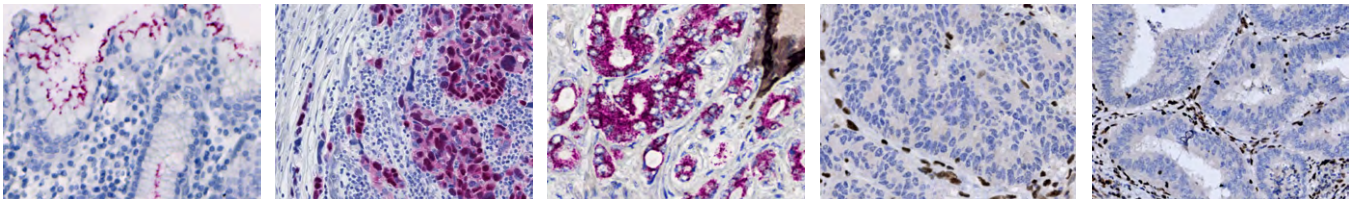
IHC and IF antibodies and ancillary reagents

Tissue-Tek Genie®

Advanced Staining Catalog

Updated September 2020



Welcome the Tissue-Tek Genie® Advanced Staining IHC and IF Antibodies and Ancillary Reagents Catalog!

This catalog contains a comprehensive library of products and reagents for the use on Sakura Finetek's Tissue-Tek Genie® Advanced Staining System, which is our platform for immunohistochemistry (IHC), immunofluorescence (IF) and in-situ hybridization (ISH).

With patient care and laboratory efficiency in mind, the Tissue-Tek Genie® Advanced Staining System offers benefits, such as LEAN workflows, that lead to laboratory productivity improvements by way of orderly patient (case) management.

This system features 3 key innovations:
(i) 30 fully independent slide staining stations;
(ii) single-use capsules to dispense antibodies;
(iii) antibodies that are rated for optimal staining only.

Finally, we acknowledge the support from all of our customers for the past 35 years, and we value your business and loyalty and your confidence in our people, products and services.

Kam Patel

President

Global mission statement

"continuous innovation for pathology" by providing integrated solutions for anatomic pathology and patients through best-in-class innovation, quality, and customer care.

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Tissue-Tek Genie®
Advanced Staining System

The Tissue-Tek Genie® Advanced Staining System is the first and only fully automated, true random access stainer for immunohistochemistry (IHC), immunofluorescence (IF) and in situ hybridization (ISH) that has 30 fully independent slide staining stations that makes it uncompromisingly fast providing you with predictable turnaround time (TAT).

With the Tissue-Tek Genie Advanced Staining System, you now have the capability to:

- Run slides fully independent of each other
- Run any slide, any station, on any Genie
- Eliminate sorting and batching of slides
- Run cases and slides with the same TAT
- Run IHC tests within 2 - 3 hours for fast and predictable TAT
- Eliminate diluting any reagents
- Stain one or multiple sections placed anywhere on the slide
- No longer deal with rail effects and messy oil

Optimal staining performance is possible due to innovations Sakura Finetek brings to advanced staining:

- Active heating/cooling on each station provides consistent staining
- Fully automated staining from dewaxing to counterstain reduces handling and reagent errors
- Advanced capillary gap technology enables placement of tissue and controls anywhere on the slide
- Bulk reagents are all ready-to-use, eliminates handling and dilution errors
- Separation of hazardous from non-hazardous waste reduces costs

Quality is US - How we ensure optimal stain quality and scores for each antibody

Laboratories are looking for staining slides with IHC assays that provide high sensitivity and high specificity to maximize diagnostic utility. Furthermore, they request consistent stain quality, slide after slide, especially important to always correctly detect low expressors. We devote our resources to produce reagents that always deliver optimal performance with a lot to lot consistency.

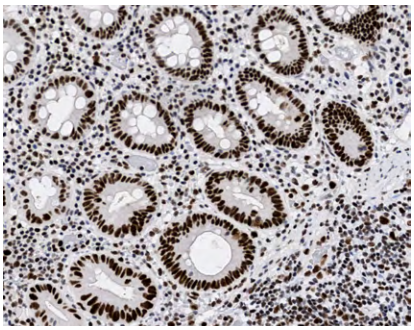
We have designed and implemented a straight forward process to develop robust assays with the following steps:

- Define the intended use and diagnostic utility of the assay
- Determine adequate control material
- Define acceptance criteria
- Identify best clone candidates
- Selection for each the best antigen retrieval
- Define for each the best dilution of the antibody and the incubation times for all the steps of the factory validated protocol
- Validate diagnostic performance internally and externally

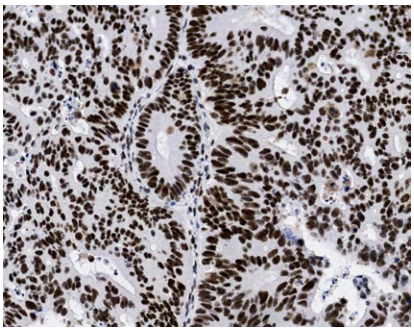
Like NordiQC, a professional and scientific organization that promotes the quality of immunohistochemistry and expands its clinical use by arranging schemes for immunohistochemical proficiency testing, we publish the results from our validation studies on our own website called Advanced Staining Gallery to display assay performance scored optimal and enable laboratories to appreciate our daily work for you with full transparency.

We collaborate with a proficiency testing institute for external independent review and confirmation of successful fulfillment of the assessment and acceptance criteria, and for confirmation that the assay performance was scored optimal. As an example, please see the assessment / acceptance criteria for PMS2 applied and explained to the right.

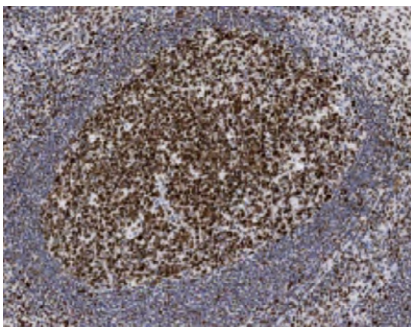
The Sakura Finetek USA antibody-based assay and default protocol run on the Sakura Finetek instrument achieved optimal score by NordiQC in the latest assessment run 53 in 2018 published on their website.



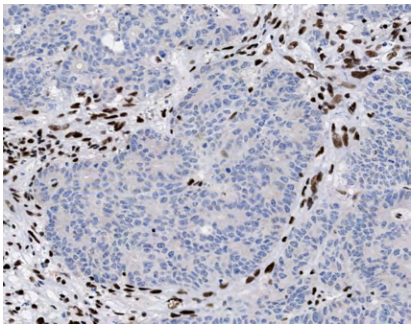
At least weak to moderate, distinct nuclear staining reaction of virtually all cells in the appendix.



A moderate to strong, distinct nuclear staining reaction of virtually all neoplastic cells in the colon adenocarcinoma.



At least weak to moderate, distinct nuclear staining reaction of virtually all mantle zone B-cells and a moderate to strong, distinct nuclear staining reaction of the germinal center B-cells in the tonsil.



No nuclear staining reaction of the neoplastic cells in the colon adenocarcinomas, but a weak to moderate distinct nuclear staining reaction in the vast majority of other cells (stromal cells, lymphocytes etc.).

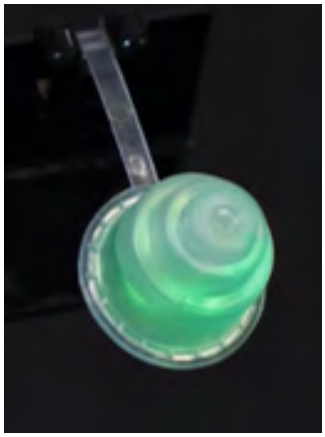
Tissue-Tek Genie® Capsules

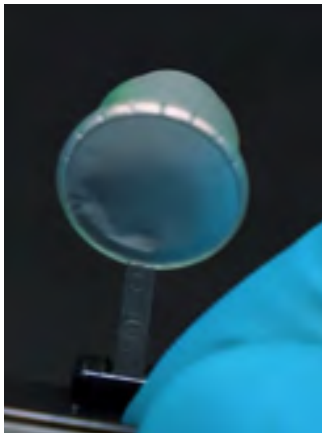
The innovative single-use Capsules make Genie the most convenient stainer on the market, eliminating batching and sorting of slides, and giving you the flexibility to load any slide, any stain, any time, any station on any Genie.

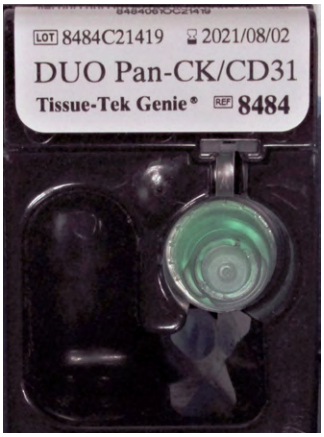
Benefit from using Capsules:

1. Run cases or single slides without the need to batch slides by antibody
2. Save time loading slides whenever a staining station is available
3. Use for any slide volume of any biomarkers

The capsule is mounted to the Tissue-Tek Genie® Reagent Dispense Area (RDA) with its attached protocol RDA-Tag and both are loaded into an empty stain station.

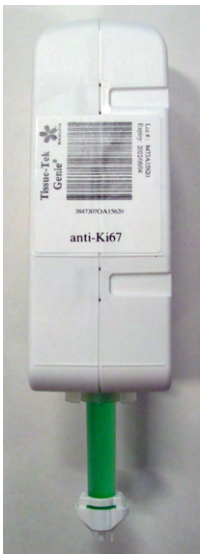






In summary, this innovative technology enables laboratories to quickly load slides and reagents for an IHC stain to gain continuous workflow with short and predictable TAT.

Tissue-Tek Genie® Cartridges



Operators are continuously looking for ways to reduce the frequency of replacing on-board reagents on their IHC stainer. The Tissue-Tek Genie Cartridges significantly reduces the instances antibodies or detection system including Hematoxylin need to be replaced. Their volume suitable for 250 tests enable you to run the Tissue-Tek Genie for days without consuming your time and interrupting your work to remove empty reagent bottles and prepare and load new reagents.

Furthermore, all reagents are provided to you ready-to-use which saves time and reduces human errors seen in diluting and mixing reagents.


Hematoxylin
Protein Block
Peroxidase Block
DAB Intensifier
9
8
7
6
5


12
11
10
9
8


Tissue-Tek Genie®
SAKURA

Description of symbols

REF	Product code
LOT	Batch code
IVD	in vitro diagnostic medical device
	Temperature limitation
	Use by
	Manufacturer
	Consult instructions for use
CE	European Conformity
EC REP	Authorized representative in the European Community

Limitations

These products have been optimized for use on the Tissue-Tek Genie® Advanced Staining System with Tissue-Tek Genie antibodies and ancillary reagents on human specimen sections. Staining quality may diminish when using non-validated protocols, other IHC or IF instrument systems and/or reagents.

Detection systems

Tissue-Tek Genie® Pro Detection Kit, DAB

IVD

Product code and quantity

8826-K250: 6 cartridges, 250 tests, RTU; 1 kit

Description

The Tissue-Tek Genie Pro Detection Kit, DAB uses a non-biotin based system to detect and to visualize mouse or rabbit primary antibodies bound to antigens in Formalin-Fixed, Paraffin-Embedded (FFPE) specimen sections.

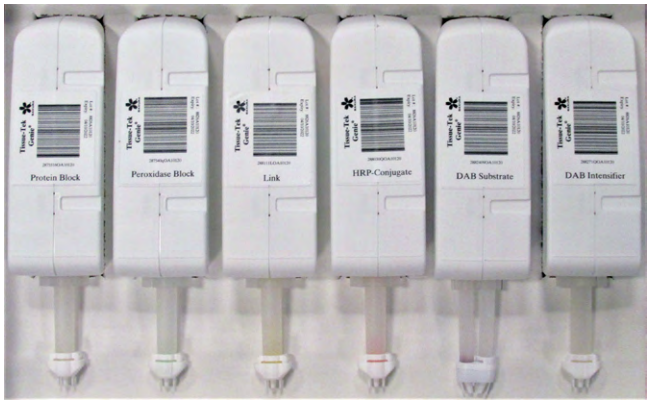
The detection system uses Protein and Peroxidase blocks to prevent unspecific binding of antibodies to antigens and reactions of endogenous peroxidase with downstream components of the detection system. After blocking, the detection system uses a Link solution that binds to the mouse or rabbit primary antibodies to form a complex with a horse radish peroxidase (HRP) conjugate which increases sensitivity.

The complex is then visualized with the addition of DAB. DAB Intensifier can be used to increase the intensity of DAB staining.

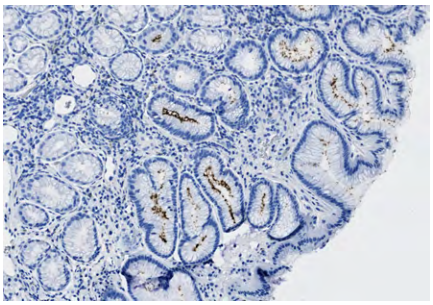
Components

The detection system kit contains 6 cartridges, one cartridge each of the following:

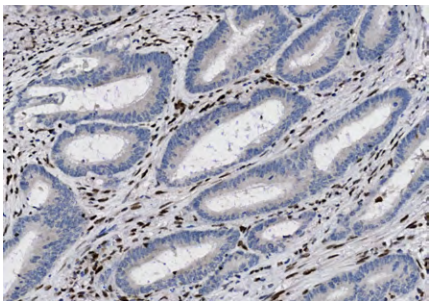
- Tissue-Tek Genie® Protein Block, 250 tests
- Tissue-Tek Genie® Peroxidase Block, 250 tests
- Tissue-Tek Genie® Link, 250 tests
- Tissue-Tek Genie® Poly HRP-Conjugate, 250 tests
- Tissue-Tek Genie® DAB, 250 tests
- Tissue-Tek Genie® DAB Intensifier, 250 tests



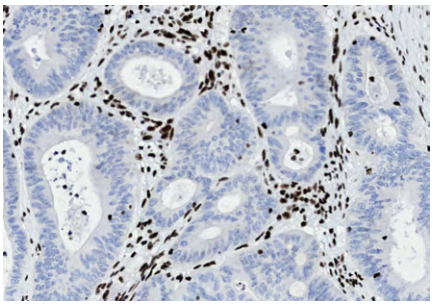
These 6 images display the exceptional sensitivity (high dynamic range) and superb specificity (no visible non-specific background staining) of the Tissue-Tek Genie *Pro* Detection Kit, DAB and selected Tissue-Tek Genie antibodies.



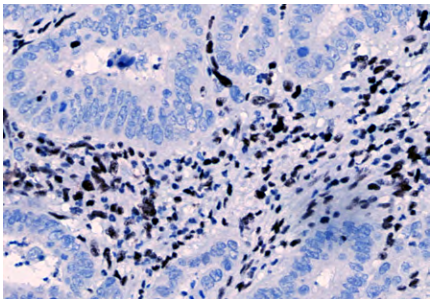
Positive Helicobacter pylori staining in crypts of gastric mucosa, no background staining.



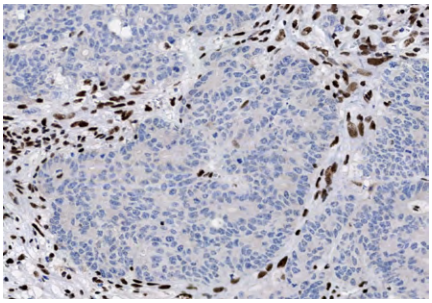
Negative staining of colon adenocarcinoma with loss of MLH1 expression, no background staining.



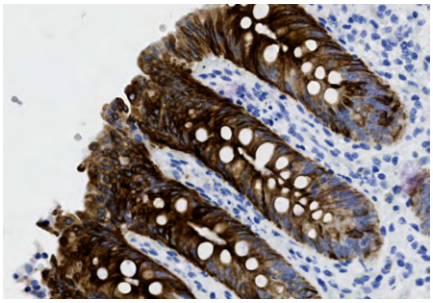
Negative staining of colon adenocarcinoma with loss of MSH2 expression, no background staining.



Negative staining of colon adenocarcinoma with loss of MSH6 expression, no background staining.



Negative staining of colon adenocarcinoma with loss of PMS2 expression, no background staining.



CK 19 staining in crypt cells of appendix with high dynamic range, no background staining.

The Tissue-Tek Genie *Pro* Detection Kit, DAB HRP staining steps provide standardization using RTU components and timing flexibility where needed.

Dewax	Wash	Antigen Retrieval	Wash	Protein Block	Wash	Primary Antibody	Wash	Peroxidase Block	Wash	Link	Wash	HRP Conjugate	Wash	DAB	Wash	DAB Intensifier	Wash	Counter-stain
0 or 6 min		0-90 min		0 or 9 min		12-30 min		0 or 3 min		15 min		10-30 min		6 min		0 or 3 min		0 to 3 min

Detection systems

Tissue-Tek Genie® Pro AP Red Detection Kit

IVD

Product code and quantity

8836-K250: 4 cartridges, 250 tests, RTU; 1 kit

Description

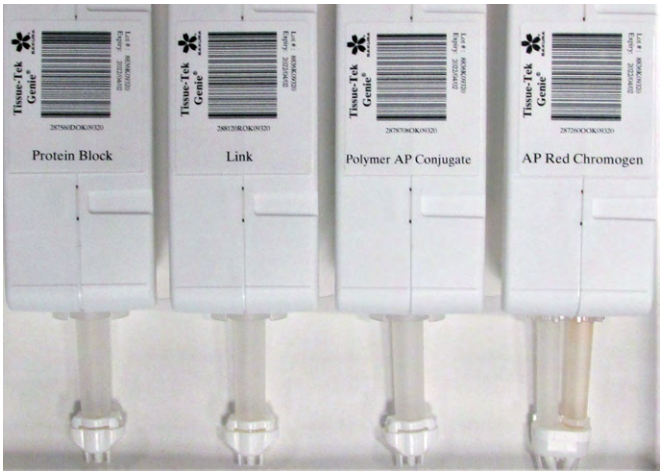
The Tissue-Tek Genie Pro AP Red Detection Kit uses a non-biotin based system to detect and to visualize mouse and rabbit primary antibodies bound to antigens informalin-fixed, paraffin-embedded (FFPE) specimen sections.

The detection system uses protein block to prevent nonspecific binding of antibodies to antigens with downstream components of the detection system. After blocking, the detection system uses a link solution that binds to the mouse and rabbit primary antibodies to form a complex with an alkaline phosphatase AP-Conjugate. The complex is then visualized with the addition of AP Red.

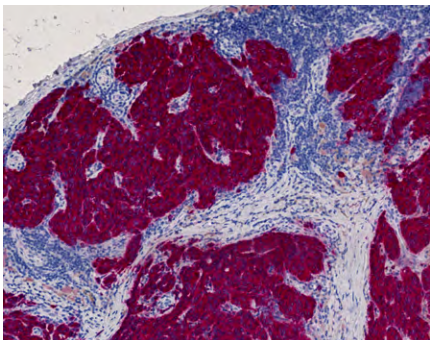
Components

The detection system kit contains 4 cartridges, one cartridge each of the following:

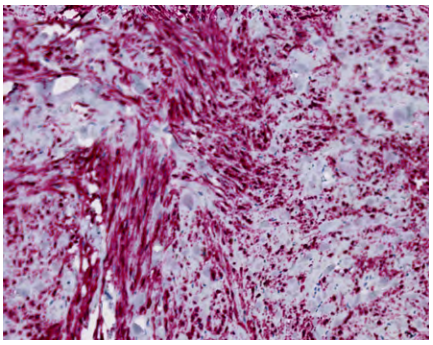
- Tissue-Tek Genie® Protein Block
- Tissue-Tek Genie® Link
- Tissue-Tek Genie® Poly AP-Conjugate
- Tissue-Tek Genie® AP Red



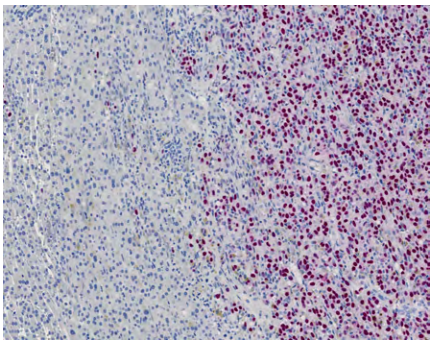
These 3 images display the exceptional sensitivity (high dynamic range) and superb specificity (no visible non-specific background staining) of the Tissue-Tek Genie Pro AP Red Detection Kit and selected Tissue-Tek Genie antibodies.



Strong pan melanoma staining of melanoma.



Melan-A staining of blue nevus.



SOX10 staining of melanoma.

The Tissue-Tek Genie Pro AP Red Detection Kit, staining steps provide standardization using RTU components and timing flexibility where needed.

Dewax	Wash	Antigen Retrieval	Wash	Protein Block	Wash	Primary Antibody	Wash	Link	Wash	AP-Conjugate	Wash	AP Red	Wash	Counterstain
0 or 6 min		0-90 min		0 or 9 min		12-30 min		15 min		10-30 min		6 min		0 to 3 min

Detection systems

Tissue-Tek Genie® DUO Detection Kit

IVD

Product code and quantity

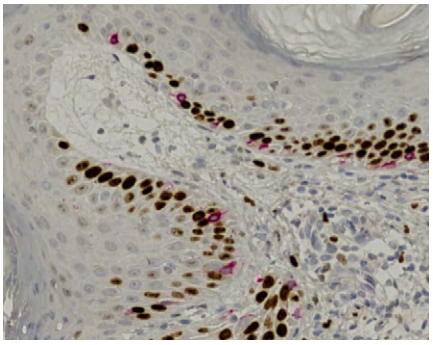
8837-K250: 6 cartridges, 250 tests, RTU; 1 kit

Tissue-Tek Genie® DUO Mouse-DAB/Rabbit-AP Red Dual Detection Kit

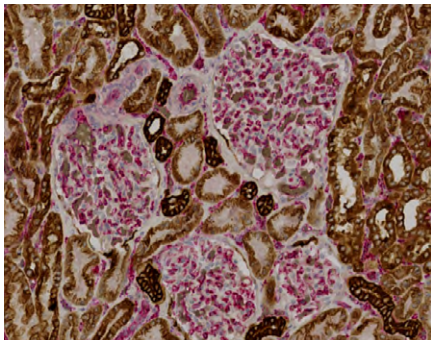
The Tissue-Tek Genie® DUO Mouse-DAB/Rabbit-AP Red Dual Detection Kit uses a non-biotin-based system to detect and to visualize mouse and rabbit primary antibodies bound to antigens in FFPE specimen sections.

The detection system uses a protein block to prevent nonspecific binding of antibodies to antigens with downstream components of the detection system. After blocking, mouse and rabbit primary antibodies are applied on the tissue sections simultaneously using prefilled capsules or cartridges. Subsequently, the detection system sequentially applies the Link Mouse solution that binds to mouse primary antibodies and then the Link Rabbit solution that binds to rabbit primary antibodies. This is followed by an application of a cocktail containing a horseradish peroxidase (HRP) conjugate for mouse and an alkaline phosphatase AP-Conjugate for rabbit. The resulting complex is visualized by sequentially applying the diaminobenzidine (DAB) substrate-chromogen solution, and then by applying the AP Red substrate-chromogen solution, which create colored precipitates at the location of the antigens.

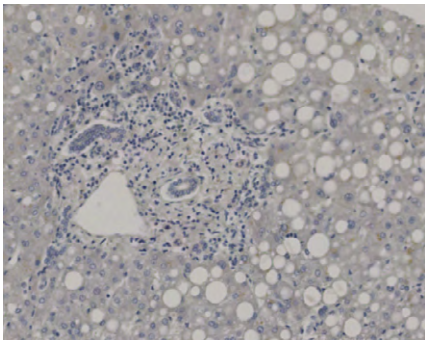
Dewax	Antigen Retrieval	Protein Block	Primary Antibody	Link Mouse	Link Rabbit	HRP and AP-Conjugate	DAB	AP Red	Counter-stain
0 or 6 min	45 min	0 or 9 min	30 min	6-21 min	6-21 min	20 min	3-9 min	3-9 min	0-3 min



Tissue-Tek Genie® DUO anti-Melan-A [EP43] /Ki67 [GM010] Antibody Cocktail.
Note that the benign melanocytes are not proliferatively active.



Tissue-Tek Genie® DUO anti-Pan Cytokeratin [AE1/AE3/DC10] / CD31[RM247] Antibody Cocktail.
The combination of these two markers on a single slide is particularly helpful for identifying small foci of carcinoma within lymphatics.



Tissue-Tek Genie® DUO Non-immune Mouse and Rabbit Ig Antibody Cocktail.

Primary antibodies

Tissue-Tek Genie® anti-Actin, Smooth Muscle

IVD

Clone
1A4

Host/clonality
Mouse monoclonal

Product codes and quantity
8292-C010: RTU, 10 capsules; 1 pack
8292-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
The antibody labels SMA in smooth muscle cells seen in virtually all blood vessels and within the muscularis propria and lamina muscularis of the gastrointestinal tract, and in myoepithelial cells (including neoplasms thereof). It may be useful in identification of myogenic and myoepithelial tumors when used with a panel of antibodies.

Description
Actins are cytoskeletal proteins that are involved in cell motility and are universally expressed by, and highly conserved in, all eukaryotic cells. Most cell types express the beta and gamma actins, which are involved in internal cell motility. The alpha actins are found mainly in muscle tissues where they comprise part of the contractile apparatus.

Positive tissue control
Stomach, small Intestine, colon, appendix, myogenic tumors with known alpha actin expression

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct cytoplasmic staining reaction of all smooth muscle cells in the muscularis propria, lamina muscularis mucosae and myofibroblasts lining crypts and surface epithelium of the appendix.
2. An at least weak to moderate, distinct cytoplasmic staining reaction of the majority of the perisinusoidal cells (hepatic stellate cells) in the liver.
3. A moderate to strong, distinct cytoplasmic staining reaction of virtually all neoplastic cells in the leiomyosarcoma and leiomyoma.
4. An at least weak, distinct cytoplasmic staining reaction of the majority of neoplastic cells in the GIST.
5. A strong, distinct cytoplasmic staining in smooth muscle cells in virtually all vessels.

6. References

1. Helm O, et al. PLoS One. 2014; 9:e94357.
2. Hornick JL, Fletcher CD. Am J Surg Pathol. 2011; 35:190-201.
3. Liegl B, et al. Am J Surg Pathol. 2008; 32:608-614.
4. Mercut R, et al. Rom J Morphol Embryol. 2014; 55:263-272.

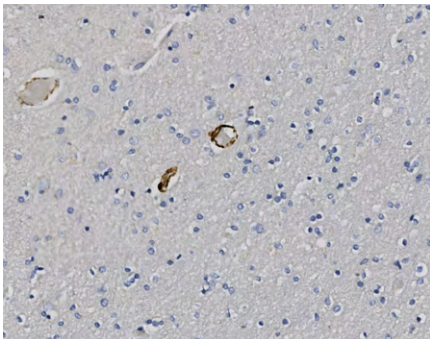


Figure 1. The neural and glial elements show no reactivity for Smooth Muscle Actin. In contrast, the small vessel walls show a strong cytoplasmic reaction.

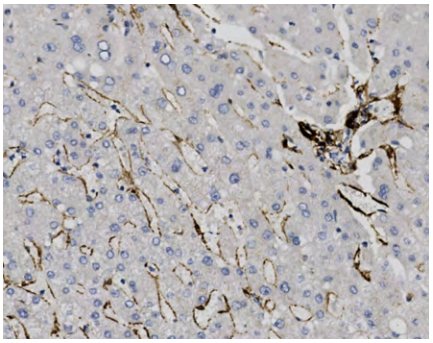


Figure 2. Perisinusoidal cells of the liver show moderate to strong reactivity for Smooth Muscle Actin. The hepatocytes are negative.

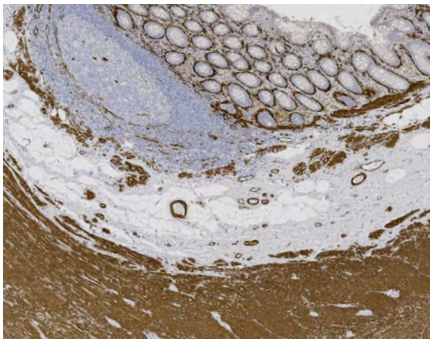


Figure 3. Strong cytoplasmic reactivity for Smooth Muscle Actin is seen in the smooth muscle layers and vascular walls of this appendix specimen.

Tissue-Tek Genie® anti-ALK (Heme)

IVD

Clone
1A4

Host/clonality
Mouse monoclonal

Product codes and quantity
8350-C010: RTU, 10 capsules; 1 pack
8350-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Granular cytoplasmic staining of ganglion cells is observed in the appendix; epithelial cells in appendix are negative. Cytoplasmic staining of neoplastic cells is observed in some ALCLs, some Merkel cell carcinomas, and small subset of lung adenocarcinomas, as well as several other tumors. Several additional translocation partners for ALK exist, including EML4, which is typically seen in lung adenocarcinomas. The translocation partner determines the subcellular localization of the ALK protein and is reflected in the reactivity pattern. Nuclear and cytoplasmic staining of ALK may be observed in neoplastic cells of ALCL. It is useful for identification and classification of subgroups of ALCL when used in a panel with other antibodies.

Description
Anaplastic Lymphoma Kinase (ALK) is a transmembrane receptor tyrosine kinase. In normal tissue ALK is expressed in cells within a developing and mature nervous system including glial cells, neurons, endothelial cells, and pericytes. ALK was originally discovered as part of a fusion protein with nucleophosmin (NPM) produced by a translocation between the NPM and ALK genes and is the ALK fusion protein primarily associated with anaplastic large cell lymphoma (ALCL).

Positive tissue control
Appendix, ALK positive ALCL

Staining pattern
Cytoplasmic and/or nuclear staining

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak granular cytoplasmic staining of ganglion cells in appendix.
2. Cytoplasmic staining of neoplastic cells in a large subset of Merkel cell carcinomas.
3. Cytoplasmic staining of neoplastic cells in a subset of non-small cell lung adenocarcinomas.
4. Nuclear and cytoplasmic staining of neoplastic cells in a major subset of ALCL.
5. No staining of neoplastic cells in adenocarcinomas without ALK rearrangement.
6. No staining of epithelial cells in appendix.

References

1. Wang Q, et al. Lung Cancer. 2016; 95:39-43.
2. Hofman P. Cancers (Basel). 2017; 9:107.
3. Van den Borne BE S, et al. Clin Cancer Res. 2017; 23:4251-4258.
4. Della Corte et al. Molecular Cancer. 2018; 17:30.

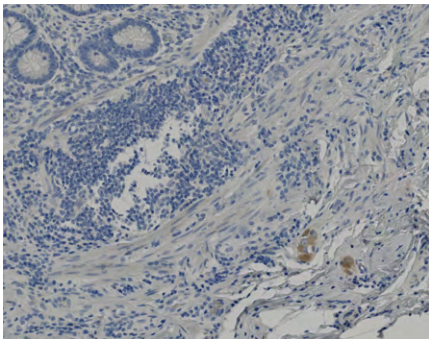


Figure 1. Ganglion cells of the appendix show weak cytoplasmic reactivity for ALK, making this an excellent control tissue for this marker. The appendix shows no reactivity for ALK among the epithelial, inflammatory or smooth muscle components.

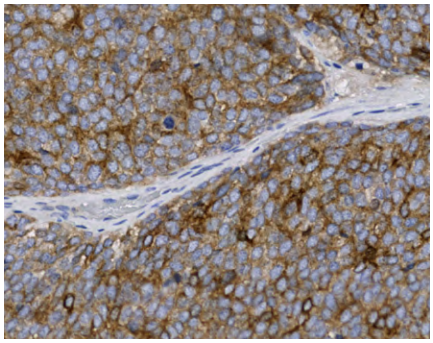


Figure 2. Moderate granular cytoplasmic reactivity for ALK is seen in this Merkel cell carcinoma. Upregulation of ALK expression in this tumor, as well as some others, including anaplastic thyroid carcinoma, appears to be though a mechanism independent of translocation.

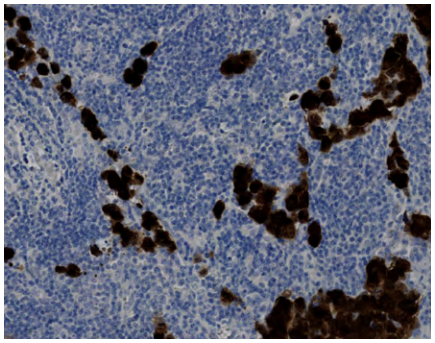


Figure 3. This ALK-positive anaplastic large cell lymphoma shows a characteristic sinusoidal infiltration of a lymph node. The ALK reactivity pattern is strong and is seen in both the nuclear and cytoplasmic compartments.

Tissue-Tek Genie® anti-AMACR

IVD

Clone
13H4

Host/clonality
Rabbit monoclonal

Product codes and quantity
8291-C010: RTU, 10 capsules; 1 pack
8291-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the AMACR (Alpha Methylacyl Coenzyme A Racemase) protein in the cytoplasm of epithelia in both normal and neoplastic cells. AMACR is positive in cells of premalignant high-grade prostatic intraepithelial neoplasia and prostate adenocarcinoma, but is present at low or undetectable levels in glandular epithelial cells of normal prostate and benign hyperplasia. It may be useful for detecting prostate cancer when used with a panel of antibodies.

Description
AMACR, also known as P504S, is a mitochondrial enzyme expressed in many normal epithelia such as hepatocytes, tubular epithelia of kidney, epithelia of gall bladder, bronchial epithelia of lung, and colonic surface epithelia.

Positive tissue control
Prostate adenocarcinoma

Staining pattern
Granular and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong granular cytoplasmic staining of epithelial cells lining renal proximal tubules.
2. A moderate to strong cytoplasmic staining of neoplastic cells in prostatic intraepithelial neoplasia (PIN) and prostate adenocarcinoma.
3. A negative or only weak focal cytoplasmic staining of epithelial cells in hyperplastic prostate glands.
4. A negative or only week cytoplasmic staining of stromal cells.

References

1. Hameed O, et al. Am. J. Surg. Pathol. 2005; 29(5):579-587.
2. Jiang Z, et al. Hum. Pathol. 2003; 34(8):792-796.

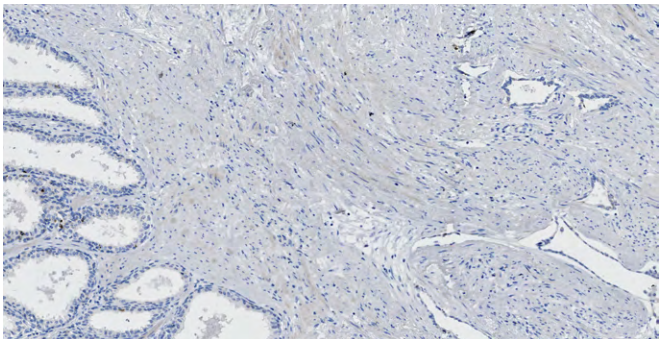


Figure 1. Negative staining of columnar epithelial cells but strong staining in lymphoid T-cells of normal colon.

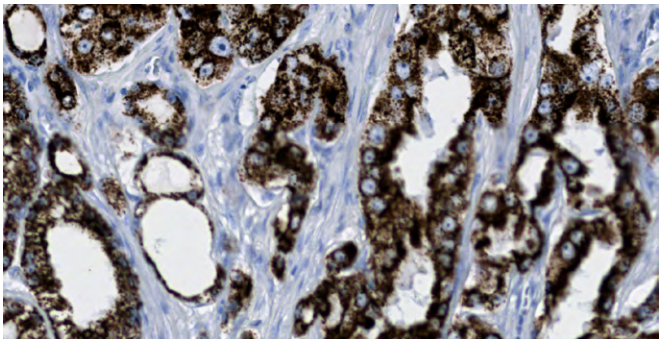


Figure 2. Strong staining in T-cell lymphoma (higher magnification).

Tissue-Tek Genie® anti-BCL2

IVD

Clone
EP36

Host/clonality
Rabbit monoclonal

Product codes and quantity
8459-C010: RTU, 10 capsules; 1 pack
8459-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the BCL2 protein in the cytoplasm of B-cells in mantle zones, interfollicular T-cell areas, and a few cells in the germinal centers of lymphoid tissues and basal cells of epithelial tissues; it can stain both normal and neoplastic cells. It may be useful for detecting follicular lymphomas, diffuse large cell lymphomas, and differentiating follicular lymphomas from reactive lymph nodes when used with a panel of other antibodies.

Description
BCL2 is a mitochondrial membrane protein expressed in lymphoid tissues (B-cells in mantle zone, interfollicular T-cell areas, and very few cells in the germinal center), and basal cells of epithelial tissues.

Positive tissue control
Tonsil

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong predominantly cytoplasmic staining of virtually all peripheral B-cells and T-cells in tonsils and appendix.
2. At least weak cytoplasmic staining of basal squamous epithelial cells in tonsil and of basal epithelial cells in appendix.
3. At least weak to moderate staining of virtually all neoplastic cells in follicular lymphomas.
4. No staining in germinal center B-cells.

References

1. Yang E, et al. Blood. 1996; 88(2):386-401.
2. Yunis J. J., et al. New Eng. J. Med. 1989; 320:1047-1054.
3. Yunis J. J., et al. New Eng. J. Med. 1987; 316:79-84.

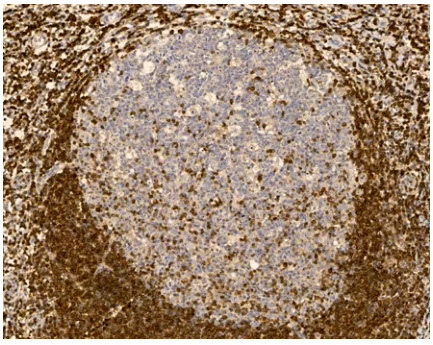


Figure 1. Negative staining of B-cells in normal germinal centers of tonsil, but scattered T-cells show positive staining.

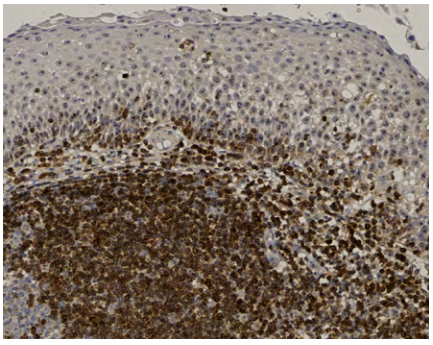


Figure 2. Weak cytoplasmic staining of the BCL2 protein in basal cells of squamous mucosa of tonsil.

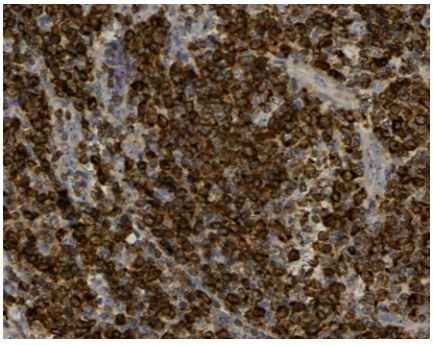


Figure 3. Strong staining of BCL2 protein in follicular lymphoma.

Tissue-Tek Genie® anti-BCL6

IVD

Clone
EP278

Host/clonality
Rabbit monoclonal

Product codes and quantity
8461-C010: RTU, 10 capsules; 1 pack
8461-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the BCL6 protein in the nucleus of germinal center B-cells and some T-cells and thymocytes in cortex of thymus, in both normal and neoplastic tissues. The antibody labels BCL6 in both normal and neoplastic lymphocytes. It may be useful for classifying B-cell lymphomas, especially diffuse large B-cell lymphoma (DLBCL), follicular lymphoma, and Burkitt's lymphoma when used with a panel with other antibodies.

Description
BCL6 is a transcription factor essential for germinal center formation in lymphoid tissue.

Positive tissue control
Tonsil, some B-cell lymphomas

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong distinct nuclear staining of virtually all normal germinal center B-cells in tonsil.
2. At least weak to moderate distinct nuclear staining of the majority of squamous epithelial cells in tonsil.
3. A moderate to strong distinct nuclear staining of neoplastic cells in follicular lymphomas.
4. At least weak to moderate nuclear staining of neoplastic cells in diffuse large B-cell lymphoma, germinal center B-cell subtype.

References

1. Falini B, et al. Ann. Oncol. 1997; 8 Suppl 2:101-104.
2. Duy C, et al. J. Exp. Med. 2010; 207:1209-1221.

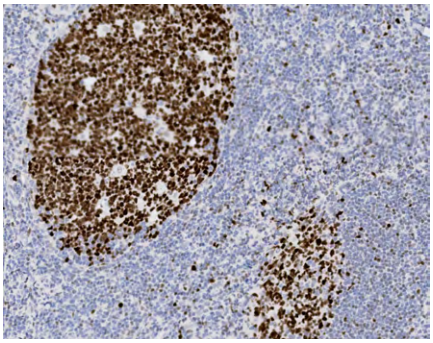


Figure 1. Negative staining of non-germinal center B-cells but moderate to strong staining in the germinal center B-cells in tonsil.

Figure 2. Moderate to strong staining of the majority neoplastic cells in diffuse large B-cell lymphoma.

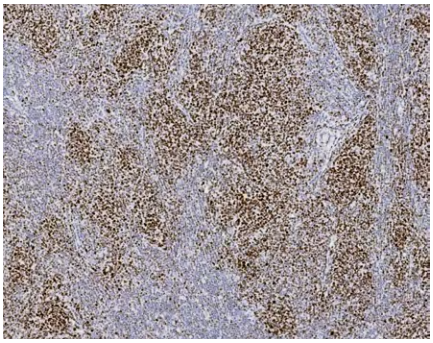


Figure 3. Moderate to strong staining in follicular lymphoma.

Tissue-Tek Genie® anti-beta-Catenin

IVD

Clone
EP35

Host/clonality
Rabbit monoclonal

Product codes and quantity
8261-C010: RTU, 10 capsules; 1 pack
8261-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells of colorectal carcinoma and neoplastic cells of most of desmoid-type fibromatosis cases. It is useful for differentiating fibromatosis (desmoid tumor) from other fibroblast-like lesions in various locations, including breast and mesentery, and for identifying colorectal cancer when used with a panel of antibodies.

Description
Beta-catenin protein is a cell adhesion molecule that forms catenin-cadherin complex through binding the epithelial cadherin (E-cadherin) protein at juxtamembrane sites. It is normally found in the cytoplasm at a submembraneous location, but mutations in the beta-catenin gene can result in nuclear accumulation of the protein as has been demonstrated in fibromatosis lesions and in colorectal carcinoma.

Positive tissue control
Liver, appendix, colon adenocarcinoma, fibromatosis lesions

Staining pattern
Nuclear, cytoplasmic, and membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Membrane staining of normal tissue.
2. Nuclear and cytoplasmic staining of neoplastic cells.
3. In liver, a weak to moderate predominantly membraneous staining of hepatocytes.
4. In colon and appendix, a moderate to strong predominantly membraneous staining of epithelial cells.
5. Nuclear and cytoplasmic staining of fibromatosis, colon or endometrial adenocarcinoma.

References

1. Hornick JL. Mod. Pathol. 2014; 27 Suppl. 1:S47-S63.
2. Lin F, and Chen Z. Arch. Pathol. Lab. Med. 2014; 138:1564-1577.
3. Carlson JW, and Fletcher CD. Histopathology. 2007; 51:509-514.
4. Ng TL, et al. Mod. Pathol. 2005; 18:68-74.

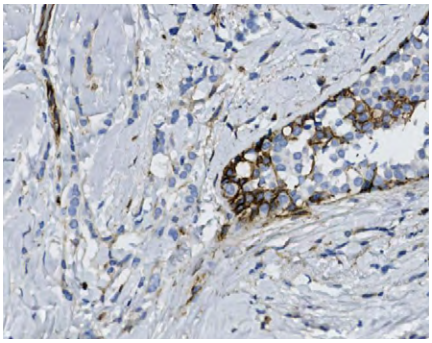


Figure 1. Membraneous staining is present in the benign ductal and myoepithelial cells in this image, but no staining is observed in the in situ or invasive lobular carcinoma. Weak staining of small vessel endothelial cells and scattered fibroblasts is also seen.

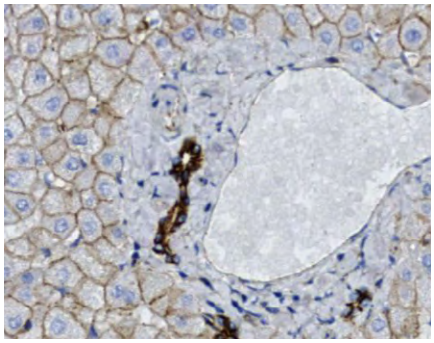


Figure 2. Weak to moderate membrane staining is seen among hepatocytes. The portal triad shows strong cytoplasmic staining in the bile ductular epithelium and there is weak to absent staining in arteries and veins.

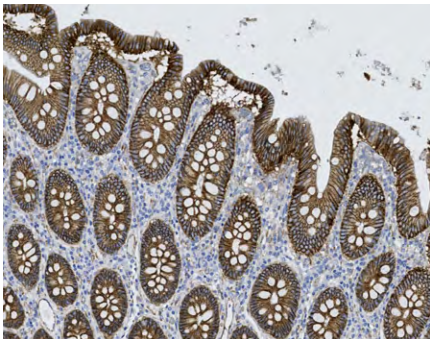


Figure 3. Strong diffuse membrane and moderate cytoplasmic staining is seen among the benign epithelial cells of the colon. There is no staining in the nuclei.

Tissue-Tek Genie® anti-BOB.1

IVD

Clone
ZM74

Host/clonality
Mouse monoclonal

Product codes and quantity
8462-C010: RTU, 10 capsules; 1 pack
8462-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Nuclear staining is observed in all germinal center and mantle zone B-cells, as well as plasma cells. Nuclear and cytoplasmic staining is observed in neoplastic cells of B-cell neoplasms, including follicle center lymphoma, DLBCL, and Burkitt lymphomas.
It is useful for identification of B-cells in germinal centers and mantle zones, and for classification of lymphomas, especially for identification of the lineage of CD20 negative B-cell neoplasms and differentiation of classical Hodgkin lymphoma (BOB.1 negative) from primary mediastinal large B-cell lymphoma (BOB.1 positive) when used in a panel with other antibodies. The strong nuclear expression of BOB.1 and OCT.2 by germinal center derived lymphomas makes these antibodies a novel class of broad-spectrum B-lineage IHC markers to aid in the differential diagnosis of lymphomas.

Description
BOB.1 is a B-cell specific coactivator and interacts with OCT.1 and OCT.2 transcription factors. The expression of BOB.1 is limited largely to mature B-cells in germinal centers and mantle zones, as well as plasma cells. The expression of BOB.1 in B-cell tumors is variable. Lymphocyte predominant (LP) cells in nodular lymphocyte predominant Hodgkin lymphoma are BOB.1 positive. In B-cell lymphomas, the highest expression levels for BOB.1 are in follicle center lymphomas, diffuse large B-cell lymphomas (DLBCL) and Burkitt lymphomas.

Positive tissue control
Tonsil, DLBCL, follicle center lymphoma

Staining pattern
Cytoplasmic and nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Nuclear and cytoplasmic staining.
2. In tonsil and appendix, strong nuclear staining of germinal center B-cells and plasma cells; at least weak staining of mantle-zone B-cells; a moderate staining of lymphocytes in the lamina propria.
3. Nuclear and cytoplasmic staining of neoplastic cells of B-cell neoplasms and follicle center lymphoma, DLBCL, and Burkitt lymphomas.

References

1. Gibson SE, et al. Am J Clin Pathol. 2006; 126:916-924.
2. Hoefnagel JJ, et al. Mod Pathol. 2006; 19:1270-1276.
3. McGune R, et al. Mod Pathol. 2006; 19:1010-1018.
4. Hoeller S, et al. Histopathology. 2010; 56:217-228.

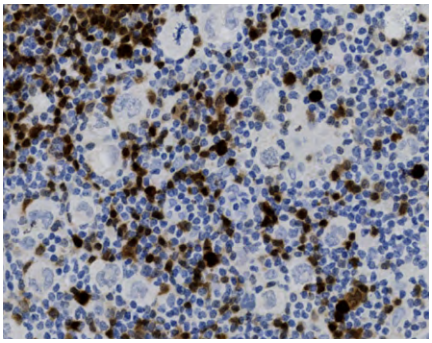


Figure 1. The neoplastic cells in this classical Hodgkin lymphoma show no, or only very weak, nuclear staining for BOB.1.

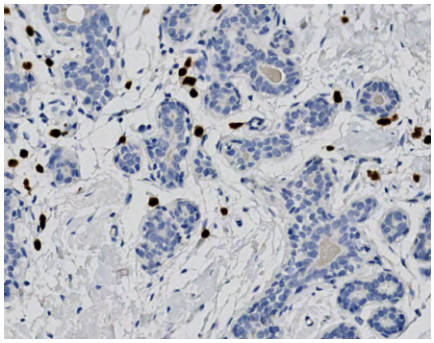


Figure 2. Scattered B-cells among the ducts and lobules of this benign breast specimen show strong nuclear reactivity for BOB.1.

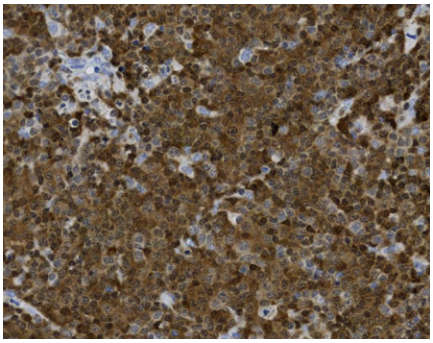


Figure 3. The neoplastic cells of this diffuse large B-cell lymphoma show moderate to strong cytoplasmic and nuclear staining for BOB.1.

Tissue-Tek Genie® anti-Calponin

IVD

Clone
EP63

Host/clonality
Rabbit monoclonal

Product codes and quantity
8310-C010: RTU, 10 capsules; 1 pack
8310-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the calponin protein in the cytoplasm of vascular and visceral smooth muscle cells in both normal and neoplastic cells. It may be useful for differentiating benign sclerosing lesions of the breast from carcinoma when used with a panel of antibodies.

Description
Calponin is a protein involved in the regulation of smooth muscle contraction and is expressed exclusively to vascular and visceral smooth muscle cells.

Positive tissue control
Gastrointestinal tract, normal breast

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. Positive staining in myoepithelial cells and smooth muscle.
3. Negative staining in breast neoplastic cells.
4. In gastrointestinal track, a moderate to strong cytoplasmic staining of smooth muscle cells. In normal breast, a moderate to strong cytoplasmic staining of myoepithelial cells in lobules and ducts.

References

1. Lazard D, et al. Proc. Natl. Acad. Sci. USA. 1993; 90:999-1003.
2. Gimona M, et al. FEBS Lett. 1990; 274(1,2):159-162.

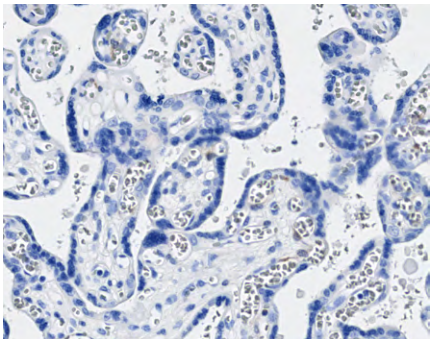


Figure 1. Negative staining of cytotrophoblasts in placenta.

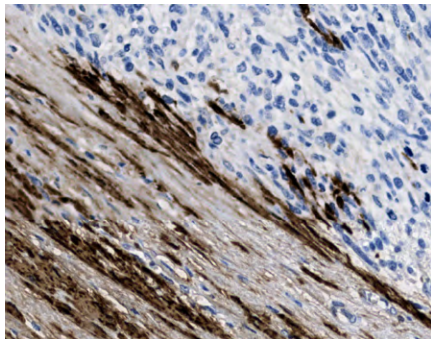


Figure 2. Positive staining in rhabdomyosarcoma.

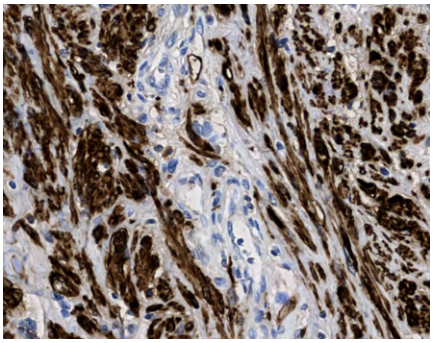


Figure 3. Positive staining in leiomyosarcoma.

Tissue-Tek Genie® anti-Calretinin

IVD

Clone
RM324

Host/clonality
Rabbit monoclonal

Product codes and quantity
8522-C010: RTU, 10 capsules; 1 pack
8522-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels central and peripheral neural tissues (including ganglion cells), mesothelium, Sertoli cells of the testis, ovarian stromal cells, and adrenal cortical cells. Calretinin is useful for identification of malignant mesotheliomas of the epithelial type and their differentiation from metastases of lung adenocarcinoma when used with a panel of other antibodies.

Description
Calretinin is a calcium-binding protein that is expressed in both central and peripheral neural tissues, mesothelium, eccrine glands of skin, Sertoli cells of the testis, ovarian stromal cells, and adrenal cortical cells.

Positive tissue control
Appendix, colon, mesothelioma

Staining pattern
Cytoplasmic and nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic and nuclear staining.
2. In appendix and colon, moderate to strong staining in the ganglion cells; weak to moderate staining of the axons; nuclear and cytoplasmic staining of the peripheral macrophages; no staining in the epithelial cells.
3. Cytoplasmic and nuclear staining of neoplastic cells of mesothelioma.

References

1. Cury PM, et al. Mod Pathol. 2000; 13:107-112.
2. Ordonez NG. Am J Surg Pathol. 2003; 27:1031- 1051.
3. Misir A, Sur M. Arch Pathol Lab Med. 2007; 131: 979-981.
4. Husain AN, et al. Arch Pathol Lab Med. 2009; 133:1317-1331.

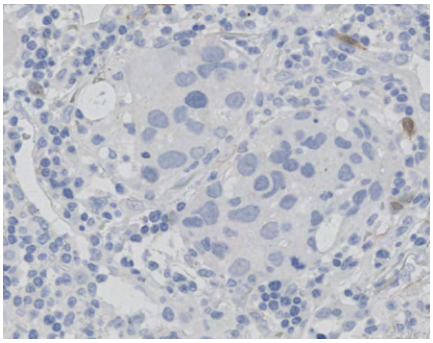


Figure 1. This lung adenocarcinoma shows no reactivity for calretinin.

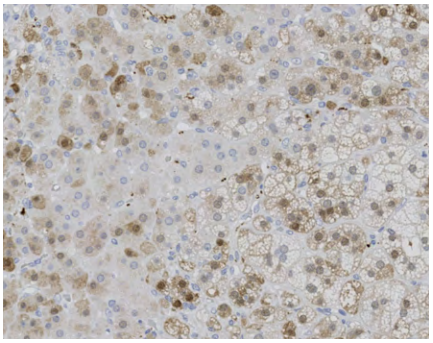


Figure 2. Weak to moderate nuclear and cytoplasmic reacitivity for calretinin is seen in a patchy distribution in this sample of adrenal cortex.

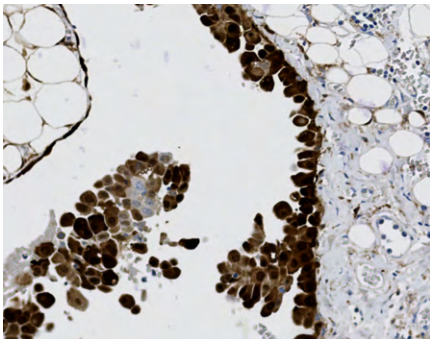


Figure 3. Strong nuclear and cytoplasmic reactivity for calretinin is seen in this malignant mesothelioma.

Tissue-Tek Genie® anti-CD1a

IVD

Clone
EP80

Host/clonality
Rabbit monoclonal

Product codes and quantity
8246-C010: RTU, 10 capsules; 1 pack
8246-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD1a protein in both normal and neoplastic cells. It may be useful for classifying thymomas, differentiating cutaneous T-cell lymphomas from B-cell lymphomas and pseudolymphomas when used with a panel of antibodies.

Description
CD1a is a cell surface protein expressed on dendritic cells, cortical thymocytes, Langerhans cells skin, and some epithelia.

Positive tissue control
Thymus, skin

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Membraneous and cytoplasmic staining.
2. Langerhans' cells in squamous epithelium have a moderate to strong predominantly membraneous staining.
3. Epithelial cells are negative.
4. Cortical thymocytes have moderate to strong predominantly membraneous staining.

References

1. Krenács L, et al. J. Pathol. 1993; 171(2):99-104.
2. Emile JF, et al. Amer. J. Surg. Pathol. 1995; 19(6):636-641.

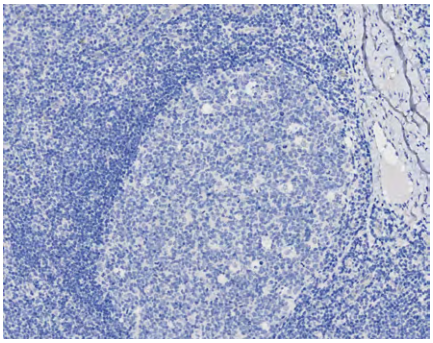


Figure 1. Negative staining of non-germinal center cells in tonsil.

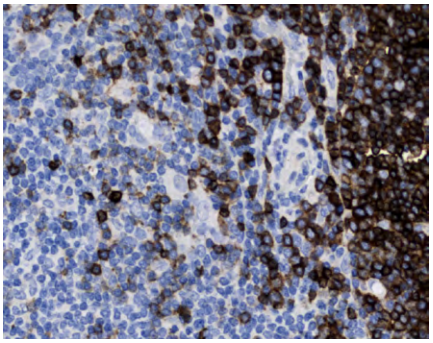


Figure 2. Strong staining of cortical thymocytes, T-cells, and B-cells in thymus.

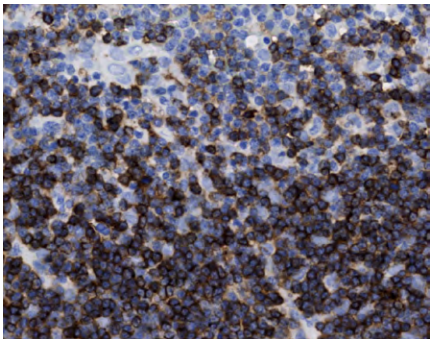


Figure 3. Strong staining in thymoma.

Tissue-Tek Genie® anti-CD2

IVD

Clone
EP222

Host/clonality
Rabbit monoclonal

Product codes and quantity
8255-C010: RTU, 10 capsules; 1 pack
8255-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD2 protein in the cell membrane of T-cells and most NK cells in peripheral blood and lymphoid tissues, as well as T-cell lymphomas and some abnormal mast cell proliferations.

Description
CD2 a transmembrane protein expressed on the majority of thymocytes and peripheral T-lymphocytes, and is considered a pan T-cell antigen.

Positive tissue control
Tonsil, appendix, some T-cell lymphomas

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Membraneous staining.
2. In tonsil, moderate to strong membraneous staining of crowed T-cells in T-zone and scattered T-cells and macrophages in germinal center.
3. In appendix and colon, moderate to strong membraneous staining of intraepithelial T-cells.
4. Negative tissue components. No staining of other type of cells in tonsil and appendix.

References

1. Bakels V, et al. Am. J. Pathol. 1997; 150:1941-1949.
2. Aguilera NS, et al. Arch. Pathol. Lab. Med. 2006; 130:1772-1779.

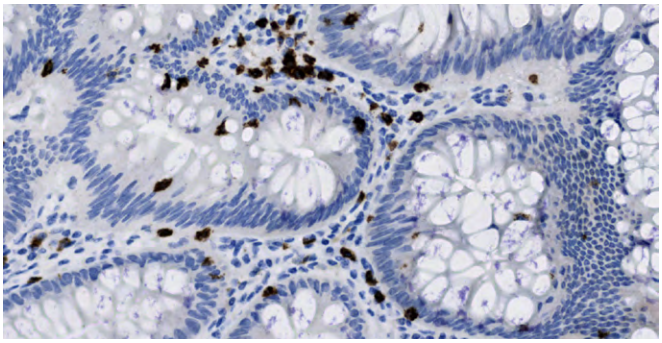


Figure 1. Negative staining of columnar cells but strong staining of lymphoid T-cells in appendix.

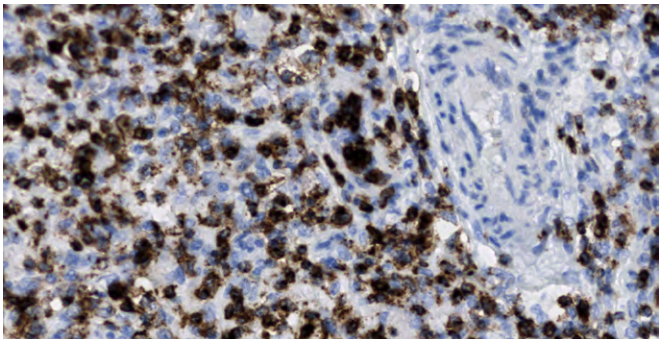


Figure 2. Strong staining in nodal T-cell lymphoma.

Tissue-Tek Genie® anti-CD3

IVD

Clone
EP177

Host/clonality
Rabbit monoclonal

Product codes and quantity
8280-C010: RTU, 10 capsules; 1 pack
8280-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD3 protein in the cell membrane of normal and neoplastic T-cells. CD3 is expressed in the majority of T-cell neoplasms and is often not expressed in non T-cell lymphoid malignancies. It may be useful for classifying T-cell neoplasms when used with a panel of other antibodies. It may also be used to highlight T-cell populations within a variety of tissues.

Description
CD3 is a complex of membrane proteins composed of five polypeptide chains that associate directly with the T-cell antigen receptor. CD3 is expressed on T-lymphocytes in the thymus, bone marrow, peripheral lymphoid tissue and blood.

Positive tissue control
Tonsil

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong and distinct predominantly membraneous staining of all T-cells both in interfollicular T-zones and in germinal centers of tonsil.
2. A moderate to strong and distinct predominantly membraneous staining of intra-epithelial T-cells in colon mucosa.
3. At least weak to moderate and distinct predominantly membraneous staining of neoplastic T-cells in T-cell lymphomas.
4. No staining of other cells. Especially the B-cells in tonsil are negative.

References

1. Frank SJ, et al. Semin. Immunol. 1990; 2:89-97.
2. Chetty R, et al. J. Pathol. 1994; 173:303-307.

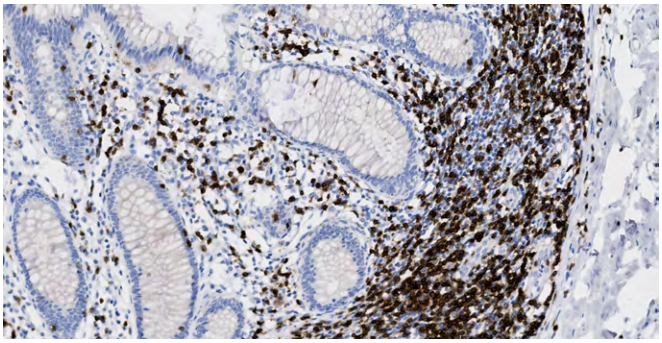


Figure 1. Negative staining of columnar epithelial cells but strong staining in lymphoid T-cells of normal colon.

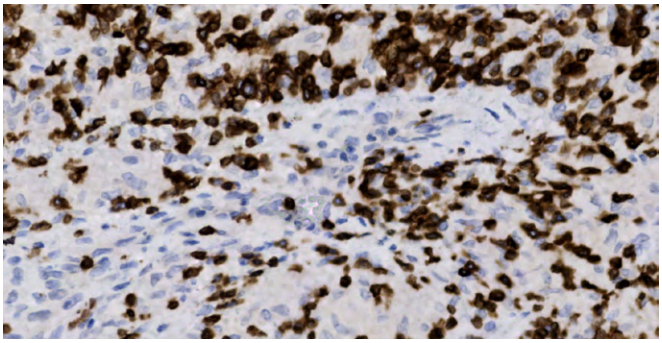


Figure 2. Strong staining in T-cell lymphoma (higher magnification).

Tissue-Tek Genie® anti-CD4

IVD

Clone
EP204

Host/clonality
Rabbit monoclonal

Product codes and quantity
8226-C010: RTU, 10 capsules; 1 pack
8226-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD4 protein in the membrane of helper T-cells in interfollicular regions and germinal centers of lymph nodes, scattered macrophages in the lamina propria of the enteric tract, and some peripheral blood T-lymphocytes. This antibody also labels Kupffer cells in liver sinusoids as well as liver sinusoidal endothelium, monocytes, and monocyte-derived cells such as histiocytes and Langerhans cells. This antibody also labels a subset of T-cell lymphomas. The antibody labels CD4 in both normal and neoplastic cells.

Description
CD4 is a transmembrane protein expressed in helper T-cells, the majority of mature peripheral T-lymphocytes and mature thymocytes, and a subset of suppressor of cytotoxic T-cells.

Positive tissue control
Tonsil, appendix, and some T-cell lymphomas

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct, predominantly membraneous staining of virtually all helper/inducer T-cells in T-zones and within germinal centers in tonsil.
2. A moderate to strong, distinct, predominantly membraneous staining of intraepithelial T-cells in colon mucosa.
3. At least moderate, distinct, predominantly membraneous staining of germinal center macrophages in tonsil, macrophages in lamina propria in colon mucosa and Kupffer cells in liver.
4. At least weak to moderate, distinct, predominantly membraneous staining of the majority of neoplastic cells in T-cell lymphoma.

References

1. Schwarting R, et al. Blood. 1989; 74(5):1678-1689.
2. de Bruin PC, et al. Leukemia. 1995; 9(10):1620-1627.
3. Stein H, et al. Blood. 2000; 96(12):3681-3695.

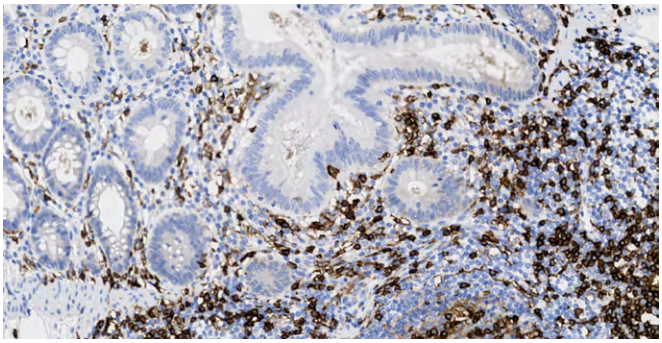


Figure 1. Negative staining in columnar epithelial cells of normal colon but moderate staining in lymphoid T-cells.

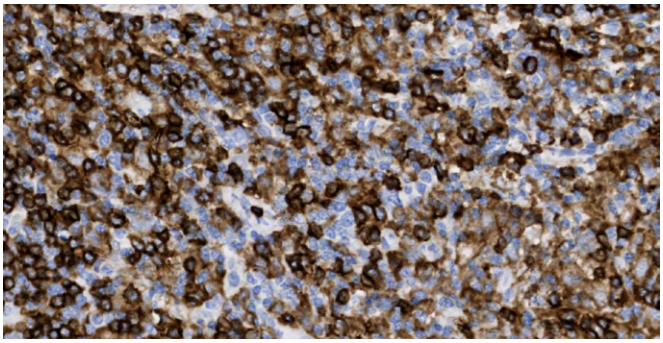


Figure 2. Moderate staining in Hodgkin lymphoma.

Tissue-Tek Genie® anti-CD5

IVD

Clone
GR020

Host/clonality
Rabbit monoclonal

Product codes and quantity
8249-C010: RTU, 10 capsules; 1 pack
8249-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD5 protein on the membrane of T-cells and subsets of B-cells found in the follicular mantle zones, bone marrow, and peripheral blood. It may be useful for classifying and characterizing T-cell and B-cell neoplasms when used within a panel with other antibodies.

Description
CD5 is a transmembrane protein expressed on all mature T-cells and subsets of B-cells found in the follicular mantle zones, bone marrow, and peripheral blood.

Positive tissue control
Tonsil, mantle cell lymphoma

Staining pattern
Membraneous and some cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct, predominantly membraneous staining of virtually all T-cells in both the T-zones and within germinal centers in tonsil.
2. At least weak to moderate but distinct membraneous staining of dispersed B-cells in mantle zone of secondary follicles in tonsil.
3. At least moderate and distinct membraneous staining of neoplastic cells in MCL and at least weak to moderate staining of neoplastic cells in B-CLLs.
4. No staining of germinal center B-cells.

References

1. Rizzo K, Nassiri M. Lymphoma. 2012; 1-15.
2. Liu Z, et al. Am. J. Clin. Pathol. 2002; 118(2):216-224.
3. Pletneva MA, Smith LB. Arch. Pathol. Lab. Med. 2014; 138:1290-1294.

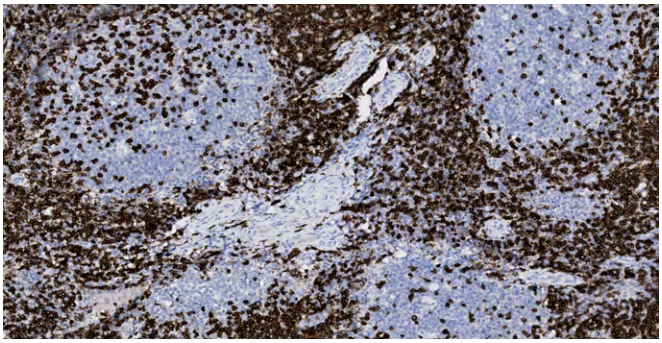


Figure 1. Negative staining of germinal center B-cells but strong staining of T-cells in tonsil.

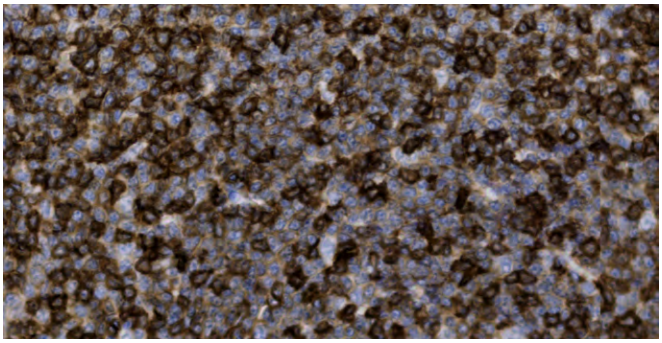


Figure 2. Moderate membraneous staining in B-CLL (B-chronic lymphatic leukemia).

Tissue-Tek Genie® anti-CD7

IVD

Clone
EP132

Host/clonality
Rabbit monoclonal

Product codes and quantity
8251-C010: RTU, 10 capsules; 1 pack
8251-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD7 protein in the membrane of T-lymphocytes in thymus, NK cells, peripheral lymphoid tissue and blood. It may be useful for classifying T-cell neoplasms especially for identifying of immature and precursor T-cell malignancies such as angioblastic and lymphoblastic lymphomas when used with a panel of antibodies.

Description
CD7 is a transmembrane protein expressed on T-lymphocytes in thymus, NK cells, peripheral lymphoid tissue and blood.

Positive tissue control
Tonsil, appendix, colon

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Membraneous staining.
2. A moderate to strong membraneous staining of T-lymphocytes.
3. In the tonsil, the T-cells are stained. The antibody stains T-cell in mantle zone and interfollicular regions, as well as in germinal center.
4. In appendix and colon, intraepithelial T-cells are stained.
5. No staining of epithelial cells.

References

1. Saxena A, et al. Am. J. Hematol. 1998; 58:278-284.
2. Miwa H, et al. Leuk. Lymphoma. 1996; 21:239-244.

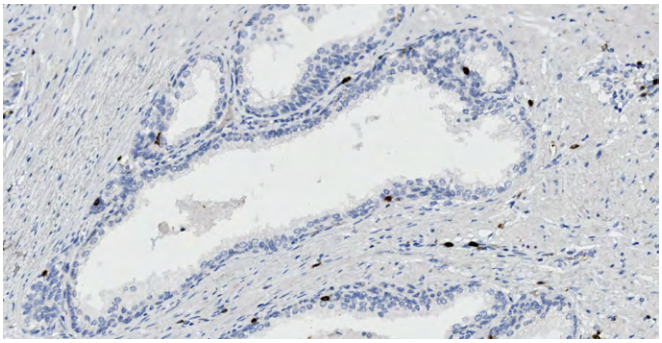


Figure 1. Negative staining of epithelial cells in prostate.

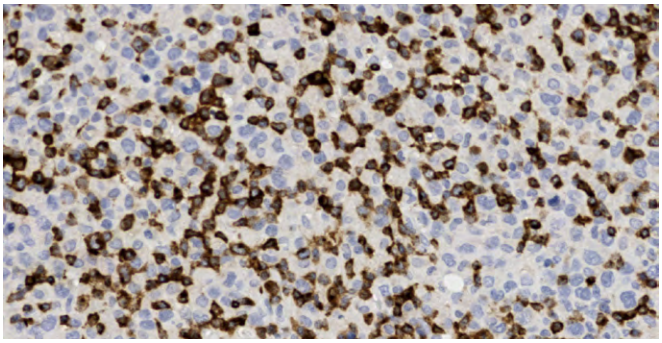


Figure 2. Positive staining of nodal T-cell lymphoma.

Tissue-Tek Genie® anti-CD8

IVD

Clone
C8/144B

Host/clonality
Mouse monoclonal

Product codes and quantity
8252-C010: RTU, 10 capsules; 1 pack
8252-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD8 protein on the membrane of T-cells in both normal and neoplastic cells. It may be useful for classifying T-cell neoplasms and differentiating between cytotoxic and helper T-cells when used with a panel of antibodies.

Description
CD8 is a transmembrane protein expressed in mature cytotoxic/suppressor T-cells.

Positive tissue control
Normal tonsil, spleen

Staining pattern
Mainly membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct predominantly membraneous as well as cytoplasmic granular staining of neoplastic cells in T-cell lymphomas, whereas neoplastic cells in other T-cell lymphomas are negative.
2. A strong and distinct membraneous as well as cytoplasmic granular staining of normal suppressor/ cytotoxic T-cells in tonsil and liver.
3. No staining in other cells. Especially B-cells in tonsil are negative.

References

1. Mason D, et al. J. Clin. Pathol. 1992; 45(12):1084-1088.
2. Nuckols J, et al. J. Cutan. Pathol. 1999; 26:169-175.

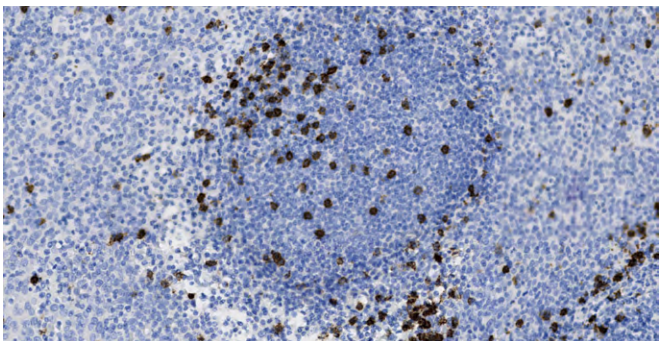


Figure 1. Negative staining in B-cell but strong staining in T-cells in tonsil.

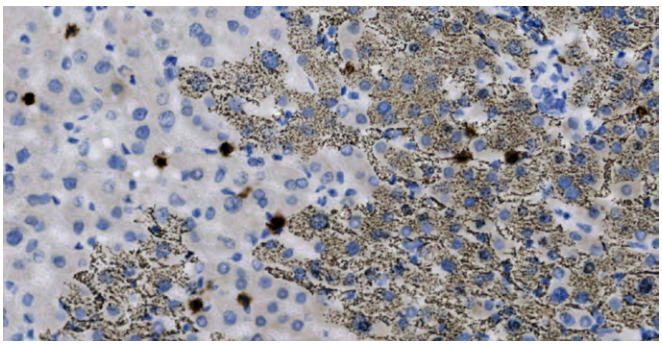


Figure 2. Strong membraneous and cytoplasmic granular staining of the normal suppressor/ cytotoxic T-cells in normal liver.

Tissue-Tek Genie® anti-CD10

IVD

Clone
GM003

Host/clonality
Mouse monoclonal

Product codes and quantity
8253-C010: RTU, 10 capsules; 1 pack
8253-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD10 protein on the membrane and cytoplasm of early lymphoid progenitors, small subset of immature B-cells, proliferating B-cells, mature neutrophils and on various non-lymphoid cells in both normal and neoplastic cells. It may be useful for classifying Burkitt's lymphoma, some follicular lymphoma, and renal cell carcinoma when used with a panel of antibodies.

Description
CD10, also known as common acute lymphoblastic leukemia antigen (CALLA), is a cell surface metallopeptidase expressed on early lymphoid progenitors, a small subset of immature B-cells, proliferating B-cells and mature neutrophils.

Positive tissue control
Normal tonsil, small intestine

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least moderate, distinct membraneous staining of virtually all germinal center B-cells in tonsil.
2. Moderate to strong, predominantly membraneous but also cytoplasmic staining of epithelial cells in renal proximal tubules and parietal layer of Bowman's capsule.
3. At least moderate staining of virtually all neoplastic cells in renal clear cell carcinoma and Burkitt's lymphoma.
4. At least weak staining of majority of neoplastic cells in follicular lymphoma.
5. At least weak to moderate staining of neutrophil granulocytes in all specimens.

References

1. Le Gouill S, et al. Haematologica: the hematology journal 2007; 92(10):1335-1342.
2. Leong AS-Y, et al. CD10. Manual of Diagnostic Antibodies for Immunohistology. 2003; pp. 77-78.

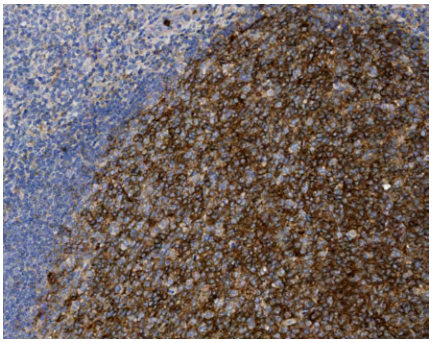


Figure 1. Negative staining of mantle zone lymphoid cells but moderate staining in the germinal centers B-cells in tonsil.

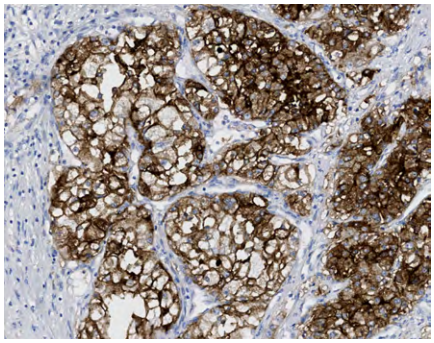


Figure 2. Moderate staining in renal clear cell carcinoma.

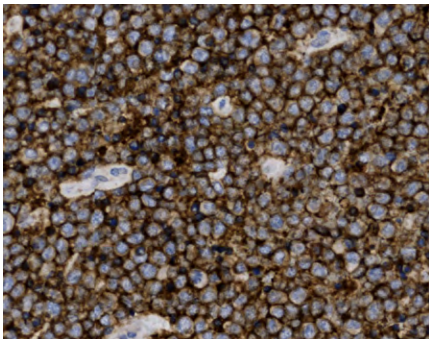


Figure 3. Strong staining in Burkitt's lymphoma.

Tissue-Tek Genie® anti-CD13

IVD

Clone
EP117

Host/clonality
Rabbit monoclonal

Product codes and quantity
8503-C010: RTU, 10 capsules; 1 pack
8503-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
In normal appendix, lung, tonsil, thymus, positive staining is observed in macrophage/dendritic cells, a subset of lymphocytes, mast cells and monocytes. Specific cytoplasmic and membraneous staining is also detected in prostate gland epithelial cells, epithelium of renal proximal tubules and gastrointestinal tract tissues. In normal liver, cytoplasmic staining of virtually all hepatocytes and a strong staining reaction of bile canaliculi are found. Positive staining on myeloblasts is observed in bone marrow of selected types of AML.
The antibody labels leukemic blasts in most acute myeloid leukemia (AML) and is useful in identifying the AML M0 subtype. A canalicular staining pattern of CD13 is observed in both normal and neoplastic liver tissues, and is useful in the differentiation between hepatocellular carcinoma (HCC) and non-HCC tumors in liver when used in a panel with other antibodies.

Description
CD13 is a heavily glycosylated membrane protein expressed by most cells of myeloid origin including monocytes, macrophages, granulocytes, and their hematopoietic precursors. CD13 is also abundantly expressed in the brush border of epithelial cells (e.g., renal proximal tubules, small intestine, prostatic epithelial cells), bile duct canaliculi, mast cells, bone marrow stromal cells, osteoclasts, in fibroblasts, and smooth muscle cells.

Positive tissue control
Appendix, bone marrow, liver and selected cases of AML

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic and membraneous staining.
2. In normal liver, a moderate cytoplasmic staining of virtually all cells in liver, and a strong staining reaction of bile canaliculi in liver.
3. In normal appendix, at least weak staining of lymphocytes in lamina propria.
4. Membraneous and cytoplasmic staining of myeloblasts in bone marrow and selected cases of AML.

References

1. Kirshenbaum AS, et al. Blood 1999; 94:2333-2342.
2. Thalhammer-Scherrer R, et al. Am J Clin Pathol. 2002; 117:380-9.
3. Rocken C, et al. J Clin Pathol. 2005; 58:1069-1075.
4. Bauvois B, et al. Med Res Rev. 2006; 26:88-130.
5. Piedfer M, et al. FASEB J. 2011; 25:2831-2842.

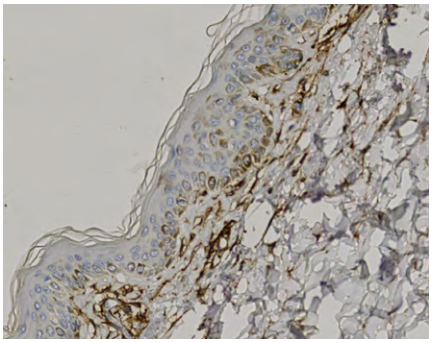


Figure 1. The squamous epithelial cells of skin show no reactivity for CD13.

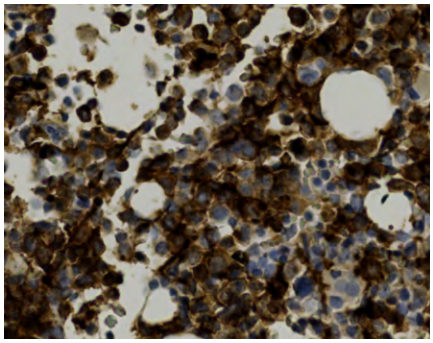


Figure 2. A strong membraneous and cytoplasmic staining pattern is seen in among the blast cells of this AML M4 involving the bone marrow.

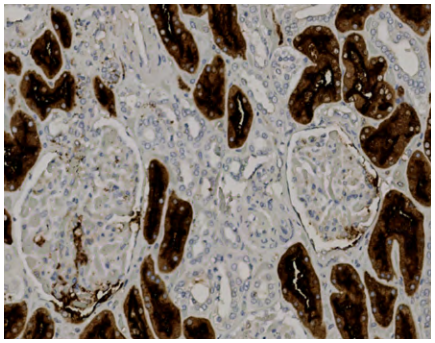


Figure 3. A strong cytoplasmic and membrane expression pattern is seen for CD13 among the proximal renal tubules.

Tissue-Tek Genie® anti-CD14

IVD

Clone
EP128

Host/clonality
Rabbit monoclonal

Product codes and quantity
8321-C010: RTU, 10 capsules; 1 pack
8321-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the cytoplasm and membranes on follicular dendritic cells and macrophages of tonsil and appendix, and on Kupffer cells, macrophages and sinusoidal endothelial cells of the liver. Cytoplasmic staining is observed in neoplastic cells of acute myelomonocytic leukemia (AML M4), in monocyte-derived cells in various leukemias. It is useful for classification of neoplastic cells of monocytic cell lineage when used with a panel of other antibodies.

Description
CD14 is expressed on monocytes, macrophages, follicular dendritic cells, histiocytes, and Langerhans' cells. CD14 is detected in myeloid leukemias with monoblastic/monocytic differentiation, histiocytic neoplasms, Langerhans' cell histiocytosis, and giant cell tumors. CD14 is more specific than CD68 in the identification of monocytes/histiocytes and associated neoplasms.

Positive tissue control
Tonsil, appendix, liver

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil and appendix, a moderate to strong cytoplasmic and membraneous staining of follicular dendritic cells (in germinal centers) and macrophages.
2. Intestinal epithelial cells are negative.
3. In liver, a moderate to strong cytoplasmic and membraneous staining of Kupffer macrophages and sinusoidal endothelial cells.

References

1. Rollins-Raval MA, et al. Histopathology. 2012 May;60(6):933-42.
2. Klco JM, et al. Am J Clin Pathol 2011; 135:720-730.
3. Smeltzer J, et al. Clin Cancer Res. 2014; 20: 2862-2872.

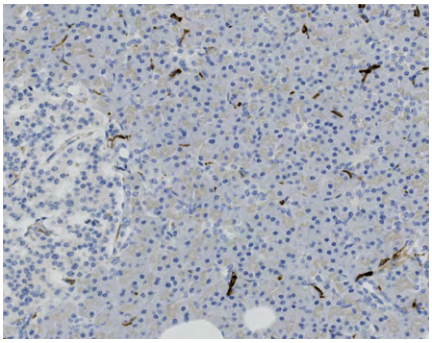


Figure 1. The islet cells, acini and ductal epithelium of pancreas show a negative staining reaction for CD14, while scattered macrophages show strong cytoplasmic and membraneous reactivity.

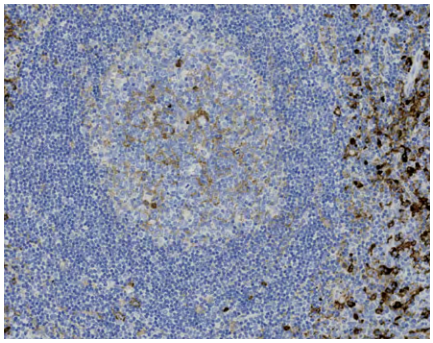


Figure 2. A weak to moderate cytoplasmic and membraneous staining reaction for CD14 is seen among the follicular dendritic cells and macrophages of this tonsillar germinal center. Strong cytoplasmic and membraneous staining is seen among the macrophages in the interfollicular areas.

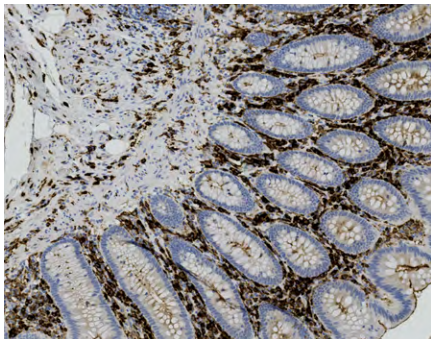


Figure 3. The macrophages in the lamina propria and submucosa of this appendix show a strong cytoplasmic and membraneous staining reaction for CD14. Additionally, the epithelial cells show a moderate to strong membraneous staining reaction in a "brush-border" pattern.

Tissue-Tek Genie® anti-CD15

IVD

Clone
MMA

Host/clonality
Mouse monoclonal

Product codes and quantity
8256-C010: RTU, 10 capsules; 1 pack
8256-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels a number of hematologic malignancies and solid tumors. It may be useful for the diagnosis of classical Hodgkin lymphoma, characterization of acute leukemia, and differentiation of mesothelioma from lung adenocarcinoma when used with a panel of other antibodies.

Description
CD15 is a membrane protein expressed by most terminally differentiated myeloid cells. Activated lymphocytes are CD15 protein positive, but the majority of lymphocytes are CD15 protein negative.

Positive tissue control
Tonsil, appendix, kidney, classical Hodgkin lymphoma, and lung adenocarcinoma

Staining pattern
Cytoplasmic and membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. An at least weak but distinct predominantly membraneous staining reaction of follicular dendritic cells in the germinal centers of tonsil.
2. A moderate to strong predominantly membraneous staining reaction of epithelial cells lining renal proximal tubules.
3. A moderate to strong and distinct predominantly membraneous staining reaction as well as dot-like (Golgi) staining reaction of the vast majority of Hodgkin and Reed-Sternberg cells in Hodgkin lymphomas.
4. A strong cytoplasmic staining reaction of neutrophil granulocytes in tonsil, kidney and Hodgkin lymphomas
5. No or only minimal background reaction.

References

1. Pellegrini W, et al. Haematologica. 2007; 92:708-709
2. Elgin J, et al. Ann. Diagn. Pathol. 1999; 3:263-275

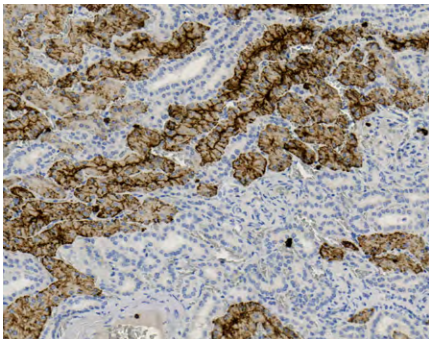


Figure 1. Distal tubules in a normal kidney specimen are negative, while the proximal tubules show moderate cytoplasmic and strong membraneous staining for CD15.

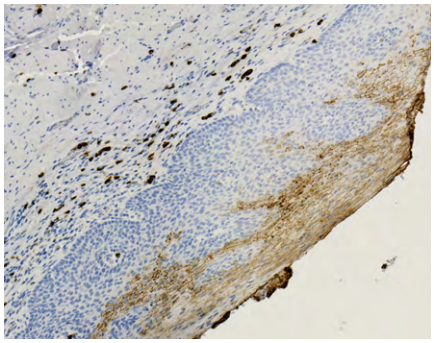


Figure 2. The superficial aspect of the squamous epithelium in this esophageal specimen shows weak to moderate cytoplasmic and membraneous reactivity for CD15, while the underlying submucosal layers show scattered myeloid cells with strong cytoplasmic reactivity.

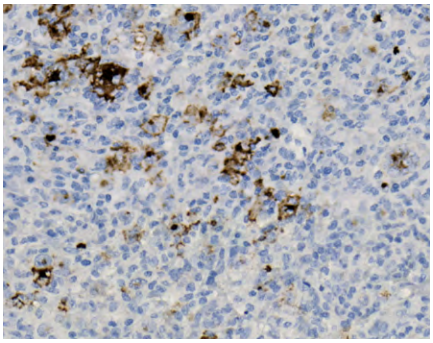


Figure 3. Hodgkin and Reed-Sternberg cells in this example of classical Hodgkin lymphoma show strong Golgi staining (dot-like pattern), as well moderate to strong membrane staining. Background myeloid elements are strongly positive, while lymphocytes are negative.

Tissue-Tek Genie® anti-CD19

IVD

Clone
EP169

Host/clonality
Rabbit monoclonal

Product codes and quantity
8516-C010: RTU, 10 capsules; 1 pack
8516-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the membrane and is observed on the B-cells in mantle zone, germinal center, and inter-follicular areas, as well as follicular dendritic cells. Weak staining of plasma cells is observed. Membrane staining is observed on neoplastic cells of B-cell neoplasms. Staining is not observed on neoplastic cells of other tumors.
It is useful for the identification of a majority B-cell neoplasms when used with a panel of other antibodies.

Description
CD19 regulates B-cell development, activation, and differentiation. CD19 is widely expressed from early pre-B-cells, normal B-cells, and normal plasma cells. Its expression on normal plasma cells is weaker than normal B-cells and a subpopulation may lack expression. CD19 is also expressed on follicular dendritic cells. CD19 is a specific and sensitive marker of B-cells and is found on the majority of B-cell neoplasms.

Positive tissue control
Tonsil, appendix, and B-cell neoplasms

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Membraneous staining.
2. In tonsil and appendix, a strong predominantly membraneous staining of B-cells of the germinal centers, mantle zones, and inter-follicular areas, as well as follicular dendritic cells; a weak staining in normal plasma calls; a negative staining of all other cell types.
3. Membraneous staining of neoplastic cells of B-cell neoplasms and follicular dendritic cell tumors.

References

1. Chung E, et al. The Journal of Clinical Investigation 2012; 122: 2257-2266.
2. Wang K, et al. Experimental Hematology & Oncology 2012, 1:36.
3. Boyd S, et al. Appl Immunohistochem Mol Morphol. 2013; 21: 116-131.
4. Wang H, et al. Arch Pathol Lab Med. 2017;141:1236-1246.

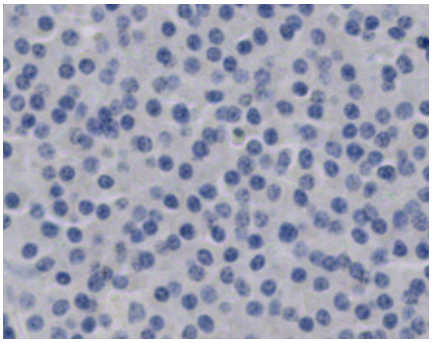


Figure 1. This particular example of a plasmacytoma shows no staining reaction for CD19.

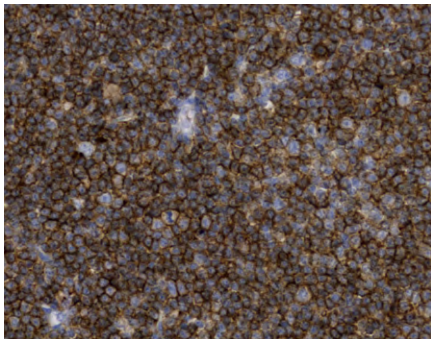


Figure 2. A moderate to strong membraneous staining pattern for CD19 is seen on the neoplastic cells in this B-cell CLL/SLL.

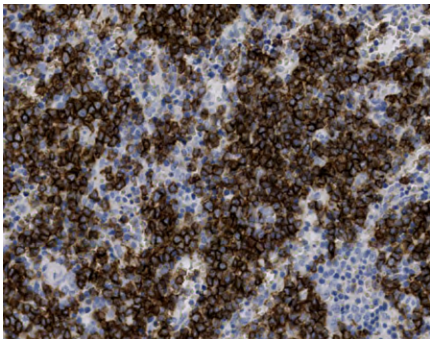


Figure 3. Strong membraneous staining is seen on the neoplastic cells of this pre-B-cell acute lymphoblastic leukemia (pre-B ALL).

Tissue-Tek Genie® anti-CD20

IVD

Clone
L26

Host/clonality
Mouse monoclonal

Product codes and quantity
8259-C010: RTU, 10 capsules; 1 pack
8259-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD20 protein on the membrane of B-cell precursors and B cells in both normal and neoplastic cells. It may be useful for classifying tumor cells of B-lymphocytic lineage when used with a panel of antibodies.

Description
CD20 is a transmembrane protein expressed on B-cell precursors and mature B-cells, but is lost in plasma cells. CD20 is almost always expressed in B-cell lymphomas.

Positive tissue control
Tonsil

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, predominantly membraneous staining of mantle zone B-cells, germinal center B-cells and interfollicular B-cells in tonsil and appendix.
2. A strong membraneous staining of virtually all neoplastic cells of diffuse large B-cell lymphoma.
3. A moderate to strong membraneous staining of neoplastic cells in B-chronic lymphatic leukemia.
4. A negative staining of pre-B-acute lymphatic leukemia (only scattered maturated neoplastic cells and entrapped normal B-cells should be stained).
5. A negative staining of plasmacytoma (only the remnants of normal B-cells should be stained).

References

1. Cartun RW, et al. Am. J. Pathol. 1987; 129(3):415-421.
2. Mason DY, et al. Am. J. Pathol. 1990; 136(6):1215-1222.
3. Ishii Y, et al. Clin. Exp. Immunol. 1984; 58(1):183-192.

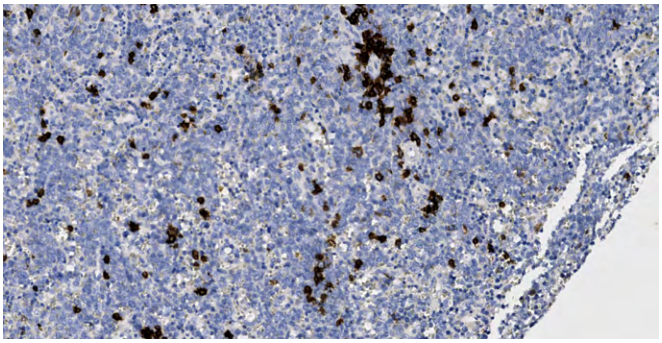


Figure 1. Negative straining in pre-B acute lymphatic leukemia but positive staining in normal B-cells.

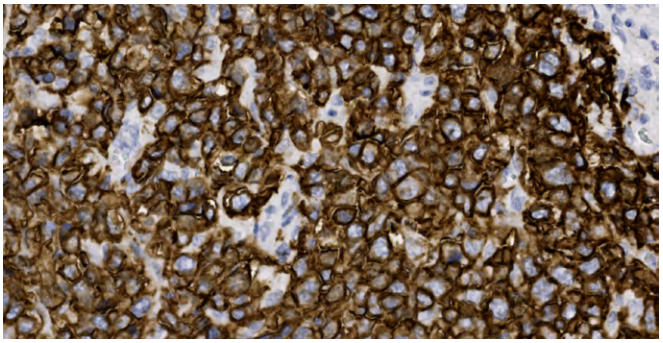


Figure 2. Strong staining in diffuse large B-chronic lymphatic leukemia.

Tissue-Tek Genie® anti-CD21

IVD

Clone
EP64

Host/clonality
Rabbit monoclonal

Product codes and quantity
8260-C010: RTU, 10 capsules; 1 pack
8260-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells of follicular dendritic cell tumors and B-cell lymphomas. It is useful for identification of follicular dendritic cells, mature B-cells, and follicular dendritic cell tumors when used with a panel of antibodies.

Description
CD21 is a membrane protein that serves as the receptor for complement component C3 (C3d) and the Epstein-Barr Virus (EBV). CD21 is expressed on dendritic cells and mature B-cells.

Positive tissue control
Tonsil, lymph node

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High-pH Antigen Retrieval Solution

Assessment criteria
1. Moderate to strong membraneous staining of follicular dendritic cells in germinal centers of tonsil and other lymphoid tissues
2. Weak to moderate membraneous staining of a few active B cells in follicular mantle zones of tonsil and other lymphoid tissues
3. Membraneous staining of neoplastic cells in follicular dendritic cell tumors
4. CD21 does not stain T-cells, monocytes, or granulocytes

References

1. Heim-Hall J, and Yohe SL. Arch. Pathol. Lab. Med. 2008; 132:476-489.
2. Perez-Ordonez B, et al. Am. J. Surg. Pathol. 1996; 20:944-955.
3. De Leval L, et al. Am. J. Surg. Pathol. 2001; 25:732-741.

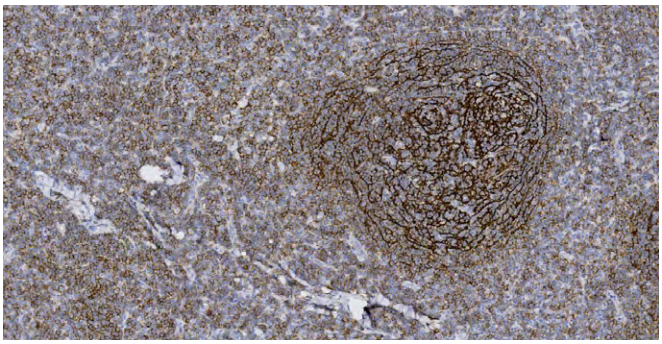


Figure 1. Moderate membraneous expression of CD21 is present on the neoplastic lymphocytes in this chronic lymphocytic lymphoma (CLL/SLL), and the benign follicular dendritic cells show strong membraneous expression.

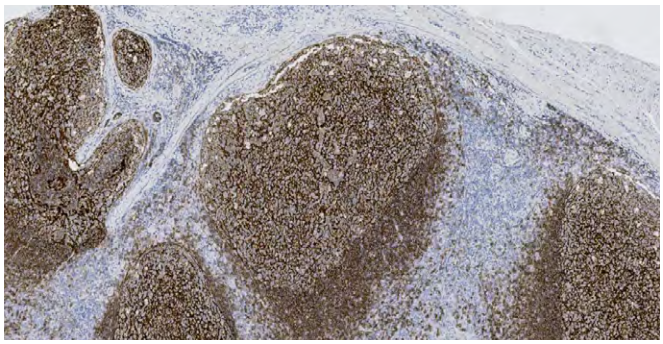


Figure 2. Follicular dendritic cells within reactive follicles in this tonsil show strong membraneous staining for CD21. There is weak to moderate staining among the B-cells of the mantle zone.

Tissue-Tek Genie® anti-CD23

IVD

Clone
GR013

Host/clonality
Rabbit monoclonal

Product codes and quantity
8262-C010: RTU, 10 capsules; 1 pack
8262-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
Positive staining of neoplastic cells is observed in some B-cell lymphomas, whereas mantle cell lymphomas are generally negative with this antibody. It may be useful for identifying/classifying a range of leukemias and lymphomas when used with a panel of antibodies.

Description
CD23 is type II membrane glycoprotein and is primary expressed on the surface of a sub-population of B-cells in germinal center (mantle zone, and follicular dendritic cells). In tonsil, membrane staining is observed with follicular dendritic cells in germinal centers and activated B-cells in the mantle zones around germinal centers.

Positive tissue control
Tonsil or known CD23 positive B-cell lymphoma

Staining pattern
Membraneous and some cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak to moderate and distinct membraneous staining of activated B-cells in mantle zone of germinal centers of tonsil.
2. A strong, distinct staining of follicular dendritic cells in germinal centers of tonsil.
3. At least weak to moderate, distinct membraneous staining of neoplastic cells in B-chronic lymphatic leukemia.
4. No staining of neoplastic cells in mantle cell lymphoma.

References

1. Schlette E, et al. Am. J. Clin. Pathol. 2003; 120:760-766.
2. Maeda K, et al. J. Histochem. Cytochem. 2002; 50:1475-1486.

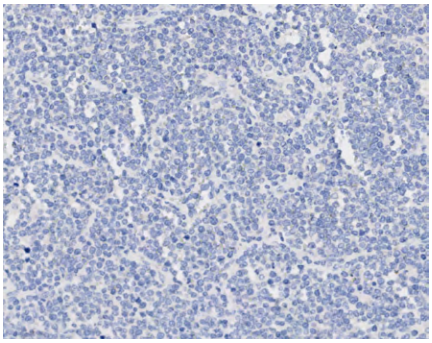


Figure 1. Negative staining of mantle cell lymphoma.

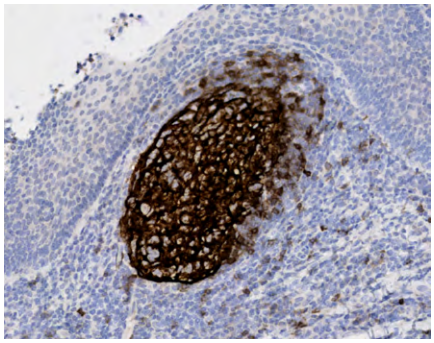


Figure 2. Moderate staining of activated B-cells in the mantle zone and follicular dendritic cells of germinal centers in tonsils.

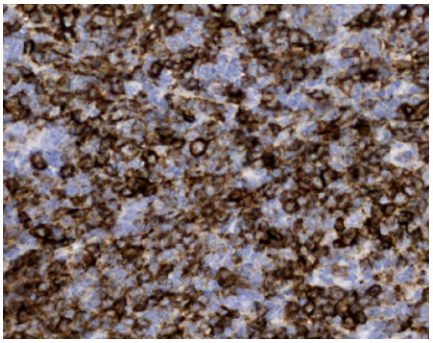


Figure 3. Moderate staining in B-chronic lymphatic leukemia.

Tissue-Tek Genie® anti-CD30

IVD

Clone
Ber-H2

Host/clonality
Mouse monoclonal

Product codes and quantity
8265-C010: RTU, 10 capsules; 1 pack
8265-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels CD30 protein on the membrane and cytoplasm of scattered large activated B- and T-lymphocytes of tonsil, lymph nodes, spleen, and thymus in both normal and neoplastic cells. The antibody labels CD30 protein in normal and neoplastic cells, such as Hodgkin and Reed-Sternberg cells and anaplastic large-cell lymphoma cells (ALCL). CD30 positive staining may aid in identifying of classical Hodgkin lymphoma and ALCL when used with a panel of antibodies

Description
CD30 is a transmembrane protein expressed on scattered large activated B- and T-lymphocytes in tonsil, lymph nodes, spleen, and thymus.

Positive tissue control
Hodgkin lymphoma and ALCL

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak to moderate and distinct membraneous staining of interfollicular activated B- and T-cells and perifollicular germinal center B-cells in tonsil.
2. A moderate to strong, predominantly membraneous and dot-like (Golgi zone) cytoplasmic staining of Hodgkin and Reed-Sternberg cells in Hodgkin lymphoma.
3. At least weak to moderate, predominantly membraneous and dot-like (Golgi zone) cytoplasmic staining of Hodgkin and Reed-Sternberg cells in Hodgkin lymphoma.
4. A moderate to strong, predominantly membraneous staining of virtually all neoplastic cells in embryonal carcinoma - a weak background staining due to necrosis was acceptable.

References

1. Schwarting R, et al. Blood. 1989; 74(5):1678-1689.
2. de Bruin PC, et al. Leukemia. 1995; 9(10):1620-1627.
3. Stein H, et al. Blood. 2000; 96(12):3681-3695.

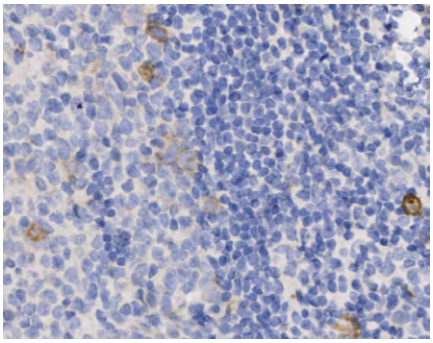


Figure 1. Negative staining of normal lymphoid cells but weak staining in activated B-cells and T-cells in tonsil.

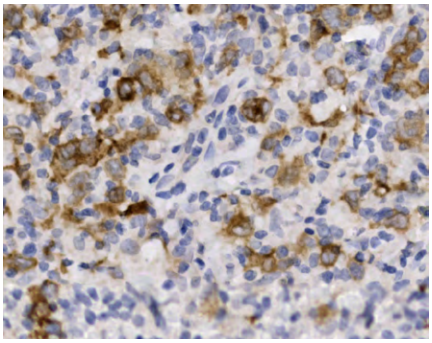


Figure 2. Weak to moderate staining in Hodgkin lymphoma.

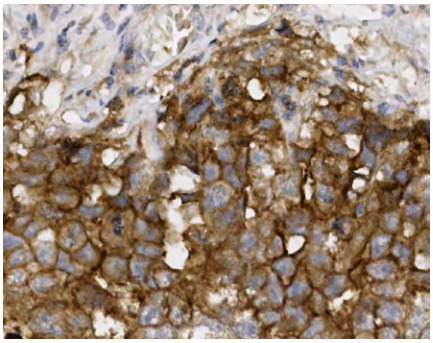


Figure 3. Moderate to strong staining in germ cell embryonal carcinoma.

Tissue-Tek Genie® anti-CD31

IVD

Clone
RM247

Host/clonality
Rabbit monoclonal

Product codes and quantity
8282-C010: RTU, 10 capsules; 1 pack
8282-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD31 protein on the membrane, and sometimes cytoplasm, of endothelial cells in both normal and neoplastic cells. It may be useful for identifying vascular disorder, e.g. angiosarcoma, and evaluating vascularization of tumors when used with a panel of antibodies.

Description
CD31, also known as platelet/endothelial cell adhesion molecule 1 (PECAM-1), is a trans-membrane protein expressed on endothelial cells.

Positive tissue control
Appendix, tonsil, liver, placenta

Staining pattern
Mainly membraneous and some cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct, predominantly membraneous staining of normal endothelial cells and plasma cells in appendix and tonsil.
2. At least weak to moderate, distinct membraneous staining of activated B- and T-cells, in particular mantle zone B-cells in tonsil and intraepithelial T-cells in appendix.
3. At least weak to moderate staining of hepatic sinusoidal endothelial cells.
4. At least moderate, predominantly membraneous staining of neoplastic cells in angiosarcoma.
5. No staining of the epithelial cells in appendix and tonsil.

References

1. Wang D, et al. Biotech. Histochem. 2008; 83:179-189.
2. Engel CJ, et al. Am. J. Surg. Pathol. 1996; 20:1260-1265.

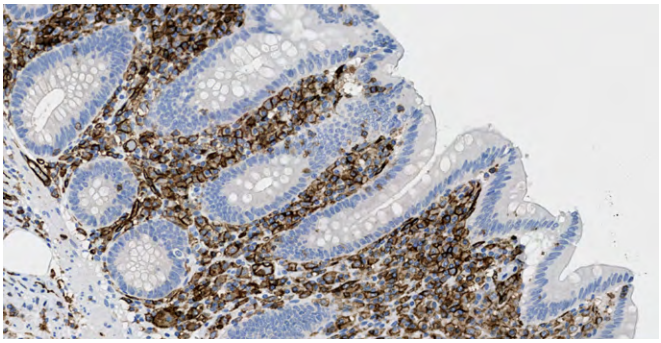


Figure 1. Negative staining of columnar cells but strong staining of T-cells in the appendix.

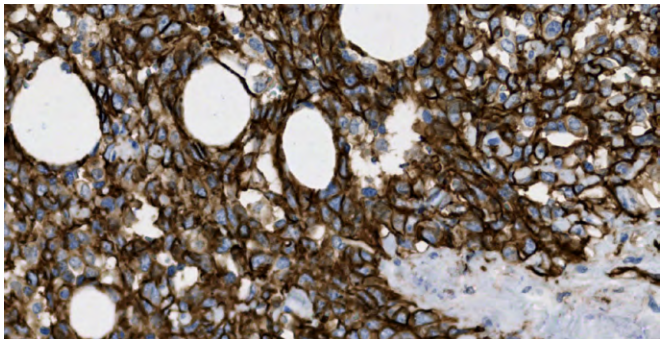


Figure 2. Strong staining in the angiosarcoma.

Tissue-Tek Genie® anti-CD34

IVD

Clone
QBEnd/10

Host/clonality
Mouse monoclonal

Product codes and quantity
8268-C010: RTU, 10 capsules; 1 pack
8268-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD34 protein on the membrane of hematopoietic progenitor cells, capillary endothelial cells, rare glial cells in nervous tissues, and embryonic fibroblasts in both normal and neoplastic cells. It may be useful for classifying vascular and lymphatic tumors, and for sub-classifying leukemia when used with a panel of antibodies.

Description
CD34 is a transmembrane protein expressed on hematopoietic progenitor cells, capillary endothelial cells, rare glial cells in nervous tissues, and embryonic fibroblasts. The antibody recognizes a CD34 epitope that is resistant to neuraminidase, and sensitive to glycoprotease and chymopapain.

Positive tissue control
Normal appendix, tonsil, liver

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct, predominantly membraneous staining of endothelial cells in tissues.
2. A moderate to strong, predominantly membraneous staining of Cajal cells in muscularis propria and stromal fibroblast-like cells in appendix.
3. A moderate to strong, predominantly membraneous staining of endothelial cells in portal tracts and periportal sinusoidal endothelial cells in liver (zone 1 sinusoids).
4. A strong, distinct membraneous staining of neoplastic cells in pre-B-ALL.
5. A strong, predominantly membraneous staining of neoplastic cells of gastrointestinal stromal tumor and of dermatofibrosarcoma protuberans.

References

1. Krause DS, et al. Blood. 1996; 87(1):1-13.
2. Fina L, et al. Blood. 1990; 75:2417-2426.
3. Ramani P, et al. Histopathology. 1990; 17(3):237-242.

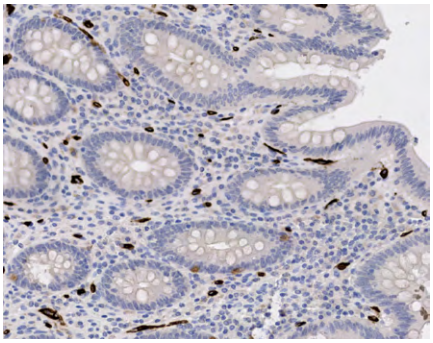


Figure 1. Negative staining of the columnar cells in the appendix.

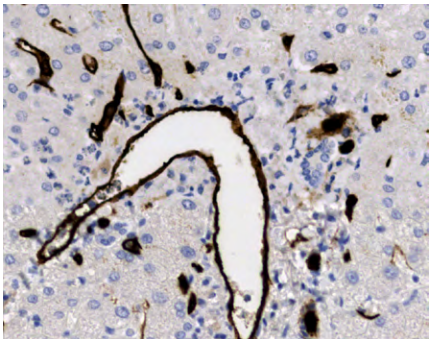


Figure 2. Strong staining in portal tracts and sinusoidal endothelial cells of liver.

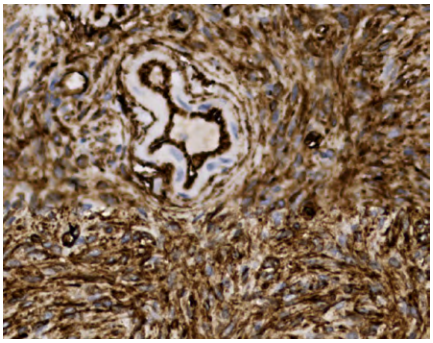


Figure 3. Strong staining of dermatofibrosarcoma protuberans.

Tissue-Tek Genie® anti-CD38

IVD

Clone
GM038

Host/clonality
Mouse monoclonal

Product codes and quantity
8277-C010: RTU, 10 capsules; 1 pack
8277-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels CD38 plasma cells and germinal center B-cells, and in the neoplastic cells of myeloma and plasmacytoma.
This antibody is useful for identifying plasma cells and tumors with plasmablastic differentiation when used with a panel of antibodies.

Description
CD38 protein is expressed on a wide range of cells with the highest expression levels typically seen in plasma cells. CD38 protein is found on immature cells of the B-cell and T-cell lineages, but is absent from most mature, resting peripheral lymphocytes.

Positive tissue control
Appendix, myeloma, and plasmacytoma

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, predominantly membraneous staining of peripheral nerves and the interfollicular NK-cells and a small subset of T-cells (CD4+ & CD8+ double positive).
2. Moderate to strong cytoplasmic and membraneous staining of activated late stage B-cells in germinal center and plasma cells in tonsil and appendix.
3. Cytoplasmic and membraneous staining neoplastic cells of myeloma and plasmacytoma.
4. A moderate to strong, predominantly membraneous staining of virtually all neoplastic cells in neuroendocrine tumors.
5. A weak to moderate staining of fibroblastic reticular cells in tonsil and appendix, a proportion of smooth muscle cells and endothelial cells in the liver sinusoids. No staining reaction in the squamous epithelial cells of tonsil or the hepatocytes in liver.

References

1. Kumar S, et al. Best Pract. Res. Clin. Haematol. 2010; 23:433–451.
2. Wei A, and Juneja S. J. Clin. Pathol. 2003; 56:406-411.
3. Deaglio S, et al. J. Immunol. 1998; 160:395-402.

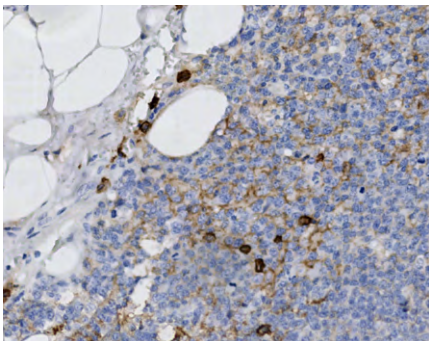


Figure 1. The neoplastic cells of this diffuse large B-cell lymphoma are negative for CD38, while scattered non-neoplastic hematopoetic cells are positive.

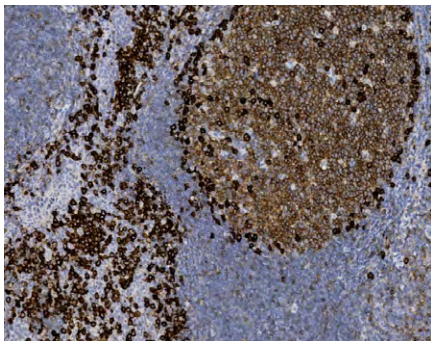


Figure 2. Moderate membraneous and cytoplasmic staining for CD38 is seen in the germinal center B-cells of this normal tonsil. Strong staining is seen among plasma cells, and a range of staining intensity is seen among other hematopoetic elements.

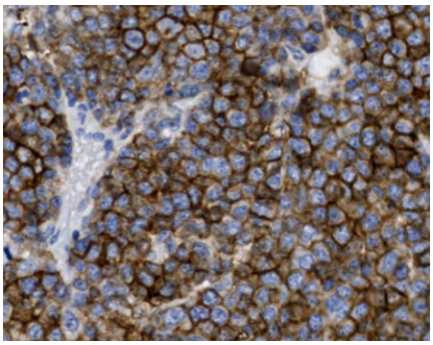


Figure 3. Moderate to strong membraneous and cytoplasmic staining for CD38 is demonstrated in this plasmacytoma.

Tissue-Tek Genie® anti-CD43

IVD

Clone
DF-T1

Host/clonality
Mouse monoclonal

Product codes and quantity
8279-C010: RTU, 10 capsules; 1 pack
8279-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels T-cells. It also stains macrophages in the germinal center and plasma cells in the lamina propria of appendix or colon. CD43 is frequently detected in a subset of B-cell lymphomas, including mantle cell lymphoma, SLL/CLL, DLBCL, marginal zone lymphoma and Burkitt lymphoma. It is a useful tool for identifying and classifying a range of lymphoid and myeloid tumors when used with a panel of antibodies.

Description
CD43 is membrane glycoprotein expressed on the surface of thymocytes, T-cells, and cells of the myeloid lineage. The antibody labels CD43 in normal and neoplastic cells.

Positive tissue control
Lymph node, tonsil, appendix

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil, strong membraneous staining of T-cells in the T-zone; at least moderate membraneous staining of scattered T cells and macrophages in germinal centers.
2. In appendix, moderate to strong membraneous staining of T-cells and plasma cells in lamina propria.
3. No staining of other type of cells in tonsil and appendix.

References

1. Stross WP, et al. J Clin Pathol. 1989; 42:953-961.
2. Borche L, et al. Eur J Immunol. 1987; 17:1523-1526.
3. Boudova L, et al. J Cutan Pathol. 2006; 33:584-589.
4. Lai R[1], et al. Am J Clin Pathol. 1999 Apr;111(4):488-94.

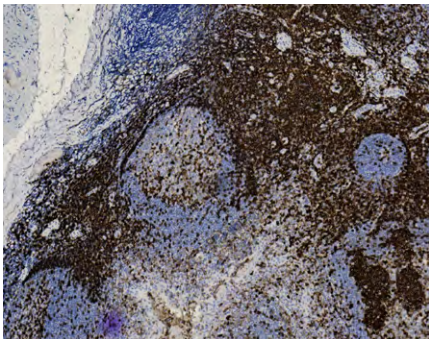


Figure 1. No CD43 expression is seen in the germinal center or mantle zone B-cells of this benign lymph node. Strong membrane staining is demonstrated among the T-cells.

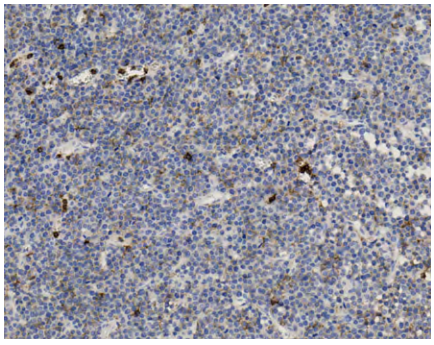


Figure 2. Weak to moderate membrane staining for CD43 is seen in this plasmacytoma of bone.

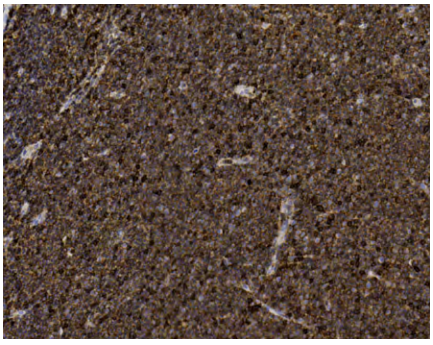


Figure 3. Strong membrane staining for CD43 is demonstrated in this small cell lymphoma/chronic lymphocytic leukemia (CLL/SLL).

Tissue-Tek Genie® anti-CD45

IVD

Clone
GR009

Host/clonality
Rabbit monoclonal

Product codes and quantity
8271-C010: RTU, 10 capsules; 1 pack
8271-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD45 protein on the membrane of the leucocytes including lymphocytes, macrophages, and granulocytes in both normal and neoplastic cells. CD45 is detected in a large majority of hematopoietic-lymphoid neoplasms, i.e., leukemia and malignant lymphomas. Certain types of lymphoid neoplasms may lack CD45 expression (i.e. Hodgkin disease, some T-cell lymphomas, and some leukemia).

Description
CD45 is a transmembrane protein which is also known as Leucocyte Common Antigen, LCA. It is expressed on most nucleated cells of hematopoietic origin and has various isoforms.

Positive tissue control
Tonsil, liver

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong and distinct predominantly membraneous staining of lymphocytes. In tonsil, B-cell and T-cell should be distinctively stained.
2. At least weak to moderate and distinct staining of Kupffer cells in liver and microglial cells in brain.
3. At least weak to moderate membraneous staining of neoplastic cells in B-CLL.
4. No staining of squamous epithelial cells in tonsil or hepatocytes in liver.

References

1. Trowbridge, IS and Thomas, ML. Annu. Rev. Immunol. 1994; 12:85-116.
2. Mohamed M, et al. Clin. Med. Res. 2010; 8:84-88.

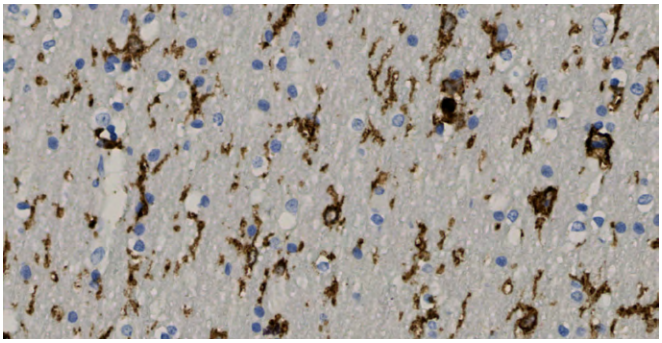


Figure 1. Negative staining of support stroma but strong staining in microglial cells of normal brain.

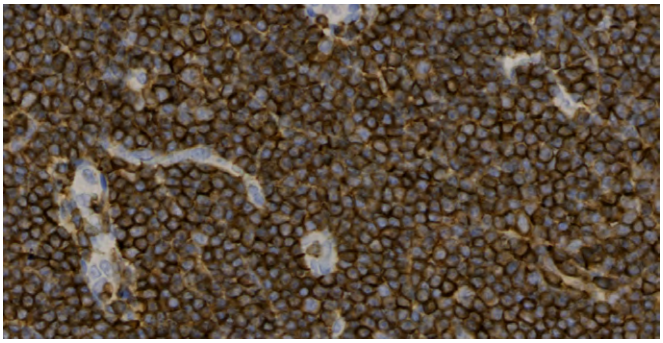


Figure 2. Moderate staining in B-CLL.

Tissue-Tek Genie® anti-CD56

IVD

Clone
MRQ-42

Host/clonality
Rabbit monoclonal

Product codes and quantity
8274-C010: RTU, 10 capsules; 1 pack
8274-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels certain large granular lymphocyte leukemias, small cell lung carcinomas, neural-derived tumors, myelomas, and myeloid leukemias. It can be useful for identifying and characterizing NK/T-cell lymphoma, multiple myeloma, myeloid leukemia cells, some thyroid tumors, schwannoma, small cell carcinoma, neuroblastoma, and osteosarcoma when used with a panel of antibodies.

Description
CD56, also known as neuronal cell adhesion molecule (NCAM), is a membrane protein expressed in neurons and glial cells of the central nervous system, nerves and neuromuscular junctions of the peripheral nervous system, most types of neuroendocrine cells, various epithelial cells, smooth muscle cells, osteoblasts, natural killer (NK) cells and NK-like T-cells.

Positive tissue control
Tonsil, appendix, liver

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, predominantly membraneous staining of peripheral nerves.
2. A strong, predominantly membraneous staining of the interfollicular NK-cells and a small subset of T-cells (CD4+ & CD8+ double positive).
3. A moderate to strong, predominantly membraneous staining of virtually all neoplastic cells in neuroendocrine tumors.
4. A weak to moderate staining in a proportion of smooth muscle cells, of endothelial cells in the liver sinusoids, and of fibroblastic reticular cells in tonsils and appendix.
5. No staining reaction in the squamous epithelial cells of the tonsil or the hepatocytes in the liver.

References

1. Kontogianni K, et al. J. Clin. Pathol. 2005; 58:978-980.
2. McNiff JM, et al. J. Cutan. Pathol. 2005; 32:541-545.
3. Lanza F, et al. Leukemia. 1993; 7:1570-1575.

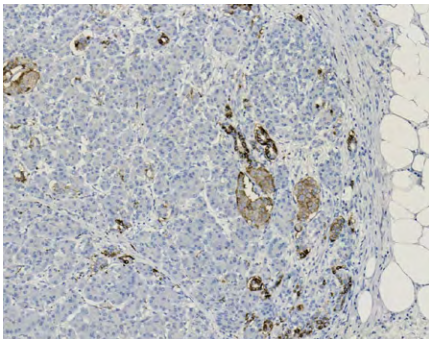


Figure 1. Pancreatic exocrine cells are negative while those of neuroendocrine lineage are positive.

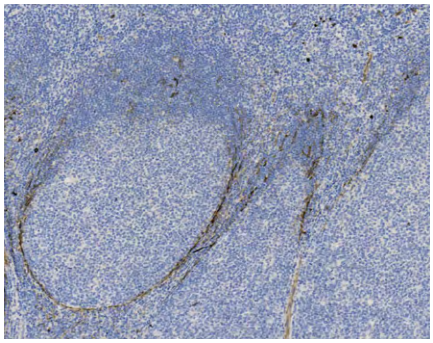


Figure 2. Strong membraneous staining is seen in NK cells and a subset of T-cells in this tonsil. Fibroblastic reticular cells show moderate expression with both a membraneous and cytoplasmic pattern.

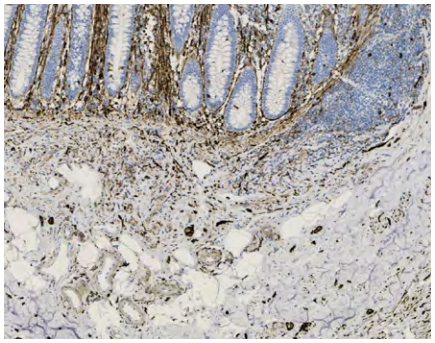


Figure 3. Intense membraneous reactivity is seen in peripheral nerves, scattered mucosal neuroendocrine cells, NK-cells and a subset of T-cells in the appendix. Weaker reactivity is seen in a subpopulation of smooth muscle cells.

Tissue-Tek Genie® anti-CD57

IVD

Clone
NK1

Host/clonality
Mouse monoclonal

Product codes and quantity
8338-C010: RTU, 10 capsules; 1 pack
8338-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
CD57 membraneous staining is observed in a subset of lymphocytes (NK cells) in germinal centers of tonsil and other tissues. Membraneous staining is also observed in pancreatic islet cells, peripheral nerve, brain, adrenal gland, pituitary, prostate (including prostate adenocarcinoma), pheochromocytomas, astrocytoma and oligoastrocytoma, ganglioneuroblastoma, and synovial sarcoma.
It is useful in classifying subtypes of Hodgkin's lymphoma and T-cell large granular lymphocyte disorders and may aid in classifying lymphoid neoplasms when used in a panel with other antibodies.

Description
CD57 is expressed on subtypes of T-cells, natural killer (NK) cells, and other peripheral blood mononuclear cells. CD57 is also present in glial cells, a variety of other neural and epithelial cells, as well as various neural tumors. In addition, CD57 is expressed in prostate tissue, prostate adenocarcinoma, papillary thyroid carcinomas and thymomas.

Positive tissue control
Lymph node and tonsil

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong staining reaction in NK-cells in germinal center in the normal tonsil.
2. An at least weak to moderate staining reaction of NK-cells in the normal tonsil and B-CLL.
3. A weak staining reaction in scattered T-cells in colon adenocarcinoma, liver, high expressor tonsil, both AMLs, nodal and peripheral T-cell lymphomas.

References

1. Boudova L, et al. Blood 2003 Nov 15; 102(10):3753-8.
2. Nielsen CM, et al. Front Immunol 2013; 4:422.
3. Kared H, et al. Cancer Immunol Immunother 2016; 65(4):441-52.

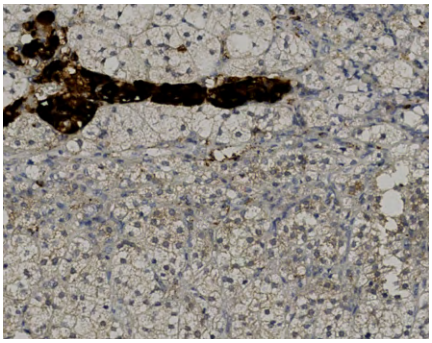


Figure 1. The cortical cells of this adrenal gland show a negative staining reaction for CD57, while the medullary cells show intense membraneous reactivity.

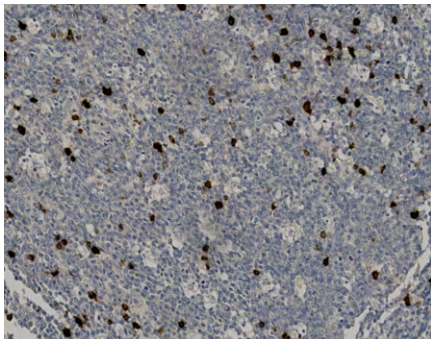


Figure 2. A moderate to strong membraneous staining reaction for CD57 is seen among NK cells and a subset of CD8+ T-cells, as shown in the germinal center of this tonsil.

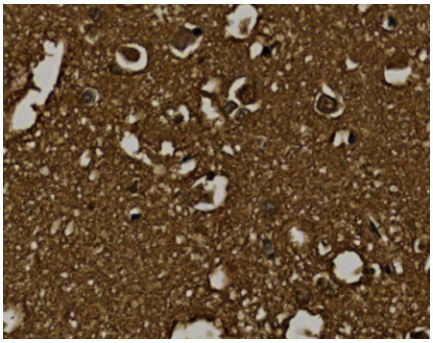


Figure 3. CD57 is highly expressed in neural tissues and a strong membraneous expression pattern is seen among neurons and glial elements in this normal cerebrum.

Tissue-Tek Genie® anti-CD61

IVD

Clone
ZM33

Host/clonality
Mouse monoclonal

Product codes and quantity
8518-C010: RTU, 10 capsules; 1 pack
8518-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels platelets and megakaryocytes in acute megakaryoblastic leukemia (AML) including AML M7 and some acute lymphoblastic leukemia (ALL).
It is useful for identifying megakaryoblastic differentiation and for classification of megakaryoblastic leukemia when used in a panel with other antibodies.

Description
CD61 (platelet glycoprotein IIIa, GPIIIa) is expressed in platelets and megakaryocytes, as well as endothelial cells, monocytes, smooth muscle cells, some B-cells, macrophages, mast cells, osteoclasts, and fibroblasts.

Positive tissue control
Bone marrow, AML

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining of platelets and megakaryocytes in bone marrow.
2. Cytoplasmic staining of megakaryocytes and platelets in AMLs.
3. No staining in liver or tonsil, except platelets inside blood vessels.

References

1. Klairmont MM, et al. Am J Clin Pathol. 2018; 150:461-467.
2. Olsen RJ, et al. Arch Pathol Lab Med. 2008;132:462-475.
3. Moreno A, et al. Histol Histopathol. 2002; 17:347-352.

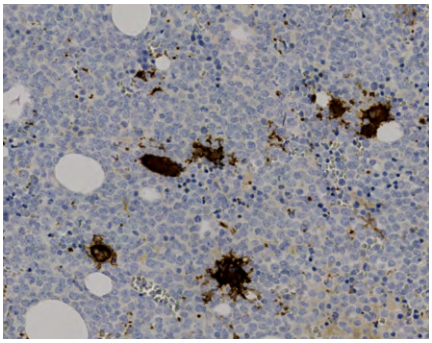


Figure 1. The neoplastic cells of this bone marrow, largely replaced with AML-M1, show no reactivity for CD61. However, background megakaryocytes and platelets show a strong granular cytoplasmic reaction for CD61.

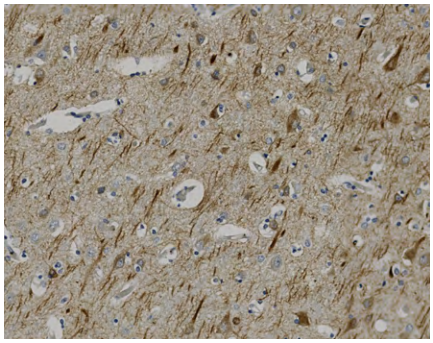


Figure 2. Moderate cytoplasmic reactivity for CD61 is seen among some neurons and axons in the cerebrum.

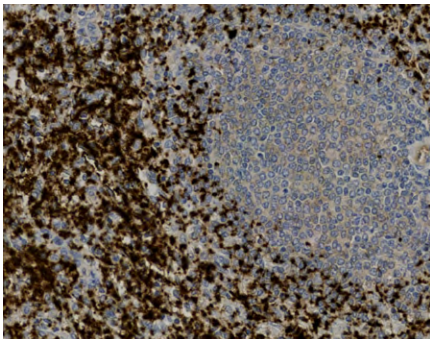


Figure 3. Varying degrees of cytoplasmic reactivity for CD61 are seen among several components of normal spleen including, B-cells, monocytes, mast cells, endothelial cells and platelets.

Tissue-Tek Genie® anti-CD63

IVD

Clone
EP211

Host/clonality
Rabbit monoclonal

Product codes and quantity
8283-C010: RTU, 10 capsules; 1 pack
8283-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
The antibody labels CD63 protein in normal and neoplastic cells. It is a useful tool for identifying/classifying neoplasia such as melanoma, Merkel cell carcinoma, renal cell carcinoma, and adenocarcinoma of the breast and lung, when used with a panel of antibodies.

Description
CD63 is a 53 kD lysosomal membrane protein expressed by a broad range of tissues/cell types, including platelets, granulocytes, basophils, a subset of T-cells, endothelial cells, sweat gland, islets of Langerhans, pancreas, prostate, and melanoma.

Positive tissue control
Pancreas, skin, prostate, melanoma

Staining pattern
Cytoplasmic (with occasional dot-like pattern) and membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining of acinar cells in pancreas, melanocytes in skin, and epithelium in prostate.
2. Cytoplasmic staining of melanoma cells in selective melanomas.

References

1. Barrio MM, et al. Hybridoma 1998; 17:355-364.
2. Huang CI, et al. Am J Pathol. 1998; 153:973-983.
3. Mete O, et al. Virchows Arch. 2005; 447:938-946.
4. Woegerbauer M, et al. Mod Pathol. 2010; 23:751-762.

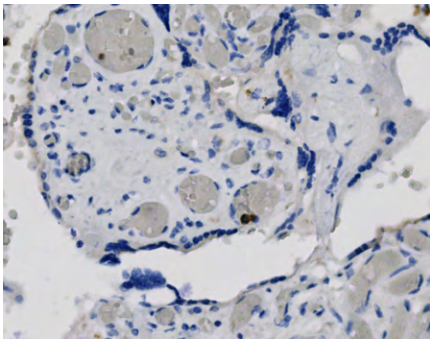


Figure 1. Trophoblasts and villus mesenchymal cells are negative for CD63.

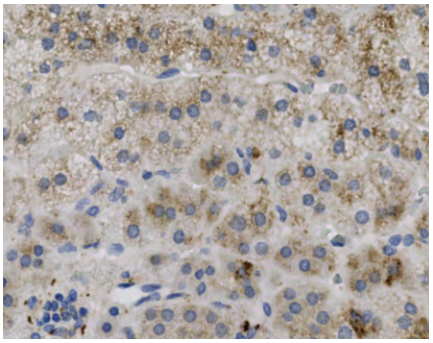


Figure 2. Variable degrees of granular cytoplasmic reactivity for CD63 are seen in the cortical regions of the adrenal gland.

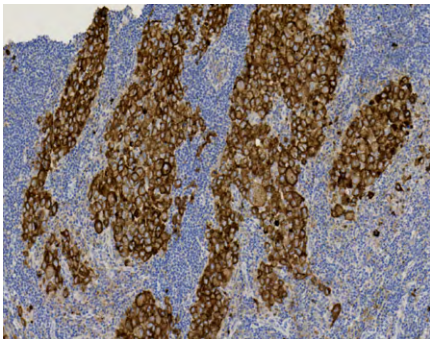


Figure 3. Strong cytoplasmic staining for CD63 is present among the metastatic melanoma cells involving a lymph node. There is no reactivity among the lymphocytes.

Tissue-Tek Genie® anti-CD68

IVD

Clone
GR021

Host/clonality
Rabbit monoclonal

Product codes and quantity
8275-C010: RTU, 10 capsules; 1 pack
8275-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels CD68 protein on the cytoplasm of different types of macrophages of monocyte lineage, myeloid precursor cells in the bone marrow, and some non-hematopoietic tissues such as Kupffer cells in liver, and cells in renal glomeruli and tubules. It may be useful for classifying neoplasms of myeloid and macrophage/monocyte origin when used with a panel of antibodies.

Description
CD68 is an intracellular protein expressed on macrophages, histiocytes, myeloid precursor cells in the bone marrow, and somenon-hematopoietic tissues such as Kupffer cells in liver, and cells in renal glomeruli and tubules.

Positive tissue control
Tonsil, brain

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct cytoplasmic staining of germinal center macrophages in secondary follicles of tonsil and appendix.
2. A moderate to strong cytoplasmic staining of macrophages in interfollicular zones of tonsil, lamina propria of appendix and Kupffer cells of liver.
3. At least weak to moderate cytoplasmic staining of microglial cells in brain.
4. At least moderate cytoplasmic staining in neoplastic cells of histiocytic sarcoma.
5. No staining in liver cells and only a weak cytoplasmic staining in epithelial cells of appendix and tonsil.

References

1. Barros MHM, et al. PLoS ONE. 2013; 8(11):e80908.
2. Mori K, et al. BMC Cancer. 2015; 15:573.
3. Komohara Y, et al. Pathol. Int. 2015; 65:170-176.

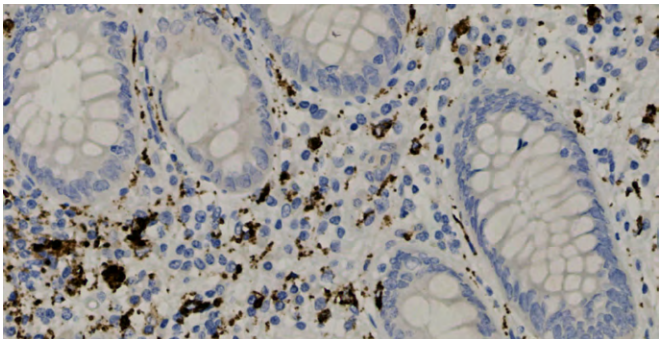


Figure 1. Negative staining in epithelial cells of appendix.

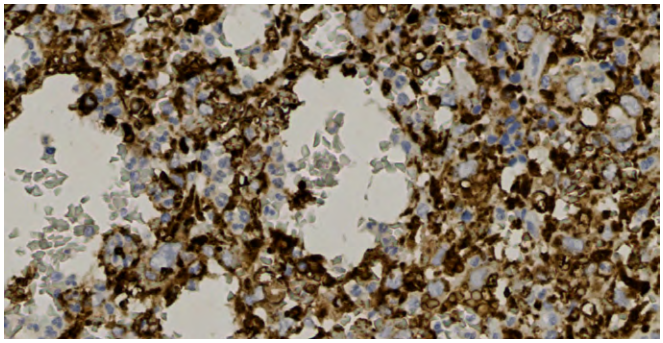


Figure 2. Moderate staining in histiocytic sarcoma.

Tissue-Tek Genie® anti-CD71

IVD

Clone
EP232

Host/clonality
Rabbit monoclonal

Product codes and quantity
8322-C010: RTU, 10 capsules; 1 pack
8322-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the cytoplasm and membrane on erythroid precursors of bone marrow. Cytoplasmic and membraneous staining is observed on syncytiotrophoblasts of placenta, activated B- and T-cells, macrophages of tonsil, hepatocytes, and spermatocytes. Cytoplasmic and membraneous staining is observed on erythroid precursors and erythroblasts of acute myeloid leukemia AML-M6 (erythroid leukemia).
It is useful for identifying erythroid precursors in bone marrow and diagnosing erythroid leukemia and benign erythroid proliferative disorders when used with a panel of other antibodies.

Description
CD71 is regarded as a proliferation marker, and is expressed on myelocytes, activated B- and T-cells, thymocytes, macrophages, proliferating cells, as well as metabolically active cells, e.g., placental syncytiotrophoblasts, basal keratinocyte, hepatocyte, endocrine cells, and spermatocytes. CD71 expression is observed in various neoplasms.

Positive tissue control
Tonsil, appendix, liver, placenta, bone marrow, AML-M6

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil and appendix, at least weak to moderate cytoplasmic and membraneous staining of activated lymphocytes and germinal center macrophages, a moderate to strong staining of squamous epithelial cells.
2. In liver, a weak cytoplasmic and membraneous staining of dispersed lymphocytes.
3. Cytoplasmic and membraneous staining on erythroid precursors and erythroblasts of acute erythroid leukemia (AML-M6).

References

1. Marsee DK, et al. Am J Clin Pathol 2010; 134:429-435.
2. Raess P, et al. Am J Surg Pathol. 2012; 36: 1538-1547.
3. Dong HY, et al. Am J Surg Pathol. 2011 May;35(5):723-32.

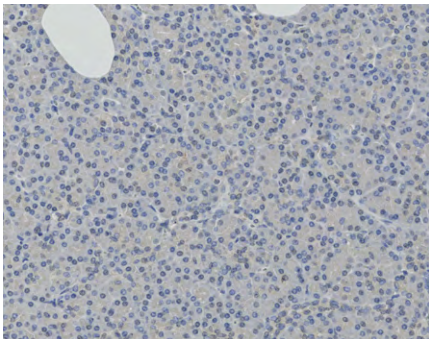


Figure 1. The acini and ductal epithelial cells of pancreas show a weak to negative cytoplasmic or membraneous reactivity pattern for CD71.

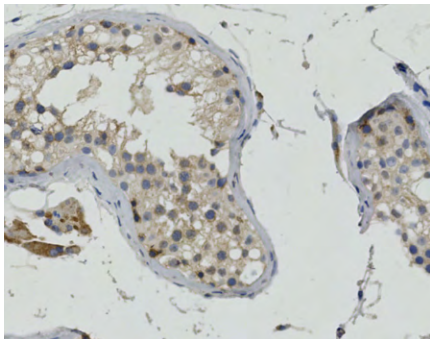


Figure 2. Moderate cytoplasmic reactivity for CD71 is seen among the spermatocytes and Leydig cells of this testis.

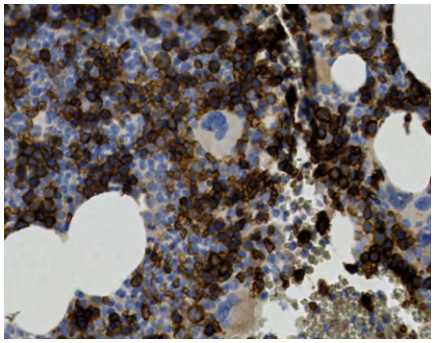


Figure 3. Strong membraneous and cytoplasmic staining is seen among the erythroblasts and erythroid precursors in this bone marrow involved by AML-M6.

Tissue-Tek Genie® anti-CD79a

IVD

Clone
GR019

Host/clonality
Rabbit monoclonal

Product codes and quantity
8278-C010: RTU, 10 capsules; 1 pack
8278-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CD79a protein on the membrane and cytoplasm of select B-cells and T-lymphoblast in normal and neoplastic cells. It may be useful for classifying B-cell neoplasms and Hodgkin disease when used with a panel of antibodies.

Description
CD79a is a membrane protein expressed on B-cells from precursors through plasma cells. CD79a is also found to be expressed in 10% of T-lymphoblastic leukemia/lymphoma.

Positive tissue control
Tonsil, colon, appendix

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, predominantly membraneous staining of mantle zone B-cells and at least a moderate membraneous staining of germinal center B-cells in secondary follicles in tonsil and colon.
2. A strong, predominantly cytoplasmic staining of plasma cells and late stage activated germinal center B-cells in tonsil and colon.
3. A moderate to strong membraneous staining of neoplastic cells in B-CLL.
4. At least weak predominantly membraneous staining of neoplastic cells in pre-B-ALL.
5. At least weak cytoplasmic staining of neoplastic cells in plasmacytoma.

References

1. Mason DY, et al. Blood. 1995; 86(4):1453-1459.
1. Chu PG and Arber DA. Appl. Immunohistochem. Mol. Morphol. 2001; 9(2):97-106.

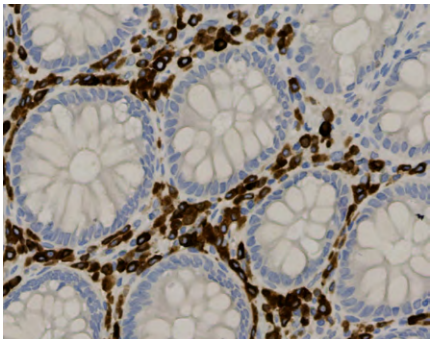


Figure 1. Negative staining of columnar cells but strong staining of plasma cells in colon.

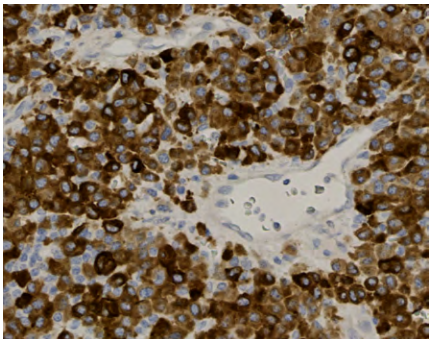


Figure 2. Moderate staining in plasmacytoma.

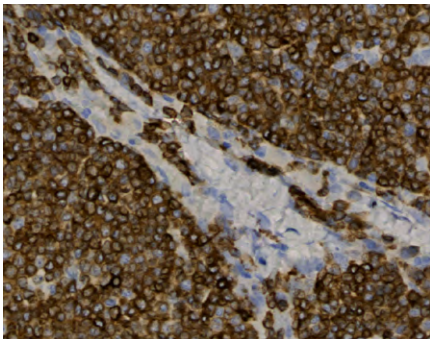


Figure 3.Strong staining in B-CLL.

Tissue-Tek Genie® anti-CD117 (c-kit)

IVD

Clone
EP10

Host/clonality
Rabbit monoclonal

Product codes and quantity
8267-C010: RTU, 10 capsules; 1 pack
8267-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells of GIST. It is a useful tool for differentiating between gastrointestinal stromal tumors (GIST) and other intra-abdominal mesenchymal tumors when used with a panel of antibodies.

Description
CD117, also known as c-kit, is a transmembrane protein expressed on hematopoietic stem/progenitor cells, interstitial cells of Cajal, mammalian ductal epithelia, melanocytes, mast cells and basal cells of skin.

Positive tissue control
Appendix, Colon, GIST

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct, predominantly membraneous but also cytoplasmic, staining reaction of the interstitial cells of Cajal in the gastrointestinal tract.
2. A strong, distinct staining reaction of all neoplastic cells in GIST.
3. A strong, distinct membraneous staining reaction of neoplastic cells in germ cell neoplasia in situ (GCNIS).
4. A strong predominantly membraneous staining reaction of mast cells in all tissues.
5. A weak to moderate, distinct staining reaction of neovascular endothelial structures and epithelial cells lining the basal compartment of crypts in appendix.
6. No staining of smooth muscle cells or neoplastic cells in desmoid tumors.

References

1. Tsuura Y, et al. Virchows Arch. 424(2):135-141, 1994.
2. Di Matteo G., et al. Hepatogastroenterology 49(46):1013-6, 2002.
3. Lammie A, et al. J Histochem Cytochem 42(11): 1417-25, 1994.

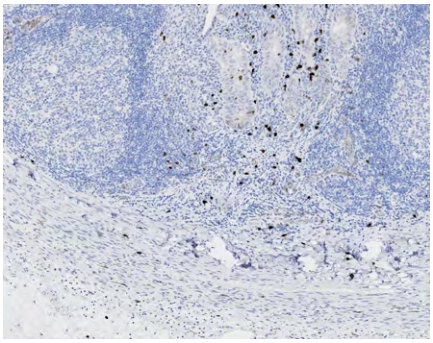


Figure 1. CD117 is negative in the appendiceal epithelium, lymphoid cells and smooth muscle of the muscularis propria. Mast cells are darkly stained and interstitial cells of Cajal are moderately stained in a membraneous and cytoplasmic pattern.

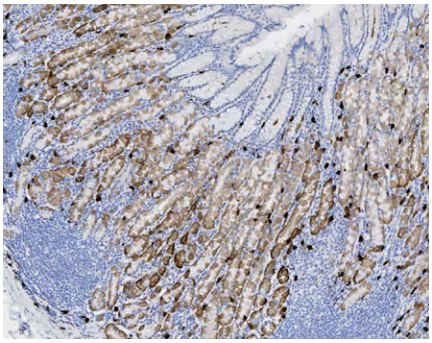


Figure 2. Moderate cytoplasmic and membraneous staining is seen in the basilar region of the gastric crypts. More superficial epithelium is negative. Mast cells are darkly stained.

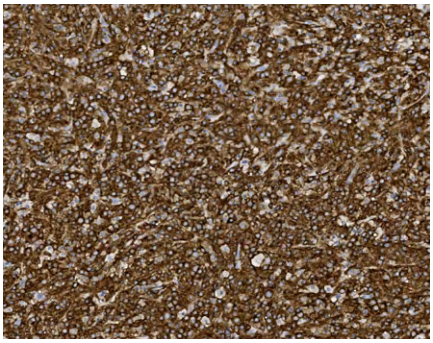


Figure 3. Strong membraneous and cytoplasmic staining in a GIST.

Tissue-Tek Genie® anti-CD138

IVD

Clone
B-A38

Host/clonality
Mouse monoclonal

Product codes and quantity
8241-C010: RTU, 10 capsules; 1 pack
8241-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells of multiple myeloma, plasmacytoma, and diffuse large B-cell lymphoma (DLBCL), but not Burkitt lymphoma. Anti-CD138 antibody is a useful tool for identifying plasma cell differentiation within hematolymphoid tissues when used with a panel of antibodies.

Description
CD138, also known as Syndecan-1, is a membrane protein which is involved in regulating cell morphology and adhesion. CD138 is predominantly expressed on mature plasma cells and early pre B-cells, in plasma cell malignancies, but not in mature mesenchymal and neural tissues. Various types of epithelial cells are CD138 positive.

Positive tissue control
Tonsil, appendix, plasmacytoma, and CD138 positive DLBCL

Staining pattern
Mainly membraneous and some cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong, predominantly membraneous staining reaction of activated late stage B-cells in the germinal centers and plasma cells of tonsil and appendix.
2. A strong, distinct membraneous staining reaction of the majority of the squamous epithelial cells in tonsil.
3. A moderate to strong membraneous staining reaction of the majority of the neoplastic cells of plasmacytomas and a subset of DLBCL.
4. An at least weak to moderate predominantly membraneous staining reaction of dispersed neoplastic cells of ovarian serous carcinomas.

References

1. Sanderson RD, et al. Ann. Hematol. 2002; 81:125-135.
2. O'Connell FP, et al. Am. J. Clin. Pathol. 2004; 121:254-263.

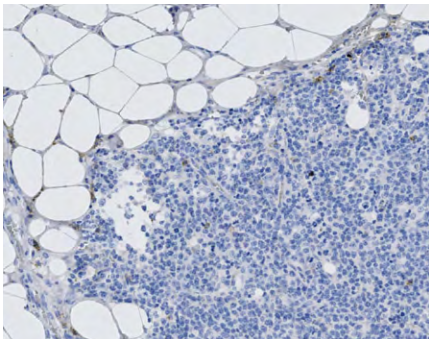


Figure 1. No expression of CD138 is seen in the neoplastic cells of this typical diffuse large B-cell lymphoma.

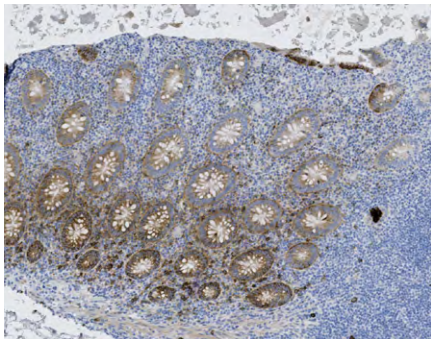


Figure 2. Weak to moderate cytoplasmic staining for CD138 is demonstrated in the columnar epithelium of the appendix.

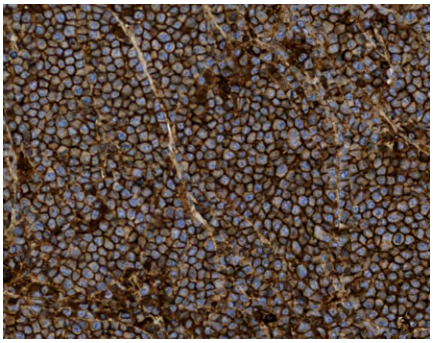


Figure 3. Diffuse strong membrane staining is seen in this plasmacytoma.

Tissue-Tek Genie® anti-CD163

IVD

Clone
EP324

Host/clonality
Rabbit monoclonal

Product codes and quantity
8245-C010: RTU, 10 capsules; 1 pack
8245-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells of dermatofibromas and histiocytic sarcomas. Hepatocytes, lymphocytes, and epithelial cells are negative. It is a useful tool for classifying neoplasms of myeloid and macrophage/monocyte origin when used with a panel of other antibodies.

Description
CD163 is a membrane protein that has anti-inflammatory functions and is expressed by cells of the monocyte/macrophage lineage. It is found in a majority of acute myeloid leukemia cases with monocytoid differentiation and histiocytic sarcoma.

Positive tissue control
Tonsil, appendix, liver, CD163 positive dermatofibromas

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong and distinct cytoplasmic staining of the germinal center macrophages in the dark zones of the secondary follicles in the tonsil and appendix.
2. A moderate to strong cytoplasmic staining of the macrophages in the interfollicular zones of the tonsil, in lamina propria of the appendix and in the Kupffer cells of the liver.
3. An at least moderate cytoplasmic staining in virtually all the neoplastic cells of the histiocytic sarcoma.
4. No staining in the liver cells and in the epithelial cells of the appendix and tonsil.
5. A distinct cytoplasmic staining of the macrophages surrounding the vessels in the brain specimen (the microglial cells express virtually no CD163).

References

1. Lau SK, et al. Am. J. Clin. Pathol. 2004; 122:794-801.
2. Nguyen TT, et al. Am. J. Surg. Pathol. 2005; 29:617-624.
3. Sachdev R, Sundram U. J. Cutan. Pathol. 2006; 33:353-360.
4. Pouryazdanparast P, et al. J. Cutan. Pathol. 2009; 36:859-864.

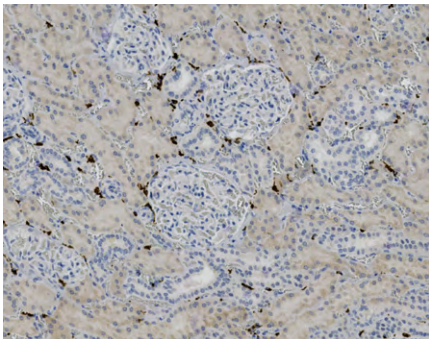


Figure 1. Renal tissues, including glomeruli, ducts and tubules, are negative for CD163, while scattered macrophages cells show moderate to strong cytoplasmic reactivity.

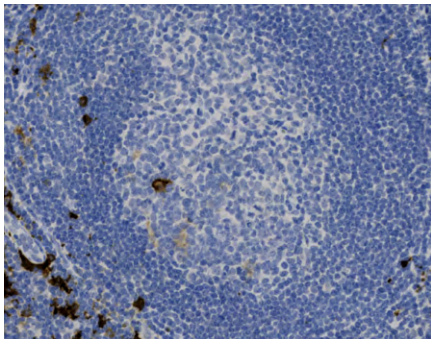


Figure 2. Weak to moderate granular cytoplasmic reactivity for CD163 is seem among germinal center macrophages. Strong reactivity is seen in the macrophages of the interfollicular regions. The lymphocytes of the follicle and perifollicular areas of this tonsil are negative.

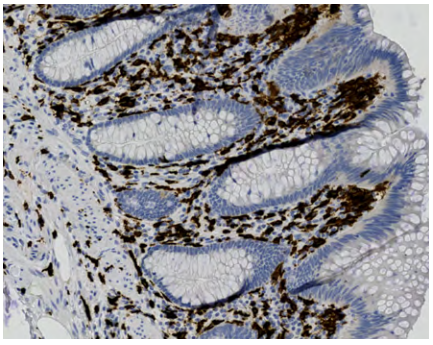


Figure 3. Macrophages of the lamina propria and submucosa of this appendix show a strong cytoplasmic reaction for CD163, while other tissue elements are negative

Tissue-Tek Genie® anti-CDX2

IVD

Clone
EP25

Host/clonality
Rabbit monoclonal

Product codes and quantity
8285-C010: RTU, 10 capsules; 1 pack
8285-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CDX2 protein in epithelial cells from the duodenum to rectum, including pancreas and biliary tract; it stains both normal and neoplastic cells. It may be useful for classifying adenocarcinoma and neuroendocrine tumor of the gastrointestinal tract when used with a panel of other antibodies.

Description
CDX2 is a transcription factor essential for differentiation of epithelium in the intestine, pancreas, and biliary tract. CDX2 is expressed in epithelial cells from the duodenum to rectum, including pancreas and biliary tract.

Positive tissue control
Appendix, pancreas

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct nuclear staining of epithelial cells in appendix.
2. A moderate to strong, distinct nuclear staining of neoplastic cells in colon adenocarcinoma.
3. At least weak to moderate, distinct nuclear staining of scattered neoplastic cells in pancreas adenocarcinoma.
4. At least weak to moderate and distinct nuclear staining of duct epithelial cells in pancreas.
5. A maximally weak cytoplasmic in cells with strong nuclear staining. All other cells should be negative.

References

1. Drummond F, et al. Ann. Hum. Genet. 1997; 61:393-400.
2. Moskaluk CA, et al. Mod. Pathol. 2003; 16:913-919.

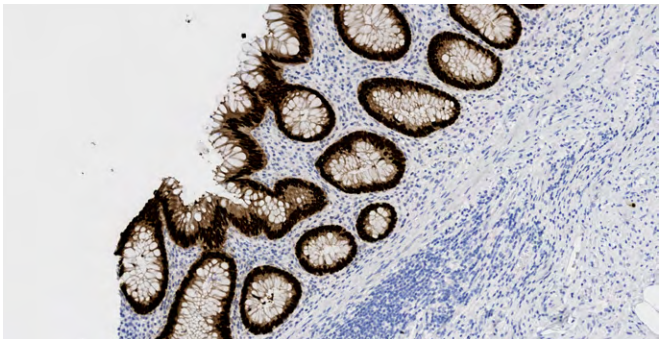


Figure 1. Negative staining of non-epithelial cells in support stroma but strong staining of epithelial cells in colonic mucosa.

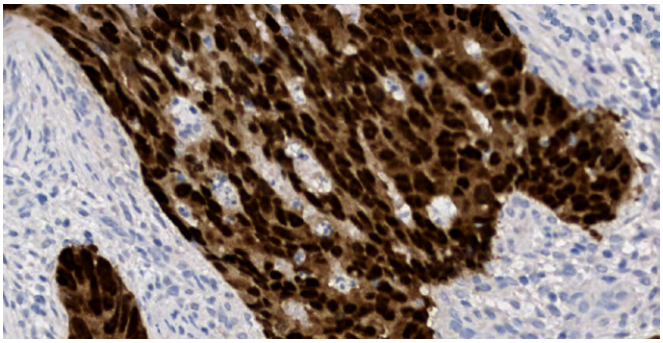


Figure 2. Strong staining in pancreatic adenocarcinoma.

Tissue-Tek Genie® anti-CEA

IVD

Clone
COL-1

Host/clonality
Mouse monoclonal

Product codes and quantity
8225-C010: RTU, 10 capsules; 1 pack
8225-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the CEA protein on the membrane and cytoplasm of colon and a variety of other normal tissues in both normal and neoplastic cells. It may be useful for classifying adenocarcinomas, especially in the gastrointestinal track including colon and pancreatic adenocarcinomas. It may be useful for classifying secretory meningioma and medullary carcinomas of the thyroid when used with a panel of antibodies.

Description
CEA (Carcinoembryonic Antigen) is a membrane protein expressed on colon and variety of other normal tissues.

Positive tissue control
Normal colon

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak to moderate cytoplasmic staining of columnar epithelial cells in appendix with enhancement of glycocalyx.
2. A moderate to strong predominantly cytoplasmic staining of neoplastic cells in colon adenocarcinoma and urothelial carcinoma.
3. At least weak to moderate predominantly cytoplasmic staining focally of neoplastic cells in urothelial carcinoma.

References

1. Muraro R, et al. Cancer Res. 1985; 45(11 Pt 2):5769-5780.
2. Shi ZR, et al. J. Histochem. Cytochem. 1994; 42(9):1215-1219.
3. Sheibani K, et al. Hum. Pathol. 1992; 23(2):107-116.

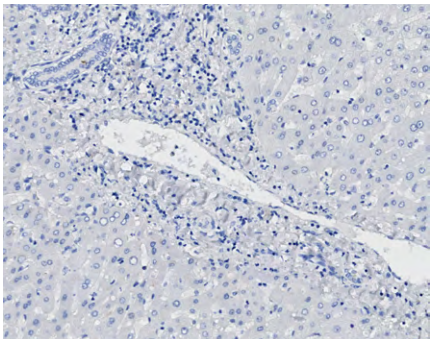


Figure 1. Negative staining in normal liver.

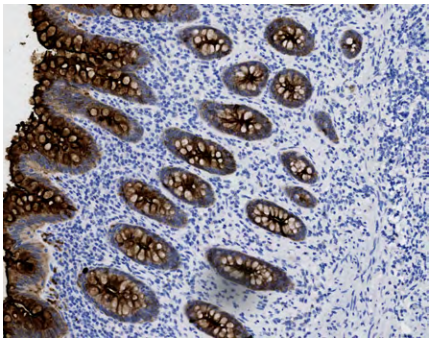


Figure 2. Strong staining in columnar epithelial cells of appendix.

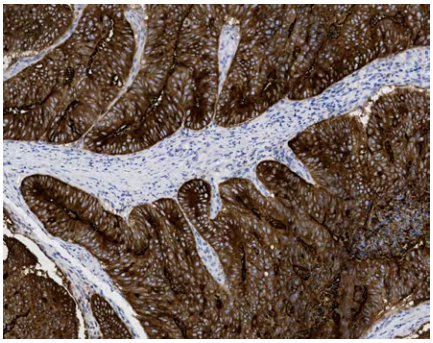


Figure 3. Strong staining in colon adenocarcinoma.

Tissue-Tek Genie® anti-Chromogranin A

IVD

Clone
LK2H10

Host/clonality
Mouse monoclonal

Product codes and quantity
8286-C010: RTU, 10 capsules; 1 pack
8286-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the chromogranin A protein in the cytoplasm of neuroendocrine cells in both normal and neoplastic cells. Moderate to strong granular cytoplasmic staining of neuroendocrine cells within the epithelial surface is observed in gastrointestinal organs; granular cytoplasmic staining is also seen in axons and perikarya of neurons and ganglion cells in the submucosa, whereas epithelial cells and muscle cells are negative. This anti-chromogranin A antibody may be useful in the detection of neuroendocrine tumors when used with a panel of antibodies.

Description
Chromogranin A is a secreted glycoprotein of the chromogranin/secretogranin family that is found in the secretory granules of most endocrine cells.

Positive tissue control
Colon, appendix, brain, pancreas, neuroendocrine tumors

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® Citrate Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct cytoplasmic staining of neuroendocrine cells in appendiceal mucosa and islets of pancreas.
2. At least weak, distinct granular cytoplasmic staining of normal ganglion cells and axons in nerve plexus of appendix.
3. At least moderate, distinct cytoplasmic of neoplastic cells in pancreatic neuroendocrine carcinoma and medullary thyroid carcinoma.
4. At least weak, distinct granular cytoplasmic staining of neoplastic cells in small cell lung carcinoma.

References

1. Fischer-Colbrie R, et al. Neuroscience 1985; 16:547-555.
2. Hearn SA. J. Histochem. Cytochem. 1987; 35:795-801.
3. Holt N and Grønbæk H. Sci. World J. 2013; 2013:543696.
4. Klimstra DS, et al. Am. Soc. Clin. Oncol. Educ. Book. 2015; 35:92-103.

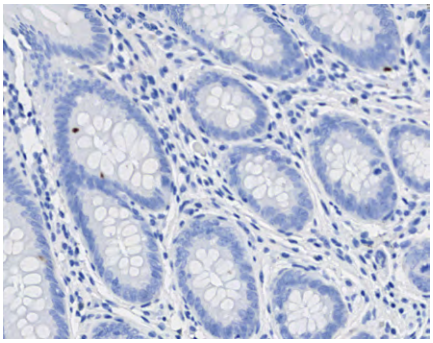


Figure 1. Negative staining of columnar cells in appendix.

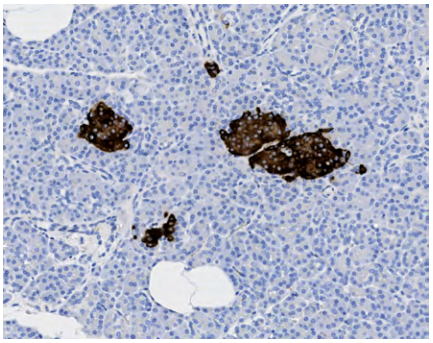


Figure 2. Strong staining in the islets of pancreas.

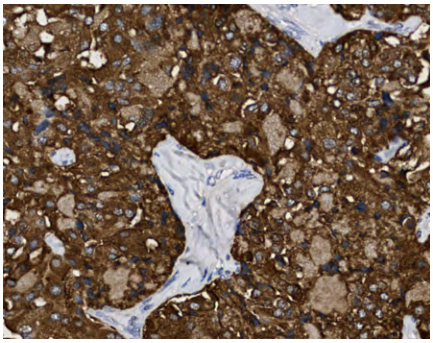


Figure 3. Moderate staining in thyroid medullary carcinoma.

Tissue-Tek Genie® anti-c-Myc

IVD

Clone
EP121

Host/clonality
Rabbit monoclonal

Product codes and quantity
8332-C010: RTU, 10 capsules; 1 pack
8332-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the nucleus in epithelial cells of tonsil, skin, esophagus, appendix, uterus, mammary gland, bladder, cervix, and fallopian tube. Nuclear staining is observed in subset of B-cells in the tonsil. Nuclear staining is observed in neoplastic cells of Burkitt lymphoma, diffuse large B-cell lymphoma, follicular lymphoma, B-cell non-Hodgkin lymphoma, gastric adenocarcinoma, cervical carcinoma, breast carcinoma, and renal cell carcinoma.
It is useful for characterizing lymphoma and identifying B-cell lymphomas likely to harbor a c-Myc rearrangement when used with a panel of other antibodies.

Description
C-Myc is expressed during proliferation in a wide variety of adult tissues and at all stages of embryonic development. C-Myc gene translocations to various chromosomal loci have been demonstrated in Burkitt lymphoma, diffuse large B-cell lymphoma, blastic mantle cell lymphoma, and transformed follicular lymphoma. C-Myc expression has been described in various cancers including lymphomas, breast, prostate, lung and colon cancers.

Positive tissue control
Tonsil, c-Myc positive B-cell lymphoma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil, a weak to moderate nuclear staining of activated B-cells.
2. Nuclear staining in some pancreas, testis, spleen, small intestine, salivary gland, kidney, cervix, and skin.
3. Nuclear staining of neoplastic cells of some DLBCL, Burkitt lymphoma, and follicular lymphoma.
4. Nuclear staining of neoplastic cells in some squamous cell lung carcinoma, glioblastoma, ovarian adenocarcinoma, breast carcinoma, lung carcinoma, and esophagus carcinoma.

References

1. Clark Schneider KM, et al. Leuk Lymphoma. 2016; 57:1640-1648.
2. Kluk MJ, et al. Am J Clin Pathol 2016; 145:166-179.
3. Gurel B, et al. Modern Pathology (2008) 21, 1156-1167.

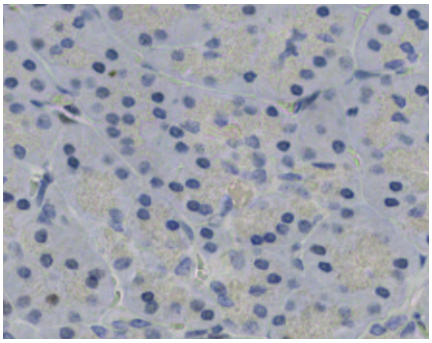


Figure 1. Acinar epithelial cells of this normal pancreas show a negative staining reaction, or only focal faint staining, for c-Myc.

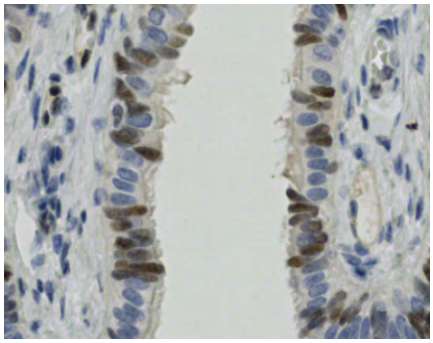


Figure 2. Epithelial cells of this benign fallopian tube show a weak to moderate nuclear c-Myc staining reaction.

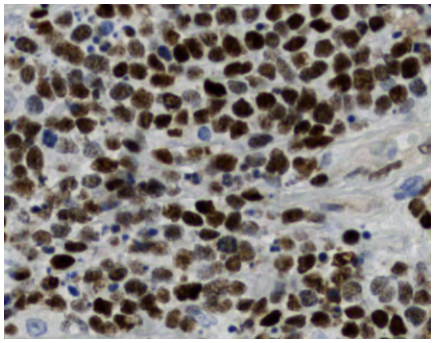


Figure 3. Diffuse, moderate to strong nuclear reactivity for c -Myc is observed in this diffuse large B-cell lymphoma.

Tissue-Tek Genie® anti-Cyclin D1

IVD

Clone
EP12

Host/clonality
Rabbit monoclonal

Product codes and quantity
8469-C010: RTU, 10 capsules; 1 pack
8469-M250: RTU, 1 cartridge, 250 tests; 1unit

Application
This antibody labels the Cyclin D1 protein in both normal and neoplastic cells. It may be useful for classifying mantle cell lymphomas and breast carcinoma when used with a panel of antibodies.

Description
Cyclin D1 is a key cell cycle regulating protein expressed primarily during the G1 phase of the cell cycle.

Positive tissue control
Tonsil

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong, distinct nuclear staining of virtually all suprabasal squamous epithelial cells, scattered lymphocytes and endothelial cells in tonsil.
2. At least weak, distinct nuclear staining of germinal center macrophages in tonsil.
3. A moderate to strong and distinct nuclear staining of virtually all neoplastic cells in mantle cell lymphoma.
4. No nuclear staining of neoplastic cells in B-CLL (whereas a moderate nuclear staining should be seen in scattered endothelial cells).

References

1. Ott MM, et al. J. Pathol. 1996; 179(3):238-242.
2. Leong AS-Y, et al. Manual of Diagnostic Antibodies for Immunohistology. 2003; pp. 165-166.
3. de Boer CJ, et al. Blood. 1995; 86(7):2715-2723.

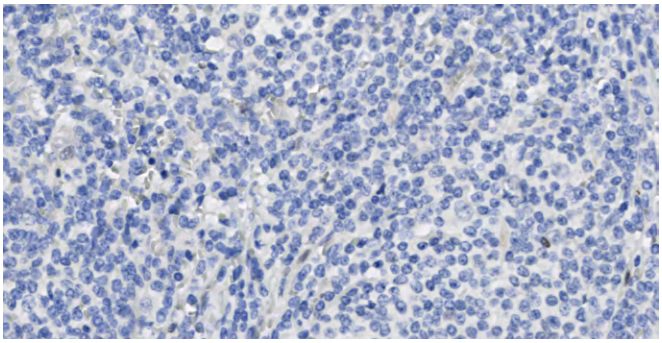


Figure 1. Negative staining in B-cell lymphoma.

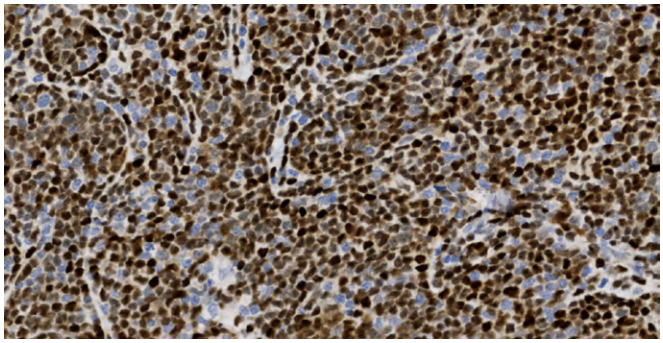


Figure 2. Strong staining in mantle cell lymphoma.

Tissue-Tek Genie® anti-Cytokeratin HMW (CK5)

IVD

Clone
GM028

Host/clonality
Mouse monoclonal

Product codes and quantity
8294-C010: RTU, 10 capsules; 1 pack
8294-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the cytokeratin HMW (CK5) protein in both normal and neoplastic cells. Cytoplasmic staining is observed with stratified squamous epithelia, and with basal cells of complex epithelia. Simple epithelia and non-epithelial cells are negative. It may be useful for classifying squamous cell carcinoma, distinguishing malignant mesothelioma from lung adenocarcinoma, and determining breast and prostate malignancies when used with a panel of antibodies.

Description
Cytokeratin 5 (CK5) is a high molecular weight (HMW) cytokeratin expressed in various epithelial basal cells and mesothelial cells. This antibody labels cytokeratins 5 and 6 in normal and neoplastic cells.

Positive tissue control
Tonsil, esophagus, prostate

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct cytoplasmic staining of squamous epithelial cells in esophagus.
2. A strong and distinct cytoplasmic staining of basal cells in prostate hyperplastic glands and prostate intraepithelial neoplasia (PIN) lesions.
3. A moderate to strong cytoplasmic staining of neoplastic cells in lung squamous cell carcinoma.

References

1. Clover J, et al. Histopathology. 1997; 31(12):140-143.
2. Cury PM, et al. Mod. Pathol. 2000; 13(2):107-112.
3. Abrahams NA, et al. Histopathology 2002; 41(1):35-41.
4. Abrahams NA, et al. Am. J. Clin. Pathol. 2003; 120:368-376.

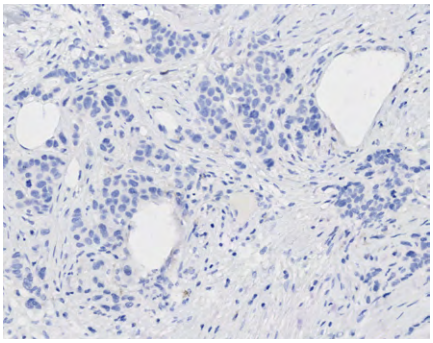


Figure 1. Negative staining in cells of breast ductal carcinoma.

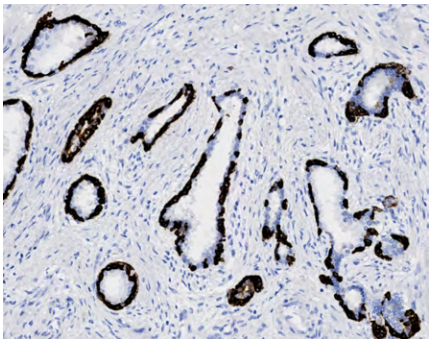


Figure 2. Strong staining of the basal cells of prostate.

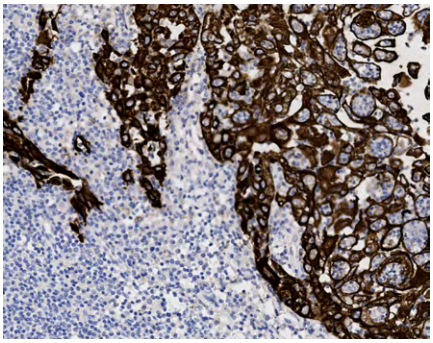


Figure 3. Strong staining in lung squamous cell carcinoma.

Tissue-Tek Genie® anti-Cytokeratin 5/6

IVD

Clone
D5/16B4

Host/clonality
Mouse monoclonal

Product codes and quantity
8295-C010: RTU, 10 capsules; 1 pack
8295-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
The antibody labels keratins 5 and 6 in stratified squamous epithelia and with basal cells of complex epithelia, both, normal and neoplastic cells. Simple epithelia and non-epithelial cells are negative. It is useful for identifying squamous cell carcinoma, distinguishing malignant mesothelioma from lung adenocarcinoma, and defining breast and prostate malignancies when used with a panel of other antibodies.

Description
Keratins 5 and 6 (CK5/6) are high molecular weight cytokeratins that are expressed in various epithelial basal cells and mesothelial cells.

Positive tissue control
Tonsil, esophagus, prostate

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Positive staining of stratified squamous epithelia and the basal cells of complex epithelia.
2. Simple epithelia and non-epithelial cells are negative.
3. In tonsil and esophagus, a moderate to strong cytoplasmic staining of squamous epithelial cells; staining should be seen in all cell layers in epithelial surface.
4. In prostate, a weak to moderate cytoplasmic staining of basal cells with no or only focal staining of the secretory cells.

References

1. Zhao W, et al. Int. J. Clin. Exp. Pathol. 2014; 7:4247-4253.
2. Kaufmann O, et al. Am. J. Clin. Pathol. 2001; 116:823-830.
3. Cury PM, et al. Mod. Pathol. 2000; 13:107-112.

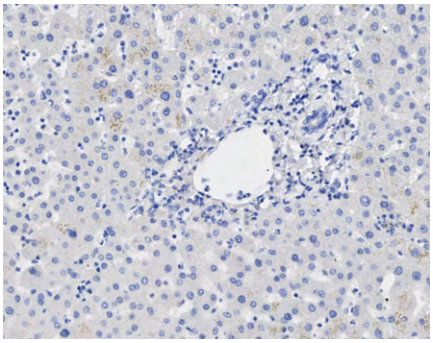


Figure 1. Hepatocytes, bile ducts, sinusoids and vascular structures are all negative for CK5/6.

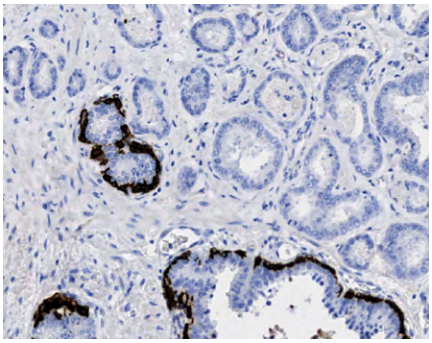


Figure 2. Negative staining with CK5/6 among invasive carcinoma glands corresponds to the absence of basal cells in the tumor. Basal cells are preserved in the benign glands and prostate intraepithelial neoplasia.

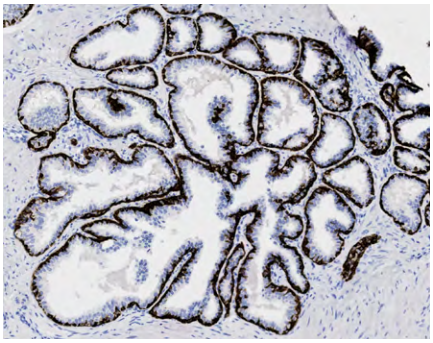


Figure 3. Strong cytoplasmic staining is observed among the basal cells of benign prostate glands. Luminal epithelium and stromal smooth muscle are negative.

Tissue-Tek Genie® anti-Cytokeratin 7

IVD

Clone
OV-TL 12/30

Host/clonality
Mouse monoclonal

Product codes and quantity
8296-C010: RTU, 10 capsules; 1 pack
8296-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the cytokeratin 7 (CK7) protein in the cytoplasm of most ductal, glandular, and transitional in both normal and neoplastic cells. It may be useful for classifying adenocarcinomas of lung, breast, endometrium, thyroid gland, ovary, and chromophobe renal cell carcinomas when CK7 is positive and when it is used with a panel of antibodies. It may be useful for classifying colonic and prostate lineage tumors when CK7 is negative and when it is used with a panel of antibodies.

Description
Cytokeratin 7 is a member of cytokeratin proteins expressed in most ductal, glandular, and transitional epithelia.

Positive tissue control
Normal pancreas

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong, distinct cytoplasmic staining of epithelial cells in renal collecting ducts and scattered epithelial cells in Bowman capsule.
2. A strong, distinct cytoplasmic staining of all alveolar epithelial cells in the lung tissue.
3. At least weak, predominantly cytoplasmic staining of luminal foveolar epithelial cells in gastric corpus mucosa.
4. A strong, distinct cytoplasmic staining of epithelial cells in large pancreatic ducts, while the majority of epithelial cells of intercalating ducts at least shows a weak to moderate cytoplasmic staining.

References

1. Ramaekers J, et al. Am J Pathol. 1990; 136(3): 641–655.
2. van de Molengraft FJ, et al. Histopathology. 1993; 22(1):35-38.

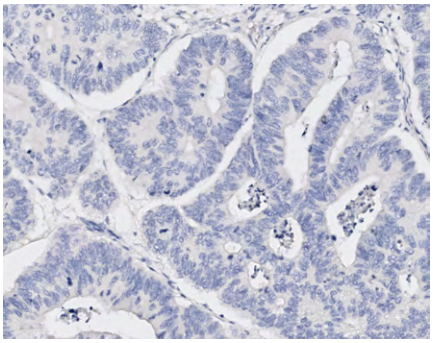


Figure 1. Negative staining in colon adenocarcinoma.

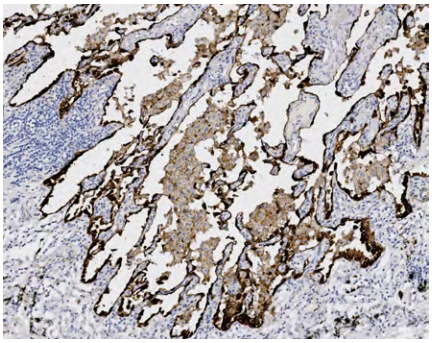


Figure 2. Strong staining in lung adenocarcinoma with lepidic growth pattern.

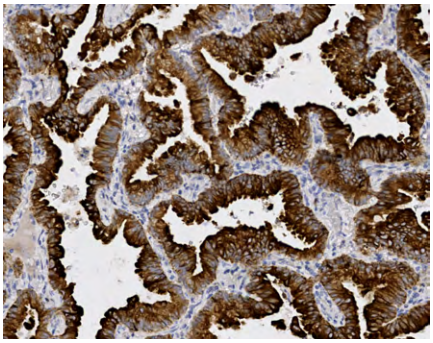


Figure 3. Strong staining in the lung adenocarcinoma.

Tissue-Tek Genie® anti-Cytokeratin 8

IVD

Clone
EP17

Host/clonality
Rabbit monoclonal

Product codes and quantity
8238-C010: RTU, 10 capsules; 1 pack
8238-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells in colon adenocarcinoma, breast ductal carcinoma, renal cell carcinoma, hepatocellular carcinoma, and small cell lung carcinoma. Kupffer cells are negative. Cytokeratin 8 is useful for the identification of adenocarcinomas of simple epithelial origin when used with a panel of other antibodies.

Description
Cytokeratin 8 (CK8) is low molecular weight cytokeratin that is often co-expressed with cytokeratin 18. Cytokeratin 8 is expressed in simple, non-stratified epithelia, in transitional epithelium, and in the luminal/secretory cells of complex epithelia.

Positive tissue control
Liver, gastrointestinal tract, and known CK8 positive tumors

Staining pattern
Cytoplasmic and sometimes membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct cytoplasmic staining reaction of virtually all appendiceal columnar epithelial cells, bile duct epithelial cells and an at least weak predominantly membraneous staining reaction of the large majority of the hepatocytes.
2. A moderate to strong, distinct cytoplasmic staining reaction of the majority of the neoplastic cells of the breast ductal carcinoma and the renal cell carcinoma.
3. An at least weak to moderate cytoplasmic staining reaction in the majority of the neoplastic cells of the colon neuroendocrine carcinoma.
4. A weak to moderate cytoplasmic staining reaction in smooth muscle cells and basal squamous epithelial cells of the esophagus.

References

1. Moll R, et al. Histochem. Cell. Biol. 2008; 129:705-733.
2. Moriya T, et al. Med. Mol. Morphol. 2006; 39:8–13.

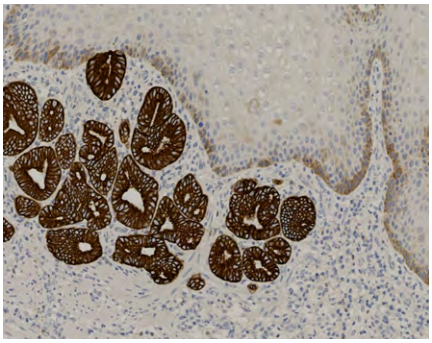


Figure 1. The simple epithelium of these glands show strong membraneous and cytoplasmic CK8 reactivity, while the overlying squamous epithelium shows only weak reactivity in the basal aspect.

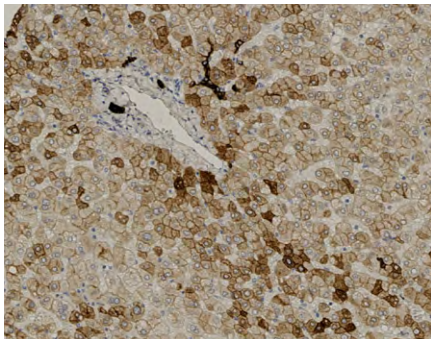


Figure 2. Weak to moderate cytoplasmic and membraneous staining for CK8 is seen in normal hepatocytes, with stronger staining among the hepatocytes of periportal areas.

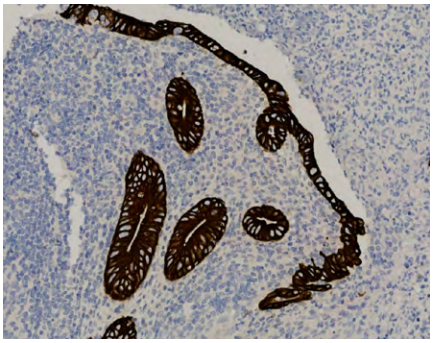


Figure 3. Strong membraneous and cytoplasmic reactivity for CK8 is seen among the columnar epithelial cells of the appendix.

Tissue-Tek Genie® anti-Cytokeratin LMW (CK8/18) Antibody Cocktail [EP17/DC10]

IVD

Clone
EP17/DC10

Host/clonality
Rabbit and mouse monoclonal

Product codes and quantity
8298-C010: RTU, 10 capsules; 1 pack
8298-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody cocktail labels many epithelial-derived tumor cells, and thus it is useful for the identification/classification of adenocarcinomas and most squamous cell carcinomas when used with a panel of antibodies.

Description
Cytokeratins 8 and 18 are often co-expressed in glandular and transitional epithelial cells in liver and intestine.

Positive tissue control
Liver, GI tract, esophagus, and known cytokeratin LMW (CK8/18) positive tumors.

Staining pattern
Cytoplasmic and sometimes membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Positive staining of simple, non-stratified epithelial, basal and superficial cells of transitional epithelium as well as in the luminal/secretory cells of complex epithelia, endothelial cells in venules, lymphatics and capillaries.
2. Stratified epithelial component is negative.
3. In liver, a moderate to strong cytoplasmic staining of bile duct epithelial cells; a weak to moderate membraneous staining of liver cells. Among hepatocytes, the staining can be heterogeneous with the strongest staining in the periportal zones. There is no staining of Kupffer cells.

4. References

1. Wang PH. Oral Oncol. 2011; 47:775.
2. Ordonez NG. Hum Pathol. 2013; 44:1195-1215.
3. Abd El-Rehim DH, et al. J Pathol 2004; 203:661-671.
4. Oshima RG, et al. Cancer Metastasis Rev. 1996; 15:445-471.
5. Nagashio R, et al. Pathol Int. 2010; 60:71-77.

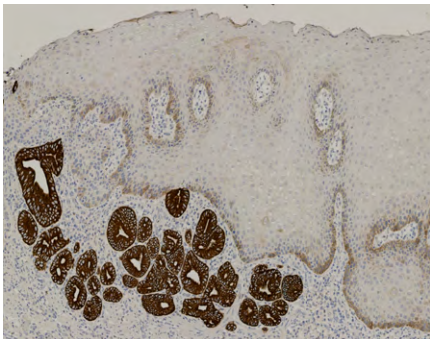


Figure 1. In contrast to the strong cytoplasmic reactivity present in the simple glandular epithelium, below, the stratified squamous epithelium of the esophagus shows weak to negative cytoplasmic reactivity for CK8/18, with the greatest degree of intensity in the basal region.

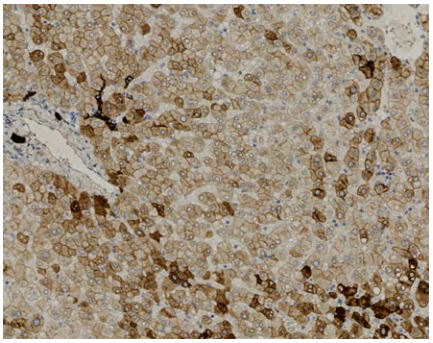


Figure 2. Variable levels of cytoplasmic and membraneous reactivity for CK8/18 are present among hepatocytes, with greater degrees of staining in the periportal zones.

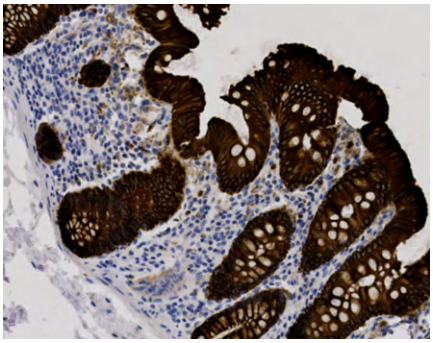


Figure 3. Strong cytoplasmic and membraneous reactivity for CK8/18 is observed in simple epithelia, as in this example of colon.

Tissue-Tek Genie® anti-Cytokeratin 14

IVD

Clone
LL002

Host/clonality
Mouse monoclonal

Product codes and quantity
8300-C010: RTU, 10 capsules; 1 pack
8300-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels CK14 in stratified squamous epithelia and with basal cells of complex epithelia. Simple epithelia and non-epithelial cells are negative.
It is useful for identifying squamous cell carcinoma, breast basal-like carcinoma, and basal cells in prostatic tissue when used with a panel of antibodies.

Description
Cytokeratin 14 (CK14) is a member of the cytokeratin family that is usually found as a heterodimer with cytokeratin 5 to form the cytoskeleton of epithelial cells. CK14 is expressed in the basal cells of squamous epithelia, myoepithelial cells, and mesothelial cells.

Positive tissue control
Tonsil, esophagus, prostate, and squamous cell carcinoma

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment Criteria
1. Cytoplasmic staining.
2. A moderate to strong cytoplasmic staining in all cell layers in epithelial surface of tonsil and esophagus.
3. A weak to moderate cytoplasmic staining of the basal cells of prostate.
4. Positive staining with the neoplastic cells of squamous cell carcinoma.
5. Negative staining of prostate carcinoma.

References

1. Chu PG, et al. Histopathology. 2001; 39:9-16.
2. Dabbs DJ, et al. Mod. Pathol. 2006; 19:1506-1511.
3. Jones C, et al. Clin. Cancer Res. 2004; 10:5988-5997.

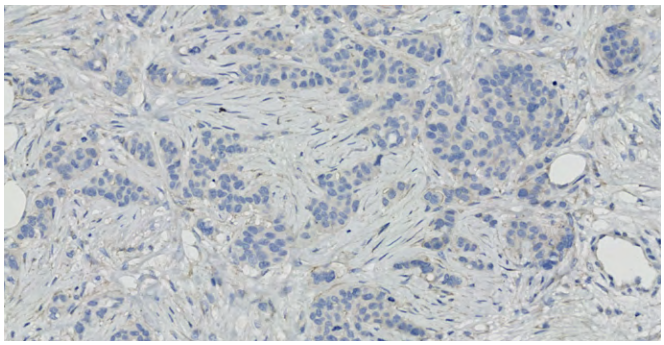


Figure 1. No CK14 expression is observed in breast adenocarcinoma.

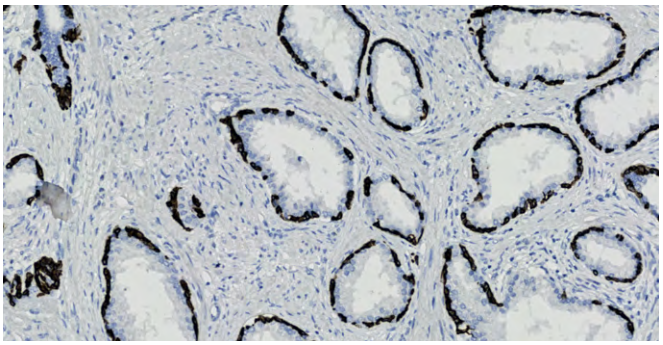


Figure 2. Strong cytoplasmic expression of CK14 is demonstrated among the basal cells of the prostate.

Tissue-Tek Genie® anti-Cytokeratin 18

IVD

Clone
DC10

Host/clonality
Mouse monoclonal

Product codes and quantity
8302-C010: RTU, 10 capsules; 1 pack
8302-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels CK18 in colon adenocarcinoma, breast ductal carcinoma, renal cell carcinoma, hepatocellular carcinoma, and small cell lung carcinoma. Kupffer cells are negative. It is useful for the identification of adenocarcinomas of simple epithelial origin when used with a panel of other antibodies.

Description
Cytokeratin 18 (CK18) is expressed in simple, non-stratified epithelia, in transitional epithelium, and in the luminal/secretory cells of complex epithelia. It is often co-expressed with CK8.

Positive tissue control
Liver, gastrointestinal tract, and known CK18 positive tumors

Staining pattern
Cytoplasmic and sometimes membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasm and membrane staining of simple non-stratified epithelium, basal and superficial cells of transitional epithelium, as well as in the luminal/secretory cells of complex epithelia, endothelial cells in venules, lymphatics and capillaries.
2. Stratified epithelium is negative.
3. In liver, a moderate to strong cytoplasmic staining of bile duct epithelial cells; a weak to moderate membraneous staining of liver cells, the staining can be heterogeneous with the strongest staining in the periportal zones; negative staining of Kupffer cells.

References

1. Makino T, et al. Br. J. Cancer. 2009; 101:1298–1306.
2. Weng YR, et al. Mol. Cancer Res. 2012; 10:485-493.

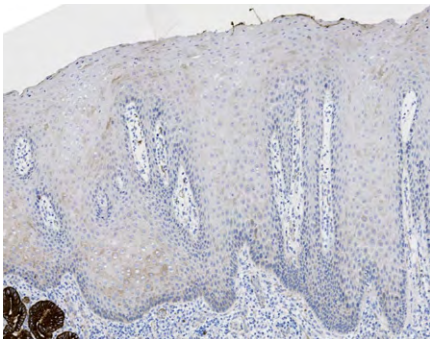


Figure 1. The squamous epithelium in this skin biopsy is negative for CK18, while a glandular structure in the lower left is strongly positive.

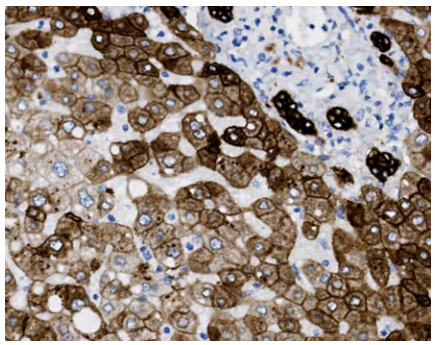


Figure 2. Weak to moderate cytoplasmic and membraneous reactivity for CK18 is seen in subsets of hepatocytes. Stronger staining is present in the vicinity of the portal tracts. Bile ducts show strong staining.

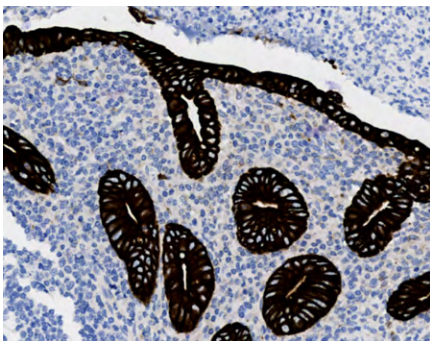


Figure 3. Strong cytoplasmic and membrane staining is present in the mucosal epithelium of the appendix.

Tissue-Tek Genie® anti-Cytokeratin 19

IVD

Clone
A53-B/A2.26

Host/clonality
Mouse monoclonal

Product codes and quantity
8303-C010: RTU, 10 capsules; 1 pack
8303-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Cytokeratin 19 (CK19) protein in the cytoplasm of a variety of epithelium (colon, stomach, pancreas, biliary tract, liver and breast) in both normal and neoplastic cells. It may be useful for detecting thyroid carcinoma of papillary type although it is positive in 50-60% of follicular carcinoma when used with a panel of antibodies.

Description
Cytokeratin 19 is a cytokeratin protein expressed in wide variety of epithelium including colon, stomach, pancreas, biliary tract, liver, and breast.

Positive tissue control
Tonsil, esophagus, prostate

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct cytoplasmic of appendiceal surface epithelial cells.
2. A strong, distinct cytoplasmic of epithelial cells in large pancreatic ducts.
3. A strong cytoplasmic of basal squamous epithelial cells in esophagus.
4. At least weak staining in scattered epithelial cells in thyroid gland.
5. At least moderate, distinct staining of neoplastic cells in ductal breast carcinoma and papillary thyroid carcinoma.

References

1. Kasper M, et al. Eur. J. Cancer Clin. Oncol. 1987; 23(2):137-147.
2. Bártek J, et al. Histochem. J. 1986; 18(10):565-575.
3. Karsten U, et al. Eur. J. Cancer Clin. Oncol. 1985; 21(6):733-740.

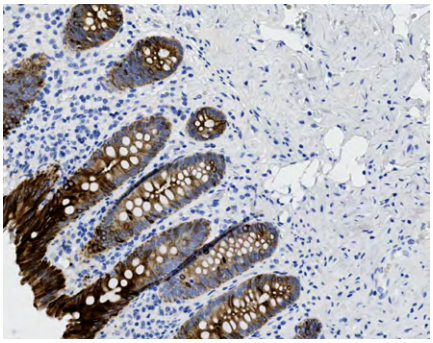


Figure 1. Negative staining of supporting stroma but strong staining in epithelial cells of appendix.

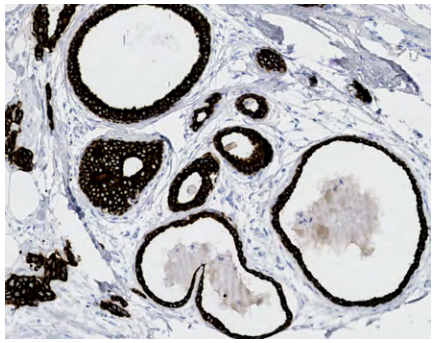


Figure 2. Strong staining of breast ductal carcinoma.

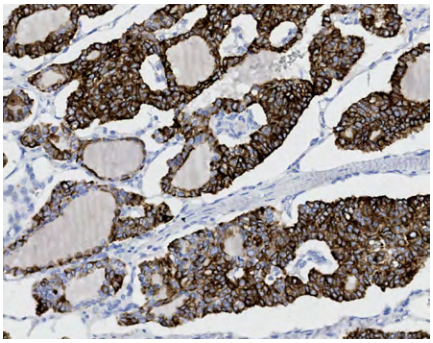


Figure 3. Strong staining in papillary thyroid carcinoma.

Tissue-Tek Genie® anti-Cytokeratin 20

IVD

Clone
Ks20.8

Host/clonality
Mouse monoclonal

Product codes and quantity
8304-C010: RTU, 10 capsules; 1 pack
8304-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Cytokeratin 20 (CK20) protein in the cytoplasm of mature enterocytes and goblet cells of the gastric and intestinal mucosa in both normal and neoplastic cells. Most colon adenocarcinomas, mucinous ovarian tumors, transitional cell and Merkel-cell carcinomas, gastric adenocarcinomas, bile system, and pancreas may be CK20 positive. Most squamous cell carcinomas and adenocarcinomas from breast, endometrium, lung, and prostate may be CK20 negative, as well as non-mucinous tumors of the ovary and small-cell lung carcinomas.

Description
Cytokeratin 20 is a cytokeratin protein expressed in mature enterocytes and goblet cells of the gastric and intestinal mucosa.

Positive tissue control
Normal colon

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct cytoplasmic staining of squamous epithelial cells in esophagus.
2. A strong and distinct cytoplasmic staining of basal cells in prostate hyperplastic glands and PIN lesions.
3. A moderate to strong cytoplasmic staining of neoplastic cells in lung squamous cell carcinoma.
4. No staining of neoplastic cells in breast ductal carcinoma and of epithelial cells in bile ducts of liver.

References

1. Moll R, et al. Am. J. Pathol. 1992; 140(2):427-447.
2. Moll R. Subcell. Biochem. 1998; 31:205-262.

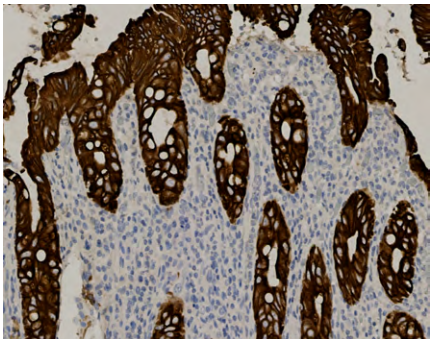


Figure 1. Negative staining of supporting stroma but strong staining in crypt cells of appendix.

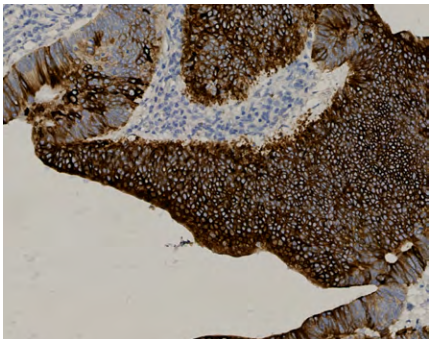


Figure 2. Weak to strong staining in colon adenocarcinoma.

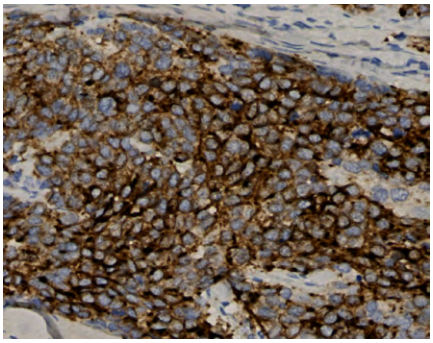


Figure 3. Moderate to strong in Merkel cell carcinoma.

Tissue-Tek Genie® anti-Cytokeratin HMW

IVD

Clone
34bE12

Host/clonality
Mouse monoclonal

Product codes and quantity
8306-C010: RTU, 10 capsules; 1 pack
8306-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels CK1, 5, 10, 14 in stratified squamous epithelia and basal cells of complex epithelia, squamous cell carcinomas of various tissues. It is useful for differentiating benign prostate gland from prostate adenocarcinoma when used with a panel of antibodies.

Description
Human high molecular weight cytokeratins (CK HMW) is a term that collectively refers to the basic cytokeratins 1 through cytokeratin 6 and the acidic cytokeratins cytokeratin 9 through cytokeratin 17. Among those, CK HMW clone 34bE12 recognizes cytokeratin 1, 5, 10, and 14. These cytokeratins are expressed in various epithelial basal cells and mesothelial cells.

Positive tissue control
Tonsil, esophagus, prostate

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining of basal cells and squamous epithelia.
2. In tonsil, a moderate to strong cytoplasmic staining of squamous epithelial cells of all layers in the epithelial surface.
3. In prostate, a moderate to strong cytoplasmic staining of basal cells with no or only focal staining of the secretory cells.

References

1. Gown AM, and Vogel AM. J. Cell. Biol. 1982; 95:414-424.
2. Gown AM, and Vogel AM. Am. J. Pathol. 1984; 114:309-321.
3. O'Malley FP, et al. Virchows Archiv. 1990; 417:191-196.
4. Bratthauer GL, et al. J. Histochem. Cytochem. 2003; 51:1527-1531.

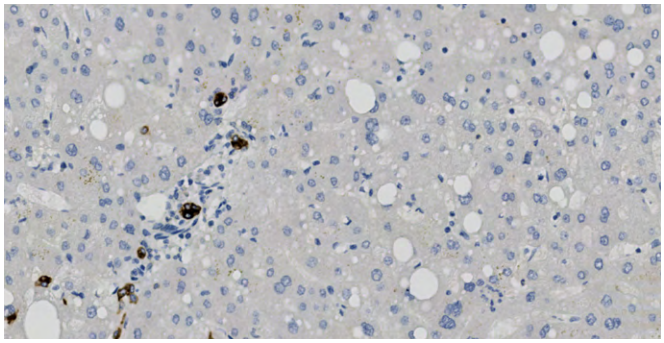


Figure 1. Hepatocytes show no reactivity for CK HMW, while there is an intense cytoplasmic reactivity among bile ducts.

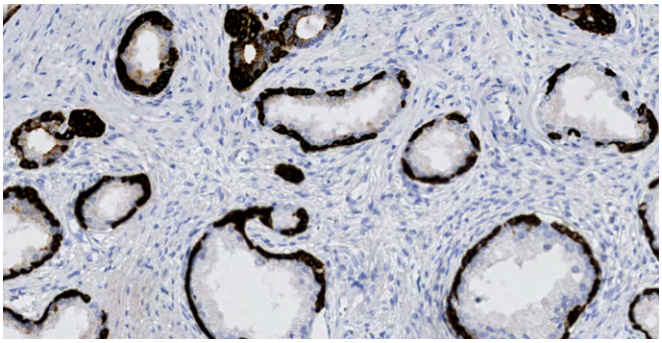


Figure 2. Strong cytoplasmic reactivity of basal cells with CK HMW is present in this example of prostatic adenomatous hyperplasia. The secretory epithelium is negative. Invasive prostatic carcinoma is typified by the absence of basal cells. Hence a negative reaction for CK HMW among atypical glands would be supportive of invasive carcinoma, although it is not seen in this case.

Tissue-Tek Genie® anti-Cytokeratin Antibody Cocktail [AE1/AE3]

IVD

Clone
AE1/AE3

Host/clonality
Mouse monoclonal

Product codes and quantity
8307-C010: RTU, 10 capsules; 1 pack
8307-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels cytokeratin proteins in the cytoplasm of normal and neoplastic cells. It is a useful tool for classifying tumors of epithelial origin and undifferentiated carcinomas when used with a panel of antibodies.

Description
Cytokeratins are a group of intermediate filament proteins expressed in cells of epithelial origin. The antibody cocktail of clones AE1 and AE3 labels both acidic and basic cytokeratins in normal and neoplastic cells.

Positive tissue control
Normal liver, esophagus, lung

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasm staining.
2. In tonsil, a strong and diffuse cytoplasmic staining of squamous mucosa in all cell layers; interdigitating reticulum cells of the lymphoid tissue can be positive.
3. In appendix, a strong cytoplasmic staining of appendiceal enterocytes (including crypt basis).
4. In liver, a weak to moderate membraneous staining of majority hepatocytes; a moderate to strong cytoplasmic staining of bile duct epithelial cells.
5. Cytoplasmic staining of carcinoma.

References

1. Woodcock-Mitchell J, et al. J. Cell. Biol. 1982; 95:580-588.
2. Moll R, et al. Cell. 1982; 31:11-24.
3. Barak V, et al. Clin. Biochem. 2004; 37:529-540.

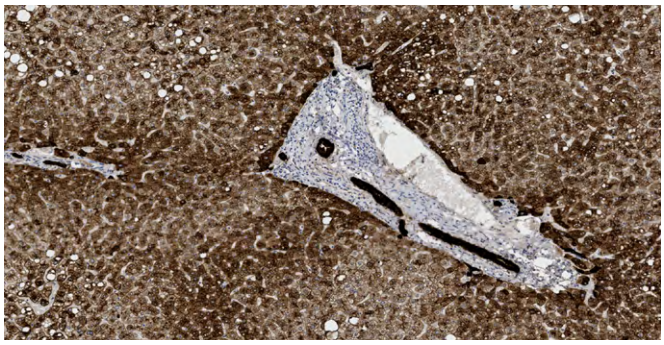


Figure 1. The antibody cocktail, AE1/AE3, shows moderate cytoplasmic and membraneous reactivity in the hepatocytes of normal liver, with strong cytoplasmic staining of bile ducts.

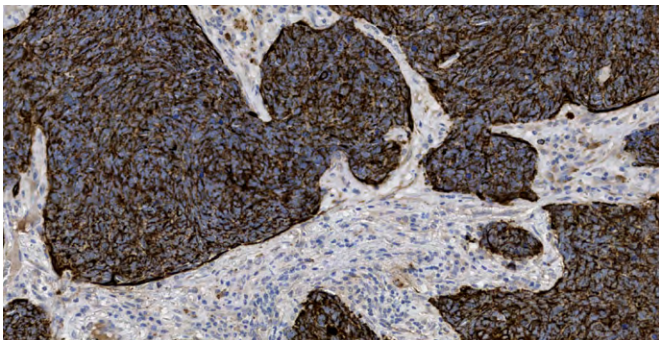


Figure 2. The AE1/AE3 cocktail shows strong cytoplasmic and membraneous staining in this high-grade neuroendocrine carcinoma of lung. Patchy golgi (dot-like) staining is also observed.

Tissue-Tek Genie® anti-Cytokeratin Pan Antibody Cocktail [AE1/AE3/DC10]

IVD

Clone
AE1/AE3/DC10

Host/clonality
Antibody cocktail

Product codes and quantity
8309-C010: 10 capsules, RTU; 1 pack
8309-M250: 1 cartridge, 250 tests, RTU; 1 unit

Application
This antibody cocktail labels cytokeratin proteins in the cytoplasm of normal and neoplastic cells. It may be useful for classifying tumors of epithelial origin and undifferentiated carcinomas when used with a panel of antibodies.

Description
Cytokeratins is a group of intermediate filament proteins expressed in cells of epithelial origin. The antibody cocktail of clones AE1, AE3, and DC10 labels both acidic and basic cytokeratins in normal and neoplastic cells.

Positive tissue control
Normal liver, esophagus, lung

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct cytoplasmic staining of bile ductal epithelial cells and at least a moderate cytoplasmic staining with membrane accentuation in hepatocytes.
2. A strong, distinct cytoplasmic staining of squamous epithelial cells in esophagus.
3. At least a moderate, distinct cytoplasmic staining of neoplastic cells in lung adenocarcinoma and small cell lung carcinoma.
4. At least weak to moderate, distinct cytoplasmic staining of neoplastic cells in renal clear cell carcinoma.

References

1. Woodcock-Mitchell J, et al. J. Cell. Biol. 1982; 95(2):580-588.
2. Moll R, et al. Cell. 1982; 31(1):11-24.

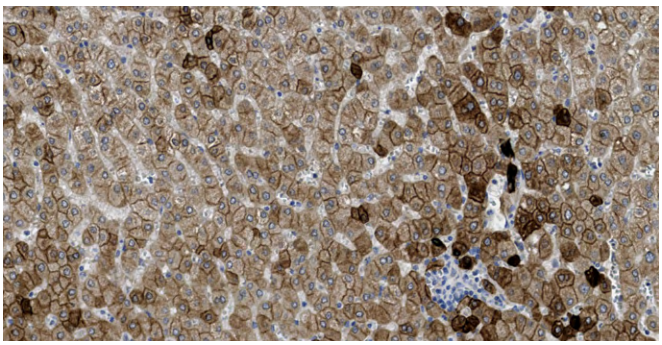


Figure 1. Hepatocytes in this image show a moderate to strong cytoplasmic staining reaction with membranous accentuation.

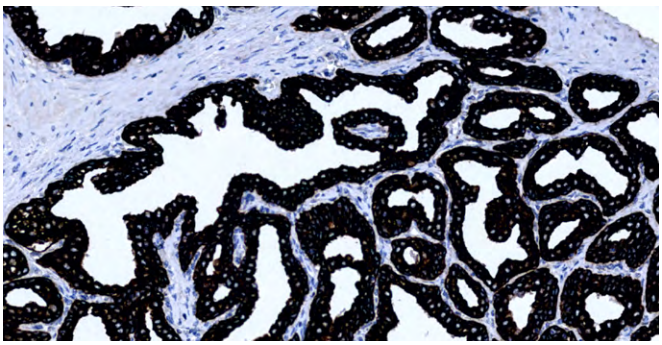


Figure 2. Intense cytoplasmic reactivity for PAN CK is seen in the epithelium of this prostate, while the background stroma is negative.

Tissue-Tek Genie® anti-Desmin

IVD

Clone
GM007

Host/clonality
Mouse monoclonal

Product codes and quantity
8311-C010: RTU, 10 capsules; 1 pack
8311-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Desmin protein in both normal and neoplastic cells. It may be useful for subtyping undifferentiated and pleomorphic tumors when used with a panel of antibodies.

Description
Desmin is an intermediate filament of all three types of muscle cells (skeletal, cardiac, and smooth muscle). Desmin is also expressed in myofibroblasts and mesothelial cells but is absent in myoepithelial cells, malignant mesothelioma, and adenocarcinoma. Desmin is expressed in the majority of rhabdomyomas, leiomyomas, rhabdomyosarcomas, and leiomyosarcomas.

Positive tissue control
Intestine

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong, distinct cytoplasmic staining of smooth muscle cells in lamina muscularis mucosae and muscularis propria of appendix.
2. At least weak to moderate cytoplasmic staining in most smooth muscle cells of vessels.
3. A moderate to strong, distinct cytoplasmic staining of neoplastic cells of leiomyoma and leiomyosarcoma.
4. At least weak to moderate cytoplasmic staining of round and spindle shaped neoplastic cells in rhabdomyosarcoma.
5. No staining of appendiceal epithelial cells and cytotrophoblastic and syncytiotrophoblastic cells in placenta.

References

1. Miettinen M, et al. Am. J. Surg. Pathol. 2000; 24(2):211-222.
2. Hurlimann J. Hum Pathol. 1994; 25(8):753-757.

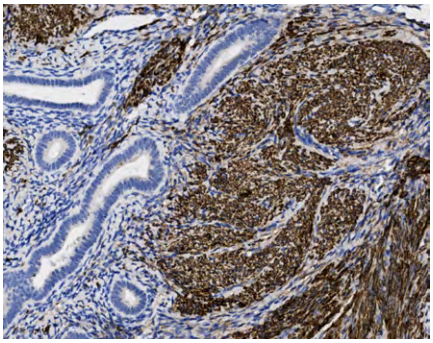


Figure 1. Negative staining of the glandular epithelium but moderate staining in smooth muscle cells of leiomyoma, also known as fibroid.

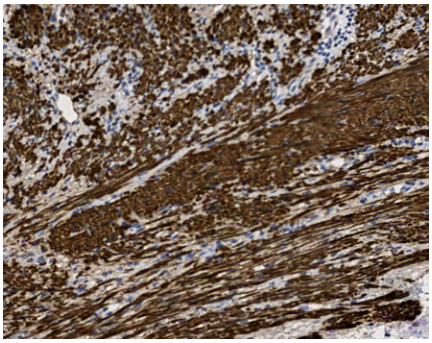


Figure 2. Strong staining in smooth muscle cells in muscularis propria of appendix.

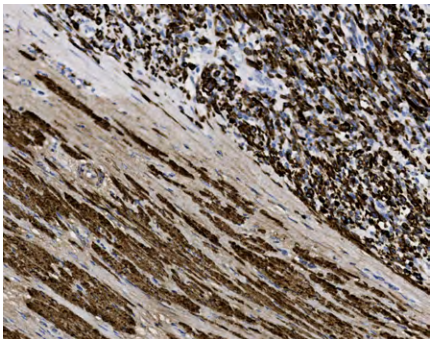


Figure 3. Moderate staining in round and spindle cells of rhabdomyosarcoma.

Tissue-Tek Genie® anti-DOG1

IVD

Clone
DOG1.1

Host/clonality
Mouse monoclonal

Product codes and quantity
8368-C010: RTU, 10 capsules; 1 pack
8368-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
In appendix, a moderate to strong predominant membraneous staining is seen in interstitial cells of Cajal, with weaker staining observed in basal columnar epithelial cells, scattered endothelial, and smooth muscle cells of vessels. Membraneous and cytoplasmic staining of neoplastic cells is observed in gastrointestinal stromal tumors (GIST). Anti-DOG1 antibody also may be useful for detecting GIST, as well as for classifying salivary and renal carcinomas, when used with a panel of antibodies.

Description
DOG1 protein is expressed predominantly on the plasma membrane of gastrointestinal interstitial cells of Cajal, acinic cells in salivary glands, pancreatic centroacinar cells, and epithelium of the biliary tract, breast, stomach, and prostate.

Positive tissue control
Appendix, GIST

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least moderate, distinct predominantly membraneous staining of Cajal cells in appendix.
2. A weak membraneous staining of scattered endothelial cells and vascular smooth muscle.
3. A weak membraneous staining of columnar epithelial cells in basal part of appendix crypts.
4. A moderate to strong staining of neoplastic cells in GIST.

References

1. Liegl B, et al. Am. J. Surg. Pathol. 2009; 33(3):437-446.
2. Espinosa I, et al. Am. J. Surg. Pathol. 2008; 32(2): 210-218.
3. Abd Raboh NM, and Hakim SA. Int. J. Clin. Exp. Pathol. 2015; 8(8):9214-9222.
4. Zhao W, et al. Pathol. Res. Pract. 2015; 211(4):303-307.
5. Gheorghe M, et al. J. Med. Life. 2014; 7(2):139-149.

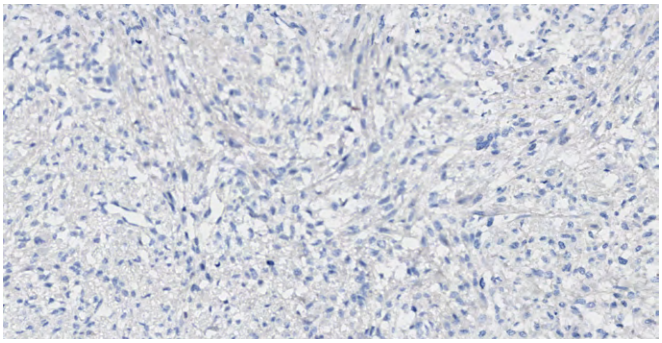


Figure 1. Negative staining in smooth muscle cells of leiomyosarcoma.

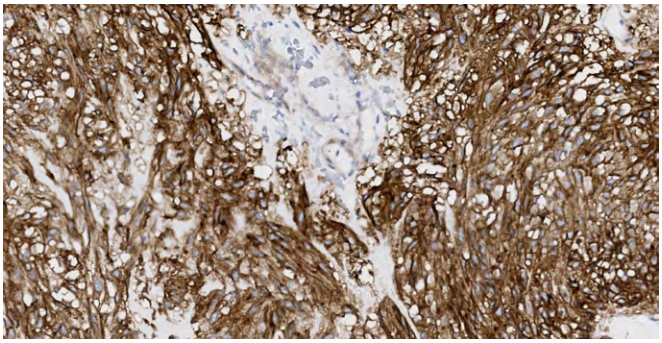


Figure 2. Strong staining in gastrointestinal stromal tumor.

Tissue-Tek Genie® anti-E-Cadherin

IVD

Clone
GM016

Host/clonality
Mouse monoclonal

Product codes and quantity
8229-C010: RTU, 10 capsules; 1 pack
8229-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels epithelial cells in many tissue types. It may be useful for differentiating between ductal (positive) and lobular (negative) breast carcinomas when used with a panel of antibodies. Lymphocytes are negative.

Description
E-cadherin is a transmembrane cell adhesion glycoprotein that is critical for epithelial junction formation. E-cadherin is expressed in a majority epithelial cells.

Positive tissue control
Appendix, liver, ductal breast carcinoma

Staining pattern
Membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct membraneous staining reaction of virtually all columnar epithelial cells in colon.
2. A strong, distinct membraneous staining reaction of epithelial cells of the bile ducts and at least a weak to moderate membraneous staining reaction of hepatocytes.
3. A moderate to strong, distinct membraneous staining reaction of virtually all neoplastic cells in breast ductal carcinoma.
4. No staining reaction or at maximum a focal membraneous staining of breast lobular carcinoma.

References

1. Singhai R, et al. N. Am. J. Med. Sci. 2011; 3:227- 233.
2. Kowalski PJ, et al. Breast Cancer Res. 2003; 5:R217-R222.

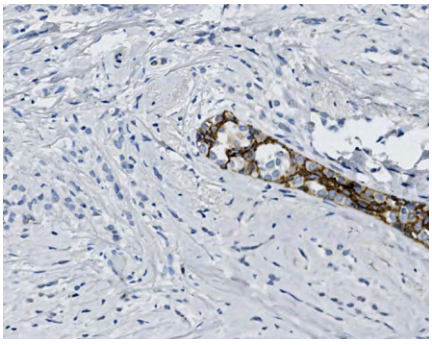


Figure 1. This image demonstrates negative E-Cadherin staining among the infiltrating lobular carcinoma cells in the breast stroma, as well as in the in situ component.

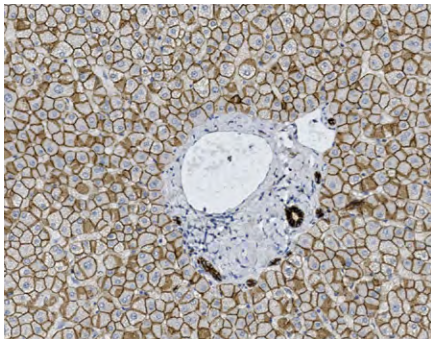


Figure 2. Moderately strong membrane staining is seen in the hepatocytes, while strong staining is observed in the bile ducts.

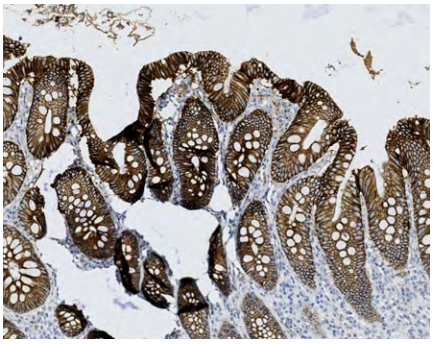


Figure 3. Strong membraneous staining is observed in the colonic epithelium and is absent in the stromal cells.

Tissue-Tek Genie® anti-Epithelial Cell Adhesion Molecule

IVD

Clone
VU-1D9

Host/clonality
Mouse monoclonal

Product codes and quantity
8230-C010: RTU, 10 capsules; 1 pack
8230-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Epithelial Cell Adhesion Molecule (EpCAM) protein on the membrane and cytoplasm of epithelial cells in both normal and neoplastic cells. It may be useful for differentiating adenocarcinoma from malignant mesothelioma when used with a panel of antibodies.

Description
Epithelial Cell Adhesion Molecule is a membrane protein expressed on epithelial cells.

Positive tissue control
Normal colon

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct, predominantly membraneous, staining of columnar epithelial cells in appendix.
2. A moderate to strong, predominantly membraneous, staining of epithelial cells in renal collecting tubules.
3. At least weak, predominantly basolateral, staining of epithelial cells in proximal tubules and membraneous staining of epithelial cells lining the Bowman capsule in kidney.
4. At least moderate, predominantly membraneous, staining of neoplastic cells in basal cell carcinoma and colon adenocarcinoma.

References

1. Litvinov SV, et al. J. Cell Biol. 1994; 125(2):437-446.
2. Tsubura A, et al. J. of Cutan. Pathol. 1992; 19(1):73-79.

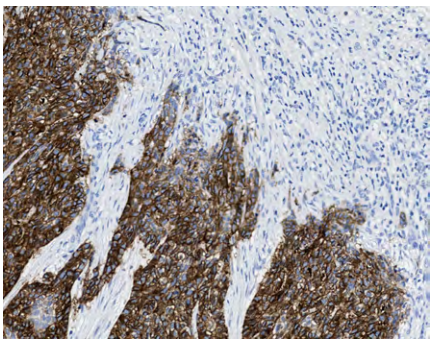


Figure 1. Negative staining of subcutaneous tissue but strong staining in basal cell carcinoma.

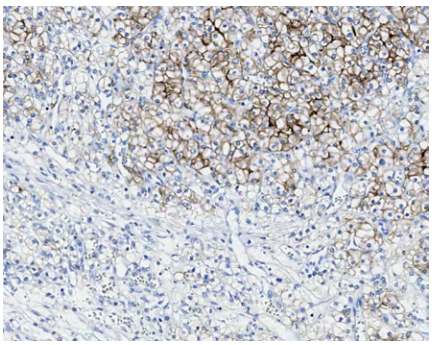


Figure 2. Weak staining in renal cell carcinomas.

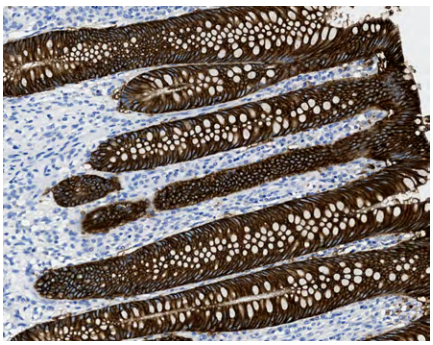


Figure 3. Strong staining in columnar epithelial cells of appendix.

Tissue-Tek Genie® anti-Epithelial Membrane Antigen

IVD

Clone
E29

Host/clonality
Mouse monoclonal

Product codes and quantity
8233-C010: RTU, 10 capsules; 1 pack
8233-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Epithelial Membrane Antigen (EMA) protein on the membrane and cytoplasm of the apical surface of secretory glandular epithelial cells in both normal and neoplastic cells. It may be useful for detecting adenocarcinomas derived from secretory epithelia such as metastases of breast carcinoma, malignant mesothelioma, renal cell carcinomas, and meningiomas when used with a panel of antibodies.

Description
Epithelial Membrane Antigen is a membrane protein expressed on the apical surface of secretory glandular epithelial cells in a variety of tissues.

Positive tissue control
Breast ductal carcinoma

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct predominantly membraneous staining of malignant mesothelioma.
2. A strong cytoplasmic staining of lung adenocarcinoma and squamous epithelium of tonsil.
3. A heterogeneous, predominantly membraneous staining of meningioma.
4. A widespread dot-like cytoplasmic staining of glioblastoma.

References

1. Sloane JP and Ormerod MG. Cancer. 1981; 47(7): 1786-1795.
2. Pinkus GS and Kurtin PJ. Hum. Pathol. 1985; 16(9):929-940.
3. Cordell J, et al. Br. J. Cancer. 1985; 52(3):347-354.
4. Heyderman E, et al. Br. J. Cancer. 1985; 52(3):355-361.

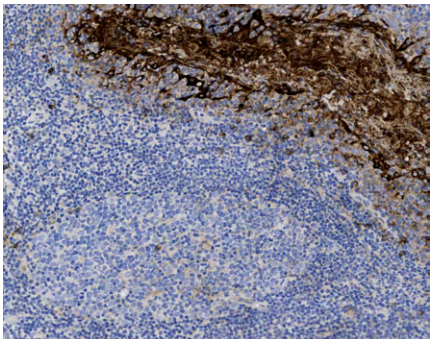


Figure 1. Negative staining of lymphoid cells but strong staining in squamous epithelium of the tonsil.

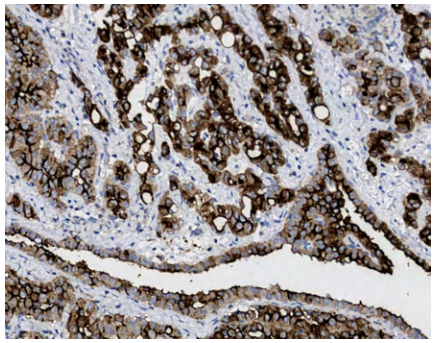


Figure 2. Strong staining of malignant mesothelioma.

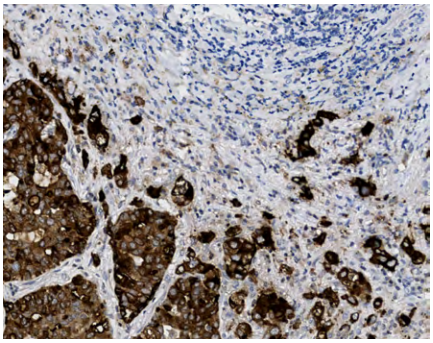


Figure 3. Strong staining of lung adenocarcinoma.

Tissue-Tek Genie® anti-ERG

IVD

Clone
EP111

Host/clonality
Rabbit monoclonal

Product codes and quantity
8323-C010: RTU, 10 capsules; 1 pack
8323-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the nucleus in endothelial cells of all tissues tested, peripheral T-cells, and mantle zone B-cells of tonsil and appendix. Staining is not observed in epithelial cells and muscle cells in appendix, tonsil, and prostate hyperplasia. Nuclear staining is observed in subset prostate carcinomas.

It may be useful for detecting prostate cancer and vascular tumors when used with a panel of other antibodies.

Description
Erythroblast transformation-specific transcription factor (ERG) is expressed in endothelial cells of blood and lymphatic vessels, and bone marrow stem cells. In particular, the TMPRSS2-ERG fusion gene is found in 45-65% of prostate cancers. ERG is expressed in endothelial neoplasms including hemangioendothelioma, angiosarcoma and Kaposi sarcoma. Clone EP111 is also named as EPR3864. This clone is capable of detecting both wild-type and truncated ERG.

Positive tissue control
Appendix, tonsil, ERG positive prostate carcinoma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong nuclear staining of endothelial cells.
2. Nuclear staining of neoplastic cells in a subset of prostate adenocarcinomas.
3. No staining of epithelial cells in appendix or benign prostate glands.
4. A weak to moderate nuclear staining in peripheral T-cells and mantle zone B-cells is accepted.

References

1. M Braun, et al. Prostate Cancer and Prostatic Diseases (2012) 15;165-169.
2. Yaskiv O, et al. Am J Clin Pathol 2012; 138:803- 810.
3. Tomlins S, et al. Arch Pathol Lab Med. 2012; 136:935-946.
4. Liu H, et al. Annals of Clinical & Laboratory Science 2013; 43,3-10.
5. Stockman DL, et al. Mod Pathol. 2014; 27:496-501.

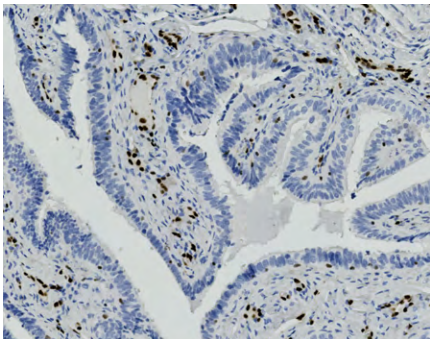


Figure 1. Fallopian tube epithelium shows no reactivity for ERG, while endothelial cells show strong nuclear reactivity.

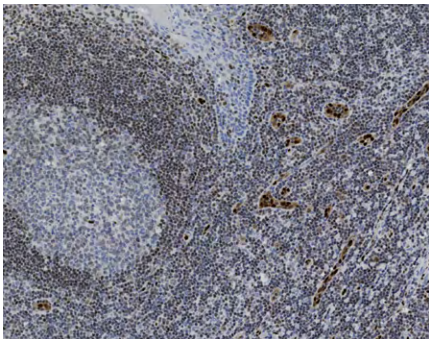


Figure 2. The lymphocytes in this tonsil specimen show weak to moderate nuclear reactivity for ERG. The background endothelial cells show strong nuclear reactivity, while the focus of squamous epithelium is negative.

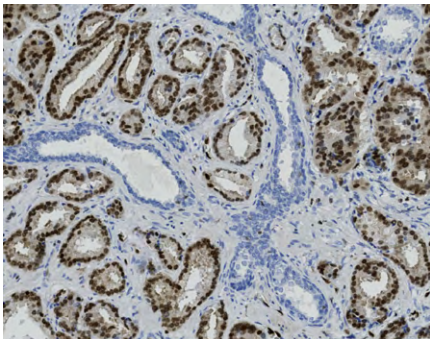


Figure 3. This prostate carcinoma shows strong nuclear expression of ERG. The benign ducts in the background are negative.

Tissue-Tek Genie® anti-Factor XIIIa

IVD

Clone
EP292

Host/clonality
Rabbit monoclonal

Product codes and quantity
8293-C010: RTU, 10 capsules; 1 pack
8293-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
In skin, factor XIIIa positive cells are observed in the dermis, most significantly within the papillary dermis, at the dermoepidermal junction. Factor XIIIa positive cells can also be seen in other tissue types, frequently so in those with encapsulated lymphoid structures. In tumor pathology, the main application is to help distinguish immune-phenotypic differences between dermatofibromas and numerous other fibrohistocytic entities, most notably dermatofibrosarcoma protuberans, when used with a panel of antibodies.

Description
Factor XIIIa protein is a blood and intracellularly produced coagulation factor, which is widely expressed in a variety of cell types, including dermal dendrocytes in skin.

Positive tissue control
Skin, gastrointestinal tract, liver, dermatofibroma

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In skin, the distribution of factor XIIIa positive cells is confined to the dermis, with the significant numbers within the papillary dermis, at dermoepidermal junction.
3. Factor XIIIa positive cells can be seen in a wider variety of tissue types, particularly in those with any encapsulated lymphoid structures, notably in connective tissue surrounding, or penetrating into such tissues, in particular, sinus lining cells, skin, and mucosa tissue, with such sites as liver, thyroid, and spleen only demonstrating relatively low numbers.
4. Positive staining of benign neoplastic cells in dermatofibroma.

References

1. Headington JT. In: Callen JR et al. (Eds), Adv. Dermatol. Yearbook, Medical Publishers, 1986; pp 159-171.
2. Cerio R, et al. Br. J. Dermatol. 1989; 121(4):421-431.

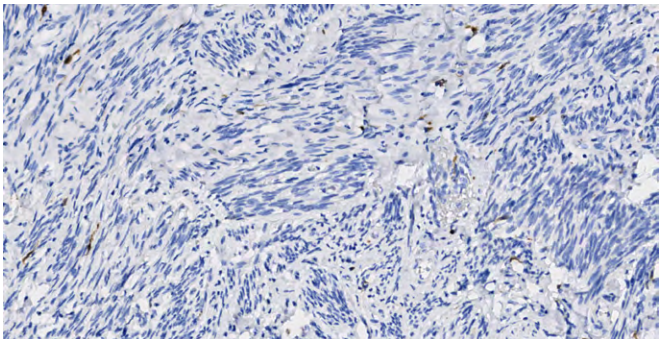


Figure 1. Negative staining in smooth muscle cells of leiomyoma.

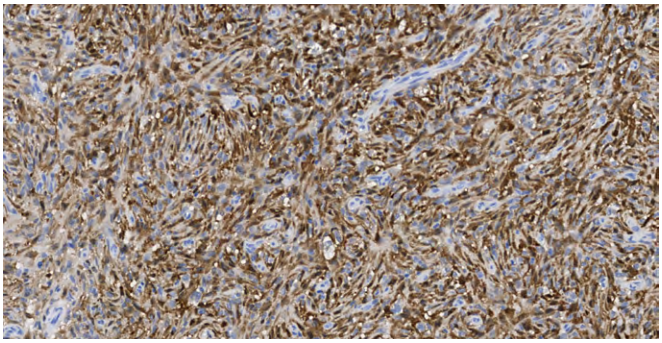


Figure 2. Strong staining in the dermatofibroma cells.

Tissue-Tek Genie® anti-Gastrin

IVD

Clone
Polyclonal

Host/clonality
Rabbit polyclonal

Product codes and quantity
8314-C010: RTU, 10 capsules; 1 pack
8314-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
In stomach, G-cells show a moderate to strong cytoplasmic staining, whereas epithelial cells are negative. Cytoplasmic staining is observed in neoplastic cells of gastrin-secreting neuroendocrine tumors. Staining with the Tissue-Tek Genie anti-Gastrin Rabbit Polyclonal Antibody may be useful in the detection of gastric neuroendocrine tumors, when used with a panel of antibodies.

Description
Gastrin protein is a peptide hormone that stimulates production gastric acid by the parietal cells of the stomach, and also aids in gastric motility. Gastrin is produced by G-cells in the pyloric antrum of stomach.

Positive tissue control
Stomach, gastrin-secreting neuroendocrine tumor

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In stomach, G-cells show a moderate to strong cytoplasmic staining; a slightly diffuse staining from G-cells may be observed.
3. The epithelial cells are negative.
4. Stomach and gastrin-secreting neuroendocrine tumor are used as control tissues.

References

1. Waldum HL, et al. Front Endocrinol. (Lausanne). 2017; 8:1-7.
2. Shao Y, et al. World J. Gastroenterol. 2014; 20(36):12860-12873.

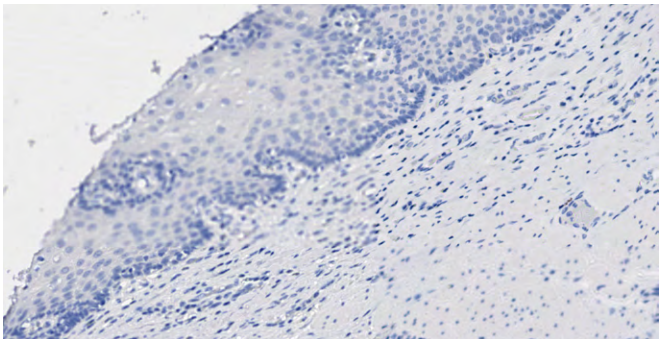


Figure 1. Negative staining in epithelial cells of esophagus.

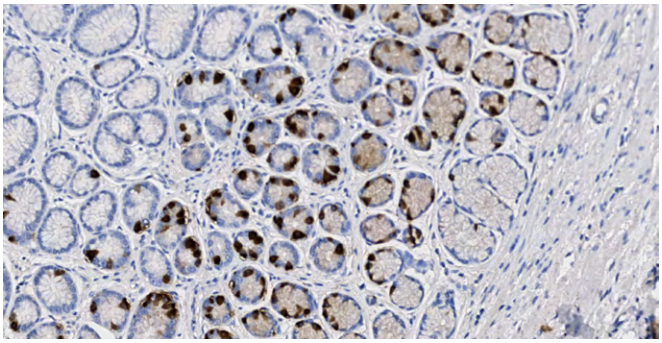


Figure 2. Strong staining of gastrin secreting in stomach.

Tissue-Tek Genie® anti-GATA3

IVD

Clone
EP368

Host/clonality
Rabbit monoclonal

Product codes and quantity
8242-C010: RTU, 10 capsules; 1 pack
8242-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells of breast ductal carcinoma, urothelial carcinoma, cervical adenocarcinoma, cutaneous squamous cell carcinoma, ovarian clear cell carcinoma, and ovarian serous borderline tumor. GATA3 is useful for identifying breast carcinoma and urothelial carcinoma, yolk sac tumor and choriocarcinoma, when used with a panel of other antibodies. Nuclear staining is observed in a majority of T-cells in the T-zones of tonsil and dispersed T-cells in all tissues.

Description
GATA binding protein 3 (GATA3) is a transcription factor involved in regulating development in multiple tissues.

Positive tissue control
Tonsil, kidney, breast

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. An at least moderate, distinct nuclear staining reaction of virtually all epithelial cells in collecting ducts and glomerular podocytes in the kidney.
2. An at least weak nuclear staining reaction in the majority of T-cells in the T-zones of tonsil and dispersed T-cells in other tissues.
3. Moderate to strong nuclear staining reaction of virtually all neoplastic cells in breast ductal carcinoma.
4. At least weak to moderate nuclear staining in the majority of neoplastic cells in urothelial carcinoma.
5. No staining of colon adenocarcinoma.

References

1. Liang Y, et al. Hum. Pathol. 2014; 45; 1466-1472.
2. Cimino-Mathews A, et al. Hum. Pathol. 2013; 44:1341-1349.
3. Liu H, et al. Am. J. Clin. Pathol. 2012; 138:57-64.

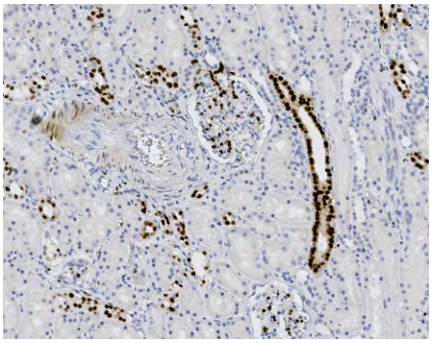


Figure 1. GATA3 is negative among the tubules and stromal elements of the kidney, while collecting ducts and glomerular podocytes show strong nuclear staining.

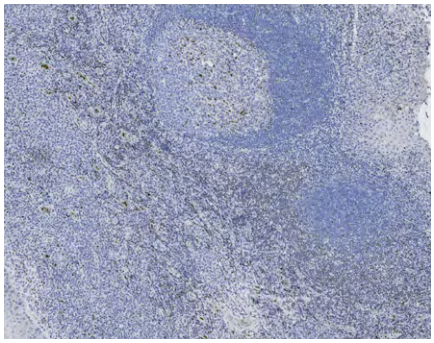


Figure 2. Weak to moderate nuclear reactivity for GATA3 is seen in the T-cells of the T-zones, as well as T-cells of the germinal centers. B-cells are negative. The overlying tonsillar squamous epithelium is negative.

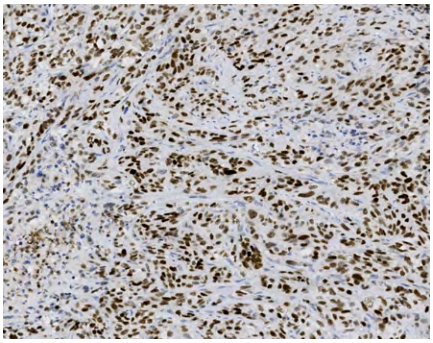


Figure 3. Urothelial carcinoma typically demonstrates moderate to strong nuclear reactivity for GATA3.

Tissue-Tek Genie® anti-GCDFP-15

IVD

Clone
EP95

Host/clonality
Rabbit monoclonal

Product codes and quantity
8325-C010: RTU, 10 capsules; 1 pack
8325-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the cytoplasm in ductal epithelial cells, apocrine metaplastic cells of hyperplastic breast, and epithelial cells of salivary gland. Cytoplasmic staining is observed in neoplastic cells of breast carcinoma. Positive staining is not observed in neoplastic cells from tumors of gastric, colorectal, lung, prostate, kidney, brain, liver, thyroid, skin, lymphomas, or soft tissue.
It is useful for identification of breast carcinoma and metastatic tumor of breast origin when used with a panel of other antibodies.

Description
Gross cystic disease fluid protein-15 (GCDFP-15) is a secretory glycoprotein and is expressed in the acinic cells of the breast, salivary glands, sweat glands, and seminal vesicle. GCDFP-15 is often expressed in neoplastic cells of breast carcinomas (50-70%), mammary and extramammary Paget's disease, sweat gland tumors (particularly apocrine), and salivary gland tumors.

Positive tissue control
Skin, GCDFP-15 positive breast and breast carcinoma

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In breast, a strong cytoplasmic staining in scattered ductal epithelial cells and apocrine metaplastic cells of hyperplastic breast.
2. Cytoplasmic staining in neoplastic cells of breast carcinomas.
3. No more than moderate background staining in the vicinity of positive cells.
4. Background staining is acceptable due to antigen diffusion.

References

1. Yang M, et al. Mod Pathol. 2010; 23:654-661.
2. Wang LJ, et al. Appl Immunohistochem Mol Morphol. 2009; 17:505-511.
3. Park S, et al. Arch Pathol Lab Med. 2007;131:1561-1567.
4. Bhargava R, et al. Am J Clin Pathol. 2007; 127:103-113.

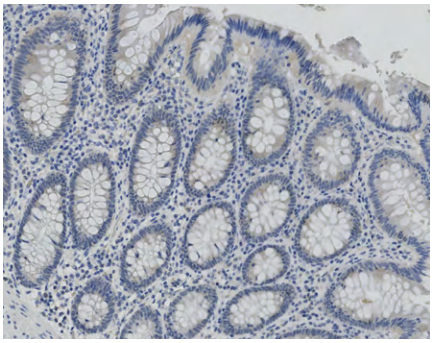


Figure 1. The appendiceal epithelium and underlying elements of the lamina propria, and muscularis, show no reactivity for GCDFP-15.

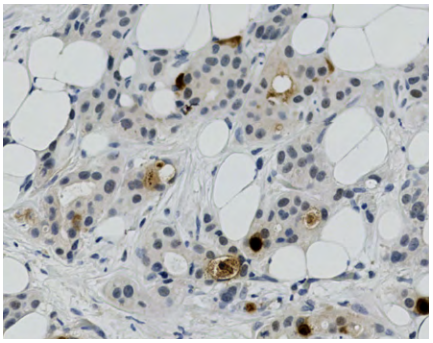


Figure 2. Scattered cells in this ductal carcinoma of breast show weak to moderate cytoplasmic reactivity for GCDFP-15. Additionally, some reactive material is seen in extracellular spaces, particularly gland lumens.

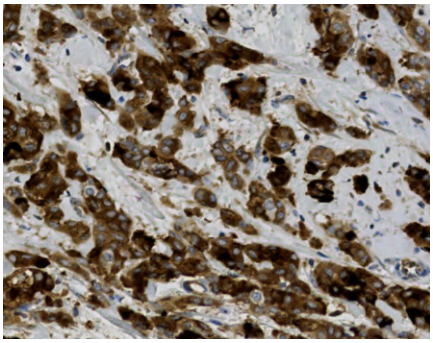


Figure 3. Diffuse strong cytoplasmic reactivity for GCDFP-15 is observed in this invasive ductal carcinoma of breast.

Tissue-Tek Genie® anti-Glial Fibrillary Acidic Protein (GFAP)

IVD

Clone
GA-5

Host/clonality
Mouse monoclonal

Product codes and quantity
8316-C010: RTU, 10 capsules; 1 pack
8316-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the cytoplasm of astrocytes, a subset of pituitary cells, Schwann cells of peripheral nerves, enteric glial cells and satellite cells of ganglia in the appendix, and myoepithelial cells of the parotid and mammary glands. It is also observed in neoplastic cells of astrocytomas, glioblastomas, oligoastrocytomas, and malignant peripheral nerve sheath tumors (MPNST).
It is useful for identifying astrocytes, differentiating primary gliomas from metastatic lesions in the brain, classifying intracranial tumors, and documenting astrocytic differentiation in tumors outside the central nervous system when used with a panel of other antibodies.

Description
GFAP is specifically expressed in astrocytes and ependymal cells. It is also expressed in Schwann cells and satellite cells in sensory ganglia of the peripheral nervous system, and in myoepithelial cells and chondroblasts. Immature oligodendrocytes and choroid plexus cells may be GFAP positive. Astrocytoma, ependymoma, glioblastoma, and oligodendroglioma are almost always GFAP positive.

Positive tissue control
Brain, ganglia of appendix/GI tract, and astrocytoma

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. Positive staining of astrocytes, glial cells, and ependymal cells.
3. A moderate to strong cytoplasmic staining of astrocytes and negative staining of other cell types in the brain.
4. A weak to moderate staining of ganglion cells in gastrointestinal tract, e.g. appendix and colon.
5. A moderate to strong cytoplasmic staining of myoepithelial cells and negative staining of other cell types in parotid gland.
6. A strong and distinct cytoplasmic staining of the normal astrocytes in the brain and some myoepithelial cells in the parotid gland as well as the astrocytoma and glioblastoma.
7. All other cells should be negative.

References

1. Morrison CD, Prayson RA. Semin Diagn Pathol. 2000; 17:204-215.
2. Schwab DE, et al. Pathol Res Pract. 2018; 214:15-24.

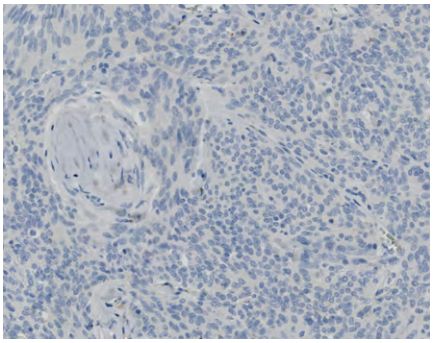


Figure 1. The neoplastic cells of this meningioma show no reactivity for GFAP.

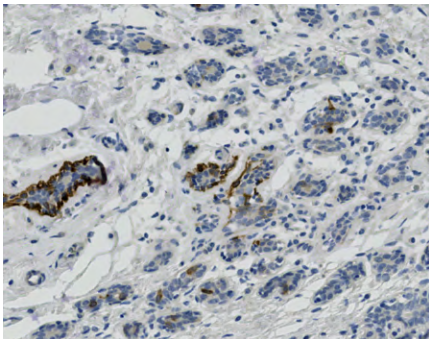


Figure 2. Myoepithelial cells of breast may show variable, weak to strong cytoplasmic reactivity for GFAP, often in a patchy distribution.

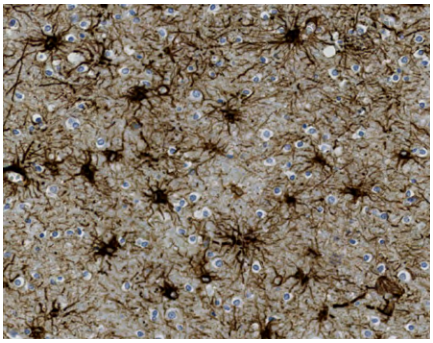


Figure 3. Astrocytes show strong cytoplasmic reactivity in this benign brain specimen.

Tissue-Tek Genie® anti-Granzyme B

IVD

Clone
EP230

Host/clonality
Rabbit monoclonal

Product codes and quantity
8234-C010: RTU, 10 capsules; 1 pack
8234-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels cytotoxic T-lymphocytes (CTLs) and natural killer (NK) cells. The expression of cytotoxic proteins, such as granzyme B may aid in the identification and classification of extra nodal peripheral T- and NK-cell lymphomas, since many of these tumors do not have specific morphology and phenotype, when used in a panel with other antibodies. In normal tonsil, spleen, and thymus, positive staining is observed in cytotoxic T-lymphocytes and natural killer cells.

Description
Granzyme B is a serine protease expressed by cytotoxic T-lymphocytes and natural killer cells. It induces apoptosis in target cells of these lymphocytes.

Positive tissue control
Spleen, tonsil, selected T-cell lymphomas

Staining pattern
Cytoplasmic, granular

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Granular cytoplasmic staining.
2. In tonsil, at least a weak to moderate granular cytoplasmic staining of a subgroup of T-lymphocytes, including cytotoxic T-lymphocytes, and natural killer cells.
3. An at least weak to moderate granular cytoplasmic staining of majority of T-cells in the peripheral T-cell lymphoma.
4. No staining in colon carcinoma, liver.

References

1. Smyth MJ, Trapani JA. Immunol Today. 1995; 16:202-206.
2. Froelich CJ, et al. Immunol Today. 1998; 19:30-36.
3. Kato N, et al. Am J Dermatopathol. 2003; 25:142-147.
4. Balmer NN, et al. Am J Dermatopathol. 2009; 31:187-192.

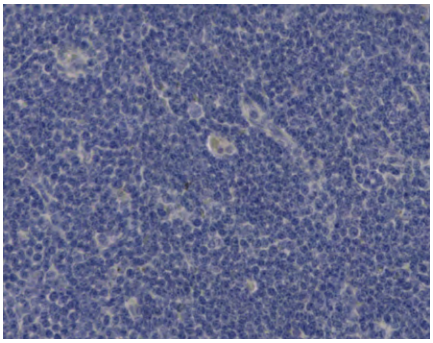


Figure 1. The neoplastic lymphocytes of this B-CLL involving the bone marrow show no reactivity for Granzyme B.

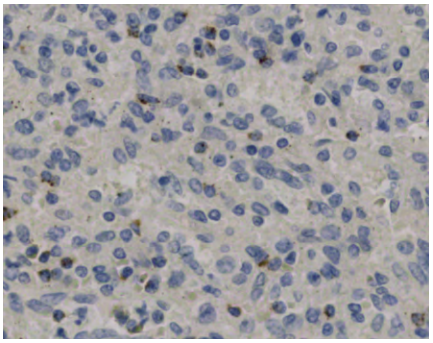


Figure 2. Scattered lymphocytes in the spleen show coarsely granular cytoplasmic reactivity for Granzyme B.

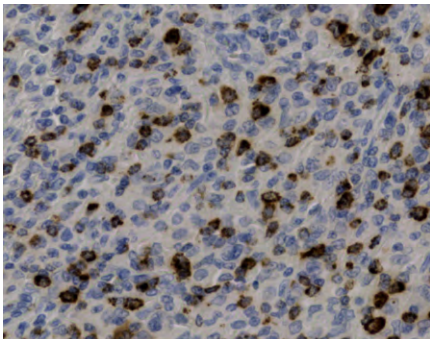


Figure 3. Moderate to strong coarsely granular cytoplasmic reactivity for Granzyme B is observed in the neoplastic cells of this peripheral T-cell lymphoma involving bone marrow.

Tissue-Tek Genie® anti-Helicobacter pylori

IVD

Clone
EP279

Host/clonality
Rabbit monoclonal

Product codes and quantity
8317-C010: RTU, 10 capsules; 1 pack
8317-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels Helicobacter pylori (H. pylori) with a characteristic helical shape and localization within the crypts of the mucosa of H. pylori infected stomach. The antibody labels H. pylori lining the gastric mucosa in normal, and neoplastic gastric tissues which are infected with H. pylori. It may aid in the detection of H. pylori infection when used with a panel of other clinical tests.

Description
H. pylori are spiral-curved, gram-negative bacteria that are known to cause peptic and duodenal ulcers and chronic gastritis in humans. H. pylori may also be involved in the development of adenocarcinoma and low grade lymphoma of mucosa associated lymphoid tissue in stomach.

Positive tissue control
H. pylori infected stomach

Staining pattern
Cell wall of H. pylori within the crypts of the stomach mucosa

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cell wall of Helicobacter pylori stained.
2. Characteristic helical shape and localization of the organisms within crypts of mucosa.
3. Negative staining within crypts of mucosa of non-Helicobacter pylori infected stomach mucosa.
4. Gastric epithelia are negative.
5. Helicobacter pylori infected stomach mucosa are used as a positive control tissue.

References

1. Andersen LP, Holck S, and Povlsen CO. APMIS. 1988; 96(6):559-564.
2. Andersen LP, Holck S. Eur. J. Clin. Microbiol. Infect. Dis. 1990; 9(2):135-138.
3. Carcas LP. J. Carcinog. 2014; 13:14.

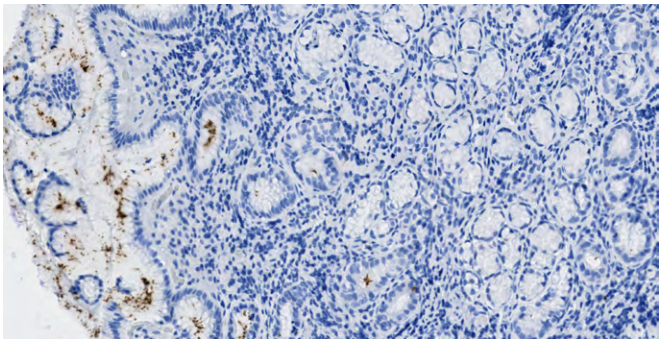


Figure 1. Negative staining of gastric epithelia but positive Helicobacter pylori staining in crypts of gastric mucosa.

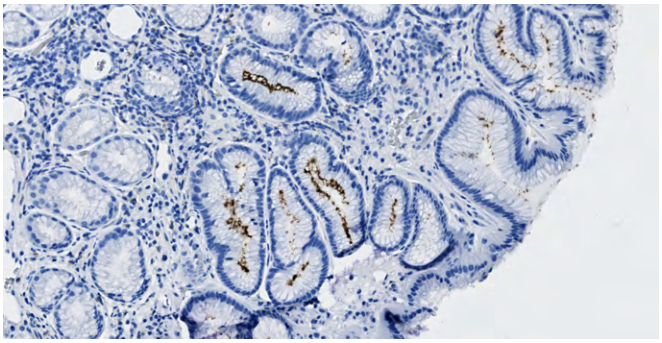


Figure 2. Negative staining of gastric epithelia but positive Helicobacter pylori staining in crypts of gastric mucosa.

Tissue-Tek Genie® anti-Hepatocyte Specific Antigen (HEP PAR 1)

IVD

Clone
OCH1E5

Host/clonality
Mouse monoclonal

Product codes and quantity
8374-C010: RTU, 10 capsules; 1 pack
8374-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Granular cytoplasmic staining is observed in hepatocytes of liver, mucosa of small intestine and appendix; cytoplasmic staining is typically not observed in bile ductal epithelial cells, tonsil, skin, smooth muscle, spleen, lung, breast, esophagus, pancreas, kidney, prostate, adrenal gland, endometrium, ovary, brain, thyroid, thymus, or adrenal gland. Granular cytoplasmic staining is observed in neoplastic cells of hepatocellular carcinoma (HCC), and may rarely be observed in other carcinomas showing “hepatoid” differentiation, including gastric, lung and colon adenocarcinoma, among others.
It is useful in differentiating HCC from metastatic lesions to liver, and hepatoblastoma from other small round cell tumors when used with a panel of other antibodies.

Description
Hepatocyte Specific Antigen, also known as Hepatocyte Paraffin 1 (Hep Par 1), is expressed in normal and neoplastic hepatocytes. Hep Par 1 is a highly specific marker for HCC, although several non-hepatic tumors occasionally can show some Hep Par 1 positivity.

Positive tissue control
Liver, HCC

Staining pattern
Granular cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In normal liver, moderate to strong granular cytoplasmic staining of hepatocytes; no staining of bile ductal epithelial cells.
3. Granular cytoplasmic staining of neoplastic cells of HCC.
4. No staining in tonsil and appendix.

References

1. Askan G, et al. Am J Clin Pathol 2016;146:163-169.
2. Lagana S, et al. Arch Pathol Lab Med 2015;139:791-795.
3. Nguyen T, et al. Arch Pathol Lab Med. 2015;139:1028-1034.
4. Butler SL, et al. Laboratory Investigation 2008;88: 78-88.
5. Fan Z, et al. Mod Pathol. 2003; 16:137-144.

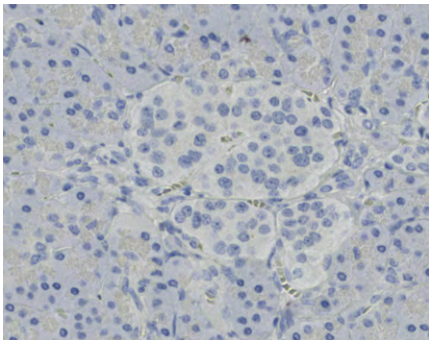


Figure 1. Normal pancreatic tissues show a negative staining reaction with Hep Par 1.

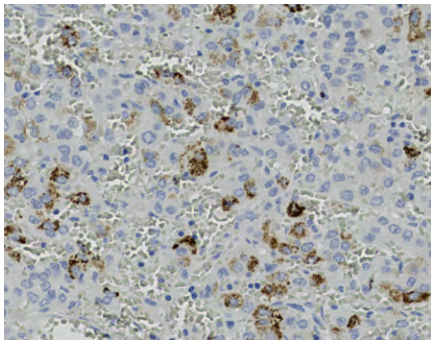


Figure 2. This example of HCC shows a more variable staining reaction with Hep Par 1.

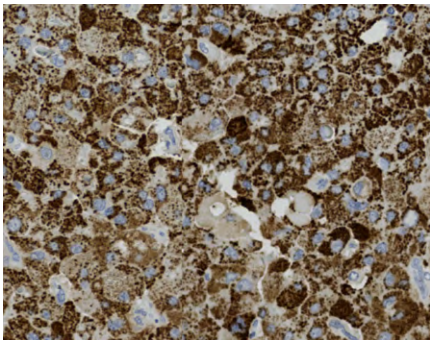


Figure 3. A diffuse strong granular cytoplasmic pattern is seen with Hep Par 1 staining in this HCC.

Tissue-Tek Genie® anti-HHV8

IVD

Clone
13B10

Host/clonality
Mouse monoclonal

Product codes and quantity
8378-C010: RTU, 10 capsules; 1 pack
8378-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels Human herpesvirus type 8 (HHV8) in the nuclei of neoplastic cells in Kaposi's sarcoma (KS) tissues, whereas normal cells within the same specimen, and uninfected tissues, will not show HHV8 immunoreactivity. Anti-HHV8 antibody may be useful in the detection of KS, primary effusion lymphoma, and multicentric Castleman's disease (CD), when used with a panel of antibodies.

Description
Human herpesvirus type 8, also known as KS-associated herpesvirus, causes KS as well as primary effusion lymphoma and some types of multi-centric CD. Latent nuclear antigen protein is consistently expressed in HHV8 infected cells.

Positive tissue control
Neoplastic cells of KS

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Nuclear staining.
2. Positive staining in neoplastic cells of KS.
3. Negative staining in normal cells of KS tissues.

References

1. Chan JK, et al. Int. J. Surg. Pathol. 2013; 21(5):455-475.
2. Radu O and Pantanowitz L. Arch. Pathol. Lab. Med. 2013; 137(2):289-294.
3. Waterston A and Bower M. Acta Oncol. 2004; 43(8):698-704.
4. Komatsu T, et al. Viral Immunol. 2004; 14(4):311-317.

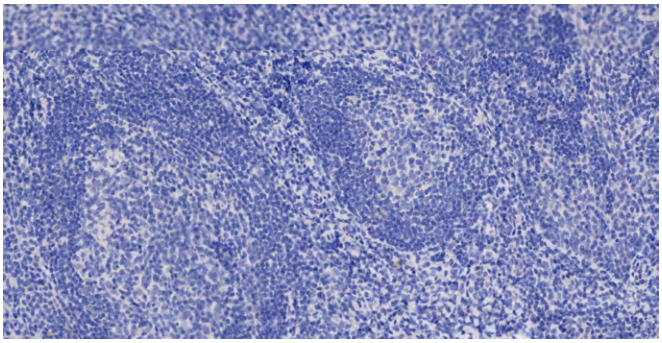


Figure 1. Negative staining in tonsil.

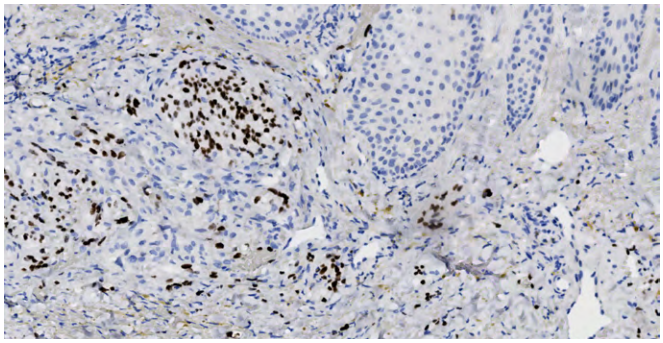


Figure 2. Positive staining of tissue infected with HHV8.

Tissue-Tek Genie® anti-IgA

IVD

Clone
EP170

Host/clonality
Rabbit monoclonal

Product codes and quantity
8229-C010: RTU, 10 capsules; 1 pack
8229-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
In tonsil and lymph node, staining is observed in the cytoplasm of plasma cells, and in the cytoplasm and plasma membrane of immunoblasts in the germinal center. Some background staining in blood vessels, connective tissue, and epithelial cells may be present. Membraneous and cytoplasmic staining is also found in a subset of B-cell neoplasms.
It is useful for classifying B-cell lymphomas and plasma cell neoplasms when used with a panel of other antibodies.

Description
In normal, healthy serum IgA is generally the second most abundant of the Ig heavy chain classes. Igs are produced in mature B-cells and plasma cells, and the amount and type of Ig heavy chain classes can vary in different stages of B-cell maturation: Igs in the earlier stages of maturation are present in the cytoplasm, whereas Igs on the membrane surface are more characteristic of mature B-cells in the mantle zone. Benign populations of B-cells show a mix of light chain classes with varying antigen specificities, while B-cell derived neoplasms, such as B-cell lymphoma, and plasma cell neoplasms, often produce only one type of clonal Ig light chain.

Positive tissue control
Tonsil, lymph node, a subset of B-cell neoplasms

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil and lymph node, a moderate to strong cytoplasmic staining of a subset plasma cells; a moderate to strong cytoplasmic and membrane staining of immunoblasts in the germinal center; some background staining in blood vessels, connective tissue and epithelial cells is accepted due to presence of extracellular IgA.
2. Membrane and cytoplasmic staining of a subset B-cell neoplasms.

References

1. Leong AS, et al. Manual of Diagnostic Antibodies for Immunohistology. Greenwich Medical Media, Ltd. 1999. London. pp 217-219.
2. Higgins RA, et al. Arch Pathol Lab Med. 2008; 132:441–461.

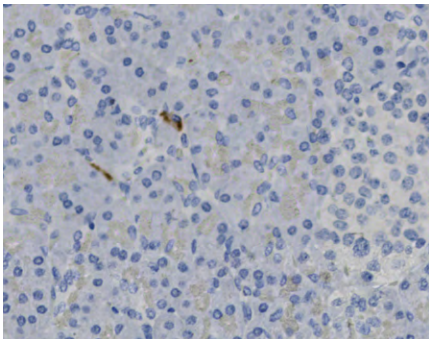


Figure 1. The pancreatic acinar and islet cells show no staining reaction for IgA. Scattered plasma cells may show strong cytoplasmic reactivity. Endothelial cells and vessel lumens may also show weak staining owing to extracellular secretion of IgA proteins.

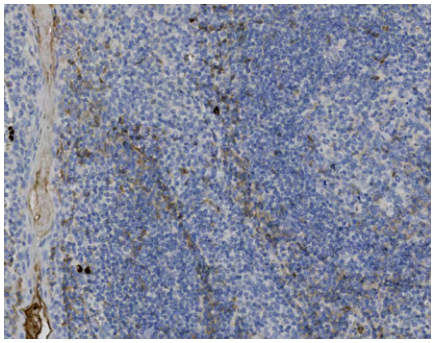


Figure 2. In this tonsil there is a moderate to strong cytoplasmic staining reaction in a subset plasma cells; a moderate to strong cytoplasmic and membrane staining of immunoblasts in the germinal center; some background staining in blood vessels, connective tissue and epithelial cells is due to presence of extracellular IgA.

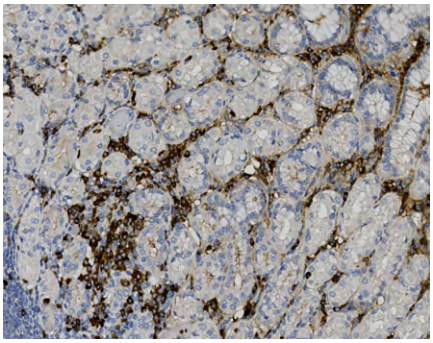


Figure 3. An abundance of plasma cells in the gastric mucosa show a strong membrane staining reaction for IgA.

Tissue-Tek Genie® anti-IgD

IVD

Clone
EP173

Host/clonality
Rabbit monoclonal

Product codes and quantity
8382-C010: RTU, 10 capsules; 1 pack
8382-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
In tonsil and lymph node, staining is observed in the cytoplasm of some plasma cells, and in the cytoplasm and plasma membrane of mantle zone lymphocytes. Some background staining in blood vessels, connective tissue, and epithelial cells may occasionally be present. Membraneous and cytoplasmic staining is also found in a subset of B-cell neoplasms, especially mantle cell lymphoma.
It is useful for classifying B-cell lymphomas and plasma cell neoplasms when used with a panel of other antibodies.

Description
In normal, healthy serum, IgD is generally the fourth most abundant of the immunoglobulin heavy-chain classes. Immunoglobulin (Igs) are produced in mature B-cells and plasma cells, and the amount and type of Ig can vary in different stages of B-cell maturation: Igs in the earlier stages of maturation are present in the cytoplasm, whereas surface expression of Igs is more characteristic of mature B-cells in the mantle zone.

Positive tissue control
Tonsil or lymph nodes or selected B-cell neoplasms

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil and lymph node, a moderate to strong cytoplasmic staining of subset plasma cells; a moderate to strong membraneous and cytoplasmic staining of mantle zone B-cell and immunoblasts in the germinal center; some background staining in blood vessels, connective tissue and epithelial cells is accepted due to presence of extracellular IgD.
2. Membrane and cytoplasmic staining in a subset of B-cell neoplasms.

References

1. Leong AS, et al. Manual of Diagnostic Antibodies for Immunohistology. Greenwich Medical Media Ltd. 1999. London. pp 217-219.
2. Camacho FI, et al. Am J Surg Pathol. 2003; 27:762-71.
3. Campo E, et al. Am J Surg Pathol. 1999; 23:59-68.
4. Higgins RA, et al. Arch Pathol Lab Med. 2008; 132:441–461.

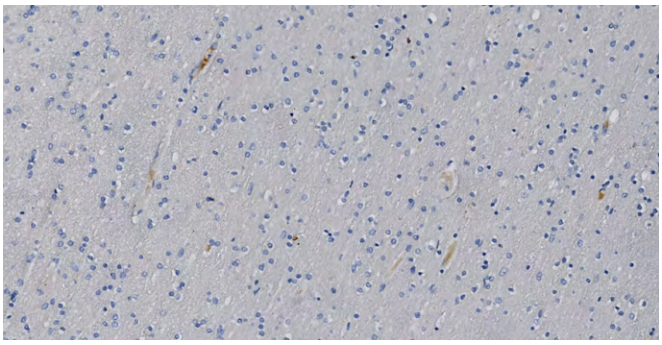


Figure 1. The neural and glial elements of the cerebrum show a negative staining reaction for IgD, while a weak staining for extracellular IgD within intravascular spaces is often seen.

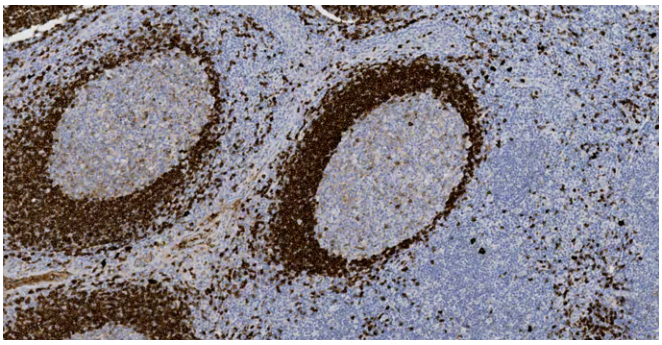


Figure 2. A subset of germinal center B-cells show weak to moderate predominantly cytoplasmic reactivity for IgD, while the mantle zone B-cells show strong membraneous and cytoplasmic staining.

Tissue-Tek Genie® anti-IgG

IVD

Clone
RM116

Host/clonality
Rabbit monoclonal

Product codes and quantity
8383-C010: RTU, 10 capsules; 1 pack
8383-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
In tonsil and lymph node, staining is observed in the cytoplasm of plasma cells, and in the cytoplasm and plasma membrane of immunoblasts in the germinal center. Some background staining in blood vessels, connective tissue, and epithelial cells may be present. Membraneous and cytoplasmic staining is also found in a subset of B-cell neoplasms.
It is useful for classifying B-cell lymphomas and plasma cell neoplasms when used with a panel of other antibodies. The IgG antibody may also be used to help calculate the ratio of IgG4 positive plasma cells to IgG positive plasma cells in tissues from IgG4-related disorders.

Description
In normal healthy serum, IgG is the most abundant of the Ig classes. Igs are produced in mature B-cells and plasma cells, and the amount and type of Ig can vary in different stages of B-cell maturation: in the earlier stages of maturation, Igs are present in the cytoplasm, whereas surface expression of Igs is more characteristic of mature B-cells in the mantle zone.

Positive tissue control
Tonsil, lymph node, or selected B-cell neoplasms

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic and membraneous staining.
2. In tonsil and lymph node, a moderate to strong cytoplasmic staining of 60-70% of the plasma cells; a moderate to strong cytoplasmic and membraneous staining of immunoblasts in the germinal center; some background staining in blood vessels, connective tissue and epithelial cells is accepted due to the presence of extracellular IgG.
3. Membraneous and cytoplasmic staining of a subset B-cell neoplasms.

References

1. Leong AS, et al. Manual of Diagnostic Antibodies for Immunohistology. Greenwich Medical Media Ltd. 1999. London. pp 217-219.
2. Sato Y, et al. Mod Pathol. 2013; 26:523-532.
3. Saab ST, et al. Mod Pathol. 2011; 24:606-612.

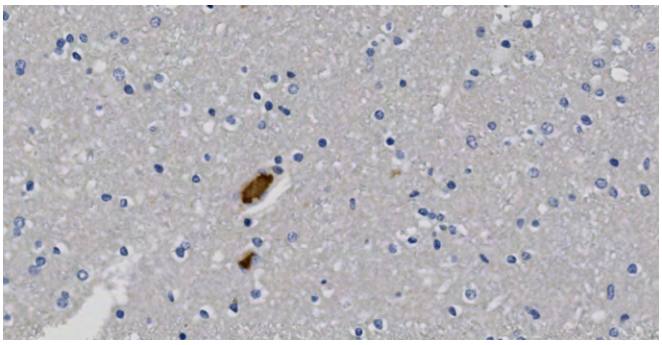


Figure 1. Neural and glial elements in the cerebrum show no staining reaction for IgG, while some staining is observed in vessel lumens.

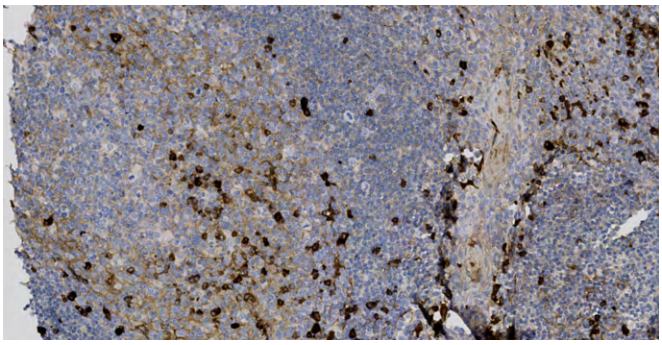


Figure 2. In the germinal centers of tonsil and lymph nodes, a strong staining reaction for IgG is observed in the cytoplasm of plasma cells, and weak to moderate staining in the cytoplasm and membrane of immunoblasts in the germinal centers.

Tissue-Tek Genie® anti-IgG4

IVD

Clone
HP6025

Host/clonality
Mouse monoclonal

Product codes and quantity
8384-C010: RTU, 10 capsules; 1 pack
8384-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
In normal tonsil and parotid gland tissues, cytoplasmic staining is detected in a subset of plasma cells. Positive staining is also detected in IgG4 related sclerosing diseases (IgG-RD) such as autoimmune pancreatitis (AIP, also referred to as IgG4-related sclerosing pancreatitis), and in some forms of Castleman's disease.
It is useful for identifying and differentiating IgG-RD from inflammatory myofibroblast tumor or other fibroinflammatory lesions when used with a panel of other antibodies.

Description
Immunoglobulin (Ig) consists of two identical heavy chains (γ, or μ, or α, or δ, or ε) and two identical light chains (kappa or lambda). IgG is the most abundant immunoglobulin and has several subclasses (IgG1, 2, 3, and 4). IgG4-related sclerosing disease (IgG-RD) is a fibroinflammatory and a multi-system disorder characterized by elevated serum IgG4 level, sclerosing fibrosis, and diffuse lymphoplasmacytic infiltration with the presence of many IgG4-positive plasma cells.

Positive tissue control
Tonsil, parotid gland, IgG4 related sclerosing pancreatitis

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining of a subset of plasma cells.

References

1. Sato Y, et al. Mod Pathol 2009; 22: 589-99.
2. Deshpande V, et al. Mod Pathol 2009 Oct;22(10): 1287-95.
3. Ghazale A, et al. Gastroenterology 2008 Mar;134(3): 706-15.
4. Koyabu M, et al. J Gastroenterol 2010 Jul;45(7): 732-41.

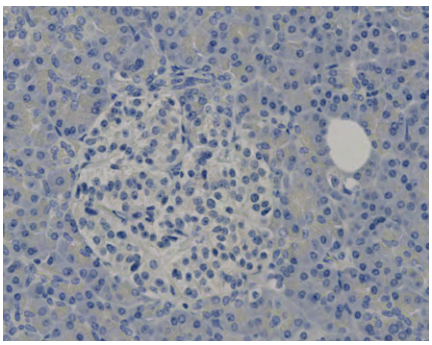


Figure 1. There is no IgG4 staining reaction in this section of normal pancreas.

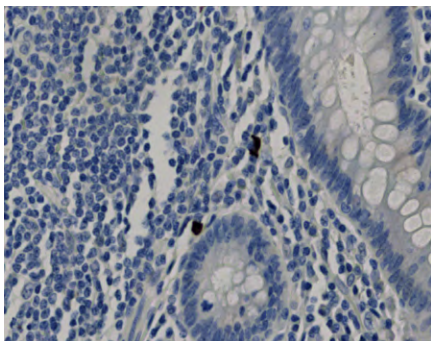


Figure 2. Rare IgG4 positive plasma cells in the lamina propria of this appendix show a strong cytoplasmic staining reaction.

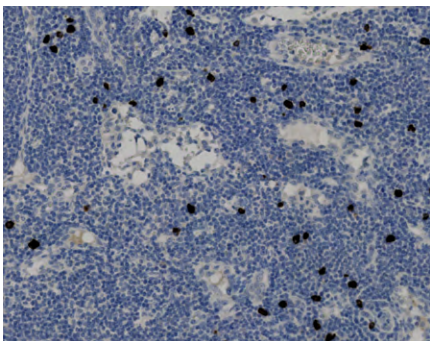


Figure 3. An increased proportion of IgG4 positive plasma cells are present in this case of IgG4-related sclerosing pancreatitis. The cells show a strong cytoplasmic staining reaction.

Tissue-Tek Genie® anti-IgM

IVD

Clone
Polyclonal

Host/clonality
Rabbit polyclonal

Product codes and quantity
8385-C010: RTU, 10 capsules; 1 pack
8385-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
In tonsil and lymph node, staining is observed in the cytoplasm of plasma cells, and in the cytoplasm and plasma membrane of immunoblasts in the germinal center. Some background staining in blood vessels, connective tissue, and epithelial cells may be present. Membraneous and cytoplasmic staining is also found in a subset of B-cell neoplasms.
It is useful for classifying B-cell lymphomas and plasma cell neoplasms when used with a panel of other antibodies.

Description
In normal, healthy serum IgM is generally the third most abundant of the immunoglobulin heavy-chain classes. Immunoglobulin (Igs) are produced in mature B-cells and plasma cells, and the amount and type of Ig can vary in different stages of B-cell maturation: Igs in the earlier stages of maturation are present in the cytoplasm, whereas surface expression is more characteristic of mature B-cells in the mantle zone.

Positive tissue control
Tonsil, lymph node, or selected B-cell neoplasms

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic and membraneous staining.
2. In tonsil and lymph node, a moderate to strong cytoplasmic staining of a subset of plasma cells; a moderate membrane staining of mantle zone B-cell and immunoblasts in the germinal center; some background staining in blood vessels, connective tissue and epithelial cells is accepted due to presence of extracellular IgM.
3. Cytoplasmic and membraneous staining of a subset of B-cell neoplasms.

References

1. Leong AS, et al. Manual of Diagnostic Antibodies for Immunohistology. Greenwich Medical Media Ltd. 1999. London. pp 217-219.
2. Strauchen JA, Mandeli JP. Am J Clin Pathol. 1991; 95:692-695.
3. Higgins RA, et al. Arch Pathol Lab Med. 2008;132:441-461.

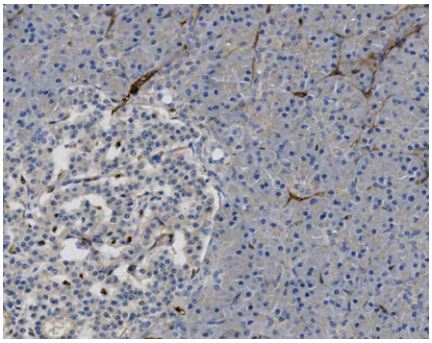


Figure 1. The islets, pancreatic acinar cells and bile ducts are negative for IgM expression. Background IgM reactivity is seen in vessel lumens and extracellular spaces.

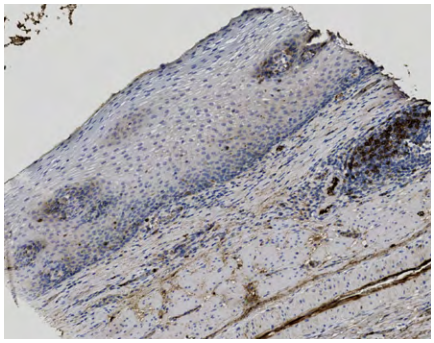


Figure 2. As is typical of most tissues, weak to moderate IgM staining is seen in the extracellular spaces of the mucosa and submucosa of the esophagus.

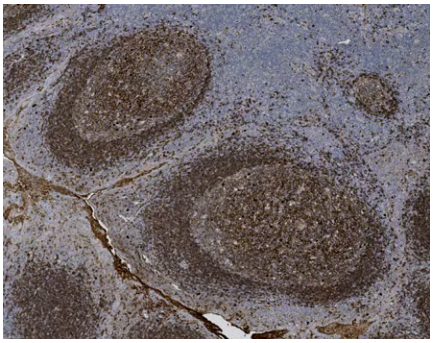


Figure 3. The B-cells of the germinal centers show moderate to strong cytoplasmic expression of IgM and the mantle zone B-cells show a moderate to strong membrane staining reaction.

Tissue-Tek Genie® anti-Kappa Light Chains

IVD

Clone
Polyclonal

Host/clonality
Rabbit polyclonal

Product codes and quantity
8394-C010: RTU, 10 capsules; 1 pack
8394-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels kappa light chains in a sub-population of normal plasma cells, as well as the neoplastic cells of kappa light-chain restricted lymphomas or plasma cell neoplasms.
This antibody is useful for classifying B-cell lymphomas and myelomas when used with a panel of antibodies.

Description
Amounts and types of immunoglobulin (Ig) monomers can vary in different stages of B-cell maturation. Igs are expressed in the cytoplasm (early stage of maturation, plasma cells) or on the membrane (B-cells in the mantle zone). Neoplasms such as B-cell lymphoma and plasma cell myeloma may be demonstrated to be clonal when they produce only one type of Ig light chain.

Positive tissue control
Tonsil, lymph node, and kappa light chain protein positive B-cell neoplasms

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® Citrate Antigen Retrieval Solution

Assessment criteria
1. Membraneous and cytoplasmic staining.
2. In tonsil and lymph node, a moderate to strong membraneous staining of B-cells in mantle zone; a moderate to strong cytoplasmic staining of plasma cells in the germinal center; some background staining in blood vessels, connective tissue and epithelial cells is accepted due to presence of extracellular immunoglobulin.
3. Membraneous and/or cytoplasmic staining among selected B-cell neoplasms.

References

1. Kaplan MA, et al. Am. J. Surg. Pathol. 1992; 16:71-75.
2. Mann RB, et al. Am. J. Pathol. 1979; 94:105-192.
3. Warnke RA, Rouse RV. Hum. Pathol. 1985; 16:326-331.

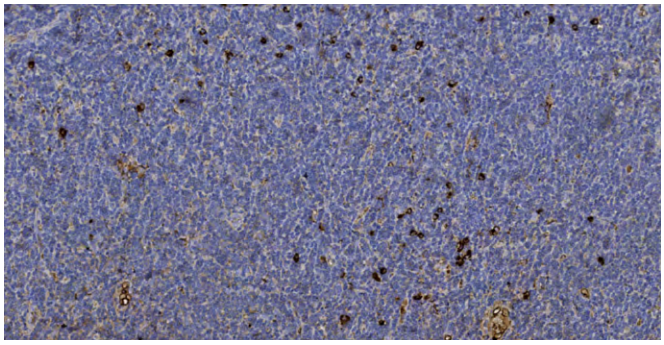


Figure 1. No expression of Kappa light chains is observed in this example of B-CLL/SLL. Scattered non-neoplastic plasma cells are strongly Kappa positive.

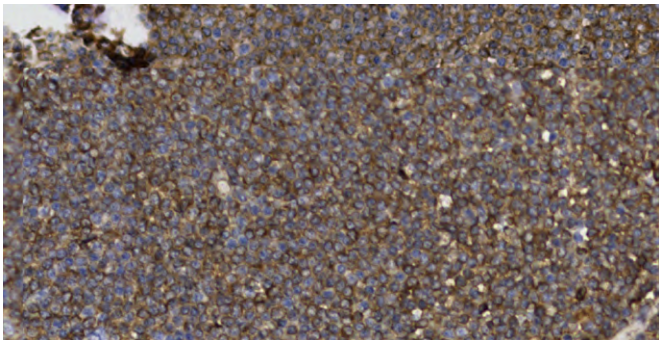


Figure 2. Strong membraneous reactivity for Ig Kappa is seen among the neoplastic cells of this B-cell CLL.

Tissue-Tek Genie® anti-Lambda Light Chains

IVD

Clone
Polyclonal

Host/clonality
Rabbit polyclonal

Product codes and quantity
8398-C010: RTU, 10 capsules; 1 pack
8398-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels lambda light chains in a sub-population of normal plasma cells, as well as the neoplastic cells of lambda light-chain restricted lymphomas or plasma cell neoplasms. This antibody is useful for classifying B-cell lymphomas and myelomas when used with a panel of antibodies.

Description
Amounts and types of immunoglobulin (Ig) monomers can vary in different stages of B-cell maturation. Igs are expressed in the cytoplasm (early stage of maturation, plasma cells) or membrane (B-cells in the mantle zone). Neoplasms such as B-cell lymphoma and plasma cell myeloma may be demonstrated to be clonal when they produce only one type of Ig light chain.

Positive tissue control
Tonsil, lymph node, and lambda light chain protein positive B-cell neoplasms

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® Citrate Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct membraneous reaction of the neoplastic cells in a subset of lymphomas.
2. A strong and distinct membraneous staining of approximately half of the normal B-cells in the mantle zone in tonsils.
3. A strong cytoplasmic reaction in a subset of plasma cells.
4. Some CLL/SLL cases, particularly with plasmacytoid morphology, may be positive.
5. A weak general background staining only.

References

1. Kaplan MA, et al. Am. J. Surg. Pathol. 1992; 16:71-75.
2. Mann RB, et al. Am. J. Pathol. 1979; 94:105-192.
3. Warnke RA, Rouse RV. Hum. Pathol. 1985; 16:326-331.

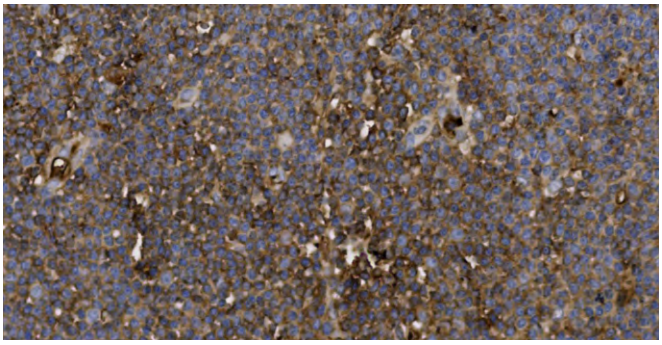


Figure 1. Moderately strong cytoplasmic lambda light chain expression is detected in this case of CLL/SLL.

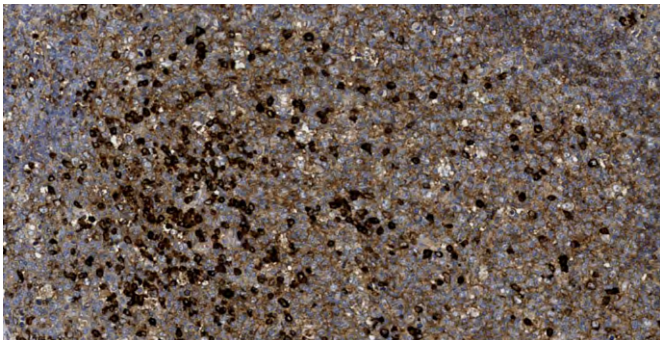


Figure 2. Strong cytoplasmic and membraneous staining for lambda light chain is seen in a subset of plasma cells in this germinal center. Light background staining is also seen due to extracellular immunoglobulin deposition.

Tissue-Tek Genie® anti-Lysozyme

IVD

Clone
Polyclonal

Host/clonality
Rabbit polyclonal

Product codes and quantity
8333-C010: RTU, 10 capsules; 1 pack
8333-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the cytoplasm in macrophages, neutrophils, histiocytes, and monocytes in tonsil, spleen, liver, colon, and other normal tissues. Cytoplasmic staining is observed in Paneth cells of small intestine and gastric mucosa. Cytoplasmic staining is observed in neoplastic cells of acute myeloid leukemia, gastric adenocarcinoma, colorectal carcinoma, and breast carcinoma.
It is useful in identification of myeloid or monocytic nature of acute leukemia and histiocytic neoplasia when used with a panel of other antibodies.

Description
Lysozyme is a ubiquitous enzyme found in tears, saliva, human milk, mucus, gastrointestinal secretions, urine, serum, spleen, lung, and kidney. Lysozyme immunoreactivity is found in cytoplasmic granules of the macrophages, the granulocytes (polymorphonuclear neutrophils), reactive histiocytes, myeloid cells, and some epithelial cells.

Positive tissue control
Tonsil, appendix

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil and lymph node, moderate to strong cytoplasmic staining of macrophages of the germinal centers and scattered in the paracortex.
2. In normal liver, colon, and skin, a weak to moderate cytoplasmic staining of macrophages, neutrophil granulocytes, histiocytes, and monocytes. In small intestine, strong cytoplasmic staining of Paneth cells.
3. In stomach, positive staining of mucosa.
4. Cytoplasmic staining in neoplastic cells of acute leukemia with myeloid or monocytic nature.
5. No staining of epithelial cells in tonsil.

References

1. Rubio CA, et al. Int J Clin Exp Med 2009; 2: 248-253.
2. Vizoso F, et al. Ann Surg Oncol. 2001 Sep;8(8):667-74.
3. Yuen ST, et al. Histopathology. 1998; 32:126-32.
4. Krugliak L, et al. Am J Hematol. 1986; 21:99-109.

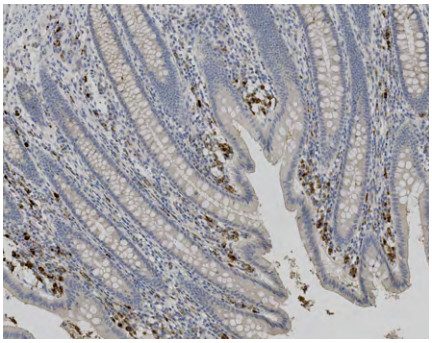


Figure 1. The appendiceal mucosa shows a weak to moderate cytoplasmic staining reaction for lysozyme among macrophages, neutrophils, histiocytes, and monocytes. No staining of the appendiceal epithelium is observed.

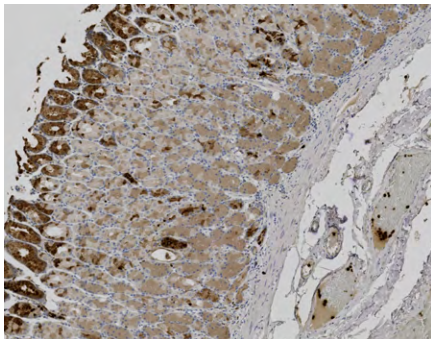


Figure 2. Gastric epithelium shows a range of moderate to strong cytoplasmic reactivity for lysozyme among epithelial cells.

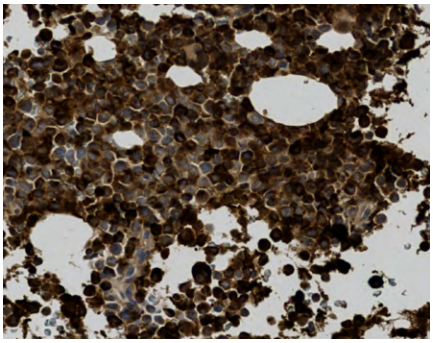


Figure 3. A diffuse moderate to strong granular cytoplasmic staining reaction for lysozyme is present in this acute myeloid leukemia (AML).

Tissue-Tek Genie® anti-Mammaglobin

IVD

Clone
EP249

Host/clonality
Rabbit monoclonal

Product codes and quantity
8240-C010: RTU, 10 capsules; 1 pack
8240-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels scattered ductal epithelial cells of normal breast tissues and apocrine metaplastic cells of ductal/lobular hyperplasia, in the majority of the epithelial cells of the eccrine sweat gland and in neoplastic cells of breast carcinoma.
It is useful for identification of breast carcinoma and metastatic tumor of breast origin when used with a panel of other antibodies.

Description
Low level of expression of mammaglobin is seen in normal breast. Its expression is markedly increased in breast carcinoma and is directly correlated with a higher grade. Mammaglobin is positive in about 80% of breast carcinomas, and is more frequently expressed than GCDFP-15.

Positive tissue control
Mammaglobin positive normal breast, breast carcinoma, skin

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In breast, a strong cytoplasmic staining in scattered ductal epithelial cells and apocrine metaplastic cells of hyperplastic breast.
3. In skin, a moderate to strong cytoplasmic staining of the majority of the epithelial cells of the eccrine sweat gland.
4. Cytoplasmic staining of the neoplastic cells of the breast carcinoma.
5. No more than a weak background reaction in the vicinity of the positive cells (antigen diffusion).

References

1. Han JH, et al. Arch Pathol Lab Med. 2003;127:1330-1334.
2. Bhargava R, et al. Am J Clin Pathol. 2007; 127:103-113.
3. Wang Z, et al. Int J Clin Exp Pathol. 2009; 2:384-389.
4. Krishnaiah A, et al. Int J Res Health Sci. 2014;31:767-775.

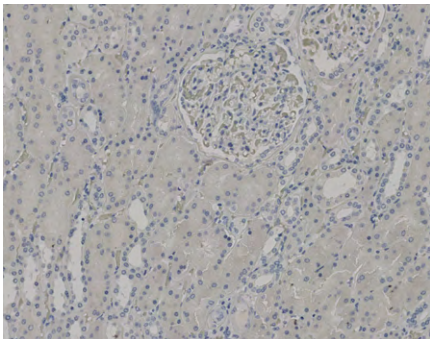


Figure 1. Ducts and glomerular cells of the kidney show no reactivity for mammaglobin.

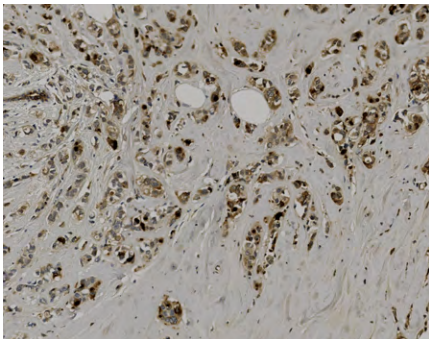


Figure 2. The epithelial cells of this invasive ductal carcinoma of breast, as well as the benign duct in the background, show predominantly weak to moderate membraneous reactivity for mammaglobin.

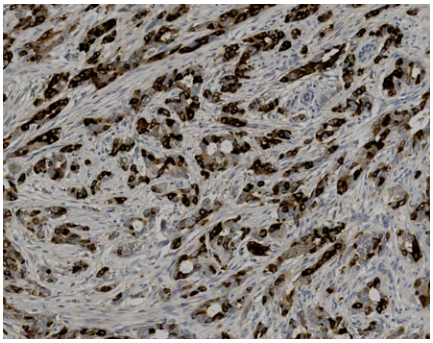


Figure 3. Moderate to strong cytoplasmic reactivity for mammaglobin is seen in this invasive breast carcinoma.

Tissue-Tek Genie® anti-Melan-A

IVD

Clone
EP43

Host/clonality
Rabbit monoclonal

Product codes and quantity
8319-C010: RTU, 10 capsules; 1 pack
8319-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Melan-A protein in the cytoplasm of skin, melanocytes and steroid producing cells in both normal and neoplastic cells. It may be useful for detecting melanomas when used with a panel of antibodies.

Description
Melan-A, also known as Melanoma Antigen Recognized by T-cell 1 (MART-1), is a transmembrane protein expressed in skin, melanocytes, and steroid producing cells. Melan-A is detected in melanomas and angio-myolipomas.

Positive tissue control
Melanoma

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong, distinct granular cytoplasmic staining in adrenal cortical cells.
2. At least weak to moderate, distinct cytoplasmic staining of neoplastic cells in malignant melanoma.
3. At least weak to moderate granular cytoplasmic staining of neoplastic cells in granulosa cell tumor.

References

1. Chen Y-T, et al. Proc. Natl. Acad. Sci. 1996; 93(12):5915-5919.
2. Jungbluth AA, et al. Am. J. Surg. Pathol. 1998; 22(5):595-602.

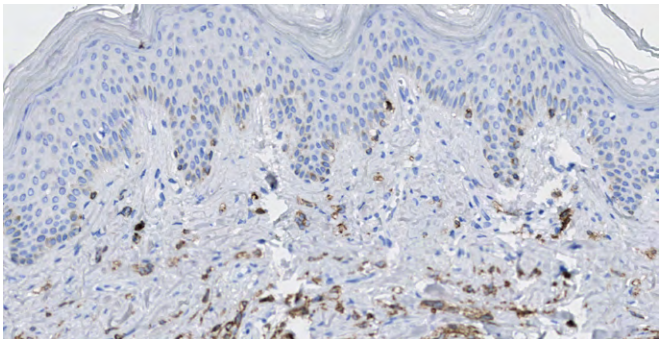


Figure 1. Negative staining in the overlying epidermis but positive staining of blue nevus.

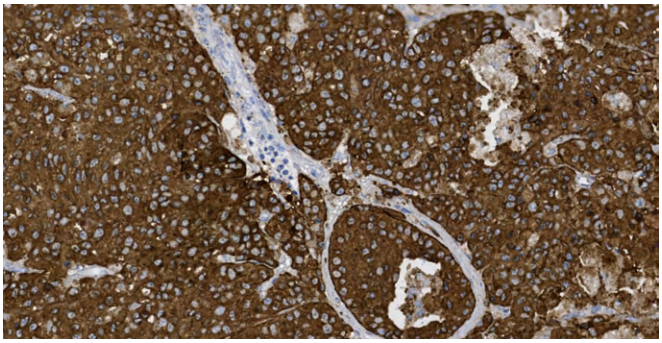


Figure 2. Strong staining of malignant melanoma.

Tissue-Tek Genie® anti-Melanoma Pan Antibody Cocktail [HMB45/EP43/T311]

IVD

Clone
HMB45/EP43/T311

Host/clonality
Mouse and rabbit monoclonal

Product codes and quantity
8371-C010: RTU, 10 capsules; 1 pack
8371-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels PMEL17, Melanoma Antigen Recognized by T-cell 1 (MART-1) and tyrosinase in melanocytes in the basal layer of the epidermis and with nevus cells; squamous epithelial cells are negative. Neoplasms of melanocytic lineage are positive. Labeling of other neoplasms, such as those of the PEComa family of tumors may also be seen. This antibody cocktail is a useful tool for identifying melanomas when used with a panel of antibodies.

Description
PMEL17, MART-1 and tyrosinase are proteins expressed in normal melanocytes, and are often detected in melanomas.

Positive tissue control
Skin, melanoma, adrenal gland

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In skin, a moderate to strong distinct cytoplasmic staining of melanocytes in the basal layer of epidermis and nevus cells; negative staining of squamous epithelial cells.
3. In adrenal gland, a weak to moderate granular staining of adrenal cortical cells throughout all zones of the gland.
4. Cytoplasmic staining in a majority of melanocytes in selective melanomas.

References

1. Brichard V, et al. J Exp Med. 1993; 178:489-495.
2. Esclamado RM, et al. Am J Surg. 1986; 152:376-385.
3. Gown AM, et al. Am J Pathol. 1986 May;123(2):195-203.
4. Jungbluth AA, et al. Am J Surg Pathol 1998; 22:595-602.

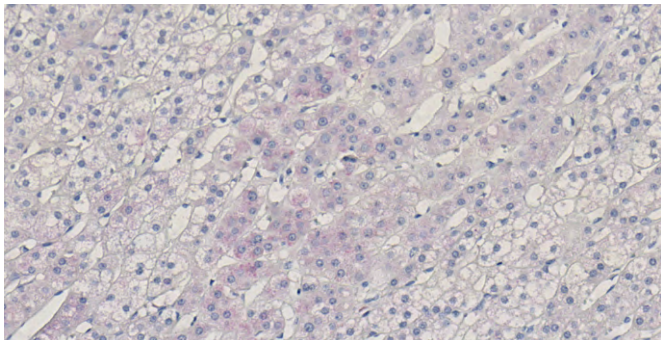


Figure 1. Weak to moderate cytoplasmic staining is seen in the adrenal gland. (Alkaline Phosphatase Red detection).

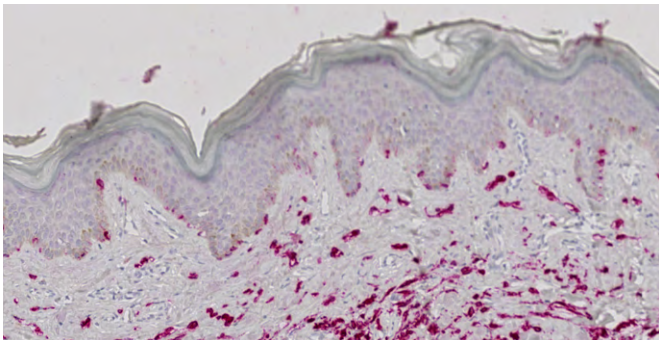


Figure 2. The pan-melanoma antibody cocktail demonstrates strong cytoplasmic reactivity among intra-epithelial melanocytes and the cells of this blue nevus. No staining is seen within the squamous epithelium, stromal fibroblasts or endothelial cells. (Alkaline Phosphatase Red detection).

Tissue-Tek Genie® anti-Melanosome

IVD

Clone
HMB45

Host/clonality
Mouse monoclonal

Product codes and quantity
8232-C010: RTU, 10 capsules; 1 pack
8232-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the melanosome protein in the cytoplasm melanocytes in both normal and neoplastic cells. It may be useful for classifying melanomas and melanocytic lesions and differentiating metastatic melanomas from other poorly differentiated tumors when used with a panel of antibodies.

Description
The antibody labels melanosome protein in the cytoplasm of activated and neoplastic melanocytes. Intradermal nevi and normal resting adult melanocytes are negative.

Positive tissue control
Melanosome

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Strong and distinct intracytoplasmic staining in tumor cells of malignant melanoma and blue nevus, which express scarce amounts of melanosome protein compared to melanoma.
2. No staining observed in other cells.

References

1. Gerdes J, et al. Hematol Oncol. 1984; 2(4):365-371.
2. Gerdes J, et al. J. Immunol. 1984; 133(4):1710-1715.

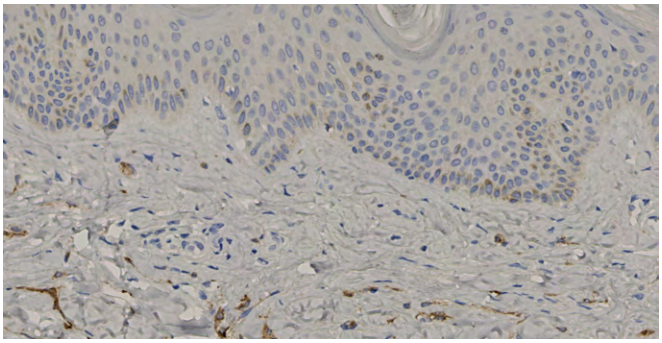


Figure 1. Negative staining in the overlying epidermis, but positive staining of blue nevus.

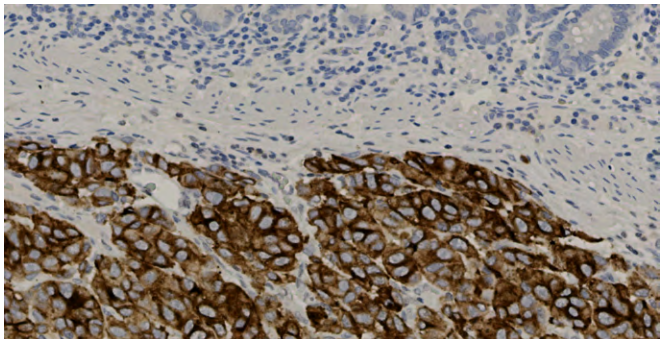


Figure 2. Strong staining in metastatic malignant melanoma in small intestine.

Tissue-Tek Genie® anti-MLH1

IVD

Clone
GM011

Host/clonality
Mouse monoclonal

Product codes and quantity
8324-C010: RTU, 10 capsules; 1 pack
8324-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the MLH1 (MutL protein homolog 1) protein in the nucleus of normal proliferating cells in both normal and neoplastic tissues and does not stain colon adenocarcinoma with complete loss of MLH1 expression. MLH1 may be useful for classifying tumors of the gastrointestinal tract, including associated extra colonic cancers such as endometrial and prostate cancers, when used with a panel of antibodies.

Description
MLH1 is expressed in normal proliferating cells and, when hetero-dimerized with PMS2 (Postmeiotic segregation increased 2), is involved in repairing DNA mutations which may occur during DNA replication. Lost expression or low levels of MLH1 are associated with colorectal and other cancers.

Positive tissue control
Normal colon

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak to moderate distinct nuclear staining of cells in appendix.
2. At least weak to moderate distinct nuclear staining of mantle zone B-cells and a moderate to strong nuclear staining of germinal center B-cells.
3. A moderate to strong nuclear staining in neoplastic cells of colon adenocarcinoma with MLH1 expression.
4. No nuclear staining of neoplastic cells in colon adenocarcinomas with loss of MLH1 expression, but a distinct nuclear staining in other cells (e.g., stromal cells, lymphocytes).

References

1. Bronner CE, et al. Nature. 1994; 368(6468): 258-261.
2. Lanza, G, et al. Mod. Pathol. 2002; 15(7): 741-749.

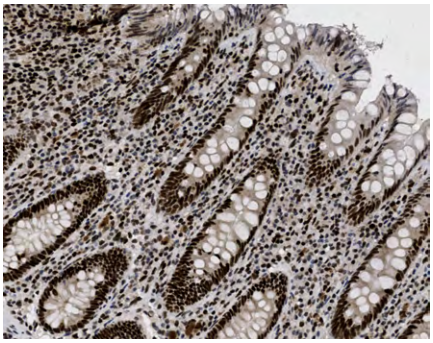


Figure 1. Strong staining of normal appendix.

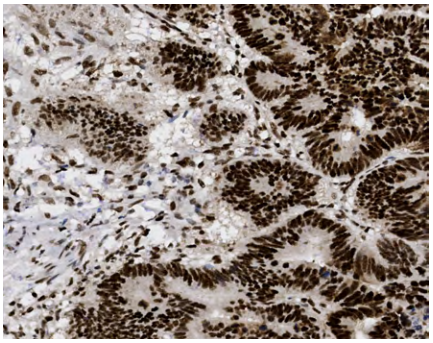


Figure 2. Strong staining of colon adenocarcinoma.

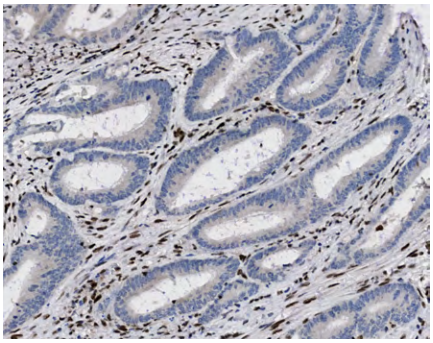


Figure 3. Negative staining of colon adenocarcinoma with loss of MLH1 expression.

Tissue-Tek Genie® anti-MSH2

IVD

Clone
RED2

Host/clonality
Rabbit monoclonal

Product codes and quantity
8327-C010: RTU, 10 capsules; 1 pack
8327-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the MSH2 (MutS homolog 2) protein in the nucleus of proliferating cells in both normal and neoplastic cells and does not stain colon adenocarcinoma with complete loss of MSH2 expression. MSH2 may be useful for classifying tumors of the gastrointestinal tract, including associated extra colonic cancers such as endometrial and prostate cancers, when used with a panel of antibodies.

Description
MSH2 is expressed in normal proliferating cells and, when heterodimerized with MSH6 (MutS homolog 6), is involved in repairing DNA mutations which may occur during DNA replication.

Positive tissue control
Normal colon, appendix, tonsil

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak to moderate, distinct nuclear staining of cells in appendix.
2. A moderate to strong, distinct nuclear staining in neoplastic cells of colon adenocarcinoma.
3. No nuclear staining in neoplastic cells of colon adenocarcinoma with loss of MSH2 expression, but a distinct nuclear staining in other cells (e.g., stromal cells, lymphocytes).

References

1. Peltomäki P. J. Clin. Oncol. 2003; 21(6):1174-1179.
2. Lynch HT and Smyrk T. Cancer. 1996; 78(6):1149-1167.
3. Kawakami H, et al. Curr. Treat. Options Oncol. 2015; 16(7):30.
4. Leach FS, et al. Cancer Res. 1996; 56(2):235-240.

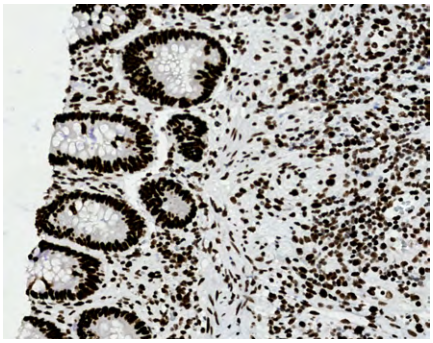


Figure 1. Strong staining of normal appendix.

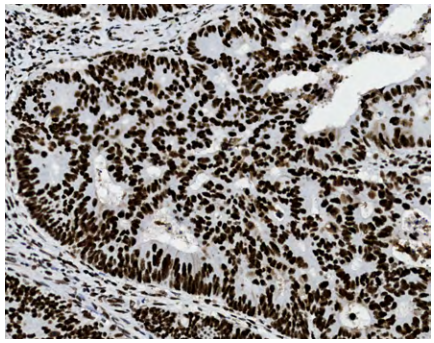


Figure 2. Strong staining of colon adenocarcinoma.

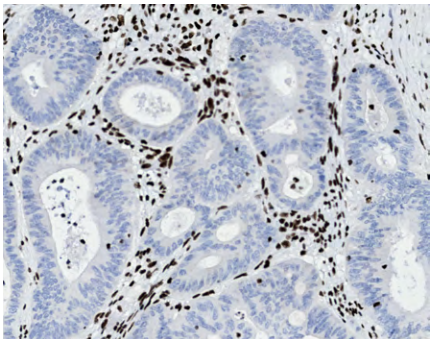


Figure 3. Negative staining of colon adenocarcinoma with loss of MSH2 expression.

Tissue-Tek Genie® anti-MSH6

IVD

Clone
EP49

Host/clonality
Rabbit monoclonal

Product codes and quantity
8326-C010: RTU, 10 capsules; 1 pack
8326-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the MSH6 (MutS homolog 6) protein in the nucleus of proliferating cells in both normal and neoplastic cells and does not label colon adenocarcinoma with complete loss of MSH6 expression. MSH6 may be useful for classifying tumors of the gastrointestinal tract, including associated extra colonic cancers such as endometrial and prostate cancers, when used with a panel of antibodies.

Description
MSH6 is expressed in normal proliferating cells and, when heterodimerized with MSH2 (MutS homolog 2), is involved in repairing DNA mutations which may occur during DNA replication.

Positive tissue control
Colon, appendix, tonsil

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak to moderate, distinct nuclear staining of cells in appendix.
2. At least weak to moderate, distinct nuclear staining of mantle zone B-cells and a moderate to strong, distinct nuclear staining of germinal center B-cells in tonsil.
3. A moderate to strong, distinct nuclear staining of neoplastic cells in colon adenocarcinoma with MSH6 expression.
4. No nuclear staining of neoplastic cells in colon adenocarcinomas with loss of MSH6 expression, but a nuclear staining in other cells (e.g., stromal cells, lymphocytes).

References

1. Peltomäki P. J. Clin. Oncol. 2003; 21(6):1174-1179.
2. Lynch H and Smyrk T. Cancer. 1996; 78(6):1149-1167.

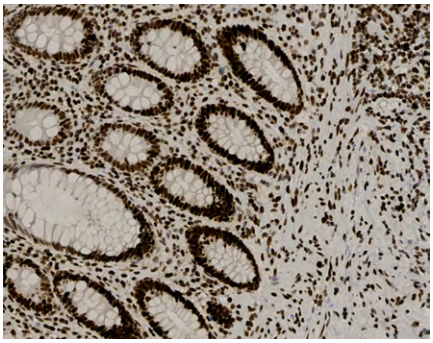


Figure 1. Strong staining in normal appendix.

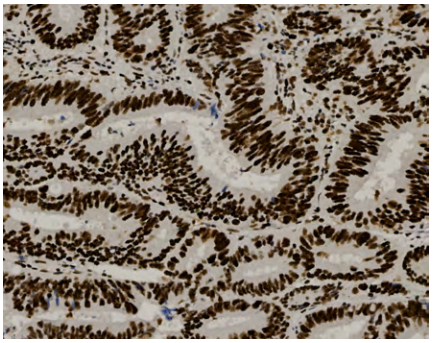


Figure 2. Strong staining in colon adenocarcinoma.

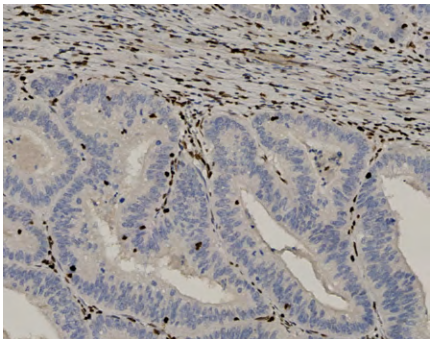


Figure 3. Negative staining of colon adenocarcinoma cells with loss of MSH6 expression.

Tissue-Tek Genie® anti-MUC1

IVD

Clone
ZM32

Host/clonality
Mouse monoclonal

Product codes and quantity
8375-C010: RTU, 10 capsules; 1 pack
8375-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the cytoplasm in reactive epithelial cells of tonsil, mainly in the superficial layer, and in epithelial cells of renal collecting tubules of kidney. Membraneous and granular cytoplasmic staining is observed in epithelial cells of breast, mainly on the apical part, and in epithelial cells of appendix, colon, eccrine and apocrine glands, and pancreas. Membraneous and cytoplasmic staining is observed in neoplastic cells of lung adenocarcinomas, breast carcinoma, gastric carcinoma, colorectal carcinoma, meningioma, mesothelioma, and renal cell carcinoma. It is useful for evaluation of tumor invasive growth and aggressiveness of carcinomas of the breast, stomach, colon, and renal cell carcinoma when used with a panel of other antibodies.

Description
Mucin 1 (MUC1) is a cell surface mucin glycoprotein and is expressed on the apical borders of most glandular epithelial cells, ductal epithelial cells, and some hematopoietic cell lineages. In neoplastic tissues, MUC1 may be expressed on the entire cell surface (depolarized expression). MUC1 is overexpressed in many human cancers, including non-small cell lung carcinoma (NSCLC) and breast carcinoma.

Positive tissue control
Tonsil, appendix, pancreas, breast, lung

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil, a moderate membraneous and cytoplasmic staining in reactive squamous epithelial cells – mainly in the superficial cell layers; a weak to moderate membraneous staining in plasma cells.
2. In breast, a moderate to strong membraneous staining in epithelial cells – mainly on the apical part of the cell membrane and, occasionally, on the entire circumference of the cell membrane, a granular cytoplasmic staining reaction can also be observed.
3. In kidney, a moderate to strong cytoplasmic staining of epithelial cells of renal collecting tubules, and no staining in epithelial cells of proximal tubules.
4. In normal appendix and colon, a moderate to strong membrane/cytoplasmic staining in majority of the glandular epithelial cells; a weak staining of stromal T-cells is acceptable.

References

1. de Roos M, et al. Histopathology 2007, 51, 227-238.
2. Kufe D. Nat Rev Cancer. 2009; 9:874-885.
3. Kufe D. Oncogene. 2013; 32: 1073-1081.
4. Mukhopadhyay P, et al. Biochim Biophys Acta. 2011; 1815: 224-240.

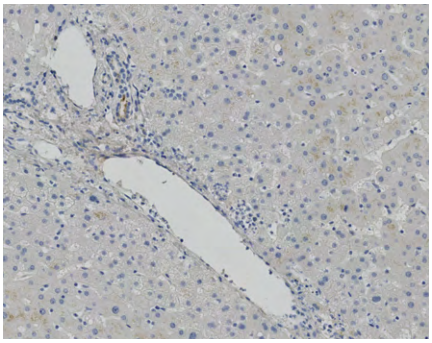


Figure 1. Normal hepatocytes show a negative staining reaction for MUC1 in this benign liver. Focal granular cytoplasmic reactivity is seen among bile ducts.

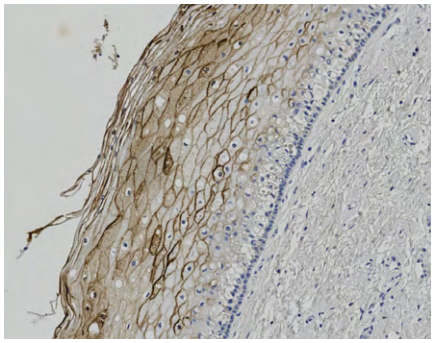


Figure 2. Squamous epithelia, as in this benign cervical specimen, may show a weak to moderate cytoplasmic and membraneous staining reaction for MUC1 that is typically in the superficial layers.

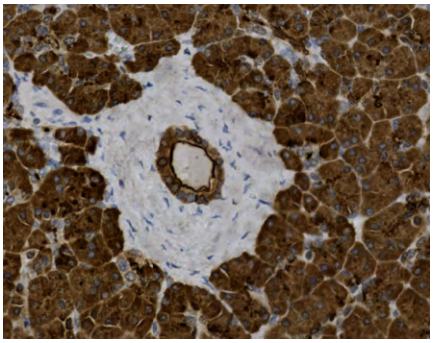


Figure 3. Pancreatic acini show a diffuse strong granular cytoplasmic staining reaction for MUC1, while the bile ducts show a cytoplasmic and apical membrane reaction. The fibrous stroma is negative.

Tissue-Tek Genie® anti-MUM-1

IVD

Clone
EP190

Host/clonality
Rabbit monoclonal

Product codes and quantity
8329-C010: RTU, 10 capsules; 1 pack
8329-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the nucleus in late stage germinal center B-cells and plasma cells of the tonsil and appendix, as well as in plasma cells in the lamina propria of appendix and colon. This antibody stains nuclei of neoplastic cells in subsets of classical Hodgkin lymphomas, non-Hodgkin lymphomas, diffuse large B-cell lymphomas (DLBCL), myelomas, plasmacytomas, and melanomas.
It is useful for classifying lymphomas and identifying plasma cell neoplasms when used with a panel of antibodies.

Description
Multiple Myeloma Oncogene 1 (MUM1) protein is expressed at the later stages of B-cell development and can be demonstrated in B-cells in the light zone of lymphoid germinal centers, plasma cells, a subpopulation of activated T-cells, and some melanocytes. MUM1 protein is expressed in many B-cell lymphomas, myelomas, and some melanocytic tumors.

Positive tissue control
Tonsil, appendix, B-cell lymphoma, and myeloma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong nuclear staining of late stage germinal center B cells and plasma cells in tonsil and appendix.
2. A strong nuclear staining of all plasma cells in lamina propria, and no staining in other cellular structures including epithelial cells and smooth muscle cells of lamina muscularis propria of colon/appendix.
3. A weak cytoplasmic staining is accepted in the cells with strong nuclear staining.
4. Nuclear staining of neoplastic cells in classical type Hodgkin lymphoma and myeloma.

References

1. Gaidano G, and Carbone A. Leukemia. 2000; 14:563-566.
2. Natkunam Y, et al. Mod. Pathol. 2001; 14:686-694.
3. Tsuboi K, et al. Leukemia. 2000; 14:449-456.

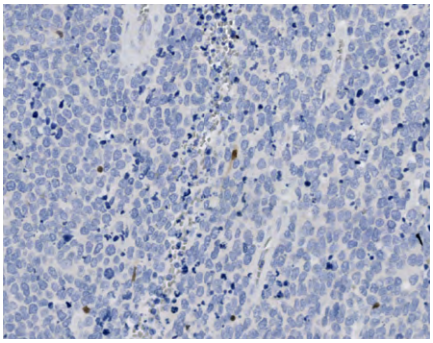


Figure 1. The neoplastic cells of this germinal center B-cell (GCB) diffuse large B-cell lymphoma show no nuclear reactivity for MUM1. Scattered benign plasma cells show a strong nuclear reaction.

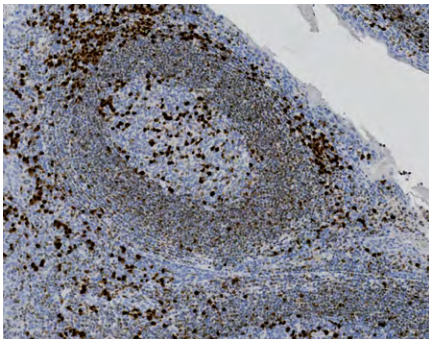


Figure 2. Variable reactivity for MUM1 is seen in this tonsil, including weak to moderate nuclear reactivity in the marginal and mantle zone B-cells, and strong nuclear reactivity among plasma cells within the germinal center and the interfollicular areas.

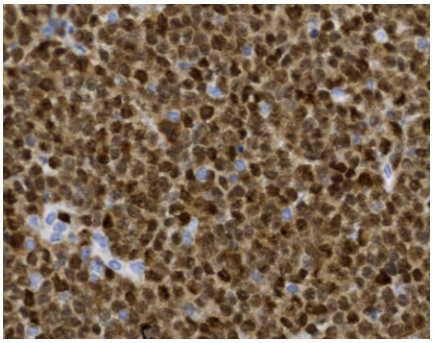


Figure 3. Strong nuclear and weak cytoplasmic reactivity for MUM1 is present in this non-GCB diffuse large B-cell lymphoma.

Tissue-Tek Genie® anti-Myeloperoxidase (MPO)

IVD

Clone
EP151

Host/clonality
Rabbit monoclonal

Product codes and quantity
8407-C010: RTU, 10 capsules; 1 pack
8407-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Granular cytoplasmic staining of neutrophils is observed in all tissues. In tonsil, granular staining can be found in the cytoplasm of neutrophils in the interfollicular zones and of macrophages in the germinal centers. In liver, granular staining of the cytoplasm can be found in neutrophils and Kupffer cells, but is absent in hepatocytes. Cytoplasmic staining is also seen in myeloblasts and immature myeloid cells of myeloid leukemias.
It is useful for detecting myeloid cell populations in bone marrow and other tissue sites, and for differentiating between myeloid and lymphoid neoplasms, when used with a panel of other antibodies.

Description
Myeloperoxidase (MPO) is a peroxidase enzyme involved in antimicrobial activity. MPO is synthesized and expressed in precursor and mature granulocytes, including neutrophils and eosinophils, and is variably expressed in monocytes/macrophages.

Positive tissue control
Bone marrow, tonsil, liver, and myeloid leukemias

Staining pattern
Granular cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Granular cytoplasmic staining.
2. In tonsil, a moderate to strong granular cytoplasmic staining of neutrophils and eosinophils in the interfollicular zones and of macrophages in the germinal centers.
3. In liver, a strong granular cytoplasmic staining of the neutrophils and Kupffer cells, and negative or a weak staining of hepatocytes.
4. Cytoplasmic staining of myeloblasts and immature myeloid cells of acute myelogenous leukemia (AML).

References

1. Arber DA, Jenkins KA. Am J Clin Pathol. 1996; 106:462-468.
2. Pinkus GS, Pinkus JL. Mod Pathol. 1991; 4:733-741.
3. Arber DA, et al. Am J Clin Pathol. 2001; 116:25-33.

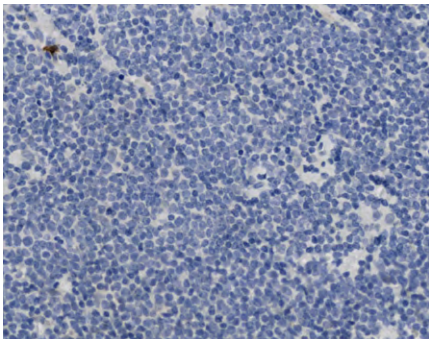


Figure 1. The neoplastic cells of this mantle cell lymphoma show no reactivity for MPO.

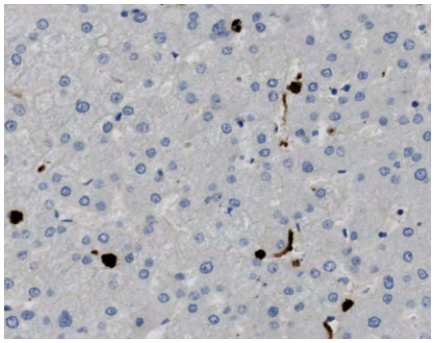


Figure 2. Hepatocytes show no, or only weak, cytoplasmic granular staining for MPO. Kupffer cells are strongly positive for a granular cytoplasmic staining reaction.

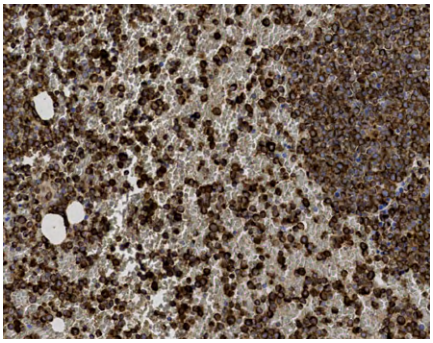


Figure 3. The neoplastic cells of this example of acute myeloid leukemia (AML-M1) involving bone marrow, show diffuse strong granular cytoplasmic reactivity for MPO.

Tissue-Tek Genie® anti-Myosin Smooth Muscle

IVD

Clone
SMMS-1

Host/clonality
Mouse monoclonal

Product codes and quantity
8517-C010: RTU, 10 capsules; 1 pack
8517-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Cytoplasmic staining is observed in visceral and vascular smooth muscle cells, myoepithelial cells lining glands of normal breast, and the majority of follicular dendritic cells of germinal centers in tonsil. Staining is not observed in luminal epithelial cells in breast tissue. Cytoplasmic staining is observed in myoepithelial cells lining DCIS, but not observed in invasive breast cancers.
It is useful for differentiating benign breast lesions and ductal carcinoma in situ (DCIS) from invasive breast carcinomas when used with a panel of other antibodies. It is also useful for identifying smooth muscle cell tumors and myoepithelial tumors when used with a panel of other antibodies.

Description
Myosin is one of the major contractile proteins in muscle and non-muscle cells. A Myosin molecule consists of two heavy chains (MHCs) and two pairs of light chains. MHCs have multiple isoforms. This antibody reacts with the smooth muscle myosin heavy chain, which is encoded by the MYH11 gene. Smooth muscle myosin heavy chain is expressed in visceral and vascular smooth muscle cells as well as myoepithelial cells.

Positive tissue control
Breast, tonsil, appendix

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil, at least weak cytoplasmic staining of the vast majority of follicular dendritic cells in germinal centers.
2. A moderate to strong cytoplasmic staining of smooth muscle cells of all tissues and in esophageal muscularis mucosa.
3. In normal, benign lesions, and DCIS of breast, a moderate to strong cytoplasmic staining of myoepithelial cells lining ducts and lobules.
4. No staining reaction of epithelial cells in esophagus or luminal breast epithelium.

References

1. Dabbs DJ and Gown AM, et al. Diagn Cytopathol. 1999; 20:203-207.
2. Werling RW, et al. Am J Surg Pathol. 2003; 27:82-90.
3. Kalof AN, et al. J Clin Pathol. 2004; 57:625-629.
4. Moriya T, et al. Med Mol Morphl. 2006; 39:8-13.

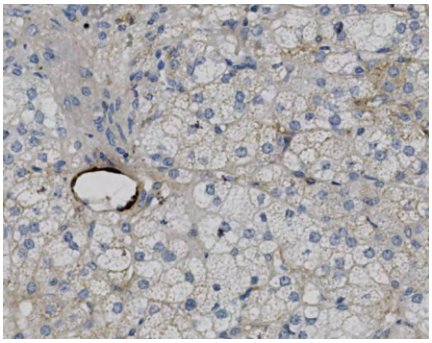


Figure 1. The cortical epithelial cells of the adrenal gland show no staining reaction for smooth muscle myosin heavy chain. A small vessel lined by smooth muscle shows a strong granular cytoplasmic staining reaction.

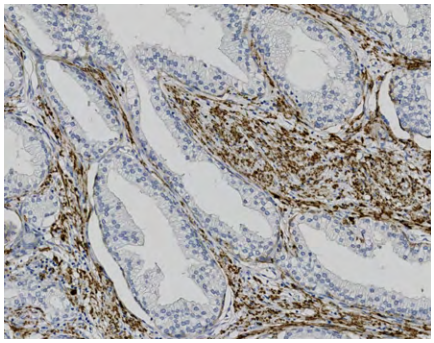


Figure 2. The smooth muscle stroma of this prostate with adenomatous hyperplasia shows moderate to strong cytoplasmic reactivity. Note that the basal cells of these glands show no staining reaction, as they are not myoepithelial cells.

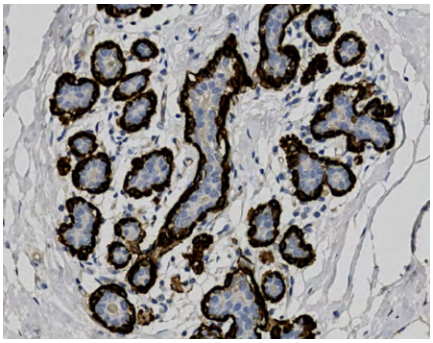


Figure 3. The myoepithelial cells of these breast ducts and lobules show a strongly positive cytoplasmic staining reaction for smooth muscle myosin heavy chain.

Tissue-Tek Genie® anti-Napsin A

IVD

Clone
EP205

Host/clonality
Rabbit monoclonal

Product codes and quantity
8331-C010: RTU, 10 capsules; 1 pack
8331-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels Napsin A in type II pneumocytes and alveolar macrophages in lung and epithelial cells of proximal tubules in kidney. It is a useful for differentiating lung adenocarcinomas from lung squamous cell carcinoma and from mesothelioma. It is also useful as an aid in the diagnosis of adenocarcinomas of unknown origin when used in a panel with other antibodies.

Description
Napsin A is a protease that is predominantly expressed in the lung and kidney. Napsin A is expressed in alveolar type II pneumocytes in lung and proximal tubules in kidney.

Positive tissue control
Lung, kidney, and known napsin A positive lung adenocarcinoma

Staining pattern
Granular cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least moderate, granular cytoplasmic staining reaction of virtually all type II pneumocytes and alveolar macrophages in the lung, as well as lung adenocarcinomas.
2. An at least moderate, granular cytoplasmic staining reaction of the majority of the epithelial cells of the proximal tubules in the kidney, as well as renal clear cell carcinoma.
3. Negative staining reaction of normal columnar epithelial cells and macrophages in lamina propria in the colon.

References

1. Turner BM, et al. Arch. Pathol. Lab Med. 2012; 136:163-171.
2. Gurda GT, et al. Clin. Transl. Med. 2015; 4:16.

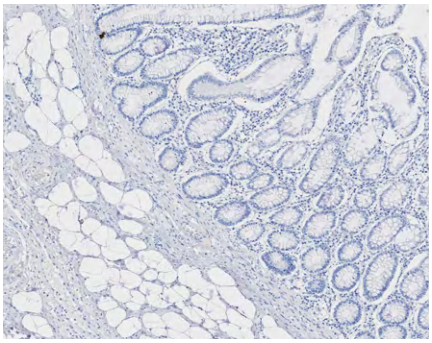


Figure 1. Colonic epithelium shows no expression of Napsin A.

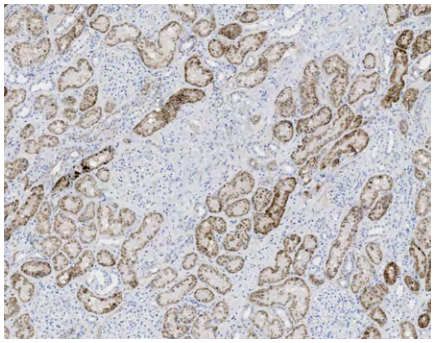


Figure 2. Cells of the proximal tubules in normal kidney show moderate to strong granular cytoplasmic staining for Napsin A.

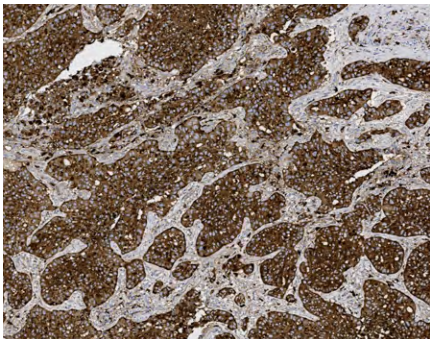


Figure 3. Cells of this lung adenocarcinoma show strong cytoplasmic expression of Napsin A. Lung squamous carcinomas and mesotheliomas are negative for Napsin A.

Tissue-Tek Genie® anti-Neurofilament

IVD

Clone
2F11

Host/clonality
Mouse monoclonal

Product codes and quantity
8289-C010: RTU, 10 capsules; 1 pack
8289-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
The antibody labels neurofilaments in ganglion cells and axons in the plexus of Auerbach in appendix and colon and the muscularis externa. Smooth muscle cells and epithelium should be negative. It is a useful tool for identifying of tumors of neural, neuroendocrine, and endocrine origin, when used with a panel of antibodies.

Description
Neurofilaments are cytoskeletal proteins normally found in neurons and axonal processes, and often found in tumors of neural, neuroendocrine, and endocrine origin, including neuromas, ganglioneuromas, gangliogliomas, ganglioneuroblastomas, paragangliomas, adrenal and extra-adrenal pheochromocytomas, and Merkel cell carcinoma.

Positive tissue control
Appendix, colon, and tumors with neuronal differentiation

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® Citrate Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In appendix and colon, moderate to strong cytoplasmic staining of ganglion cells and large axons in the plexus of Auerbach; weak to moderate cytoplasmic staining of axons in muscularis externa; smooth muscle cells and epithelium should be negative.
3. In brain, moderate to strong cytoplasmic staining of all neurons and axonal processes.
4. Cytoplasmic staining of tumors with neuronal differentiation.

References

1. Morrison CD, Prayson RA. Semin Diagn Pathol. 2000; 17:204-215.
2. Diepholder HM, et al. Cancer. 1991; 68:2192-2201.
3. Franquemont DW, et al. Am J Clin Pathol. 1994; 102:163-170.
4. Zhan FQ, et al. J Natl Compr Canc Netw. 2009; 7:333-339.

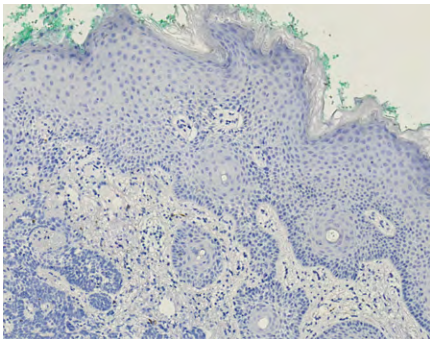


Figure 1. The squamous epithelium and underlying basal cell carcinoma show no reactivity for neurofilaments. Vascular elements and fibroblasts are also negative, while scattered nerve axons are positive.

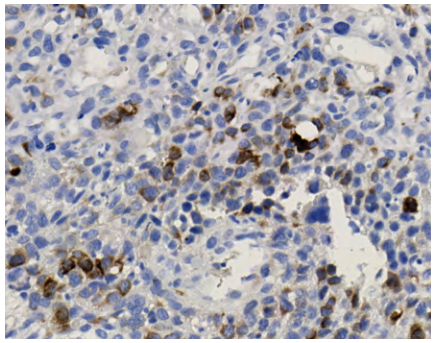


Figure 2. Moderate to strong cytoplasmic reactivity for Neurofilaments is seen in the neoplastic cells of this malignant peripheral nerve sheath tumor (MPNST).

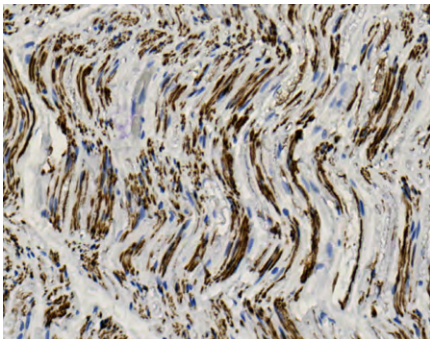


Figure 3. Strong cytoplasmic reactivity for Neurofilaments is observed in the axons of benign peripheral nerve, while smooth muscle and vascular elements show no reactivity.

Tissue-Tek Genie® anti-Neuron Specific Enolase

IVD

Clone
EP319

Host/clonality
Rabbit monoclonal

Product codes and quantity
8447-C010: RTU, 10 capsules; 1 pack
8447-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels NSE in neoplastic cells in tumors derived from neurons, ganglion cells, and peripheral nerves. This antibody a useful tool for the identification of neuronal and neuroendocrine derived tumors such as neuroblastomas, retinoblastomas, desmoplastic malignant melanoma, and small-cell lung cancer, when used with a panel of antibodies.

Description
Neuron-specific enolase (NSE) is a gamma subunit homodimer and is the dominant form of the enolase isoenzymes found in neuronal and neuroendocrine cells.

Positive tissue control
Appendix, colon, pancreas, and tumors derived from neuron and endocrine

Staining pattern
Cytoplasmic and nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic and nuclear staining of neurons in brain, ganglion cells in gastrointestinal tract, myelinated and unmyelinated nerve fibers, as well as tumors derived from or containing neurons, ganglion cells, and peripheral nerves.
2. Moderate to strong cytoplasmic and nuclear staining of adrenal cortex and islet cells of pancreas.
3. Weak cytoplasmic and nuclear staining of spermatogonia.
4. Cytoplasmic staining of smooth muscle cells, and some renal epithelium and T-cells.

References

1. MacIntosh PW, et al. Surv Ophthalmol. 2015; 60:486-494.
2. Kasprzak A, et al. Pol J Pathol. 2007; 58:23-33.
3. Portela-Gomes GM, et al. Appl Immuno-histochem Mol Morphol. 2004; 12:183-192.

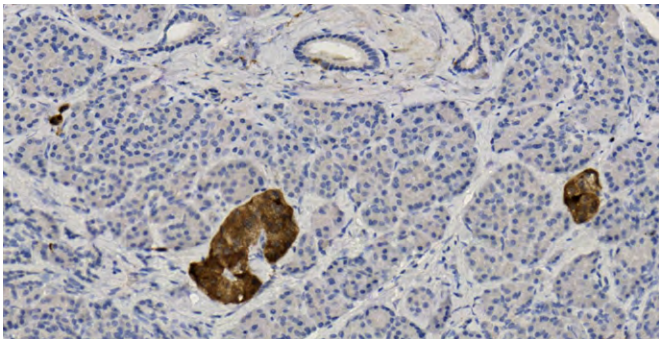


Figure 1. Pancreatic acinar cells and ductal epithelium are negative for NSE expression, while islet cells are positive.

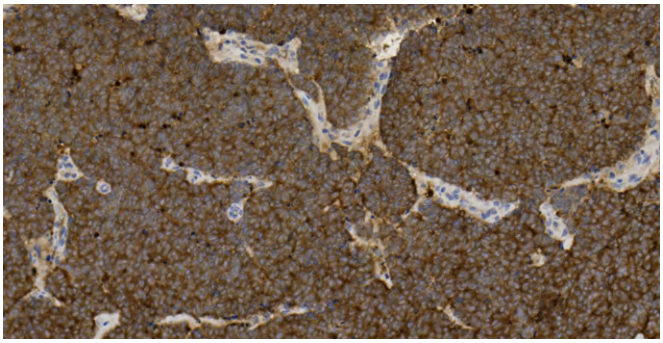


Figure 2. Strong cytoplasmic staining for NSE is seen in this neuroendocrine carcinoma (Merkel cell caracinoma).

Tissue-Tek Genie® anti-NKX3.1

IVD

Clone
EP356

Host/clonality
Rabbit monoclonal

Product codes and quantity
8320-C010: RTU, 10 capsules; 1 pack
8320-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the nucleus and is observed in luminal secretory epithelial cells and basal epithelial cells of prostate glands, dispersed spermatogonia in seminiferous tubules of testis, and epithelial cells of salivary gland. Nuclear staining is also observed in neoplastic cells of prostate adenocarcinomas.
It is useful for identifying neoplasms of prostate origin when used with a panel of other antibodies. It is particularly useful in poorly differentiated tumors where PSA and/or prostein (P501S) may be weakly expressed or absent.

Description
NKX3.1 protein down regulates growth of epithelial cells in prostate tissue and plays a critical role in suppressing prostate carcinoma. NKX3.1 is expressed predominantly in prostate epithelium and is also found in testis, ureter, pulmonary bronchial mucous glands, salivary gland, and some cases of ductal and lobular breast carcinoma. NKX3.1 is a highly sensitive and specific marker for prostate adenocarcinoma.

Positive tissue control
Prostate, testis

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In prostate, a moderate to strong nuclear staining of all luminal secretory epithelial cells and basal epithelial cells of prostate glands; stromal cells, endothelial cells, and infiltrating lymphocytes are negative.
2. In testis, at least weak to moderate nuclear staining of dispersed spermatogonia in seminiferous tubules of the testis.
3. Nuclear staining reaction of neoplastic cells in the prostate adenocarcinoma.
4. No nuclear staining reaction among other cellular structures including epithelial cells of the appendix.
5. A weak to moderate cytoplasmic reaction in cells with strong nuclear staining is accepted.

References

1. Gurel B, et al. Am J Surg Pathol. 2010; 34:1097-1105.
2. Oh WJ, et al. J Pathology and Translational Medicine. 2016; 50:345-354.
3. Asch-Kendrick RJ, et al. J Clin Pathol. 2014; 67:768-771.

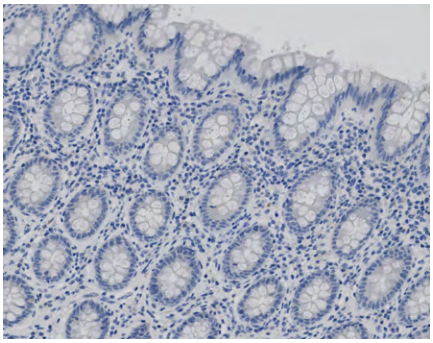


Figure 1. No reactivity for NKX3.1 is present among the epithelial cells or the elements of the lamina propria in this sample of appendix.

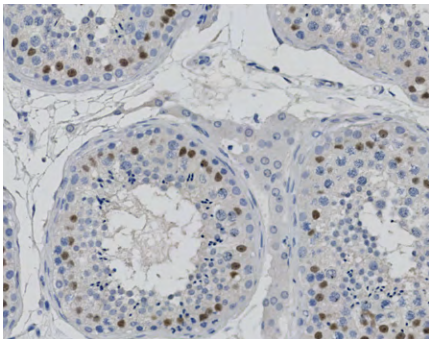


Figure 2. Scattered spermatogonia show a weak to moderate nuclear staining reaction for NKX3.1. Background elements, such as Sertoli cells and Leydig cells are negative.

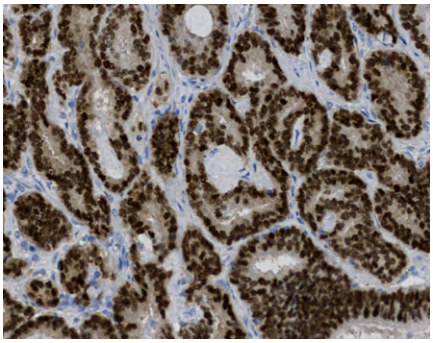


Figure 3. Diffuse strong nuclear reactivity and weak cytoplasmic reactivity is present in this prostate adenocarcinoma.

Tissue-Tek Genie® anti-OCT.2

IVD

Clone
EP284

Host/clonality
Rabbit monoclonal

Product codes and quantity
8334-C010: RTU, 10 capsules; 1 pack
8334-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Nuclear staining is observed in all germinal center and mantle-zone B-cells and plasma cells, as well as lymphocytes in lamina propria and B-cells in various tissues. Nuclear staining is observed in neoplastic cells of various B-cell lymphomas, including diffuse large B-cell lymphoma and follicular lymphoma.
It is useful for classification of lymphomas, especially for identification of the lineage of CD20 negative B-cell neoplasms and differentiation of classical Hodgkin lymphoma from primary mediastinal large B-cell lymphoma when used in a panel with other antibodies.

Description
OCT.2 is a transcription factor that binds to the immunoglobulin gene and interacts with BOB.1. It is essential for expression of B-cell specific genes. OCT.2 is expressed in mature B-cells, predominantly germinal center B-cells. High levels of OCT.2 expression are also found in monocytoid B-cells and plasma cells. Various B-cell lymphomas are also positive for this marker.

Positive tissue control
Tonsil, B-cell lymphoma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil, a moderate to strong nuclear staining of virtually all germinal center B-cells, while mantle zone B-cells must show a weak to moderate staining reaction.
2. Lymphocytes in the classic Hodgkin lymphoma show a weak to moderate staining reaction, while Hodgkin's and Reed-Sternberg cells must be negative.
3. At least moderate nuclear staining in the neoplastic cells of various B-cell lymphomas.

References

1. Yin L, et al. Histopathology. 2016; 69:775-783.
2. Higgins RA, et al. Arch Pathol Lab Med. 2008; 132:441-461.
3. Gibson SE, et al. Am J Clin Pathol. 2006; 126:916-924.

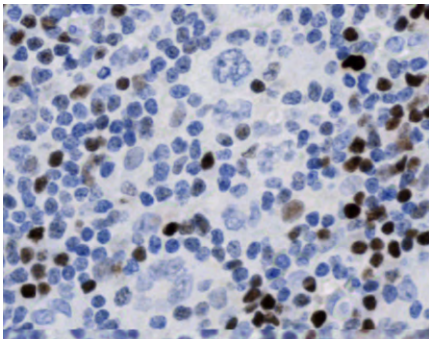


Figure 1. The Reed-Sternberg and Hodgkin cells of this classic Hodgkin lymphoma show a negative staining reaction for OCT.2, while background B-cells and plasma cells show moderate to strong nuclear reactivity.

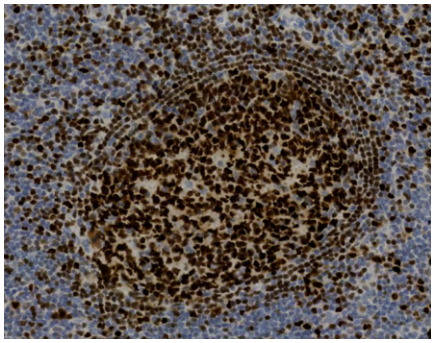


Figure 2. There is a strong nuclear staining reaction for OCT.2 among the germinal center B-cells and a weak to moderate staining among the cells of the mantle zone.

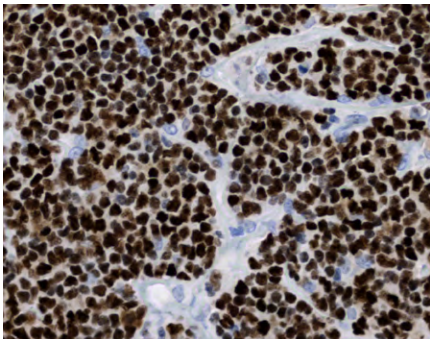


Figure 3. A strong nuclear staining reaction is observed among the neoplastic cells of this diffuse large B-cell lymphoma.

Tissue-Tek Genie® anti-p53

IVD

Clone
BP53.12

Host/clonality
Mouse monoclonal

Product codes and quantity
8477-C010: RTU, 10 capsules; 1 pack
8477-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the p53 protein in the nucleus in neoplastic cells. It may be useful for classifying tumors of all cell lineages when used with a panel of antibodies.

Description
p53 is a nuclear phosphoprotein and generally wild-type is not detectable by IHC due to its short half-life. The antibody labels wild-type and mutant-type p53 protein in neoplastic cells.

Positive tissue control
Selective squamous cell carcinoma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A weak to moderate nuclear staining in ≥20% of germinal center B-cells in tonsil.
2. A weak to moderate nuclear staining of scattered epithelial cells in fallopian tube and basal crypts in appendix.
3. A moderate to strong, distinct nuclear staining of neoplastic cells in ovarian serous carcinoma and colon adenocarcinoma.
4. A moderate to strong, distinct nuclear staining of neoplastic cells in urothelial carcinoma.

References

1. Bártek J, et al. J. Pathol. 1993; 169(1):27-34.
2. Terada T, et al. Mod. Pathol. 1994; 7(2):249-252.
3. Suzuki H, et al. Cancer Lett. 2006; 237(2):242-247.

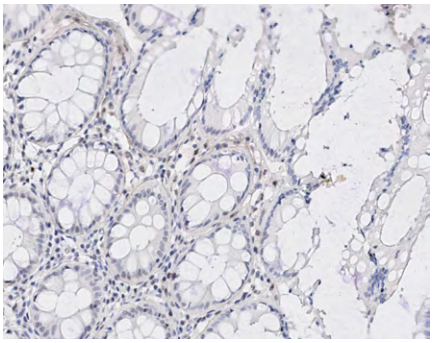


Figure 1. No staining in luminal epithelial cells of the colon.

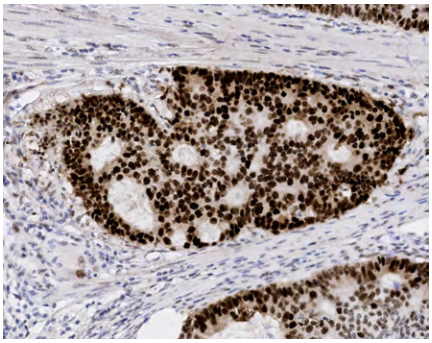


Figure 2. Strong staining in colon adenocarcinoma.

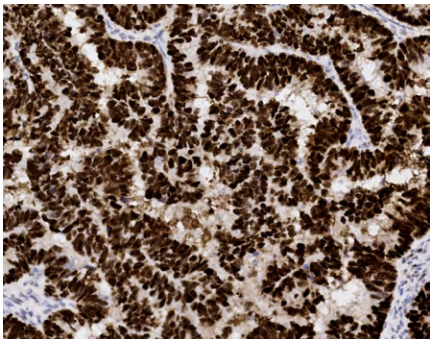


Figure 3. Strong staining in ovarian serous carcinoma.

Tissue-Tek Genie® anti-p63

IVD

Clone
MX013

Host/clonality
Mouse monoclonal

Product codes and quantity
8312-C010: RTU, 10 capsules; 1 pack
8312-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
In tonsil, moderate to strong nuclear staining is seen in squamous epithelial cells, with at least weak nuclear staining observed in scattered lymphocytes. Cytotrophoblastic cells in placenta show weak to moderate nuclear staining. In prostate, moderate to strong nuclear staining is observed in basal cells. Nuclear staining of neoplastic cells is observed in benign bronchial reserve cells, as well as squamous cell carcinoma of the lung.
It is a useful tool for differentiating squamous, urothelial, myoepithelial neoplasms from neoplasms of other types, when used with a panel of antibodies.

Description
P63 is a transcription factor that plays a critical role in the growth and development of many epithelial tissues. It is found in basal epithelial cells in tissues such as cervix, bladder, breast, epidermis, and prostate.

Positive tissue control
Tonsil, prostate, placenta, and squamous cell carcinoma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In placenta, at least weak to moderate nuclear staining of cytotrophoblastic cells.
2. In tonsil, moderate to strong nuclear staining in squamous epithelial cells, and at least weak nuclear staining in scattered lymphocytes.
3. In prostate, moderate to strong nuclear staining in basal cells.
4. No or a weak cytoplasmic staining in cells with strong nuclear expression of p63.

5. References

1. Amin MB, et al. Am J Surg Pathol. 2014; 38:20-34.
2. Knez VM, et al. J Med Case Rep. 2014; 8:275.
3. Tacha D, et al. Appl Immunohistochem Mol Morphol. 2012; 20:201-207.
4. Young A, Kunju LP. Arch Pathol Lab Med. 2012; 136:907-910.

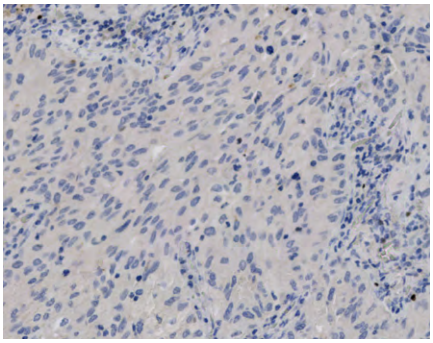


Figure 1. The neoplastic cells of this lung adenocarcinoma show no reactivity for p63. Scattered entrapped benign bronchial reserve cells show nuclear reactivity for p63.

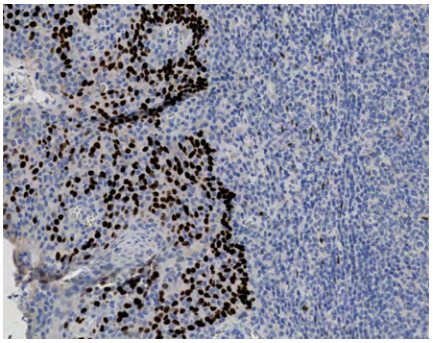


Figure 2. Moderate to strong nuclear reactivity for p63 is seen among the squamous epithelial cells of the tonsil, while scattered lymphocytes may also show weak nuclear reactivity.

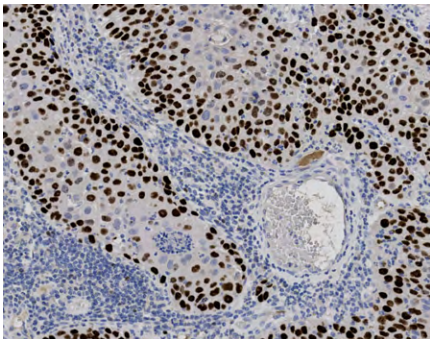


Figure 3. Strong nuclear expression for p63 is present in the majority of neoplastic cells in this squamous cell carcinoma of lung. Weak nuclear reactivity is also discernable in scattered lymphocytes.

Tissue-Tek Genie® anti-p120

IVD

Clone
EP66

Host/clonality
Rabbit monoclonal

Product codes and quantity
8373-C010: RTU, 10 capsules; 1 pack
8373-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the membrane in neoplastic cells of breast ductal carcinomas and other types of carcinomas, e.g. gastric, colorectal, lung, prostate. In contrast, a cytoplasmic staining pattern is observed in the neoplastic cells of breast lobular carcinomas and some other types of carcinomas, e.g. gastric and renal cell. Membraneous staining is observed in hepatocytes, macrophages, epithelial cells of tonsils, and follicular dendritic network of germinal centers.
It is useful for classifying breast cancers when used with a panel of other antibodies.

Description
p120 catenin binds E-Cadherin at a juxta-membrane site while alpha-catenin and beta-catenin bind to the intracellular domain of E-Cadherin. A deficiency of E-Cadherin results in the intracytoplasmic accumulation of p120 catenin. Diffuse cytoplasmic p120 catenin staining (without strong membraneous staining) is seen in in situ and invasive lobular carcinoma and other lesions with dysfunctional E-cadherin / catenin tight junctions.

Positive tissue control
Tonsil, liver, and neoplastic breast epithelial cells of lobular type (showing loss of membrane reactivity)

Staining pattern
Membraneous staining of normal cells, membraneous and cytoplasmic staining of some neoplastic cells

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Membraneous staining of normal cells, membraneous and cytoplasmic staining of some neoplastic cells.
2. In liver, a moderate to strong predominantly membraneous staining reaction must be seen all epithelial cells of bile ducts. Weak to moderate membraneous staining reaction of virtually all the hepatocytes.
3. In tonsil, a weak to moderate membraneous staining reaction of germinal center macrophages and the follicular dendritic network; a moderate to strong membraneous staining reaction of epithelial cells.
4. In breast lobular carcinoma, a diffuse cytoplasmic staining of neoplastic cells; In breast ductal carcinoma, a membraneous staining of neoplastic cells.

References

1. Liu H. Arch Pathol Lab Med. 2014; 138:1629-1642.
2. Dabbs DJ, et al. Am J Surg Pathol. 2007; 31:427-437.
3. Reed A, et al. Breast Cancer Research. 2015; 17:12.
4. El Sharouni M, et al. Virchows Arch (2017) 471:707-712.

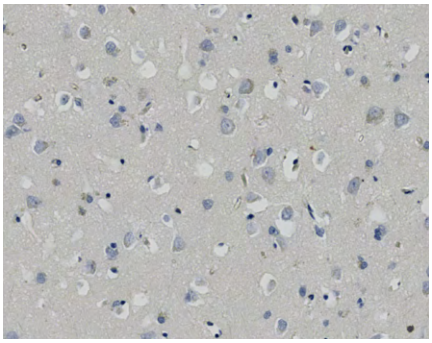


Figure 1. Neural and glial elements in the cerebrum show no staining reaction for p120 catenin.

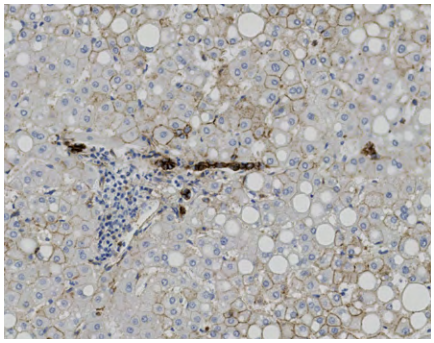


Figure 2. A moderate membraneous staining reaction for p120 is observed among hepatocytes, while bile ducts demonstrate an intense membrane staining pattern.

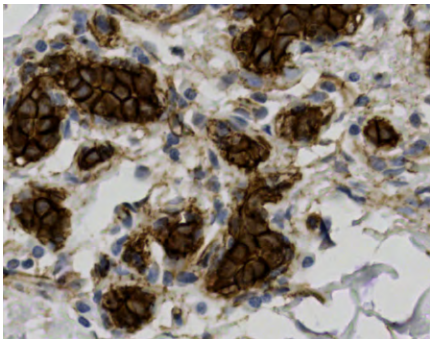


Figure 3. Strong membraneous and moderate to strong cytoplasmic staining for p120 catenin is seen in normal breast ducts and lobules. By contrast, lobular carcinoma (in situ and invasive) shows a loss of membrane staining with an accumulation of cytoplasmic protein.

Tissue-Tek Genie® anti-PAX5

IVD

Clone
EP156

Host/clonality
Rabbit

Product codes and quantity
8500-C010: RTU, 10 capsules; 1 pack
8500-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels PAX5 neoplastic cells in B-cell lymphomas and Reed-Sternberg cells in classical Hodgkin lymphoma.
This antibody is useful for subtyping lymphomas and a subset of acute lymphocytic leukemias when used with a panel of antibodies.

Description
PAX5, also designated B-cell specific activator protein (BSAP), is a transcription factor of the paired-box (PAX) containing family. PAX5 is important in control of B-cell commitment and shows nuclear expression in early progenitor B-cells and in all mature B-cells.

Positive tissue control
Tonsil, appendix, B-cell lymphoma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Nuclear staining.
2. Moderate to strong nuclear staining of all mantle zone B cells, germinal center B cells, and interfollicular peripheral B cells in tonsil and appendix. A weak to moderate cytoplasmic staining can be seen in germinal center B cells.
3. Nuclear staining of neoplastic cells in B cell lymphoma. At least weak nuclear staining of majority of Hodgkin cells and Reed-Sternberg cells in Hodgkin lymphoma.
4. No staining of other cells including T-cells, squamous epithelial cells of tonsils and columnar epithelial cells of appendix.

References

1. Feldman AL, and Dogan A. Adv. Anat. Pathol. 2007; 14:323-334.
2. Jensen KC, et al. Mod. Pathol. 2007; 20:871-877.
3. Desouki MM, et al. Clin. Med. Res. 2010; 8:84-88.
4. Johri N, et al. J. Clin. Diagn. Res. 2016; 10:XC04-XC07.

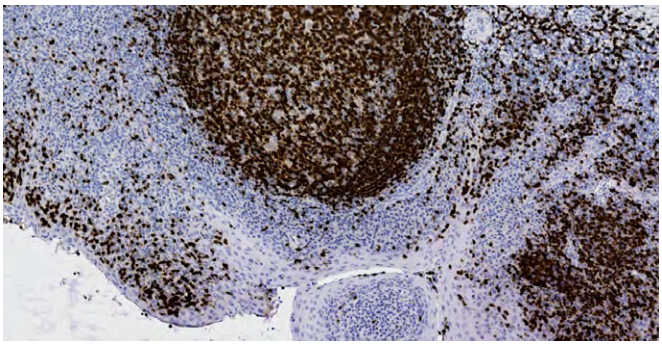


Figure 1. Strong diffuse nuclear staining of PAX5 is observed in B-cells of the germinal centers, mantle zones, and inter-follicular areas of the tonsil, while T-cells and squamous epithelium are negative.

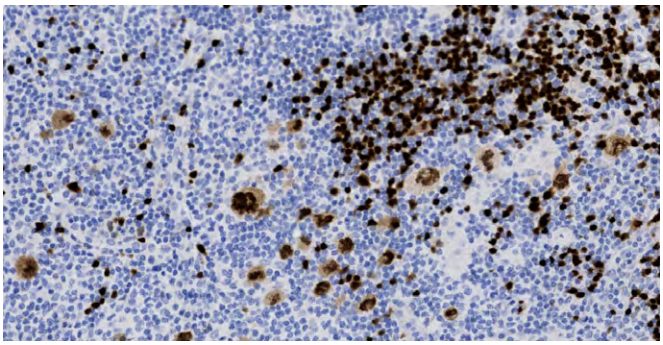


Figure 2. The PAX5 antibody highlights Hodgkins cells with moderate to strong nuclear and weak cytoplasmic staining. The background non-neoplastic B-cells are strongly positive for nuclear PAX5 reactivity.

Tissue-Tek Genie® anti-PAX8

IVD

Clone
EP298

Host/clonality
Rabbit monoclonal

Product codes and quantity
8502-C010: RTU, 10 capsules; 1 pack
8502-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels PAX8 in neoplastic cells of ovarian non-mucinous carcinoma, endometrial and endocervical adenocarcinoma, renal clear cell carcinoma (RCC), and thyroid carcinoma. In contrast, neoplastic cells of lung and breast adenocarcinomas, and ovarian mucinous carcinomas, are negative.
This antibody is useful for identifying RCC, ovarian non-mucinous carcinoma, and gynecologic tract malignancies when used with a panel of antibodies.

Description
PAX8 is a transcription factor that is important for organogenesis and development of the thyroid, urogenital tract, and placenta. PAX8 is expressed in epithelial cells of the urogenital tract and thyroid.

Positive tissue control
Kidney, endometrium, PAX8 positive RCC, and non-mucinous ovarian cancer

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In kidney, a weak to moderate nuclear staining in epithelial cells of proximal and distal tubules, loops of Henle, collecting ducts, and parietal epithelial cells of Bowman's capsule. Weak cytoplasmic staining is acceptable.
2. In fallopian tube, a strong nuclear staining of intercalated secretory epithelial cells and at least weak to moderate nuclear staining of ciliated epithelial cells.
3. At least moderate nuclear staining of the secretory endometrium and thyroid follicular cells.
4. Nuclear staining in neoplastic cells of ovarian carcinoma and renal clear cell carcinoma.
5. No staining in neoplastic cells of lung or breast adenocarcinomas.

References

1. Yemelyanova A, et al. Int. J. Gynecol. Pathol. 2014; 33:492-499.
2. Ordóñez NG. Adv. Anat. Pathol. 2012; 19:140-151.
3. Tong GX, et al. Mod. Pathol. 2009; 22:1218-1227.

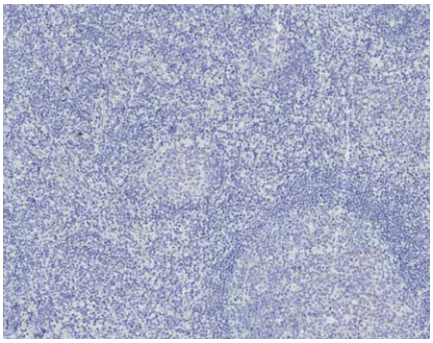


Figure 1. This antibody is negative among B-cells of the tonsil, unlike several other antibodies raised against the N-terminus of the PAX8 protein.

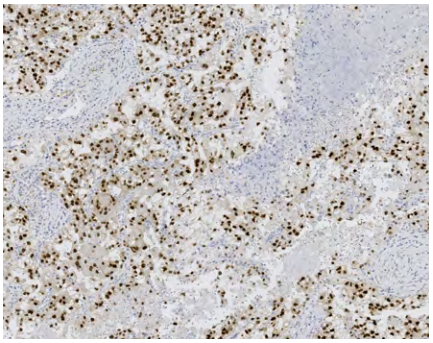


Figure 2. The PAX8 antibody shows moderate to strong nuclear staining among renal cell carcinoma cells.

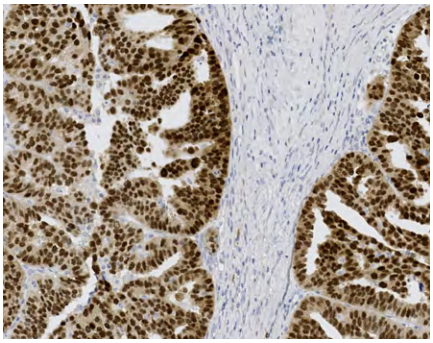


Figure 3. PAX8 shows diffuse strong nuclear and weak cytoplasmic expression in an ovarian serous carcinoma (shown here), as well as other non-mucinous ovarian carcinomas.

Tissue-Tek Genie® anti-PD-1

IVD

Clone
EP239

Host/clonality
Rabbit monoclonal

Product codes and quantity
8287-C010: RTU, 10 capsules; 1 pack
8287-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels normal tonsil, lymph node, and spleen tissues, cytoplasmic staining is observed in activated T-cells in germinal centers. Positive staining of activated T-cells is also observed in other diseases and malignancies, such as Castleman's disease, T-cell lymphomas, B-cell lymphomas, Paget's disease, and skin basal cell carcinoma.
It is a useful aid for the diagnosis of angioimmunoblastic lymphoma, primary cutaneous pleomorphic T-cell lymphoma, and nodular lymphocyte-predominant Hodgkin lymphoma when used with a panel of other antibodies.

Description
Programmed-death ligand 1 (PD-1) is expressed by germinal center-associated helper T-cells and inhibits T-cell activity. PD-1 is expressed on T-cells, B-cells, and monocytes during activation. PD-1 positivity has been found in angioimmunoblastic lymphoma, primary cutaneous pleomorphic T-cell lymphoma, and nodular lymphocyte-predominant Hodgkin lymphoma but not other subtypes of T-cell and B-cell non-Hodgkin lymphomas or classic Hodgkin lymphomas.

Positive tissue control
Tonsil, lymph-node, selective T-cell lymphomas

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In tonsil, moderate to strong staining in T-cells in germinal center; a weak to moderate staining in T-cells in T-cell zones.
3. In liver, a weak staining in few (if any) T-cells.
4. In B-CLL, a weak staining in few (if any) T-cells.
5. In T-cell lymphoma, a weak to moderate staining in T-cells.

References

1. Francisco L, et al. Immunol. 2010; 236:219-242.
2. Thangavelu G, et al. Future Oncol. 2011; 7:929-932.
3. Cetinözman F, et al. Am J Surg Pathol. 2012; 36:109-16.
4. Cogbill CH, et al. Am J Clin Pathol. 2014;142(1):88-98.

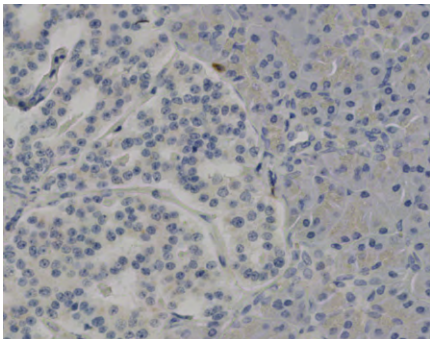


Figure 1. Pancreatic acini and ducts, as well as islet cells are all negative PD-1.

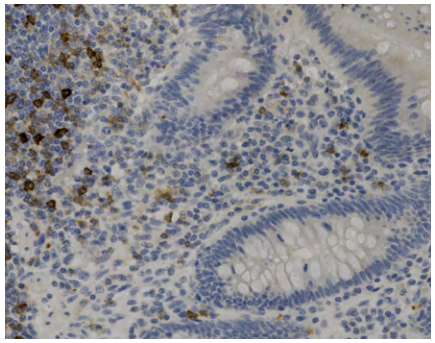


Figure 2. Lymphocytes of the colonic lamina propria demonstrate variable, weak to strong, cytoplasmic expression of PD-1.

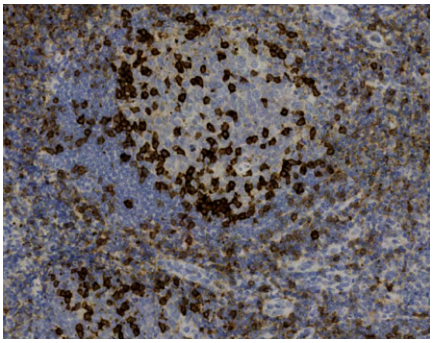


Figure 3. Variable reactivity is seen for PD-1 in this tonsil specimen with the darkest cytoplasmic reactivity in cells within the follicle.

Tissue-Tek Genie® anti-Perforin

IVD

Clone
5B10

Host/clonality
Mouse monoclonal

Product codes and quantity
8236-C010: RTU, 10 capsules; 1 pack
8236-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels T-cells of tonsil and spleen as well as neoplastic cells of anaplastic large-cell lymphoma (ALCL) and peripheral T-cell lymphoma. Weak cytoplasmic staining of scattered T-cells is observed in various tissues.
It is useful for identifying functionally active cytotoxic T-lymphocytes (CTLs) and natural killer (NK) cells in tissues and to aid in differentiating peripheral T-cell lymphomas and NK-cell lymphoma from other lymphomas when used in a panel with other antibodies.

Description
Perforin is a key molecule for cytotoxicity mediated by T-cells and natural killer cells. It is expressed in the cytoplasmic granule of cytotoxic T-lymphocytes (CTLs) and natural killer (NK) cells, and is a specific marker of functionally active CTLs and NK-cells.

Positive tissue control
Tonsil, spleen, selective ALCL

Staining pattern
Granular cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Granular cytoplasmic staining.
2. In normal tonsil, spleen, and other lymphoid tissues, scattered weak staining on T-cells.
3. In high expression tonsil and spleen, a moderate staining of the majority of T-cells.
4. Granular cytoplasmic staining of neoplastic cells in a subset of ALCLs and peripheral T-cell lymphoma.
5. Weak staining among few, if any, T-cells of other tissues.

References

1. Krenacs L, et al. Blood. 1997; 89:980-989.
2. Lopez JA, et al. Blood. 2013; 121:2659-2668.
3. Kagi D, et al. Nature. 1994; 369:31-37.
4. Hameed A, et al. Am J Pathol. 1992; 140:1025-1030.
5. Lichtenheld MG, et al. Nature. 1988; 335:448-451.

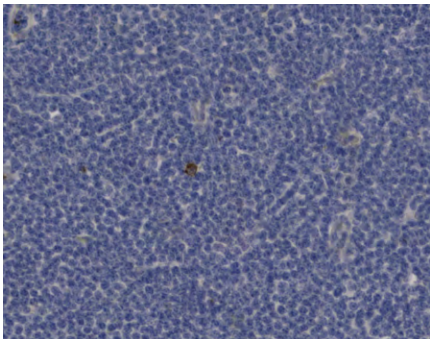


Figure 1. There is no reactivity for perforin in this B-cell chronic lymphocytic lymphoma. Rare cytotoxic T-cells are positive for granular cytoplasmic reactivity.

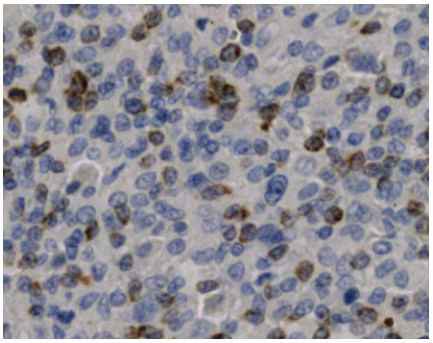


Figure 2. Weak to moderate granular cytoplasmic reacitivity is seen for perforin in this example of a peripheral T-cell lymphoma infiltrating bone marrow.

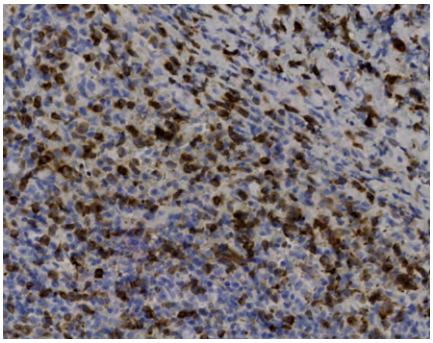


Figure 3. Numerous dispersed benign cytotoxic T-cells show moderate to strong granular reactivity for perforin in this example of a “high expresser” tonsil.

Tissue-Tek Genie® anti-PLAP

IVD

Clone
GM022

Host/clonality
Mouse monoclonal

Product codes and quantity
8235-C010: RTU, 10 capsules; 1 pack
8235-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels the neoplastic cells of seminoma, testicular intratubular germ cell neoplasia (ITGCN), embryonal carcinoma, endometrial adenocarcinoma, and ovarian serous borderline tumors. Placental Alkaline Phosphatase (PLAP) is useful for differentiating germ cell tumors such as seminomas, dysgerminomas and choriocarcinomas from other neoplasms when used with a panel of antibodies. PLAP is also useful for the identification of intratubular germ cell neoplasia.

Description
PLAP is a membrane-bound glycosylated dimeric enzyme expressed primarily in the placenta, and also in the endocervix and fallopian tubes. It is closely related to the intestinal form of the enzyme as well as to the placental-like form.

Positive tissue control
Placenta, seminoma

Staining pattern
Membraneous and cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct, predominantly membraneous, but also cytoplasmic, staining reaction of virtually all the neoplastic cells of ITGCNs and the seminoma.
2. An at least weak to moderate, predominantly membraneous, but also cytoplasmic, staining reaction of the majority of the neoplastic cells of embryonal carcinoma.
3. A strong predominantly membraneous, but also cytoplasmic, staining reaction of placental cytotrophoblasts and syncytiotrophoblasts with no or only a minimal reaction in the stromal cells.

References

1. Wick MR, et al. Hum. Pathol. 1987; 18:946-954.
2. Manivel JC, et al. Am. J. Surg. Pathol. 1987; 11:21-29.

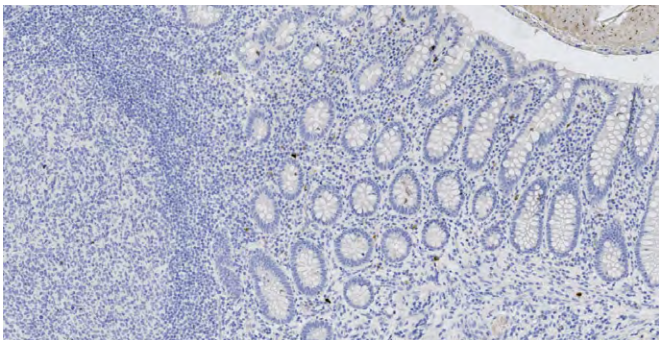


Figure 1. No expression of PLAP is seen in the epithelial cells or in lymphoid follicles of the appendix.

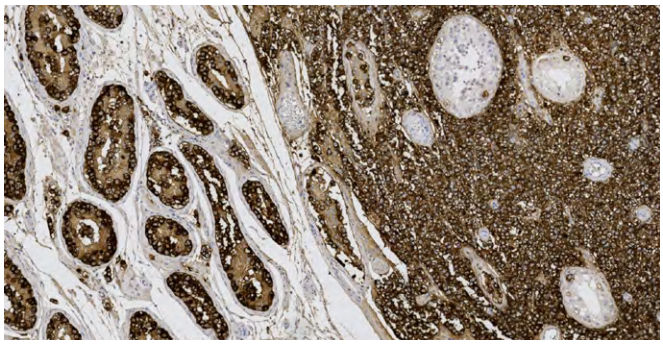


Figure 2. Strong diffuse cytoplasmic and membrane staining is seen in this seminoma and within the tubules showing intratubular germ cell neoplasia.

Tissue-Tek Genie® anti-PMS2

IVD

Clone
EP51

Host/clonality
Rabbit monoclonal

Product codes and quantity
8328-C010: RTU, 10 capsules; 1 pack
8328-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the PMS2 (Postmeiotic segregation increased 2) protein in both normal and neoplastic cells. PMS2 may be useful for classifying tumors of the gastrointestinal tract, including associated extra colonic cancers such as endometrial and prostate cancers, when used with a panel of antibodies.

Description
PMS2 is expressed in normal proliferating cells and, when heterodimerized with MLH1 (MutL protein homolog 1), is involved in repairing DNA mutations which may occur during DNA replication. Lost expression or low levels of PMS2 are associated with colorectal and other cancers.

Positive tissue control
Normal colon, appendix, tonsil

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. At least weak to moderate, distinct nuclear staining of cells in appendix.
2. At least weak to moderate, distinct nuclear staining of mantle zone B-cells and moderate to strong, distinct nuclear staining of germinal center B-cells in tonsil.
3. A moderate to strong, nuclear staining of neoplastic cells in colon adenocarcinoma with normal PMS2 expression.
4. No nuclear staining of neoplastic cells in colon adenocarcinomas with loss of PMS2 expression, but a nuclear staining in other cells (e.g., stromal cells, lymphocytes).

References

1. Peltomäki P. J. Clin. Oncol. 2003; 21(6):1174-1179.
2. Lynch H and Smyrk T. Cancer. 1996; 78(6):1149-1167.
3. Kawakami H, et al. Curr. Treat. Options Oncol. 2015; 16(7):30.

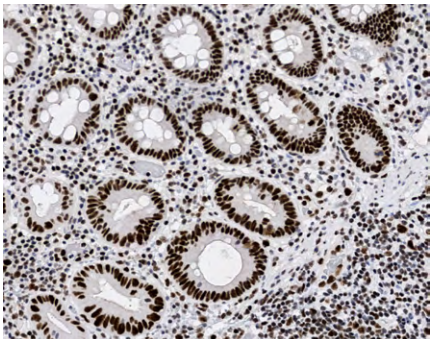


Figure 1. Moderate staining in normal appendix.

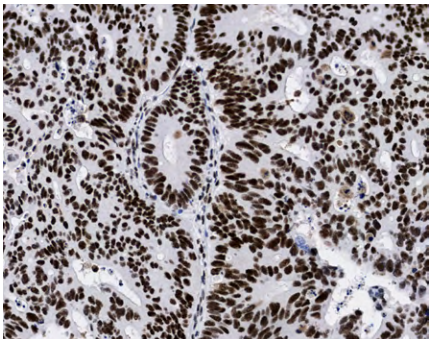


Figure 2. Strong staining in colon adenocarcinoma.

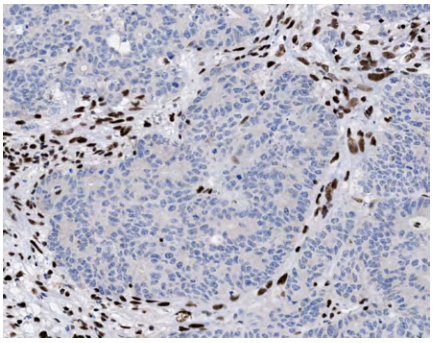


Figure 3. Negative staining in colon adenocarcinoma cells with loss of PMS2 expression.

Tissue-Tek Genie® anti-Podoplanin

IVD

Clone
D2-40

Host/clonality
Mouse monoclonal

Product codes and quantity
8515-C010: RTU, 10 capsules; 1 pack
8515-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels Podoplanin in neoplastic cells of follicular dendritic cell tumors, dermatofibromas, Kaposi's sarcoma, mesotheliomas, seminomas, and serous ovarian carcinomas. Lymphatic vessels are also positive for podoplanin, while endothelial cells of blood vessels are negative.
This antibody is useful for differentiating between malignant mesotheliomas and adenocarcinomas, identifying seminomas, and visualizing lymphatic vessels and lymphatic invasion of primary tumors when used with a panel of antibodies.

Description
Podoplanin is a transmembrane protein expressed by lymphatic endothelial cells, fibroblasts, osteocytes, follicular dendritic cells, smooth and striated muscle cells, myoepithelial cells, Cajal cells, squamous epithelial basal cells, prostatic basal epithelial cells, immature Sertoli cells, gastric crypt cells, renal glomerular podocytes, and Schwann cells. In tumors, podoplanin is detected in follicular dendritic cell tumors, dermatofibromas, lymphangiomas, Kaposi's sarcoma, hemangioblastomas, seminomas, epithelioid mesotheliomas, and a subset of angiosarcomas with lymphatic differentiation.

Positive tissue control
Tonsil, appendix, lymph node, epithelioid mesothelioma

Staining pattern
Mainly cytoplasmic and some membraneous

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct predominantly cytoplasmic staining reaction of lymphatic endothelial cells in all tissues, follicular dendritic cells in germinal centers and basal squamous epithelial cells in the tonsil, as well as neoplastic cells in seminomas and mesotheliomas.
2. A moderate to strong, distinct predominantly cytoplasmic staining reaction of fibroblastic cells and Cajal cells of the muscularis propria in the appendix.
3. A weak to moderate staining reaction of the majority of the neoplastic cells in serous ovarian carcinoma.
4. A negative staining reaction of the neoplastic cells of lung squamous cell carcinoma.

References

1. Xie Q, et al. Int. J. Clin. Exp. Pathol. 2008; 1:276-284.
2. Yu H, et al. Am. J. Clin. Pathol. 2007; 128:776-782.
3. Yu H, et al. Am. J. Clin. Pathol. 2007; 128:767-775.
4. Tong GX, et al. Mod. Pathol. 2009; 22:1218-1227.

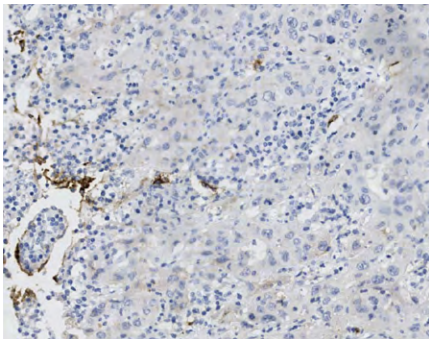


Figure 1. Podoplanin is negative in this primary lung carcinoma. Lymphatic endothelium shows cytoplasmic and membraneous staining.

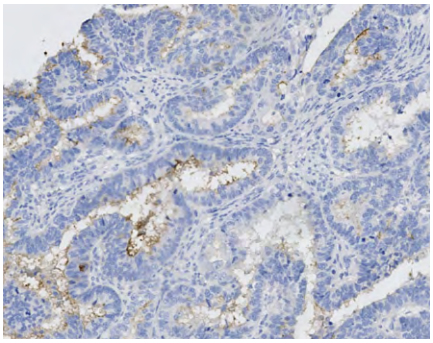


Figure 2. Podoplanin demonstrates weak to moderate membrane staining in this ovarian serous carcinoma.

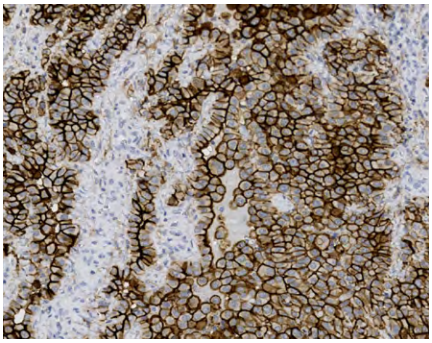


Figure 3. Podoplanin shows strong, predominantly membraneous, reactivity in this epithelioid mesothelioma.

Tissue-Tek Genie® anti-Prostate Specific Antigen

IVD

Clone
EP109

Host/clonality
Rabbit monoclonal

Product codes and quantity
8244-C010: RTU, 10 capsules; 1 pack
8244-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels normal prostate epithelial cells and the neoplastic cells of many primary and metastatic prostate carcinomas. Staining is absent in many other normal and diseased tissues, including colon, colorectal carcinoma, and urothelial carcinoma. It is useful for identifying neoplasms of prostatic origin when used with a panel of antibodies.

Description
Prostate Specific Antigen (PSA) is expressed in different types of prostate carcinoma, both primary and metastatic. It is found in approximately 99% of prostatic adenocarcinoma cases, with high grade carcinomas often displaying weaker expression.

Positive tissue control
Prostate hyperplasia, prostate carcinoma

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic staining.
2. In normal and benign prostatic hyperplasia, a moderate to strong cytoplasmic staining of the majority of luminal epithelial cells. A weak staining of the stromal compartment is acceptable.
3. Cytoplasmic staining of neoplastic cells of prostate adenocarcinoma.
4. No staining of epithelial cells in kidney and appendix.

References

1. Queisser A, et al. Mod Pathol. 2015; 28:138-145.
2. Gurel B, et al. Am J Surg Pathol. 2010; 34: 1097-1105.
3. Sheridan T, et al. Am J Surg Pathol. 2007; 31:1351-1355.
4. Varma M, et al. J Clin Pathol. 2004; 57:687-690.

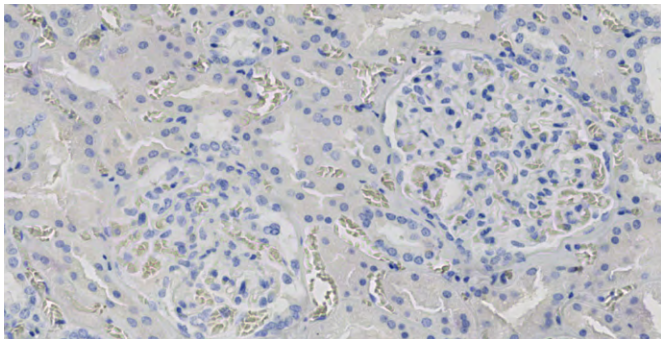


Figure 1. This kidney specimen shows no reactivity for PSA.

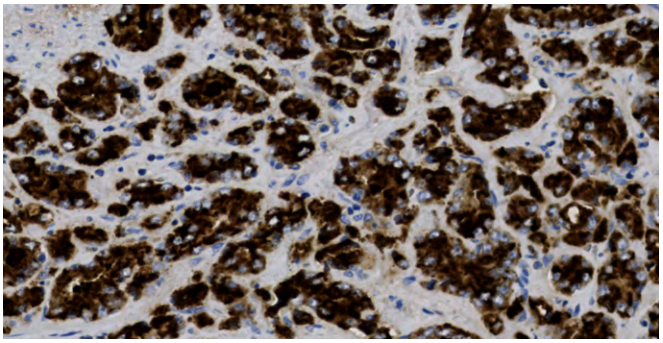


Figure 2. Strong granular cytoplasmic expression is seen for PSA in this prostatic adenocarcinoma.

Tissue-Tek Genie® anti-Prostein

IVD

Clone
ZR9

Host/clonality
Rabbit monoclonal

Product codes and quantity
8519-C010: RTU, 10 capsules; 1 pack
8519-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Granular cytoplasmic staining is observed in epithelial cells of prostate and benign prostate hyperplasia. Positive staining is not observed in any other normal tissues. Granular cytoplasmic staining is observed in neoplastic cells of prostate adenocarcinoma. Positive staining is not observed in other tumors.
It is useful for identification of prostatic carcinomas when used in a panel with other antibodies.

Description
Prostein, also known as P501S, is expressed in the vast majority of normal and malignant prostatic tissues. Prostein is localized in the Golgi complex and has a perinuclear-like cytoplasmic staining pattern. Prostein is a prostate-specific marker and has not been detected in any other normal or malignant tissues.

Positive tissue control
Benign prostate and prostate carcinoma

Staining pattern
Granular cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Granular cytoplasmic staining.
2. In normal and benign prostate, a moderate to strong granular cytoplasmic staining of the epithelial cells of the prostate gland.
3. Granular cytoplasmic staining of the majority of the neoplastic cells in prostate adenocarcinoma.
4. No staining on epithelial cells in kidney, appendix, or any other tissues.

References

1. Osunkoya AO, et al. Hum Pathol. 2007; 38:1836-1841.
2. Yin M, et al. Diagn Pathol. 2007; 2:41.
3. Wilkerson ML, et al. Arch Pathol Lab Med. 2014; 138:1643-1665.
4. Epstein JI, et al. Am J Surg Pathol 2014; 38:e6–e19.

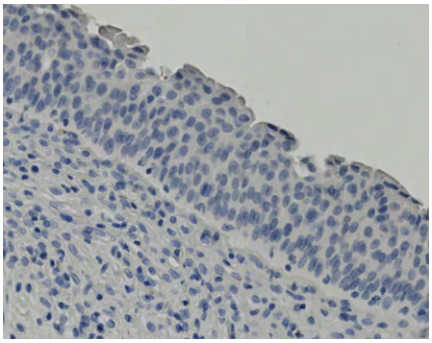


Figure 1. No staining for prostein is seen in the epithelium or stroma of the bladder.

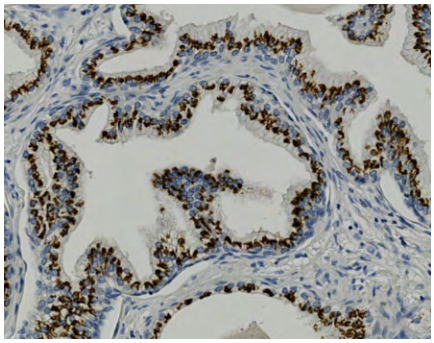


Figure 2. Strong granular cytoplasmic reactivity for prostein is seen in benign prostate epithelium.

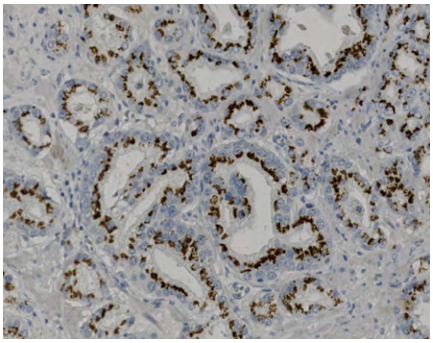


Figure 3. Moderate to strong granular cytoplasmic reactivity for prostein is seen in this example of prostate adenocarcinoma.

Tissue-Tek Genie® anti-S100B

IVD

Clone
EP32

Host/clonality
Rabbit monoclonal

Product codes and quantity
8442-C010: RTU, 10 capsules; 1 pack
8442-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the S100B protein in the cytoplasm of glial cells of nervous system, melanocytes, chondrocytes, and adipocytes. It may be useful for classifying tumors in nervous system and differentiating melanomas and nerve sheath tumors from carcinomas when used with a panel of antibodies.

Description
S100 is a multigene family of calcium binding proteins. S100B is one member of the S100 family and is expressed in glial cells of nervous system, melanocytes, chondrocytes, and adipocytes. The antibody labels S100B in normal and neoplastic cells.

Positive tissue control
Skin, gastrointestinal tract, melanoma

Staining pattern
Cytoplasmic and nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct nuclear and cytoplasmic staining of macrophages in lamina propria, Schwann cells of peripheral nerve fibers and ganglionic satellite cells in muscularis propria and submucosa in appendix.
2. A moderate to strong, distinct nuclear and cytoplasmic staining of myoepithelial cells in breast, and no more than a moderate staining in epithelial cells.
3. At least a weak, distinct nuclear and cytoplasmic staining of neoplastic cells in melanoma.
4. A moderate to strong, distinct nuclear and cytoplasmic staining of adipocytes and macrophages.

References

1. Donato R. Biochim. Biophys. Acta. 1999; 1450(3):191-231.
2. Yaziji H and Gown AM. Int. J. Surg. Pathol. 2003; 11(1):11-15.
3. Ohsie SJ, et al. J. Cutan. Pathol. 2008; 35(5):433-444.

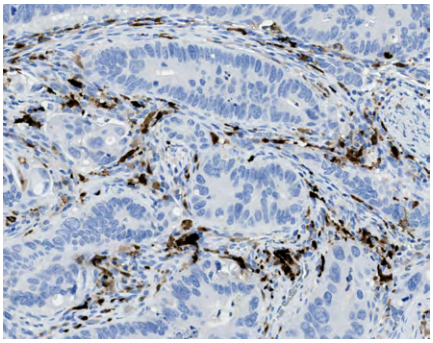


Figure 1. No staining of columnar epithelial cells in colon adenocarcinoma, but positive staining of macrophages in supporting stroma.

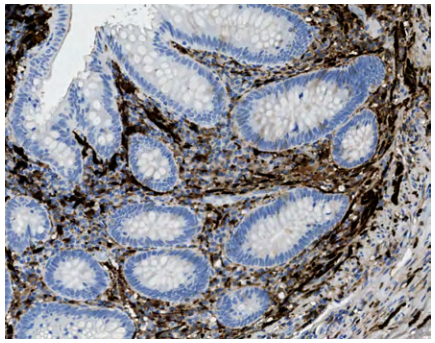


Figure 2. Strong staining of macrophages, Schwann cells, and ganglionic cells in muscularis propria and submucosa in appendix.

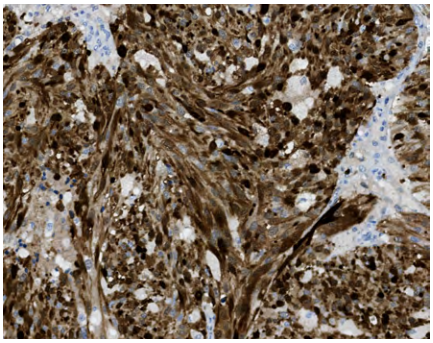


Figure 3. Strong staining in malignant melanoma.

Tissue-Tek Genie® anti-SOX2

IVD

Clone
EP103

Host/clonality
Rabbit monoclonal

Product codes and quantity
8228-C010: RTU, 10 capsules; 1 pack
8228-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels embryonic stem cells as well as adult tissue progenitor cells, basal cells of normal tonsil, esophagus, cervix, prostate, spermatogonia of testis, neoplastic cells of many cancers, such as embryonal carcinoma, various squamous cell carcinomas, brain tumors, and breast cancer.
It is useful for identifying lung squamous cell carcinomas (SCC), immature teratomas in the central nervous system (CNS), embryonal carcinoma, and to distinguish seminomatous testicular germ cell tumors (SOX2-) from nonseminomatous germ cell tumors (SOX2+) when used in a panel of other antibodies.

Description
Sry-related HMg-box gene 2 (SOX2) is expressed in multipotent neuronal stem cells in normal tissues. Overexpression of SOX2 is found in testicular germ cell tumors, teratomas, astrocytic tumors, melanomas, various squamous cell carcinomas, and breast cancers with a basal cell phenotype.

Positive tissue control
Embryonal carcinoma, esophagus, SCC, tonsil

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil, esophagus, cervix, and prostate, positive staining of basal cells.
2. In appendix, a weak to moderate staining of neuroendocrine cells, ganglion satellite cells (gliocytes), other cells are negative.
3. In testis, a weak to moderate staining of spermatogonia.
4. In embryonal carcinoma, a weak to moderate staining of neoplastic cells.
5. Nuclear staining of squamous cell carcinomas (SCC).

References

1. Rodriguez-Pinilla SM, et al. Mod Pathol. 2007; 20:474-481.
2. Santagata S, et al. Am J Surg Pathol. 2007; 31:836845.
3. Phi JH, et al. Am J Surg Pathol. 2008; 32:103-112.
4. Gopalan A, et al. Mod Pathol. 2009; 22:1066-1074.
5. Sholl LM, et al. Appl Immunohistochem Mol Morphol. 2010; 18:55-61.
6. Maier S, et al. Hum Pathol. 2011; 42:1078-1088.
7. Tsuta K, et al. J Thorac Oncol. 2011; 6:1190-1199.

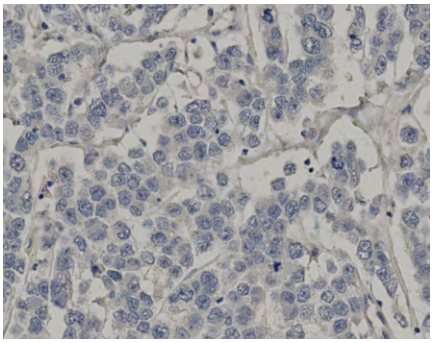


Figure 1. This seminoma is negative for nuclear SOX2 staining.

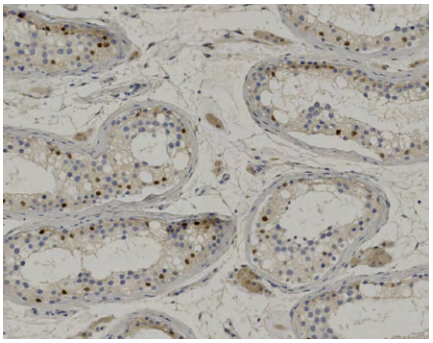


Figure 2. Moderate to strong nuclear staining is seen in scattered spermatogonia. Other tissue elements are negative.

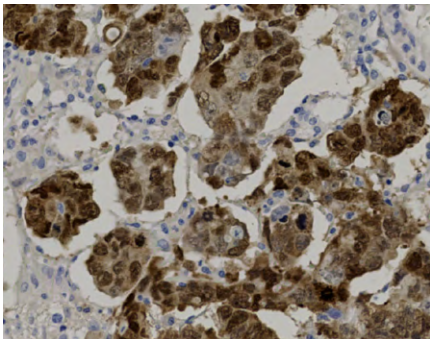


Figure 3. Moderate to strong nuclear staining and weak to moderate granular cytoplasmic expression is present in this embryonal carcinoma.

Tissue-Tek Genie® anti-SOX10

IVD

Clone
EP268

Host/clonality
Rabbit monoclonal

Product codes and quantity
8264-C010: RTU, 10 capsules; 1 pack
8264-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Sry-related HMg-box gene 10 (SOX10) protein in the nuclei of glial cells, Schwann cells, myoepithelial cells (salivary, bronchial, and mammary glands) as well as neoplasms such as melanocytic nevus, melanoma, schwannoma, neurofibroma, granular cell tumor, and glioma. It may be useful for detecting melanomas when used with a panel of other antibodies.

Description
SOX10 is a neural crest transcription factor involved in the determination of cell fate, maturation, and maintenance of Schwann cells and melanocytes. The antibody labels SOX10 in both normal and neoplastic cells.

Positive tissue control
Epidermis, colon, melanoma

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong, nuclear staining of melanocytes in skin and Schwann cells in colon.
2. At least moderate nuclear staining of majority of myoepithelial cells lining sweat glands in skin.
3. A strong nuclear staining of neoplastic cells in Schwannoma and malignant melanoma.
4. At least moderate nuclear staining of neoplastic cells in malignant melanoma.

References

1. Mollaaghababa R and Pavan WJ. Oncogene. 2003; 22(20):3024-3034.
2. Miettinen M, et al. Am. J. Surg. Pathol. 2015; 39(6):826-835.
3. Shin J, et al. J. Am. Acad. Dermatol. 2012; 67(4):717-726.

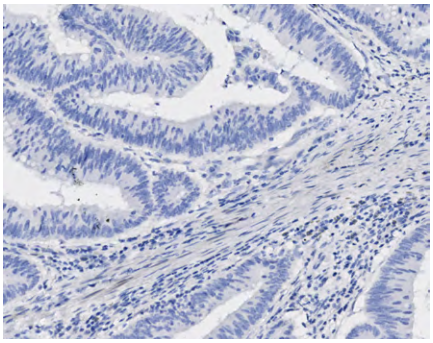


Figure 1. No staining in colon adenocarcinoma.

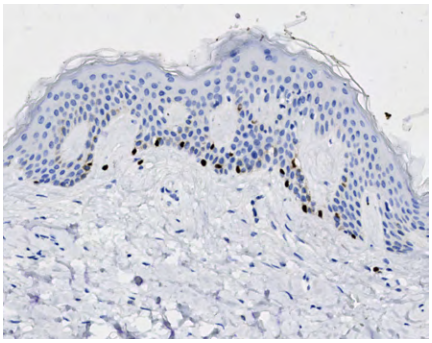


Figure 2. Strong staining in isolated melanocytes located in the basal layer of epidermis.

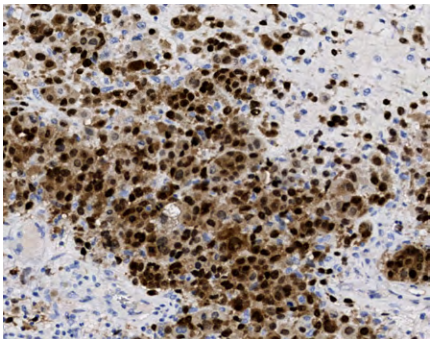


Figure 3. Strong staining in malignant melanoma.

Tissue-Tek Genie® anti-SOX11

IVD

Clone
GM032

Host/clonality
Mouse monoclonal

Product codes and quantity
8521-C010: RTU, 10 capsules; 1 pack
8521-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
A nuclear staining pattern is observed in most cases of mantle cell lymphoma. A weak cytoplasmic staining reaction in cells with a strong nuclear staining reaction may also be seen. Nuclear staining is observed in malignant gliomas, synovial sarcomas, small cell lung carcinomas (SCLC), and gastric adenocarcinomas. Positive staining is not observed in normal adult tissues.
It is useful for the diagnosis of mantle cell lymphoma, particularly for the rare cyclin D1-negative cases when used in a panel with other antibodies.

Description
Sry-related HMg-box gene 11 (SOX11) is a nuclear transcription factor expressed in the developing human central nervous system and plays a role in embryonic cell determination. SOX11 is not expressed in normal adult human tissues. SOX11 over-expression is reported in over 90% of mantle cell lymphomas, including the rare cyclin D1-negative cases. SOX11 expression has also been identified in other tumors including malignant gliomas, neuroendocrine carcinomas, sarcomas, adenocarcinomas, lymphoblastic leukemias /lymphomas, Burkitt lymphomas and hairy cell leukemias.

Positive tissue control
Selected mantle cell lymphomas.

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A weak to strong nuclear staining of virtually neoplastic cells in the mantle cell lymphoma.
2. A weak cytoplasmic staining reaction in cells with a strong nuclear staining reaction was accepted.
3. No nuclear staining in tonsil and other normal or tumor tissues.
4. A weak diffuse background staining can be expected.

References

1. Bea S, et al. Curr Oncol Rep. 2017; 19:43.
2. Nakashima M, et al. Appl Immunohistochem Mol Morphol. 2014; 22:720-7.
3. Zheng W, et al. Am J Surg Pathol. 2012; 36:214-219.
4. Chen Y, et al. Modern Pathology (2010) 23; 105-112.
5. Nordström L, et al. Int. J. Biochem. Cell Biol. 2010; 42:425-8.

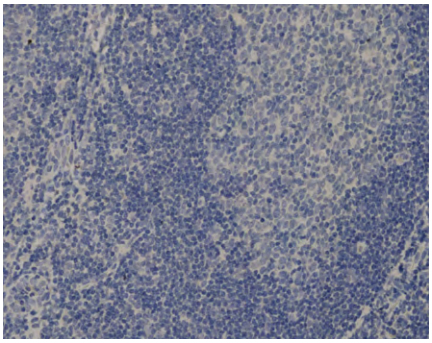


Figure 1. No reactivity for SOX11 is seen among the normal elements of this benign tonsil.

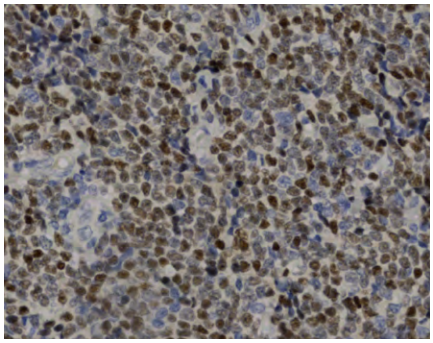


Figure 2. A moderate nuclear staining reaction for SOX11 is seen in this example of mantle cell lymphoma.

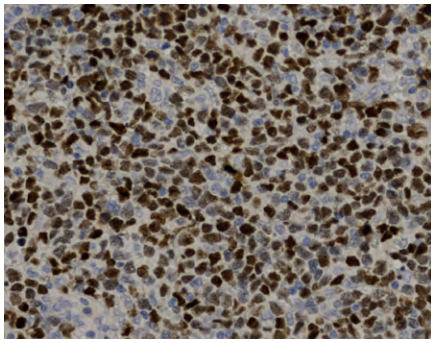


Figure 3. Strong nuclear reactivigty for SOX11 is seen in the neoplastic cells of this mantle cell lymphoma.

Tissue-Tek Genie® anti-Synaptophysin

IVD

Clone
BS15

Host/clonality
Mouse monoclonal

Product codes and quantity
8453-C010: RTU, 10 capsules; 1 pack
8453-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
In the appendix and colon, moderate to strong cytoplasmic staining of axons is observed in the Auerbach's and Meissner's plexus, and at least moderate cytoplasmic staining of endocrine cells of the mucosal tissue. Cytoplasmic staining is also observed in neuronal and neuroendocrine tumors. It may be useful for classifying neuronal and neuroendocrine tumors, when used in a panel with other antibodies.

Description
Synaptophysin is a calcium-binding glyco-protein expressed in the membranes of neuronal presynaptic vesicles, as well as in vesicle membranes of neuroendocrine cells and the choroid plexus epithelium.

Positive tissue control
Appendix, colon, pancreas, neuroendocrine tumors

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A distinct cytoplasmic staining of endocrine islet cells in pancreas.
2. A moderate to strong, distinct cytoplasmic staining of neuroendocrine cells, ganglion cells and axons of nerve plexus in colon.
3. A moderate to strong, distinct cytoplasmic, dot-like staining of cortical epithelial cells in adrenal gland.
4. At least moderate, distinct, cytoplasmic staining of neoplastic cells in small cell lung carcinoma and intestinal neuroendocrine tumor.

References

1. Baishya BK, et al. J. Pediatr. Neurosci. 2016; 11(4):348-350.
2. Bernick PE, et al. Dis. Colon Rectum. 2004; 47(2):163-169.

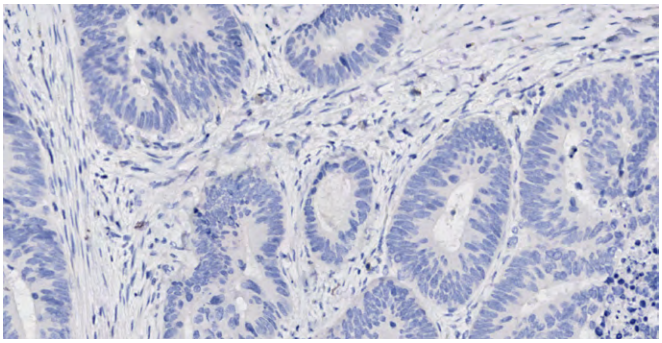


Figure 1. Negative staining in colon adenocarcinoma.

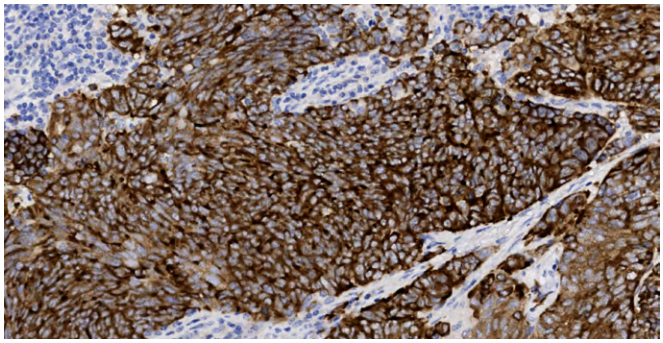


Figure 2. Strong staining in small cell lung carcinoma.

Tissue-Tek Genie® anti-Terminal Deoxyribonucleotidyl Transferase

Clone
SEN28

Host/clonality
Mouse monoclonal

Product codes and quantity
8243-C010: RTU, 10 capsules; 1 pack
8243-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels neoplastic cells of lymphoblastic leukemia/lymphoma and infiltrating immature lymphocytes within thymomas. Mature lymphomas are negative. It is useful for the classification of malignant lymphomas and acute leukemias, particularly for the identification of precursor lymphoid neoplasms such as B lymphoblastic leukemia/lymphoma and T lymphoblastic leukemia/lymphoma, when used with a panel of antibodies.

Description
Terminal deoxynucleotidyl transferase (TdT) is a deoxynucleotide polymerizing enzyme that generates antigen receptor diversity at the junctions of rearranged immunoglobulin heavy chain and T-cell receptor gene segments. TdT protein expression is normally found only in B-cell and T-cell lymphoblasts/lymphoid progenitor cells. TdT protein-positive cells are regularly detected in thymus and bone marrow, and may occasionally be seen in tonsils, lymph nodes, and extranodal lymphoid tissue.

Positive tissue control
Thymus, thymoma, some cells within tonsils

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct nuclear staining reaction of dispersed subset of T-lymphocytes in tonsil.
2. An at least moderate, distinct nuclear staining reaction of virtually all cortical thymocytes of normal thymus.
3. An at least weak to moderate, distinct nuclear staining reaction of the vast majority of immature T-cells intermingling with the neoplastic cells in a subset of thymomas.
4. No nuclear staining reaction of mature T- and B-cells in the tonsils or the vast majority of medullary thymocytes of the normal thymus.

References

1. Kang LC, and Dunphy CH. Arch. Pathol. Lab. Med. 2006; 130:153-157.
2. Strauchen JA, and Miller LK. Int. J. Surg. Pathol. 2003; 11:21-24.
3. Strauchen JA, and Miller LK. Am. J. Clin. Pathol. 2001; 116:12-16.

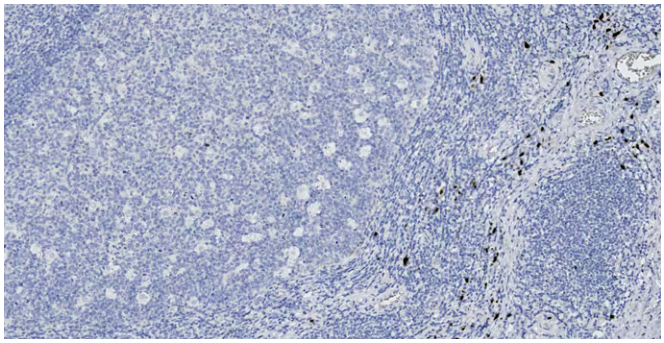


Figure 1. Mature T- and B-cells of the tonsil are negative for TdT. Scattered immature T-Cells of the interfollicular areas may show strong nuclear staining.

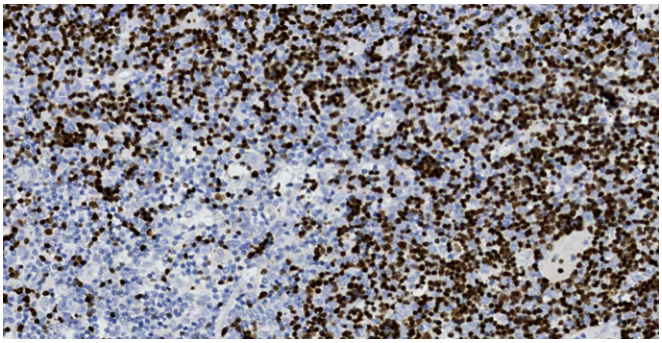


Figure 2. Strong staining of the infiltrating immature T-cells is seen in this thymoma. The neoplastic epithelial component is negative.

Tissue-Tek Genie® anti-Thyroid Transcription Factor-1

IVD

Clone
EP229

Host/clonality
Rabbit monoclonal

Product codes and quantity
8224-C010: RTU, 10 capsules; 1 pack
8224-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody labels the Thyroid Transcription Factor-1 (TTF-1) protein in the nucleus of follicular epithelial cells in normal thyroid and thyroid tumors, in nucleus of type II pneumocytes, Clara cells, and basal cells of terminal bronchioles in normal lung and lung adenocarcinomas. It may be useful for detecting tumors in lung and thyroid.

Description
TTF-1 is a transcription factor expressed in thyroid, lung, and certain areas of brain.

Positive tissue control
Thyroid, lung, thyroid, lung adenocarcinomas

Staining pattern
Nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong, distinct nuclear staining of all type II pneumocytes, Clara cells and basal cells of terminal bronchioles in lung.
2. A moderate to strong, distinct nuclear staining of columnar epithelial cells in lung terminal bronchioles.
3. A strong, distinct nuclear staining of follicular epithelial cells in thyroid gland.
4. At least weak to strong nuclear staining of neoplastic cells in lung adenocarcinomas.
5. No nuclear staining of colon adenocarcinoma.

References
1. Lazzaro D, et al. Development. 1991; 113:1093-1104.

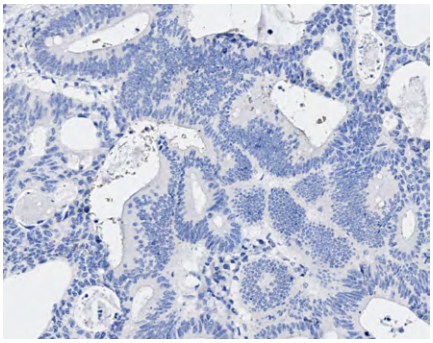


Figure 1. Negative staining of colon adenocarcinoma.

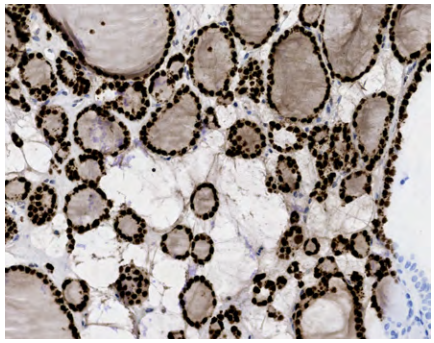


Figure 2. Strong staining in follicular epithelial cells of normal thyroid.

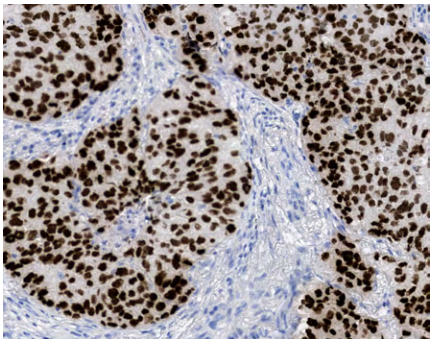


Figure 3. Strong staining in lung adenocarcinomas.

Tissue-Tek Genie® anti-Tryptase

IVD

Clone
EP259

Host/clonality
Rabbit monoclonal

Product codes and quantity
8372-C010: RTU, 10 capsules; 1 pack
8372-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
In tonsil, a moderate to strong cytoplasmic staining of interfollicular mast cells is observed. Lymphocytes should be negative for tryptase. In appendix and colon, a moderate to strong cytoplasmic staining of mast cells in the lamina propria is seen. Strong cytoplasmic staining of mast cells is observed in mastocytosis. Anti-tryptase antibody also may be useful for detecting reactive mast cell hyperplasia, mast cell leukemia, and mastocytosis, when used with a panel of antibodies.

Description
Tryptase is a trypsin-like neutral serine proteinase stored predominantly in secretory granules of mast cells and basophils, and upon cellular activation is released into the extracellular environment.

Positive tissue control
Tonsil, appendix, colon

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. In tonsil, a moderate to strong cytoplasmic staining of interfollicular mast cells. A weak and diffuse staining pattern in the vicinity of labeled cells may be observed. Lymphocytes stain negative.
2. In appendix and colon, a moderate to strong cytoplasmic staining of mast cells in lamina propria. A weak and diffuse staining pattern in the vicinity of labeled cells may be observed.
3. Cytoplasmic staining of mast cells of mastocytosis.

References

1. Fiorucci L and Ascoli F. Cell. Mol. Life Sci. 2004; 61(11): 1278-1295.
2. Foster B, et al. J. Allergy Clin. Immunol. 2002; 109(2):287-293.
3. Horny HP, et al. Pathobiology. 2010; 77:169-180.

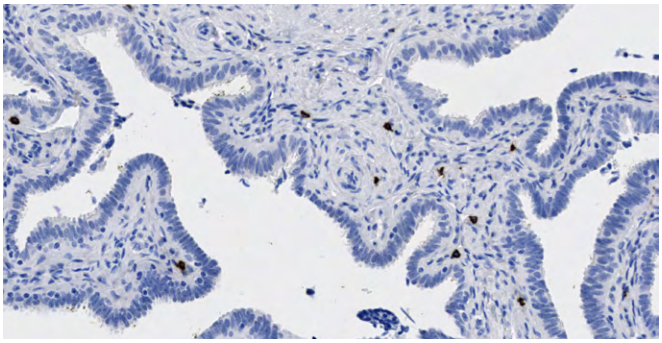


Figure 1. Negative staining of epithelial cells in uterine tube but positive staining of mast cells in tubal wall.

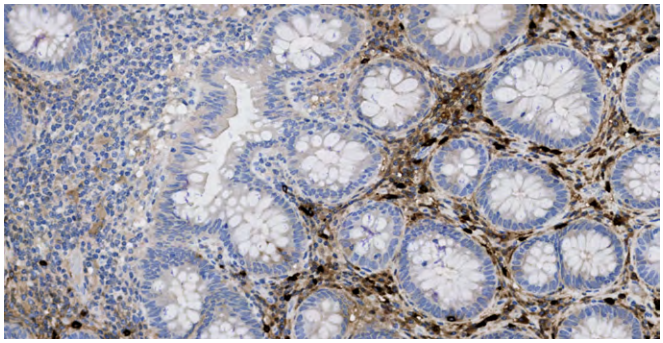


Figure 2. Moderate to strong staining of mast cells in lamina propria of colon.

Tissue-Tek Genie® anti-Vimentin

IVD

Clone
V9

Host/clonality
Mouse monoclonal

Product codes and quantity
8336-C010: RTU, 10 capsules; 1 pack
8336-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This antibody stains vimentin protein in the cytoplasm of mesenchymal cells such as fibroblasts, smooth muscle cells and endothelium in both normal and neoplastic cells. It may be useful for classifying neoplastic tissues of mesenchymal origin such as soft tissue tumors when used with a panel of antibodies.

Description
Vimentin is an intermediate filament which forms part of the cytoskeleton and is expressed ubiquitously in mesenchymal cells such as fibroblasts, smooth muscle cells, and endothelium. The antibody labels vimentin in normal and neoplastic cells.

Positive tissue control
Lymph node, appendix, tonsil

Staining pattern
Cytoplasmic

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A moderate to strong cytoplasmic staining of endothelial cells and fibroblasts.
2. A moderate to strong cytoplasmic staining of peripheral B-cells and T-cells, germinal center macrophages and follicular dendritic network in tonsil.
3. A moderate to strong cytoplasmic staining of neoplastic cells of melanoma.
4. At least weak to moderate cytoplasmic and membraneous staining of neoplastic cells in renal cell carcinoma.

References

1. Osborn M, et al. Eur. J. Cell Biol. 1984 May; 34(1):137-143.
2. Azumi N and Battifora H. Am. J. Clin. Pathol. 1987; 88(3):286-296.

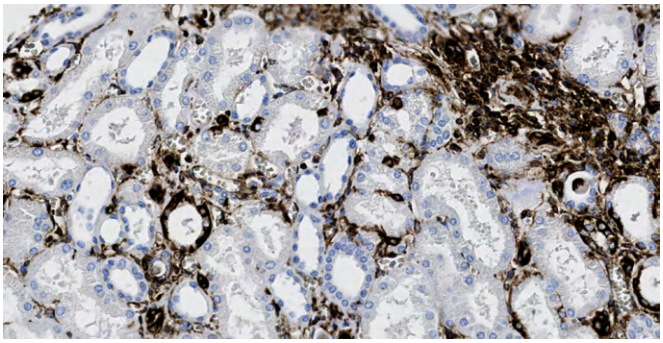


Figure 1. Negative staining in epithelial cells of proximal tubules in kidneys but strong staining in endothelial cells and fibroblasts.

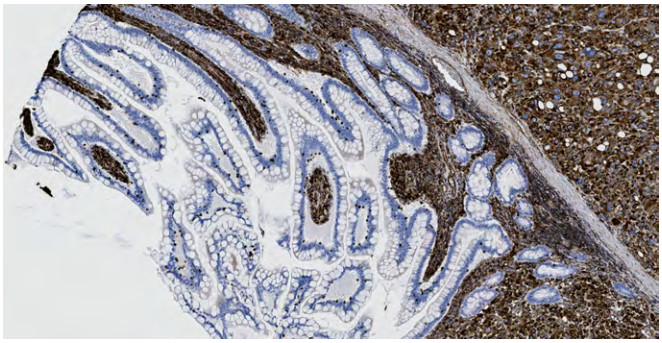


Figure 2. Strong staining of metastatic melanoma.

Tissue-Tek Genie® anti-WT1

IVD

Clone
EP122

Host/clonality
Rabbit monoclonal

Product codes and quantity
8340-C010: RTU, 10 capsules; 1 pack
8340-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This antibody labels WT1 in podocytes and parietal epithelial cells of kidney, in epithelial and smooth muscle cells of the fallopian tube, neoplastic cells of ovarian serous carcinomas and mesotheliomas, but not in renal tubule cells and lung adenocarcinoma. It is a useful for identifying Wilms' tumor, distinguishing malignant mesothelioma from lung adenocarcinoma, and distinguishing serous carcinoma from non-serous carcinoma when used with a panel of antibodies.

Description
Wilms' tumor-1 protein (WT1) is a transcription factor that plays a role in the development of genitourinary organs and is involved in the induction of Wilms' tumor (nephroblastoma), a pediatric renal malignancy. It is largely restricted to the surface epithelium and inclusion cysts of ovaries and fallopian tubes, and is absent in endometrial and cervical epithelia.

Positive tissue control
Kidney, fallopian tube, and serous carcinomas

Staining pattern
Nuclear staining is interpreted as positive. Nucleolar staining and/or membraneous staining alone are not considered positive

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. A strong and distinct nuclear staining of virtually all epithelial and smooth muscle cells in the fallopian tube, neoplastic cells in serous carcinoma and virtually all neoplastic cells in mesothelioma.
2. A moderate to strong nuclear staining of podocytes and parietal epithelial cells in kidney.
3. No staining of lung adenocarcinoma or the renal tubules.

References

1. Waldstrom M, and Grove A. Arch. Pathol. Lab. Med. 2005; 129:85-88.
2. Ordóñez NG. Am. J. Surg. Pathol. 2003; 27:1031-1051.
3. Goldstein NS, et al. Am. J. Clin. Pathol. 2001; 116:246-252.

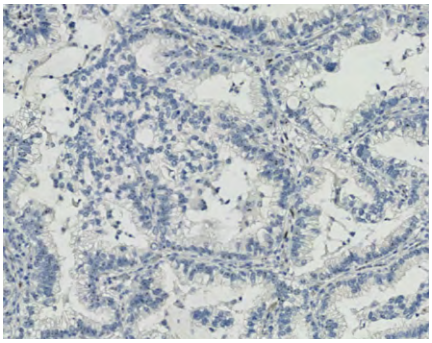


Figure 1. Lung adenocarcinoma is negative for nuclear WT1 expression (nucleolar reactivity is interpreted as negative).

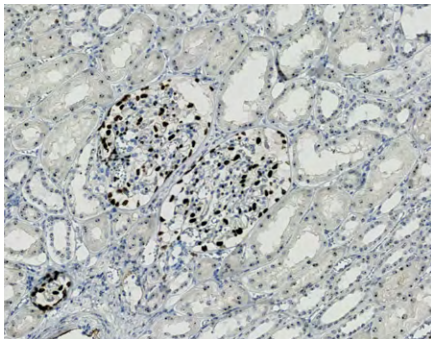


Figure 2. Moderate to strong nuclear reactivity for WT1 is present in the podocytes and parietal epithelial cells of the renal glomeruli.

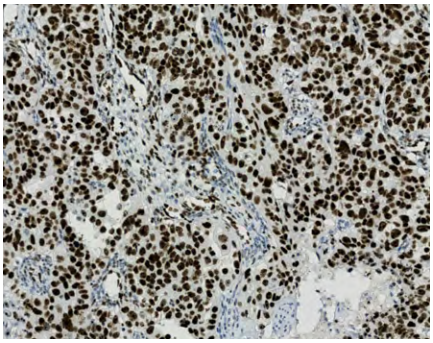


Figure 3. Strong nuclear expression of WT1 is characteristic of serous carcinoma, as seen in the above image.

Tissue-Tek Genie® anti-ZAP70

IVD

Clone
ZM97

Host/clonality
Mouse monoclonal

Product codes and quantity
8501-C010: RTU, 10 capsules; 1 pack
8501-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
Cytoplasmic and nuclear staining are observed in isolated T-cells in germinal center and T-cell zones of normal tonsil and lymph node tissues. Cytoplasmic and nuclear staining are observed in neoplastic cells of nodal T-cell lymphomas, peripheral T-cell lymphomas, and a subset of chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL). It is a useful aid for identification and classification of a subset of CLL/SLL when used with a panel of other antibodies.

Description
ZAP70 is expressed in T-cells, natural killer (NK) cells, and pro/pre B-cells, but not in normal mature B-cells. Expression of ZAP70 has been reported in various lymphomas, including mantle cell lymphoma, marginal zone lymphoma, and approximately 25% of chronic lymphocytic leukemias. In CLL, ZAP70 expression is closely associated with an unmutated configuration of the IgVH genes.

Positive tissue control
Lymph node, tonsil, selected cases of B-CLL/SLL.

Staining pattern
Cytoplasmic and nuclear

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Cytoplasmic and nuclear staining.
2. A moderate to strong staining of isolated T-cells in germinal center and a weak to moderate staining of T-cells in T-cell zones of tonsil and lymph nodes.
3. Cytoplasmic and nuclear staining of neoplastic cells in nodal T-cell lymphoma, peripheral T-cell lymphoma and a subset of cases of B-CLL.
4. Cytoplasmic and nuclear staining of dispersed lymphocytes in AMLs.
5. A faint staining in dispersed cells in liver and colon carcinoma is acceptable.

References

1. Richardson SJ, et al. Blood 2006; 107:3584-3592.
2. Scielzo C, et al. Leukemia. 2006; 20:689-695.
3. Wang H, et al. Cold Spring Harb Perspect Biol. 2010; 2:a002279.
4. Admirand JH, et al. Mod Pathol. 2010; 23:1518-1523.

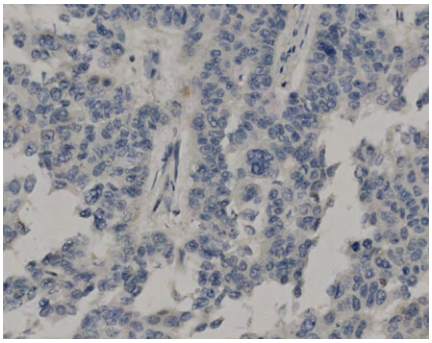


Figure 1. No staining for ZAP70 is seen among the neoplastic epithelial cells or stroma in this colorectal carcinoma.

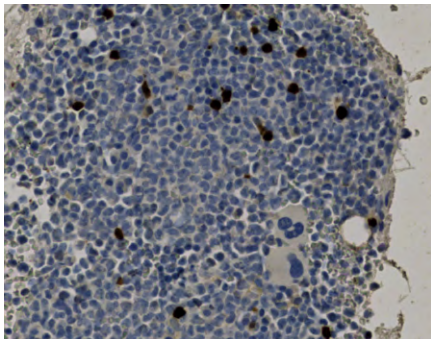


Figure 2. The neoplastic cells of this acute myeloid leukemia (M5) show no staining for ZAP70, while in the background scattered T-cells and immature B-cells are positive for strong nuclear and cytoplasmic reactivity.

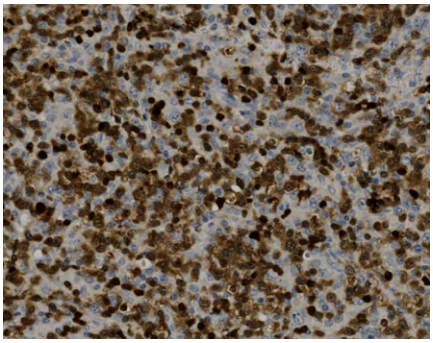


Figure 3. Cytoplasmic and nuclear staining are observed in the neoplastic cells of this nodal T-cell lymphoma.

Tissue-Tek Genie® DUO anti-AMACR/p63/ CK5/6 PIN Antibody Cocktail

IVD

Clone
13H4/MX013/(D5/16B4)

Host/clonality
Mouse and rabbit monoclonal

Product codes and quantity
8485-C010: RTU, 10 capsules; 1 pack
8485-M100: RTU, 100 tests, 1 cartridge; 1 unit

Application
This antibody cocktail labels AMACR, P63 and CK 5/6 proteins. Cytoplasmic staining for racemase (AMACR) is observed in prostate adenocarcinoma and granular cytoplasmic staining of epithelial cells lining the renal proximal tubules.
In benign prostate glands, p63 shows moderate to strong nuclear staining in basal cells. No basal cell staining is seen in prostate carcinoma. Cytoplasmic staining for racemase (AMACR) is typically seen in the neoplastic epithelium of prostate carcinoma and in some in hyperplastic glands and PIN lesions.
It is useful for distinguishing benign and malignant proliferations in the prostate, when used in a panel with other antibodies

Description
The immunohistochemical combination of nuclear p63 expression and cytoplasmic CK5/6 expression aids in detection of peripheral basal cells, while cytoplasmic expression of AMACR in glandular cells facilitates the detection of potentially neoplastic proliferations.

Positive tissue control
Normal (benign) prostate and prostate adenocarcinoma

Staining pattern
Cytoplasmic for AMACR, nuclear for p63, and cytoplasmic for CK5/6

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
AMACR
a. Granular cytoplasmic staining.
b. Cytoplasmic staining of the neoplastic cells of prostate adenocarcinoma or granular cytoplasmic staining of epithelial cells lining renal proximal tubules.
c. A negative or only weak cytoplasmic staining of stromal cells of prostate.

p63
a. Nuclear staining.
b. In prostate, moderate to strong nuclear staining in basal cells. No or a weak cytoplasmic staining in cells with strong p63 expression. Nuclear staining of basal cells of prostate PIN. No staining in prostate carcinoma owing to the absence of basal cells.

CK5/6
a. Cytoplasmic staining.
b. In basal cells of prostate, a weak to moderate cytoplasmic staining with no or only focal staining of the secretory cells.
c. Cytoplasmic staining of basal cells of the prostate hyperplastic glands and PIN lesions.

References

1. Paner GP, et al. Arch Pathol Lab Med. 2008; 132:1388-1396.
2. Dabir PD, et al. Diagnostic Pathology 2012, 7:81.
3. Trpkov K, et al. Am J Clin Pathol 2009;132:211-220.

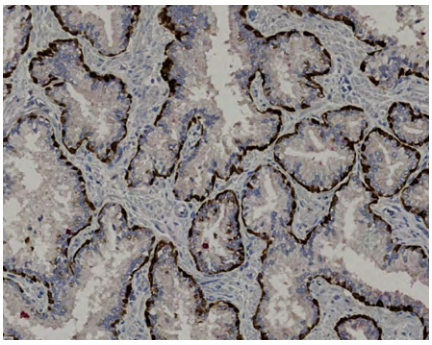


Figure 1. An example of benign hyperplastic prostate glands. The presence of nuclear staining for p63 and cytoplasmic staining for CK5/6, both in brown, demonstrates the presence of basal cells and supports a benign process. Staining for AMACR (red cytoplasmic reactivity) is negative in this image, as is typical of benign hyperplasia.

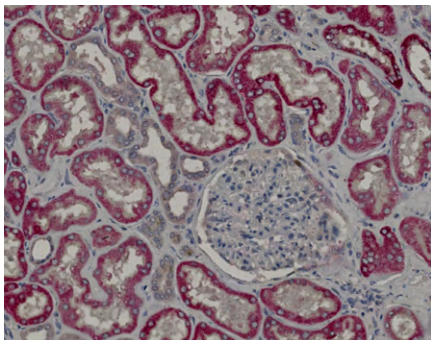


Figure 2. This example of a kidney stained with the PIN Antibody Cocktail demonstrates strong cytoplasmic staining for racemase (AMACR) in red, among proximal tubules. There is no staining among distal tubules or glomeruli for AMACR. No renal structures show reactivity for p63 or CK5/6.

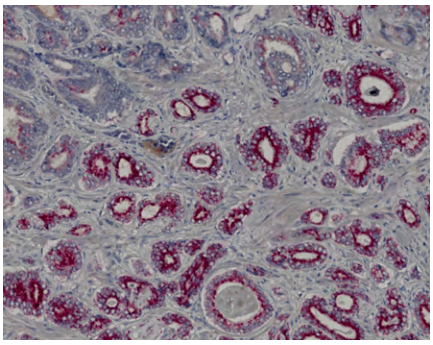


Figure 3. This image of prostatic adenocarcinoma demonstrates moderate to strong cytoplasmic staining of the neoplastic glands for racemase (AMACR), in red. The absence of staining for p63 or CK5/6 indicates the lack of basal cells among these glands and supports the diagnosis of adenocarcinoma.

Tissue-Tek Genie® DUO anti-Pan Cytokeratin/ CD31 Antibody Cocktail

IVD

Clone
(AE1/AE3/DC10)/RM247

Host/clonality
Mouse and rabbit monoclonal

Product codes and quantity
8484-C010: RTU, 10 capsules; 1 pack
8484-M100: RTU, 100 tests, 1 cartridge; 1 unit

Application
This antibody cocktail labels cytokeratin proteins in both normal epithelial cells and neoplastic cells of carcinoma, and labels CD31 protein in the endothelial cells of vascular and lymphatic vessels.
The anti-pan cytokeratin antibody cocktail is useful for identifying tumors of epithelial origin, and the anti-CD31 antibody is useful for identifying vascular and lymphatic vessels when used in a panel with other antibodies.

Description
Cytokeratins (CK) are a group of intermediate filament proteins expressed in cells of epithelial origin. CD31, also known as platelet/endothelial cell adhesion molecule 1 (PECAM-1), is a transmembrane protein expressed on endothelial cells and is considered to be a pan-endothelial cell marker.

Positive tissue control
Tonsil, appendix, liver, carcinoma

Staining pattern
Cytoplasmic and some membraneous staining for cytokeratins and membraneous and cytoplasmic staining for CD31

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
Pan Cytokeratin

a. Cytoplasmic staining.
b. In tonsil, a strong and diffuse cytoplasmic staining of squamous mucosa in all cell layers; interdigitating reticulum cells of lymphoid tissues can be positive.
c. In appendix, a strong cytoplasmic staining of appendiceal enterocytes (including crypt bases).
d. In liver, a weak to moderate membraneous staining of the majority of hepatocytes; a moderate to strong cytoplasmic staining of bile duct epithelial cells.
e. Cytoplasmic staining of the neoplastic cells in carcinomas.

CD31

a. Membraneous and cytoplasmic staining.
b. In appendix and tonsil, a moderate to strong membraneous staining of endothelial cells and plasma cells; An at least weak membraneous staining of activated B-Cell and T-cells in particular, mantle zone B-cells and intraepithelial T-cells. No staining of the epithelial cells in the appendix or tonsil.
c. In liver, at least weak to moderate staining of the majority of the hepatic sinusoidal endothelial cells.

References

1. Alexander-Sefre F, et al. J Clin Pathol. 2003 Oct; 56(10):786–788.
2. O'Donnell RK, et al. J Histochem Cytochem. 2008 Sep; 56(9):803–810.

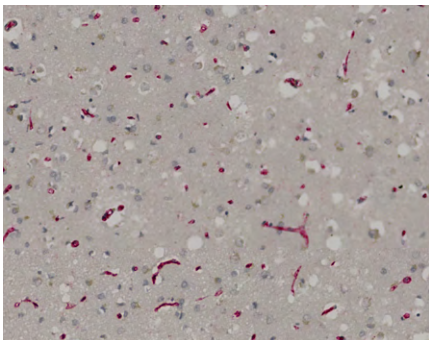


Figure 1. No brown cytoplasmic reactivity for cytokeratins is seen in this cerebrum, while endothelial cells of small vessels show strong red cytoplasmic and membrane reactivity for CD31.

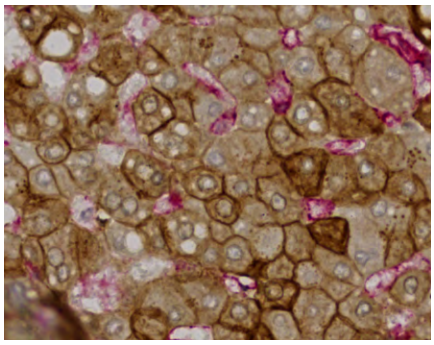


Figure 2. Moderate to strong cytoplasmic and membraneous reactivity for cytokeratins, in brown, is seen among hepatocytes. Moderate to strong cytoplasmic reactivity for CD31, in red, is seen among sinusoidal endothelial cells.

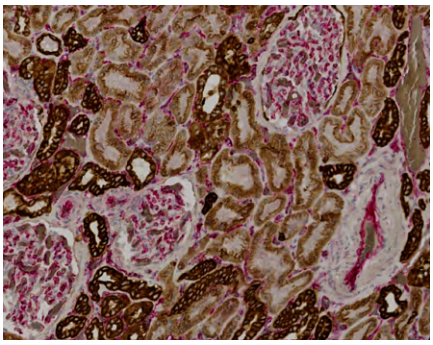


Figure 3. Moderate to strong cytoplasmic and membraneous reactivity for cytokeratins, in brown, is seen among collecting duct epithelial cells and parietal epithelial cells of Bowman's capsule. Moderate to strong cytoplasmic reactivity for CD31, in red, is seen among endothelial cells of glomeruli and within larger vessels.

Tissue-Tek Genie® DUO anti-Melan-A / Ki67 Antibody Cocktail

IVD

Clone
EP43/GM010

Host/clonality
Mouse and rabbit monoclonal

Product codes and quantity
8480-C010: RTU, 10 capsules; 1 pack
8480-M100: RTU, 100 tests, 1 cartridge; 1 unit

Application
This antibody cocktail labels Melan-A and Ki67 in both normal and neoplastic cells which show a cytoplasmic and nuclear staining pattern, respectively. Melan-A red cytoplasmic staining is observed in melanocytes in the basal layer of the epidermis, as well as nevus cells, and Ki67 brown nuclear staining is observed in some basal squamous epithelial cells. Cellular proliferation is correlated with the progression of melanoma. Neoplastic cells stained red for cytoplasmic Melan-A and brown for nuclear Ki67 are observed in some melanomas. Melanoma-infiltrating lymphocytes may also stain brown for nuclear Ki67.

This antibody cocktail is useful for assessing proliferative activity of melanoma when used in a panel of antibodies.

Description
Melan-A, also known as Melanoma Antigen Recognized by T-cell 1 (MART-1), is a protein associated with endoplasmic reticulum and melanosomes and is expressed in melanocytes. Melan-A is expressed in all normal melanocytes and is detected in 80-100% of melanomas. Ki67 is a proliferation-associated nuclear protein is expressed during all active phases of the cell cycle and is absent in resting cells.

Positive tissue control
Melanoma, skin

Staining pattern
Cytoplasmic for Melan-A and nuclear for Ki67

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
Melan-A

a. Cytoplasmic staining.
b. In skin, a strong distinct cytoplasmic staining of melanocytes in the basal layer of epidermis and nevus cells; negative staining of squamous epithelial cells.
c. Cytoplasmic staining of selected melanomas.

Ki-67

a. Nuclear staining.
b. Positive staining among proliferating cells.
c. Weak to moderate nuclear staining in the vast majority of para-basal squamous epithelial cells.
d. Nuclear staining of neoplastic cells in melanoma.
e. No or only a weak background and cytoplasmic staining among positive cells.

References

1. Nielsen PS, et al. Mod Pathol. 2013, 26:404-413.
2. Wandler A, et al. J Cutan Pathol. 2016; 43:956-962.
3. Nielsen PS, et al. Am J Dermatopathol. 2011; 33:361-370.
4. Sangoi AR, et al. Am J Surg Pathol. 2011 May;35(5):678-86.

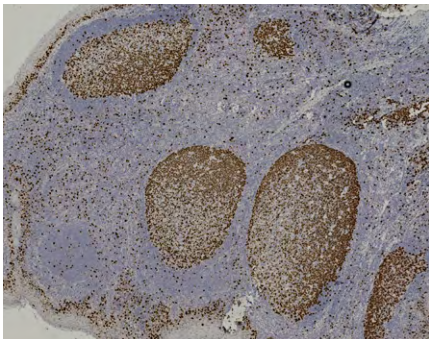


Figure 1. No staining reaction for Melan-A is observed in this reactive tonsil, while an extensive, strong nuclear staining reaction is present among the proliferating germinal center lymphocytes and the basal cells of the squamous epithelium.

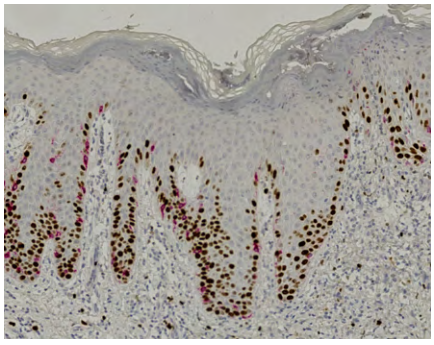


Figure 2. The melanocytes in the basal epidermis show moderate to strong cytoplasmic reactivity for Melan-A in red. The proliferating basal keratinocytes show moderate to strong Ki67 nuclear reactivity in brown.

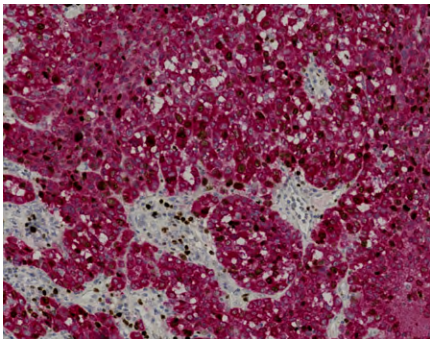


Figure 3. The neoplastic cells of this melanoma show strong cytoplasmic staining for Melan-A in red, with a significant fraction showing nuclear Ki67 reactivity in brown.

FITC-labeled antibodies

Tissue-Tek Genie® FITC anti-C3

IVD

Clone
Polyclonal

Host/clonality
Goat polyclonal

Product code and quantity
8539-C010: RTU, 10 capsules; 1 pack

Application
In diseased skin tissue, strong linear or granular staining at the dermal-epidermal junction is observed. In diseased renal tissue, strong linear or granular staining is observed at the mesangium and/or glomerular capillary regions.

Description
C3, also known as complement component 3, is a protein of the immune system and plays a central role in the complement immune system and contributes to innate immunity. Human C3 can be detected in dermal vessels in kidney and skin tissue in lupus nephritis cases containing C3 deposits, as well as associated with a kidney and skin tissues under pathologic conditions such as post-infectious glomerulonephritis and bullous pemphigoid.

Positive tissue control
Kidney or skin from Lupus cases with C3 deposits

Staining pattern
Membraneous and/or cytoplasmic

Assessment criteria
1. Linear deposition at dermal epidermal junction.

References

1. Wagrowska-Danilewicz M and Zeromski J. Pol. J. Pathol. 2010; 2:83-88.
2. Tomich CE, et al. Oral Surg. Oral Med. Oral Pathol. 1981; 51(6):603-608.
3. Mysorekar VV, et al. Indian Dermatol. Online J. 2015; 6(3): 172-180.
4. Sethi S, et al. Kidney Int. 2012; 82(4):465-473.
5. Méry JP, et al. Proc. Eur. Dial. Transplant Assoc. 1975; 11:506-511.

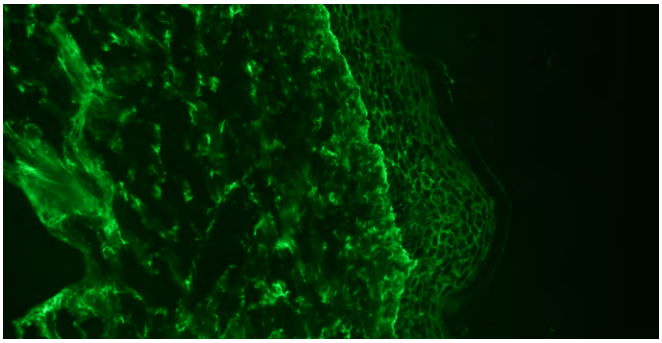


Figure 1. Linear deposition of C3 at junction in skin with bullous pemphigoid.

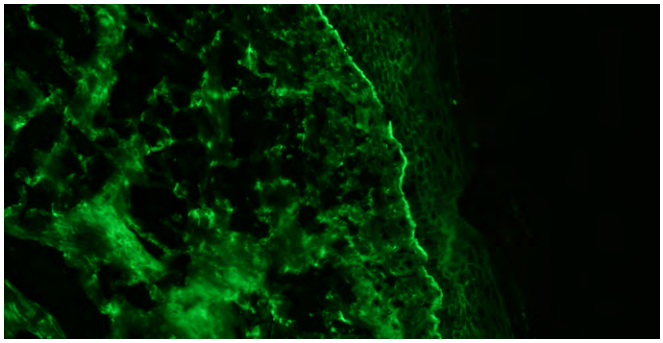


Figure 2. Linear deposition of C3 at junction in skin with bullous pemphigoid.

Tissue-Tek Genie® FITC anti-Fibrinogen

IVD

Clone
Polyclonal

Host/clonality
Goat polyclonal

Product code and quantity
8538-C010: RTU, 10 capsules; 1 pack

Application
Goat polyclonal antibody with normal placenta shows strong, distinct cytoplasmic immunofluorescent (IF) staining of trophoblastic cells and in blood clots. In diseased skin tissue, strong linear or granular staining at the dermal-epidermal junction and/or basement membrane zone is observed. In diseased renal tissue, strong linear or granular staining is observed at the mesangium and/or glomerular capillary regions.

Description
Fibrinogen is a soluble blood coagulation glycoprotein. It comprises of paired sets of three sub-unites (alpha, beta and gamma). Fibrinogen polymerizes into fibrin and acts as a cofactor in platelet aggregation.

Positive tissue control
Placenta

Staining pattern
Membraneous and/or cytoplasmic

Assessment criteria
1. Positive staining of trophoblastic cells, blood clots, and blood vessels in normal placenta.

References

1. Wagrowska-Danilewicz M and Zeromski J. Pol. J. Pathol. 2010; 2:83-88.
2. Tomich CE, et al. Oral Surg. Oral Med. Oral Pathol. 1981; 51(6): 603-608.
3. Mysorekar VV, et al. Indian Dermatol. Online J. 2015; 6(3): 172-180.

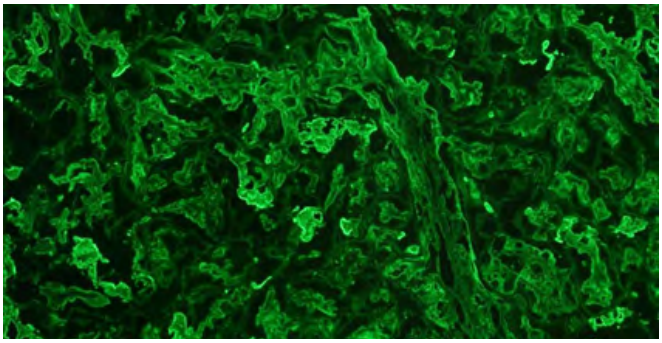


Figure 1. Positive staining of trophoblastic cells and positive staining in blood clots and blood vessels in normal placenta.

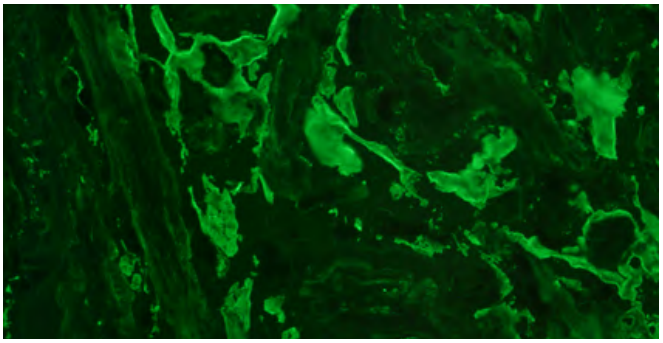


Figure 2. Positive staining of trophoblastic cells and positive staining in blood clots and blood vessels in normal placenta.

Tissue-Tek Genie® FITC anti-IgA

IVD

Clone
Polyclonal

Host/clonality
Goat polyclonal

Product code and quantity
8536-C010: RTU, 10 capsules; 1 pack

Application
Goat polyclonal antibody with normal tonsil shows strong, distinct cytoplasmic immunofluorescent staining of lymphocytes in germinal centers. In diseased skin tissue, strong linear or granular staining at the dermal-epidermal junction and/or basement membrane is observed. In diseased renal tissue, strong linear or granular staining is observed at the mesangium and/or glomerular capillary walls.

Description
IgA is a glycoprotein that plays a crucial role in the immune function of mucous membranes. Monomeric IgA constitutes 5-15% of serum immunoglobulins whereas dimeric IgA is the main immunoglobulin found in mucous secretions.

Positive tissue control
Tonsil, lymph node

Staining pattern
Membraneous and/or cytoplasmic

Assessment criteria
1. Positive staining of lymphocytes in germinal centers of normal tonsil.

References

1. Wagrowska-Danilewicz M and Zeromski J. Pol. J. Pathol. 2010; 2:83-88.
2. Tomich CE, et al. Oral Surg. Oral Med. Oral Pathol. 1981; 51(6): 603-608.
3. Mysorekar VV, et al. Indian Dermatol. Online J. 2015; 6(3): 172-180.

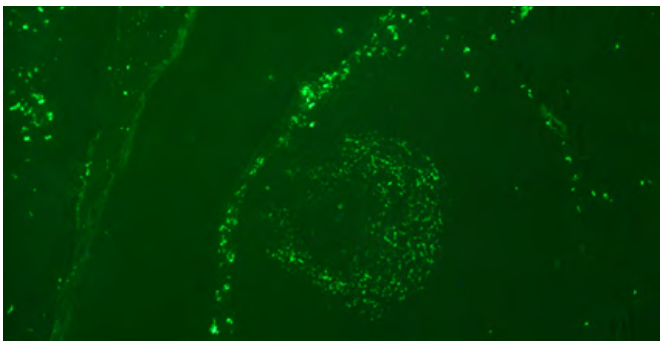


Figure 1. Positive staining of lymphocytes in germinal centers in tonsil.

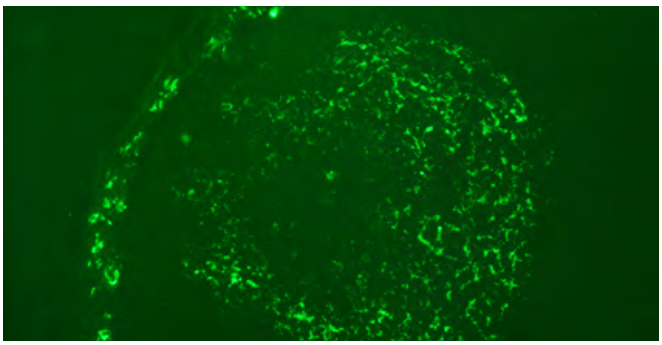


Figure 2. Positive staining of lymphocytes in germinal centers in tonsil.

Tissue-Tek Genie® FITC anti-IgG

IVD

Clone
Polyclonal

Host/clonality
Goat polyclonal

Product code and quantity
8535-C010: RTU, 10 capsules; 1 pack

Application
Goat polyclonal antibody with normal tonsil shows strong, distinct cytoplasmic immunofluorescent staining of lymphocytes in germinal centers but negative staining in mantle zones. In diseased skin tissue, strong linear or granular staining at the dermal-epidermal junction and/or basement membrane is observed. In diseased renal tissue, strong linear or granular staining is observed at the mesangium and/or glomerular capillary walls

Description
IgG is a glycoprotein that regulates immunological defense mechanisms and plays a crucial role in humoral immune response. IgG is secreted by B-cells and is the most abundant serum immunoglobulins of the immune system.

Positive tissue control
Tonsil, lymph node

Staining pattern
Membraneous and/or cytoplasmic

Assessment criteria
1. Positive staining of lymphocytes in germinal centers of normal tonsil.
2. Linear deposition at dermal epidermal junction.

References

1. Wagrowska-Danilewicz M and Zeromski J. Pol. J. Pathol. 2010; 2:83-88.
2. Tomich CE, et al. Oral Surg. Oral Med. Oral Pathol. 1981; 51(6):603-608.
3. Mysorekar VV, et al. Indian Dermatol. Online J. 2015; 6(3): 172-180.

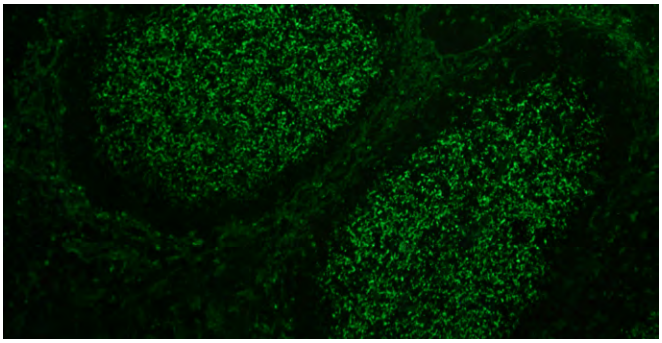


Figure 1. Positive of lymphocytes in germinal centers of tonsil.

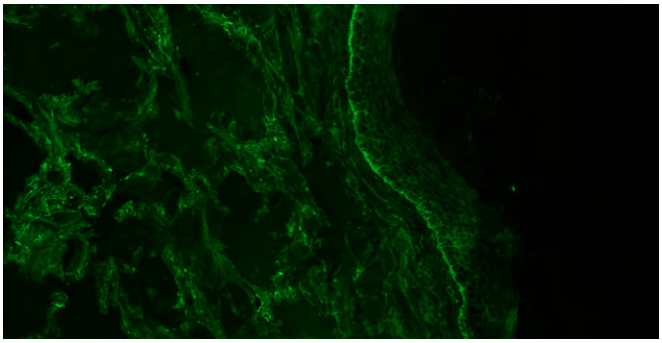


Figure 2. Linear deposition of IgG at junction in skin with bullous pemphigoid.

Tissue-Tek Genie® FITC anti-IgM

IVD

Clone
Polyclonal

Host/clonality
Goat polyclonal

Product code and quantity
8537-C010: RTU, 10 capsules; 1 pack

Application
Goat polyclonal antibody with normal tonsil shows strong, distinct cytoplasmic immunofluorescent staining of lymphocytes in germinal centers. In diseased skin tissue, strong linear or granular staining at the dermal-epidermal junction is observed. In diseased renal tissue, strong linear or granular staining is observed at the mesangium and/or sclerotic regions.

Description
IgM is a glycoprotein that is produced by B-cells. IgM constitutes ~10% of serum immunoglobulins. Monomeric IgM is expressed as a membrane bound antibody on the surface of B-cells and as a pentamer when secreted by plasma cells.

Positive tissue control
Tonsil, lymph node

Staining pattern
Membraneous and/or cytoplasmic

Assessment criteria
1. Positive staining of lymphocytes in germinal centers of normal tonsil.

References

1. Wagrowska-Danilewicz M and Zeromski J. Pol. J. Pathol. 2010; 2:83-88.
2. Tomich CE, et al. Oral Surg. Oral Med. Oral Pathol. 1981; 51(6):603-608.
3. Mysorekar VV, et al. Indian Dermatol. Online J. 2015; 6(3): 172-180.

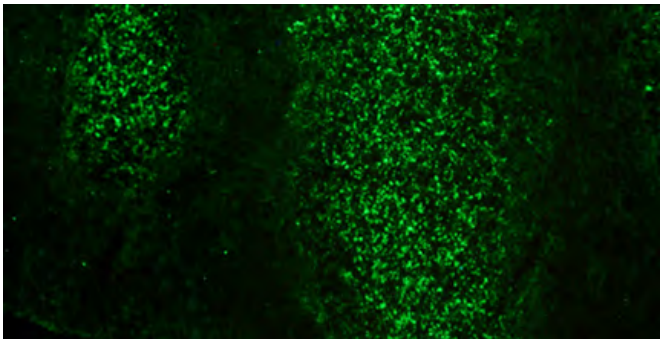


Figure 1. Positive staining in germinal centers of tonsil.

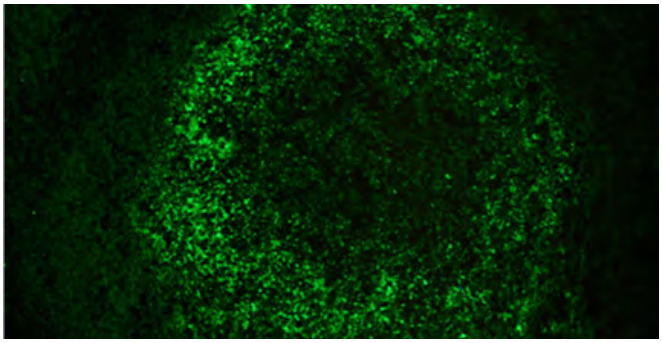


Figure 2. Positive staining of lymphocytes in germinal centers of tonsil.

Tissue-Tek Genie® DUO Non-immune Mouse and Rabbit Ig Antibody Cocktail, Negative Control

IVD

Clone
Polyclonal

Host/clonality
Antibody cocktail

Product codes and quantity
8482-C010: RTU, 10 capsules; 1 pack
8482-M250: RTU, 250 tests, 1 cartridge; 1 unit

Application
This non-immune mouse and rabbit Ig cocktail has no known specificity. No stain is expected in either normal or neoplastic cells.
This product may be used as a negative control for qualitative assessment of background staining for Tissue-Tek Genie DUO mouse and rabbit primary antibody cocktails.

Description
The concentration of mouse and rabbit Ig is similar to that of the Tissue-Tek Genie DUO mouse and rabbit primary antibody cocktails used on the Tissue-Tek Genie Advanced Staining System.

Positive tissue control
NA

Staining pattern
No staining

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution

Assessment criteria
1. Background staining is the same or less than the reference material.
2. No specific staining.

References

1. Elias JM, et al. Am J Clin Pathol. 1989, 92:836-843.
2. Diagnostic Immunohistochemistry by David J Dabbs, 3rd Ed. 2010.

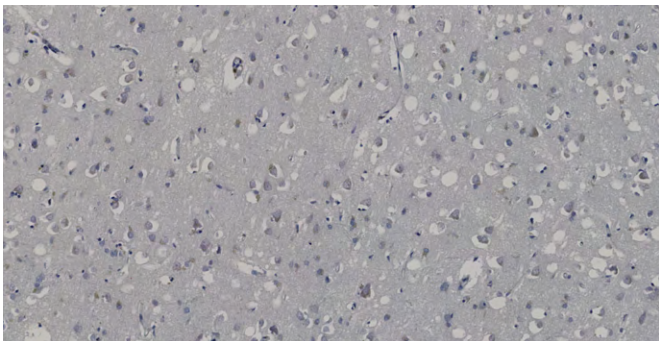


Figure 1. No specific staining is seen within this cerebrum specimen using the DUO Non-immune Neg Control reagent. Background staining is the same or less than the reference material.

Tissue-Tek Genie® Non-Immune Mouse Ig, Negative Control

IVD

Clone
NA

Host/clonality
Mouse Ig

Product codes and quantity
8604-C010: RTU, 10 capsules; 1 pack
8604-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This product may be used as a negative control for qualitative assessment of background staining for mouse antibodies.

Description
The concentration of mouse immunoglobulin is similar to that of many primary antibodies used on the Tissue-Tek Genie Advanced Staining System.

Positive tissue control
NA

Staining pattern
No staining

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution or Tissue-Tek Genie® Citrate Antigen Retrieval Solution

Assessment criteria
1. No specific staining shall be observed.

References
1. Elias JM, et al. Am. J. Clin. Pathol. 1989 Dec; 92(6):836-843.

Tissue-Tek Genie® Non-Immune Rabbit Ig, Negative Control

IVD

Clone
NA

Host/clonality
Rabbit Ig

Product codes and quantity
8605-C010: RTU, 10 capsules; 1 pack
8605-M250: RTU, 1 cartridge, 250 tests; 1 unit

Application
This product may be used as a negative control for qualitative assessment of background staining for rabbit antibodies.

Description
The concentration of rabbit immunoglobulin is similar to that of many primary antibodies used on the Tissue-Tek Genie Advanced Staining System.

Positive tissue control
NA

Staining pattern
No staining

Antigen retrieval
Tissue-Tek Genie® High pH Antigen Retrieval Solution or Tissue-Tek Genie® Citrate Antigen Retrieval Solution

Assessment criteria
1. No specific staining shall be observed.

References
1. Elias JM, et al. Am. J. Clin. Pathol. 1989 Dec; 92(6):836-843.

Ancillary reagents

Tissue-Tek Genie® Antibody Diluent

IVD

Product code and quantity

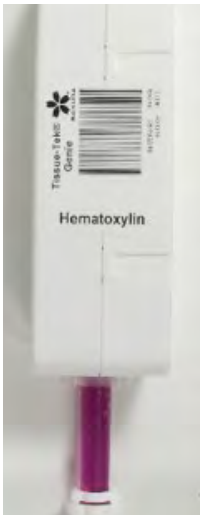
8867-G004: RTU, 4 bottles, 100 mL each; 1 case

Description

Optimal staining performance during immunohistochemistry (IHC) is achieved through dilution of the primary antibodies. This dilution process involves mixing concentrated antibody with Tissue-Tek Genie® Antibody Diluent to an optimal dilution determined by the user. The diluted antibody can then be filled into a Tissue-Tek Genie® User-Fillable Capsule, Tissue-Tek Genie® User Fillable Cartridge, or be applied by hand during manual application mode on the Tissue-Tek Genie® Advanced Staining System.

Tissue-Tek Genie® Hematoxylin

IVD



Product code and quantity

8830-M250: RTU, 250 tests, 1 cartridge: 1 unit

Description

Tissue-Tek Genie® Hematoxylin is designed to counterstain cellular nuclei in formalin-fixed, paraffin-embedded (FFPE) specimen sections after immunohistochemical (IHC) staining used the Tissue-Tek Genie® Advanced Staining System.

The Tissue-Tek Genie Hematoxylin is an ancillary reagent used on the Tissue-Tek Genie Staining System after an IHC staining. Tissue-Tek Genie Hematoxylin stains nuclei of cells in specimen sections blue in contrast to antigen staining.

Tissue-Tek Genie® Citrate Antigen Retrieval Solution

IVD

Product code and quantity

8742-G001: RTU, 1 bottle, 3.8 Liters; 1 unit

Description

Tissue-Tek Genie® Citrate Antigen Retrieval Solution is designed for heat-induced epitope retrieval (HIER) of specimen sections during immunohistochemical (IHC) staining on the Tissue-Tek Genie® Advanced Staining System.

Tissue fixation involves creating crosslinks between protein residues in the tissue. This fixation process preserves the tissue, but also denatures many antigens and makes antigen sites within the tissue less accessible to antibodies. The Tissue-Tek Genie Citrate Antigen Retrieval Solution is applied to the specimen section and heated on the Tissue-Tek Genie Advanced Staining System. This process breaks the crosslinks formed during fixation and allows proteins to renature which allows greater accessibility of antigenic sites to antibodies.

Tissue-Tek Genie® High pH Antigen Retrieval Solution

IVD

Product code and quantity

8744-G001: RTU, 1 bottle, 3.8 Liters; 1 unit

Description

Tissue-Tek Genie® High pH Antigen Retrieval Solution is designed for heat-induced epitope retrieval (HIER) of specimen sections during immunohistochemical (IHC) staining on the Tissue-Tek Genie® Advanced Staining System.

Tissue fixation involves creating crosslinks between protein residues in the tissue. This fixation process preserves the tissue, but also denatures many antigens and makes antigen sites within the tissue less accessible to antibodies. The Tissue-Tek Genie High pH Antigen Retrieval Solution is applied to the specimen section and heated on the Tissue-Tek Genie Advanced Staining System. This process breaks the crosslinks formed during fixation and allows proteins to renature which allows greater accessibility of antigenic sites to antibodies.

Tissue-Tek Genie® Dewax Solution

IVD

Product code and quantity

8865-G001: RTU, 1 bottle, 3.8 Liters; 1 unit

Description

Tissue-Tek Genie® Dewax Solution is designed to remove paraffin wax from paraffin embedded tissue sections on the Tissue-Tek Genie® Advanced Staining System.

Formalin-fixed, paraffin embedded (FFPE) specimen sections mounted on microscope slides are treated with Tissue-Tek Genie Dewax Solution on the Tissue-Tek Genie Advanced Staining System prior to the immunohistochemistry and/or in situ hybridization staining processes. Specimen sections in the presence of Tissue-Tek Genie Dewax Solution are gently heated for optimized removal of paraffin.

Tissue-Tek Genie® Wash Buffer Solution

IVD

Product code and quantity

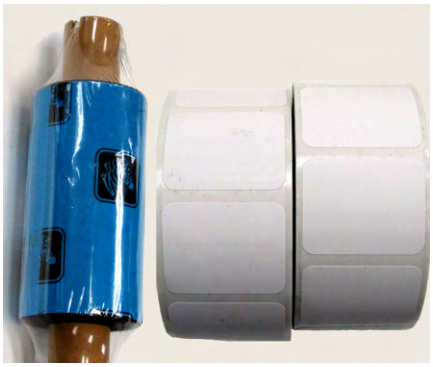
8874-G004: RTU, 4 bottles, 3.8 Liters each: 1 case

Description

Tissue-Tek Genie® Wash Buffer Solution is designed to remove residual reagents from tissue sections during immunohistochemical (IHC) staining on the Tissue-Tek Genie® Advanced Staining System.

The Tissue-Tek Genie Wash Buffer Solution is a bulk reagent that is used between incubation steps during IHC or ISH staining processes. The Tissue-Tek Genie Wash Buffer Solution serves as a rinsing agent for the removal of residual reagents that remain on the tissue sections from the previous protocol step.

Consumables



Tissue-Tek Genie® RDA-Tag Label Kit

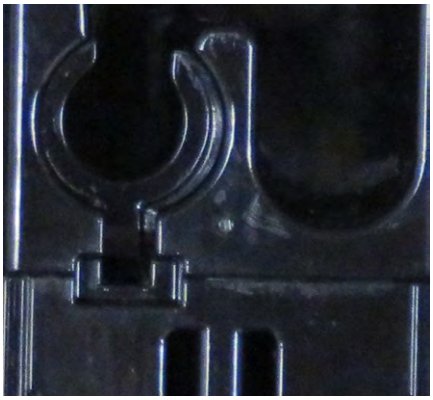
IVD

Product code and quantity

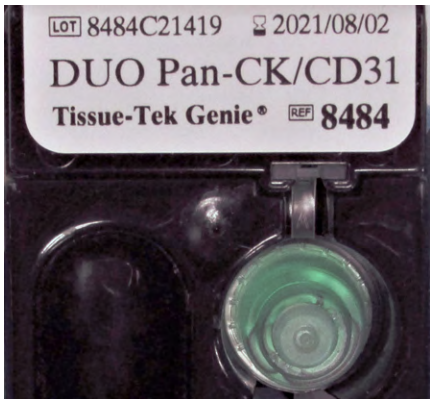
8637-K001: 1 ribbon and 2 rolls of 2,400 RDA-Tag labels; 1 kit

Description

The Tissue-Tek Genie® RDA-Tag Label Kit contains labels and a ribbon to print RDA-Tag labels.



RDA only.



RDA with capsule and its RDA-Tag.

Tissue-Tek Genie® Reagent Dispense Area [RDA]

IVD

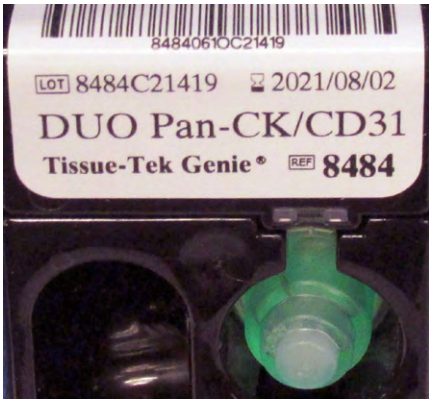
Product code and quantity

8616-G090: 90 RDAs; 1 box

Description

The Tissue-Tek Genie® Reagent Dispense Area [RDA] holds a RDA-Tag when used with a cartridge.
When used with a capsule, the RDA holds the capsule with the attached RDA-Tag.
The RDA funnels reagents from a capsule or cartridge to the slide in the staining station.

RDA-Tag without label.



RDA-Tag with label and associated prefilled RTU capsule.

Tissue-Tek Genie® Reagent Dispense Area Tag [RDA-Tag]

IVD

Product code and quantity

8618-G090: 90 RDA-Tags; 1 box

Description

The Tissue-Tek Genie® Reagent Dispense Area-Tag [RDA-Tag] holds the Tissue-Tek Genie® RDA-Tag label, which includes a 1D barcode and human readable information about the RTU reagent and associated staining protocol.

Tissue-Tek Genie® Slide Label Kit

IVD

Product code and quantity

8636-K001: 1 ribbon and 3 rolls of 3,000 slide labels; 1 kit

Description

The Tissue-Tek Genie® Slide Label Kit contains labels and a ribbon to print slide labels.

Tissue-Tek Genie® Storage and Transport Tray, Blue

Product code and quantity

8642-G001; 1 unit

Description

The Tissue-Tek Genie® Storage and Transport Tray, Blue can store a combination of up to 21 capsule packs or cartridges. It supports the histotechnologist to organize reagents for easy handling.

Tissue-Tek Genie® Storage and Transport Tray, Red

Product code and quantity

8641-G001; 1 unit

Description

The Tissue-Tek Genie® Storage and Transport Tray, Red can store a combination of up to 21 capsule packs or cartridges. It supports the histotechnologist to organize reagents for easy handling.

Tissue-Tek Genie® Waste Bottles

Product code and quantity

8217-G004: 4 bottles, 3.8 Liters each, empty; 1 case

Description

Tissue-Tek Genie® Waste Bottles are for two purposes: to collect waste generated in the staining process on the Tissue-Tek Genie® Advanced Staining System, and to hold the cleaning protocol reagents.

Tissue-Tek Genie® Workflow Organizer

Product code and quantity

8643-G001; 1 unit

Description

The Tissue-Tek Genie® Workflow Organizer supports the histotechnologists in matching and organizing up to 15 specimen slides and associated RDA with prefilled RTU capsules for easy loading into the Tissue-Tek Genie® Advanced Staining System.

Tissue-Tek® SmartWrite® Frosted Slides - Charged

IVD

Product codes and quantity

9036 - Tissue-Tek® SmartWrite® White Frosted Slides - Charged, 100/box; 10 boxes/case

9046 - Tissue-Tek® SmartWrite® Blue Frosted Slides - Charged, 100/box; 10 boxes/case

9048 - Tissue-Tek® SmartWrite® Green Frosted Slides - Charged, 100/box; 10 boxes/case

9050 - Tissue-Tek® SmartWrite® Lavender Frosted Slides - Charged, 100/box; 10 boxes/case

9052 - Tissue-Tek® SmartWrite® Pink Frosted Slides - Charged, 100/box; 10 boxes/case

9054 - Tissue-Tek® SmartWrite® Yellow Frosted Slides - Charged, 100/box; 10 boxes/case

Description

The Tissue-Tek® SmartWrite® Frosted Slides - Charged are processed to provide a uniform coating of positive charge across the entire slide for best section adhesion. The slides have proven customer satisfaction for printing, tissue adhesion, and staining. These slides are ideal for IHC and IF.

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Tissue-Tek
Tissue-Tek Genie
Sakura
SmartWrite

Notes

A long tradition of excellence

Known for best-in-class automation and reliability Sakura Finetek remains a privately-held company in business since 1871. Sakura Finetek has achieved its success and solidified its reputation by providing timely, ingenious solutions to the real challenges laboratories face on a day-to-day basis.

Our rich history has given us a thorough understanding of technology, quality, reliability, value for money and our customers' requirements. We use this knowledge to passionately develop products that anticipate developments in both technology and market needs.

Sakura Finetek USA, Inc. (SFA) is based in Torrance, California. Functions covered at this facility include sales and marketing, service and technical support, R&D, and manufacturing.

SFA is an ISO 13485 certified manufacturer and supplier. As one of the two global manufacturing and R&D sites, SFA develops instruments and reagents into system solutions and secures our innovation with a steady stream of patents.

In addition to supporting the U.S. marketplace, SFA is also responsible for Canada, Mexico, Central and South America and serves these markets with a network of local distributors.

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Our organization is developing, professionalizing and growing continuously, and thus maintaining its position as a trustworthy and valuable partner in histopathology.

Please visit our website www.sakuraus.com

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