, et al. AIMM. 2013; 21(1):1-12.



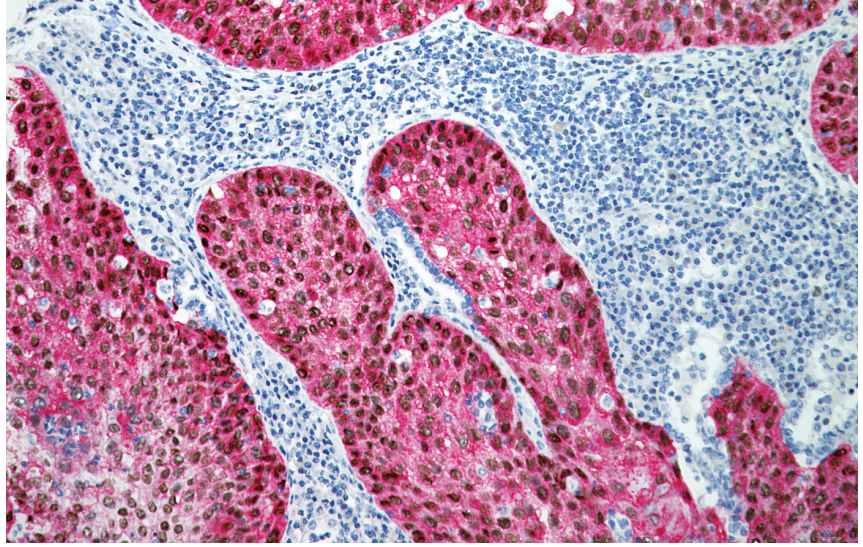
Squamous cell carcinoma stained with p63 + CK5

p63 + CK5 IVD

Clone	4A4 + EP42
Isotype	IgG2a / kappa + IgG
Reactivity	Human; others not tested
Control	Lung squamous cell carcinoma
Catalog Number	PM 391DS AA

In-house studies have shown that greater than 80% of squamous cell carcinoma of the lung was positive for p63 and CK5, and other studies have shown that the combination of p63 and CK5 was useful for differentiating adenocarcinoma (100% specificity and 82% sensitivity) from squamous cell carcinoma (89% specificity and 79% sensitivity). When used in a panel with TTF-1 + Napsin A, p63 + CK5 should prove useful for analysis of poorly differentiated lung adenocarcinomas vs. squamous cell carcinomas in formalin-fixed, paraffin-embedded (FFPE) tissues.

1. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012 May; 20(3):201-7. 2. Khayyata S, et al. Diagn Cytopathol. 2009 Mar; 37(3):178-83. 3. Kargi A, Gurel B, Tuna B. Appl Immunohistochem Mol Morphol. 2007 Dec; 15(4):415-20. 4. Rekhtman N, et al. Mod Pathol. 2011 Oct; 24(10):1348-59. 5. Tacha D, Yu C, Haas T. Mod Pathol. 2011 Feb; 24(Suppl 1s):425A 6. Tacha D, Zhou D, Henshall-Powell RL. Mod Pathol. 2010 Feb; 23(Suppl 1s):414A.



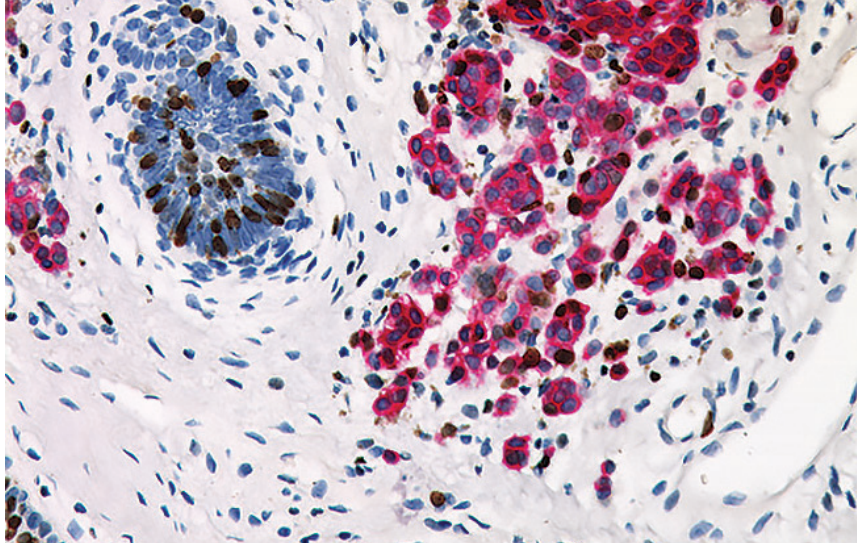
Lung squamous cell carcinoma stained with p63 + TRIM29

p63 + TRIM29 IVD

Clone	4A4 + N/A
Isotype	IgG2a / kappa + IgG
Reactivity	Human; others not tested
Control	Lung squamous cell carcinoma
Catalog Number	PPM 427DS AA

p63 has been shown to mark approximately 5-10% of lung adenocarcinomas. A comprehensive study has shown that TRIM29 (Tripartite motif-containing 29) is a sensitive (92.6%) and specific (93.0%) marker for lung squamous cell carcinoma (SqCC). In most cases, a co-expression of both antibodies will be observed in lung SqCC. Studies have also shown that when p63 and/or TRIM29 is expressed in lung SqCC, a 94.7% sensitivity and 100% specificity was achieved, if Napsin A and TTF-1 were both negative in the same case. p63 + TRIM29 may provide an excellent diagnostic tool for discriminating lung SqCC vs. lung adenocarcinoma.

1. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012 May; 20(3):201-7. 2. Terry J, et al. Am J Surg Pathol. 2010 Dec; 34(12):1805-11. 3. Ring BZ, et al. Mod Pathol. 2009 Aug; 22(8):1032-43. 4. Tacha D, Yu C, Haas T. Mod Pathol. 2011 Feb; 24(Suppl 1s):425A. 5. Tacha D, Zhou D, Henshall-Powell RL. Mod Pathol. 2010 Feb; 23 (Suppl 1s):414A.



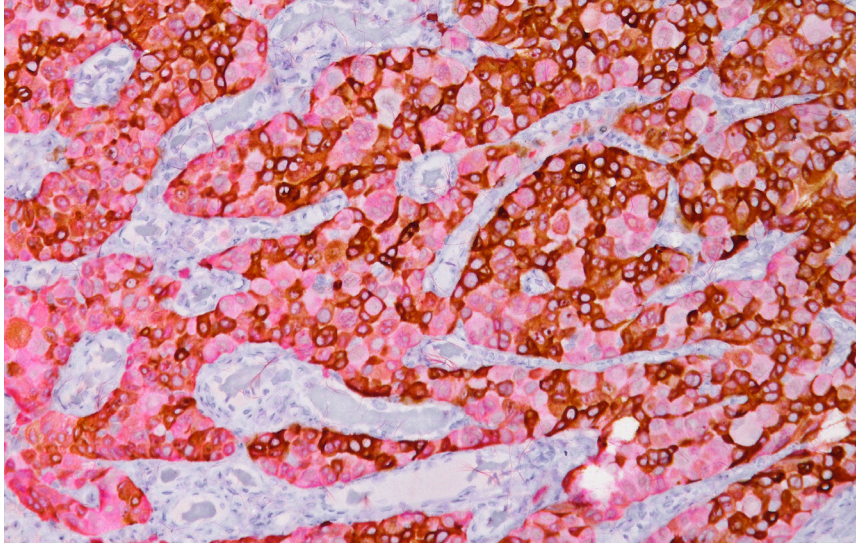
Melanoma stained with Pan Melanoma + Ki-67

Pan Melanoma + Ki-67 IVD

Clone	M2-7C10 / M2-9E3 + T311 + SP6
Isotype	IgG2a / IgG2b, kappa + IgG2b, kappa + IgG
Reactivity	Human; others not tested
Control	Melanoma
Catalog Number	PM 362DS AA, H

Pan Melanoma (MART-1 + Tyrosinase) + Ki-67 serves as a tool to identify the proliferation rate of melanocytic lesions in cases with sparse melanocytes, dense lymphocytic infiltrates, or melanocytes mixed with fibroblasts. In general, a higher proliferative fraction is seen in melanoma than in melanocytic nevi. There are many types of nevi and some simulate melanoma closely. Benignity is favored if there is a very low Ki-67 labeling rate in MART-1/ Tyrosinase positive cells. A high Ki-67 labeling rate, especially toward the deep part of a melanocytic lesion, raises the possibility of malignancy.

1. Nielsen PS, Riber-Hansen R, Steiniche T. Am J Dermatopathol. 2011 Jun; 33(4):361-70. 2. Orchard G. Br J Biomed Sci. 2002; 59(4):196-20. 3. Orchard GE. Br J Biomed Sci. 1998 Mar; 55(1):8-9. 4. Blessing K, Sanders DS, Grant JJ. Histopathology. 1998 Feb; 32(2):139-46.



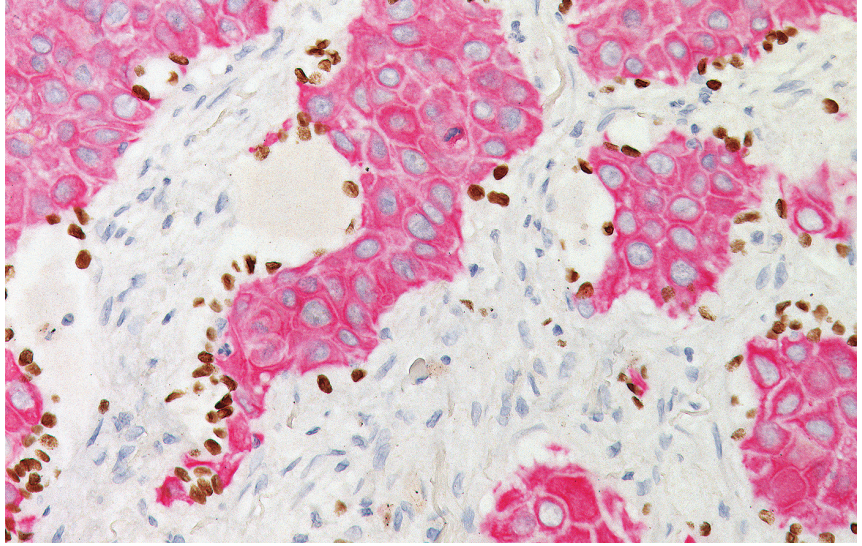
Melanoma stained with Pan Melanoma + S100

Pan Melanoma + S100 IVD

Clone	M2-7C10 / M2-9E3 + T311 + N/A
Isotype	IgG2a / IgG2b, kappa + IgG2b,kappa + N/A
Reactivity	Human; others not tested
Control	Melanoma
Catalog Number	PPM 213DS AA

Pan Melanoma (MART-1 + Tyrosinase) + S100 may aid in identifying metastatic melanoma. MART-1 (Melanoma Antigen Recognized by T cells 1) is a useful addition to melanoma panels as studies show it is specific for melanocytic lesions and is more sensitive than HMB45 when labeling metastatic melanomas. Tyrosinase is a sensitive melanoma marker shown to label a high percentage of desmoplastic melanomas. S100 stains Schwannomas, ependymomas, astrogliomas and almost all benign and malignant melanomas and their metastases.

1. Shidham VB, et al. BMC Cancer. 2003 May; 3:15. 2. Orchard G. Br J Biomed Sci. 2002; 59(4):196-202. 3. Fernando SS, Johnson S, B-te J. Pathology. 1994 Jan; 26(1):16-9.



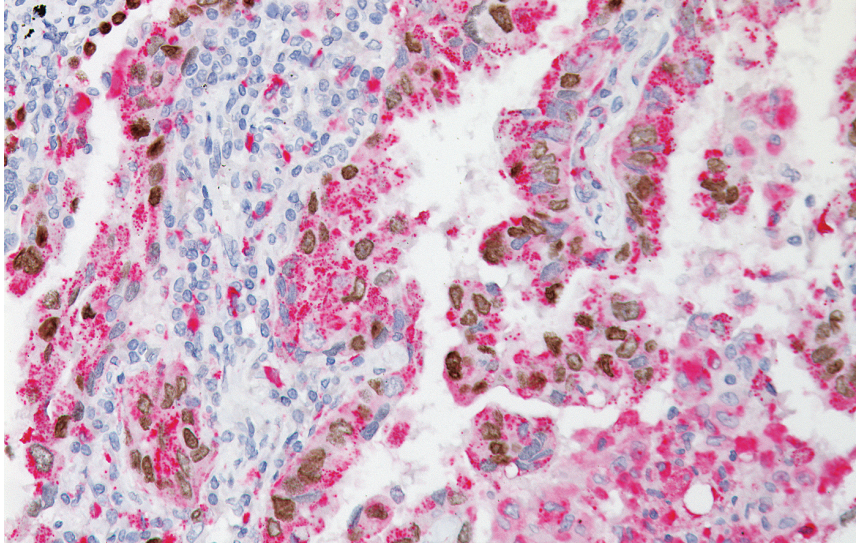
Lung squamous cell carcinoma stained with TTF-1 + CK5

TTF-1 + CK5 IVD

Clone	8G7G3/1 + EP42
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Lung adenocarcinoma (TTF-1) or lung SqCC (CK5)
Catalog Number	PM 425DS AA

TTF-1 has been shown to be a sensitive (65-81%) and specific marker (94%) in the majority of primary lung adenocarcinomas. Studies have shown that CK5, used in combination with Desmoglein 3, provided 93.7% sensitivity with 100% specificity for lung squamous cell carcinoma (SqCC). In most lung cancers tested, only a single antibody stain will be observed. Co-expression of both antibodies may be an indication of adenosquamous cell carcinomas. The antibody combination of TTF-1 + CK5 can aid the discrimination between lung adenocarcinoma (TTF-1) vs. lung SqCC (CK5).

1. Mukhopadhyay S, Katzenstein AL. Am J Surg Pathol. 2011 Jan; 35(1):15-25. 2. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012 May; 20(3):201-7. 3. Tacha D, Yu C, Haas T. Mod Pathol. 2011 Feb; 24(Suppl 1s):425A. 4. Tacha D, Zhou D, Henshall-Powell RL. Mod Pathol. 2010 Feb; 23(Suppl 1s):414A. 5. Terry J, et al. Am J Surg Pathol. 2010 Dec; 34(12):1805-11. 6. Kargi A, Gurel D, Tuna B. Appl Immunohistochem Mol Morphol. 2007 Dec; 15(4):415-20. 7.Downey P, et al. APMIS. 2008 Jun; 116(6):526-9.



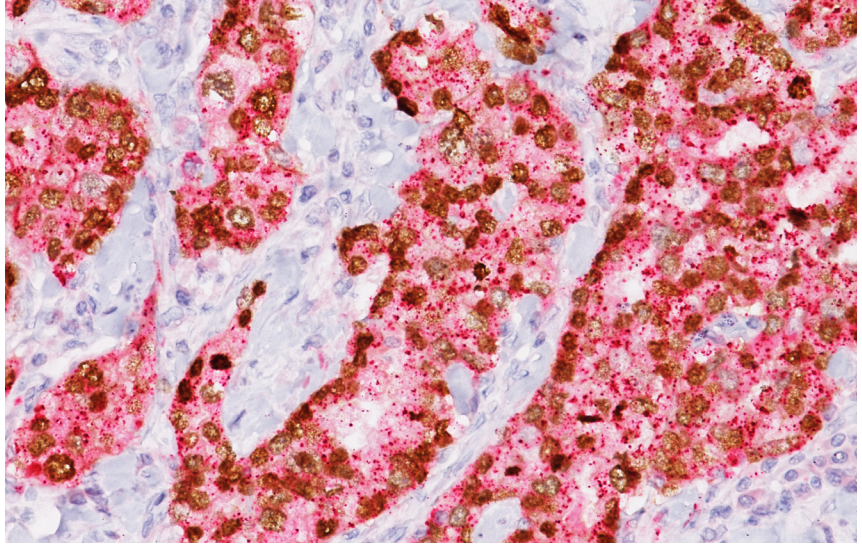
Lung adenocarcinoma stained with TTF-1 + Napsin A

TTF-1 + Napsin A IVD

Clone	8G7G3/1 + N/A
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Lung adenocarcinoma
Catalog Number	PPM 394DS AA; IPI 394DS G10

TTF-1 has been the premier marker for lung adenocarcinoma. Napsin A is expressed in type II pneumocytes and in adenocarcinomas of the lung. Studies have shown Napsin A to be more sensitive and specific than TTF-1 in lung adenocarcinomas and virtually negative in all squamous carcinomas. Other studies have shown that when TTF-1 and Napsin A are used in combination, a higher sensitivity and specificity is achieved compared to either antibody alone. When used in a panel with p63 and CK5, TTF-1 + Napsin A may aid in the analysis of poorly differentiated lung adenocarcinomas vs. squamous cell carcinomas.

1. Hirano T, et al. Lung Cancer. 2003 Aug; 41(2):155-62. 2. Ye J, et al. Appl Immunohistochem Mol Morphol. 2011 Jul; 19(4):313-7. 3. Bishop JA, Sharma R, Illei PB. Hum Pathol. 2010 Jan; 41(1):20-5. 4. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012 May; 20(3):201-7. 5. Tacha D, Yu C, Haas T. Mod Pathol. 2011 Feb; 24(Suppl 1s):425A. 6. Tacha D, Zhou D, Henshall-Powell RL. Mod Pathol. 2010 Feb; 23(Suppl 1s):414A.



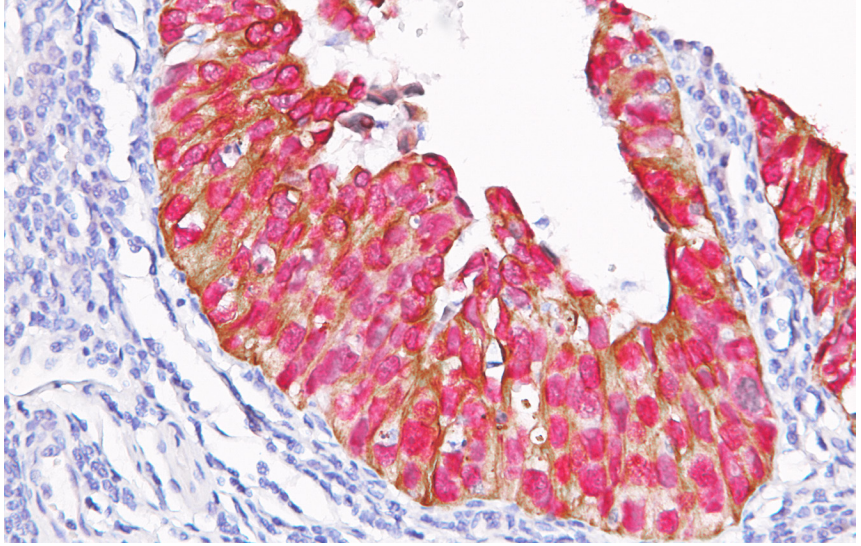
Lung adenocarcinoma stained with TTF-1 + Napsin A (RM)

TTF-1 + Napsin A (RM) IVD

Clone	8G7G3/1 + BC15
Isotype	IgG1 + IgG
Reactivity	Human; others not tested
Control	Lung adenocarcinoma
Catalog Number	API 3078DS AA

Thyroid transcription factor-1 (TTF-1) is detected in primary lung adenocarcinomas and small cell carcinomas. Napsin A is expressed in type II pneumocytes and in adenocarcinomas of the lung. Studies have shown Napsin A to be more sensitive and specific than TTF-1 in lung adenocarcinomas and virtually negative in all squamous carcinomas. When TTF-1 and Napsin A are used in combination, studies show a higher sensitivity and specificity is achieved for lung adenocarcinomas. The use of a rabbit monoclonal reduces lot-to-lot variation often seen when using a polyclonal. TTF-1 + Napsin A (RM) may aid in the analysis of poorly differentiated lung adenocarcinomas vs. squamous cell carcinomas.

1. Hirano T, et al. Lung Cancer. 2003 Aug; 41(2):155-62. 2. Ueno T, Linder S, Steterger G. Br J Cancer. 2003 Apr; 88(8):1229-33. 3. Suzuki A, et al. Pathol Res Pract. 2005; 201(8-9):579-86. 4. Mukhopadhyay S, Katzenstein AL. Am J Surg Pathol. 2011 Jan; 35(1): 15-25. 5. Turner BM, et al. Arch Pathol Lab Med. 2012 Feb; 136(2): 163-71.



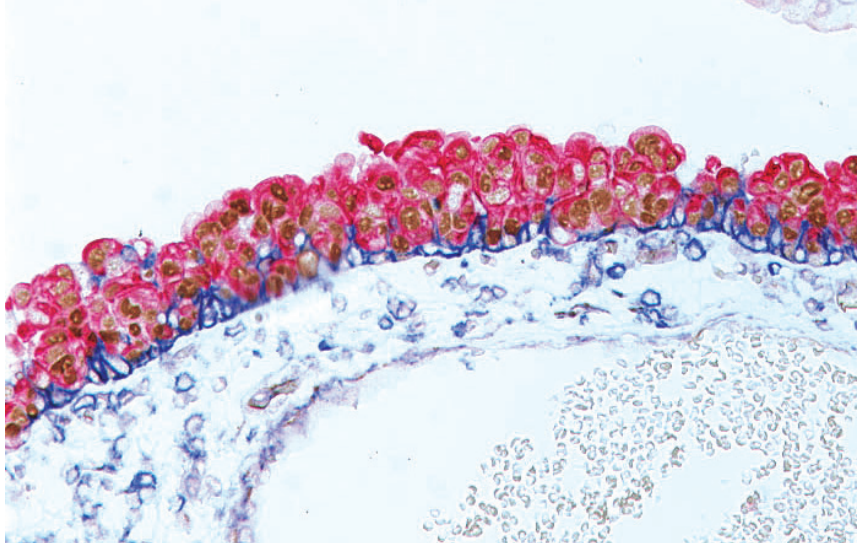
Bladder CIS stained with Uro-2™ (CK20 + p53)

Uro-2™ (CK20 + p53) IVD

Clone	Ks20.8 + EP9
Isotype	IgG2a + IgG
Reactivity	Human; others not tested
Control	p53 positive bladder or colon cancers
Catalog Number	API 3001DS AA

Studies have shown that in normal urothelium, the superficial umbrella cell layer shows reactivity for CK20 only; whereas, p53 nuclear staining is absent to focal. For urothelium with reactive atypia, particularly in cases with marked atypia, CK20 and p53 staining remain identical to those seen in normal urothelium. In cases of carcinoma in situ (CIS), diffuse, strong cytoplasmic reactivity for is observed for CK20 diffuse nuclear reactivity for p53 is observed throughout the urothelium.

1. Russo S, et al. Pathologica. 2007 Apr; 99(2):46-9. 2. McKenney JK, et al. Am J Surg Pathol. 2001 Aug; 25(8):1074-8. 3. Sun W, et al. Appl Immunohistochem Mol Morphol. 2002 Dec; 10(4):327-31. 4. Mallofre C, et al. Mod Pathol. 2003 Mar; 16(3):187-91.



CIS in bladder stained with URO-3™ Triple Stain

URO-3™ Triple Stain IVD (CD44 + p53) with CK20

Clone	BC8 + EP9 + Ks20.8
Isotype	IgG1 + IgG + IgG2a
Reactivity	Human; others not tested
Control	p53-positive bladder or colon carcinomas
Catalog Number	PM 370TS AA

URO-3 Triple Stain (CD44 + p53) with CK20 can be used to aid in differentiating urothelial reactive atypia from carcinoma in situ (CIS) in bladder. In normal urothelium, superficial umbrella cell layer shows reactivity for CK20 only, whereas CD44 staining is limited to the basal and parabasal urothelial cells and p53 nuclear staining is absent to focal. For urothelium with reactive atypia, CD44 shows increased reactivity in all layers of the urothelium and is often absent in neoplastic cells while CK20 and p53 staining is identical to normal urothelium. In cases of CIS, diffuse, strong cytoplasmic reactivity for CK20 and diffuse nuclear reactivity for p53 is observed throughout the urothelium.

1. Russo S, et al. Pathologica. 2007 Apr; 99(2):46-9. 2. McKenney JK, et al. Am J Surg Pathol. 2001 Aug; 25(8):1074-8. 3. Mallofre C, et al. Mod Pathol. 2003 Mar; 16(3):187-91. 4. Oliva E, et al. Hum Pathol. 2013 May; 44(5):860-6.

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