



# Special, Immunohistochemistry (IHC), & Chromogenic *in situ* Hybridization (CISH) Stains

## Special Stains

### Group I for Microorganisms Special Stains, Group I 88312

*Stain name & primary demonstration*

#### **Fite**

*Mycobacteria leprae*

#### **Gomori's Methenamine Silver (GMS)**

Fungus, *Pneumocystis*, Bacteria

#### **Gram**

Gram-Positive & Gram-Negative Bacteria

#### **PAS/Light Green Counterstain**

Fungus

#### **Warthin-Starry**

Bacteria, Spirochetes

#### **Ziehl-Neelsen Acid-Fast Bacilli (AFB)**

Acid-Fast *Mycobacterium*

## Special Stains

### Group II - All Other Special Stains, Group II 88313

*Stain name & primary demonstration*

#### **Alcian Blue, pH 2.5**

Acid Mucopolysaccharides

#### **Alcian Blue/Hyaluronidase**

Epithelial and Connective Tissue Mucin Differentiation

#### **Alcian Blue/Periodic Acid-Schiff (PAS)**

Acid and Neutral Mucins

#### **Bielschowsky**

Neurofibrils

#### **Bile, Hall's Method**

Bilirubin

#### **Colloidal Iron**

Mucopolysaccharides, Collagen

#### **Colloidal Iron/Hyaluronidase**

Epithelial and Connective Tissue Mucin Differentiation

#### **Congo Red**

Amyloid

#### **Copper (Rhodanine)**

Copper

#### **Crystal Violet**

Amyloid

#### **Elastic Stain (EVG)**

Elastic Fibers, Collagen

#### **Fontana-Masson**

Argentaffin Granules or Melanin

#### **Giemsa (Mast Cell)**

Eosinophilic Granules and Mast Cells

#### **Iron Stain**

Iron

#### **Jones Methenamine Silver**

Basement Membranes, Reticular Fibers

#### **Luxol Fast Blue**

Myelin

#### **Masson Trichrome**

Collagen

#### **Melanin Bleach**

Eliminates Melanin

#### **Movat**

Collagen, Elastic Fibers, Fibrin, Mucin, Muscle

#### **Mucicarmine**

Mucosubstances

#### **Oil Red O**

Fat

#### **Periodic Acid-Schiff (PAS)**

Glycogen, Neutral Mucopolysaccharides, Basement Membranes

#### **Periodic Acid-Schiff/Amylase (PAS/D)**

Eliminates Glycogen

#### **Phosphotungstic Acid Haematoxylin (PTAH)**

Myelin

#### **Reticulum**

Reticulum Fibers

#### **Sodium Sulphate-Alcian Blue (SAB)**

Amyloid

#### **Thioflavin S**

Amyloid

#### **Toluidine Blue**

Mast Cell Granules

#### **Uric Acid**

Urate Crystals

#### **Von Kossa**

Calcium



# Special, Immunohistochemistry (IHC), & Chromogenic *in situ* Hybridization (CISH) Stains

## Special Stains

### Histochemical Enzyme 88319

*Stain name & primary demonstration*

#### Acetylcholinesterase (ACE)

Nerve Fibers/Hirschsprung's Disease

#### Acid Phosphatase

Muscle Fibers undergoing Degeneration

#### Alkaline Phosphatase

Basement Membranes, Regenerating Fibers

#### Adenosine Triphosphatase (ATP): 4.6, 9.8

Muscle Fiber Types

#### Cytochrome C

Cytochrome Oxidase

#### Nicotinic Adenine Dinucleotide Dehydrogenase (NADH)

Whorls, Target Fibers, Central Cores,  
Moth-Eaten Fibers

#### Phosphofructokinase (PFK)

PFK Activity

#### Phosphorylase

Phosphorylase Activity

#### Succinic Dehydrogenase (SDH)

Mitochondrial Disease

## Immunohistochemistry (IHC) Stains

*Stain name & antibody specificity*

#### ACTH

Human Adrenocorticotrophic Hormone

#### Actin HHF35

Human Muscle Actin

#### Actin SM

Alpha-Smooth Muscle Isoform, Myoepithelium, etc.

#### Adenovirus

Adenovirus

#### AFP

Alpha Fetoprotein

#### ALK (D5F3)

Anaplastic Lymphoma Kinase, Clone D5F3

#### ALK-1

ALK-1

#### AMACR (p504s)

Prostate Cancer Marker

#### Amyloid Kappa (AMY-K)

Amyloidosis

#### Amyloid Lambda (AMY-L)

Amyloidosis

#### Androgen Receptor

Androgen Receptor

#### Annexin A1

Hairy Cell Leukemia

#### Arginase 1

Normal Liver Cells

#### ATRX

Glioma

#### β-Catenin

Beta Catenin

#### BCL2

Follicular Lymphoma, Apoptosis Inhibin Protein

#### BCL2 EP36

BCL2, Clone EP36

#### BCL-6

Burkitt's Lymphoma,  
Follicular and Diffuse Lymphomas,  
Lymphocyte-Predominant Hodgkin's Disease

#### B72.3 (TAG-72)

Tumor-Associated Glycoprotein

#### BOB-1

Transcription Coactivator for Oct-1 and Oct-2

#### BRAF V600E

Hairy Cell Leukemia

#### CA9

Carbonic Anhydrase IX

#### CA 125

Ovarian, Endometrial, Breast, GI Cancer Tumor Marker

#### Calcitonin (P)

Calcitonin

#### Calponin

Myoepithelial Differentiation,  
Diagnosis of Myoepithelial Neoplasms

#### Calreticulin

Expressed in Megakaryocytes when  
Calreticulin is mutated

#### Calretinin (P)

Calcium-Binding Protein, Mesothelial Cells

#### CAMTA1

Epithelioid Hemangioendothelioma Marker

#### Cathepsin K

Renal Angiomyolipoma

#### C3d (Complement 3d)

Transplant Rejection Biomarker

#### C4d (Complement 4d)

Transplant Rejection Biomarker

#### CD1a

Cortical Thymocytes-Langerhans Cells

#### CD2

Lymphocyte Function-Associated Antigen 2

#### CD3 (2VG6)

T-Cells



# Special, Immunohistochemistry (IHC), & Chromogenic *in situ* Hybridization (CISH) Stains

## Immunohistochemistry (IHC) Stains

*Stain name & antibody specificity*

**CD4**

T-Cells, Helper T

**CD5**

Pan T-Cells, B-Cell Subset,  
Thymic Carcinomas

**CD7**

Thymocytes, Immature T-Cells, NK Cells

**CD8**

T-Cells, Suppressor T

**CD10**

Common Acute Lymphoblastic Leukemia

**CD14**

Monocytes, Histiocytes

**CD15**

BRA4F1

**CD15 (MMA)**

Epithelial, Hodgkin's, Myeloid

**CD19**

B-Lymphocyte Antigen

**CD20**

Human B-Lymphocyte Antigen

**CD21**

Dendritic Cells, B-Cells

**CD22**

Mature B-Cells

**CD23**

Activated B-Cells

**CD25**

Activated T-Cells & B-Cells

**CD31**

Endothelium (Tumor Angiogenesis)

**CD33**

Monocytes

**CD34**

Endothelium, Stem Cells, Stromal Tumors

**CD35**

Dendritic Cells

**CD43**

T-Cells, B-Cell Subset, Myeloid,  
Histiocytes, Plasma Cells (Leukosialin)

**CD44**

Phagocytic Glycogen-1

**CD45**

Helper, Inducer T-Cells

**CD56**

Natural Killer Cells

**CD57**

Neural & Neuroendocrine Marker  
NK Cells, Stromal Tumors

**CD61**

GP111A

**CD68 (KP1)**

Sarcomas, Leukemia

**CD68 (PG-M1)**

Monocytes / Macrophages

**CD71**

Erythroid Precursor Marker

**CD79a**

B-Cells

**CD99**

Ewing's Sarcoma / PNET

**CD117**

C-Kit

**CD123**

Alpha Receptor for IL3

**CD138**

Plasma Cell Marker, Syndecan

**CD163**

Ber-MAC3

**CEA**

Carcinoembryonic Antigen

**Chromogranin (DAK-A3)**

Chromogranin A

**CDX-2**

Metastatic Colon CA

**Chymotrypsin (10-104.10)**

Expressed in Cells of Pancreatic Acinar Origin

**Clusterin**

Apoptosis

**Cyclin-D1**

Cyclin D1/PRAD-1 Oncogene Product, Mantle Cell

**Cytokeratin AE1 / AE3**

Keratin Cocktail:  
40, 48, 50, 50, 6, 58, 65, 5 kD

**Cytokeratin CAM5.2**

Keratin: 39, 43, 500 kD

**Cytokeratin 5/6**

Intermediate Filament Protein

**Cytokeratin 7**

Keratin: 54 kD

**Cytokeratin 19**

Human Cytokeratin 19 Polypeptide

**Cytokeratin 20**

Keratin: 54 kD

**Cytokeratin KER903**

High-Molecular Weight Cytokeratins

**Cytokeratin OSCAR**

Cytokeratins 7, 8, 18, 19

**c-MYC**

Lymphoma Marker

**CMV**

Cytomegalovirus

**CXCL-13**

B-Lymphocyte Chemoattractant

**D2-40**

Podoplanin, Lymphatic Endothelial Marker



# Special, Immunohistochemistry (IHC), & Chromogenic *in situ* Hybridization (CISH) Stains

## Immunohistochemistry (IHC) Stains

*Stain name & antibody specificity*

**Desmin**

Desmin

**DOG-1**

Gastrointestinal Stromal Tumor (GIST) Marker

**DUX4**

CIC-DUX4 Sarcoma from Ewing Sarcoma

**EBNA-2**

Stains Nuclei of Epstein-Barr Virus (EBV)-Infected Lymphoblastoid Cells

**EBV**

Epstein-Barr Virus

**E-cadherin (CADH) EMA**

Epithelial Marker

**EMA**

Epithelial Membrane Antigen

**Enolase (NSE)**

Neuron-Specific Enolase

**EP4-Ber**

Epithelial Antigen

**ER**

Estrogen Receptor

**ERG**

Vascular, Prostate Malignancy Marker

**Factor VIII**

Von Willebrand Factor, Endothelium, Megakaryocytes

**Factor XIIIa**

Fibrohistiocytic Tumors, Dendritic Interstitial Cells

**Fascin**

Hodgkin's Disease, High-Grade Breast Carcinoma

**FGFR3**

CD333, Fibroblast Growth Factor Receptor 3

**FOXL2**

Ovarian Sex Cord-Stromal Tumors (SCSST)

**Fumarate Hydratase**

Hereditary Leiomyoma, Renal Cell Carcinoma

**FSH**

Follicle-Stimulating Hormone

**Gastrin**

Gastrin-Secreting Tumors, G-Cell Hyperplasia

**GATA-3**

Urothelial Carcinoma Marker

**GCET1**

Germinal Center B-Cell Marker

**GFAP**

Human Glial Fibrillary Acidic Protein

**GH**

Growth Hormone

**Glucagon**

Glucagon

**GLUT1**

Glucose Transporter 1

**Glutamine Synthetase**

Hepatocellular Carcinoma Marker

**Glypican-3**

Hepatocellular Carcinoma Marker

**Granzyme-B**

Serine Protease

**H3K27me3, Wild**

Malignant Peripheral Nerve Sheath Tumor Marker

**H3K27M, Mutant**

Glioma/Astrocytoma

**HBcAg**

Hepatitis B Core Antigen

**HBsAg**

Hepatitis B Surface Antigen

**H-Caldesmon**

Smooth Muscle Differentiation

***H. pylori***

*Helicobacter pylori*

**HCG**

Human Chorionic Gonadotropin (HCG) in Trophoblastic Elements of Germ Cell Tumors

**Hemoglobin-A**

Hemoglobin-A

**Hepatocyte**

Hep-par1

**Herpes**

HSV I & II

**HER2**

Erb-2 Oncoprotein, Clone 4B5

**HHV8**

Human Herpes Virus 8

**HMB-45**

Melanoma-Associated Marker

**HPV**

Human Papilloma Virus Subtype

**IDH-1**

Glioma Marker

**IgA**

Immunoglobulin A

**IgD**

Immunoglobulin D

**IgG**

Immunoglobulin G

**IgG4**

Autoimmune Pancreatitis

**IgM**

Immunoglobulin M

**Inhibin**

Granulosa Cell Tumor, Sex Cord Stromal Tumor

**INI1**

Malignant Rhabdoid Tumor Marker

**Insulin**

Insulin

# Special, Immunohistochemistry (IHC), & Chromogenic *in situ* Hybridization (CISH) Stains

## Immunohistochemistry (IHC) Stains

*Stain name & antibody specificity*

### **Kappa**

Kappa Light Chain

### **Ki67**

Cell Proliferation Marker

### **Lambda**

Lambda Light Chain

### **Langerin**

Langerhans Cell Histiocytosis

### **LEF1**

Chronic Lymphocytic Leukemia (CLL),  
Small Lymphocytic Leukemia (SLL)

### **LH**

Luteinizing Hormone

### **LMO2**

Large B-Cell Lymphoma Marker

### **MAL**

Myelin and Lymphocyte Protein  
expressed in Primary Mediastinal  
Large B-Cell Lymphoma

### **Mammaglobin**

Primary and Metastatic Breast Carcinoma Marker

### **MDM2**

Liposarcoma

### **Melan A**

Malignant Melanoma Marker

### **MiTF**

Melanocyte Development Regulator,  
Melanoma Oncogene

### **MLH-1**

Mismatch Repair Gene MLH-1

### **MOC-31**

Differentiates Carcinomas from  
Mesothelial Cells and Mesotheliomas

### **MSH-2**

Mismatch Repair Gene MSH-2

### **MSH-6**

Mismatch Repair Gene MSH-6

### **MUC4**

Fibromyxoid Sarcoma

### **MUM-1**

Multiple Myeloma Oncogene-1

### **Muramidase**

Muramidase/Lysozyme

### **Myeloperoxidase**

Neutrophilic Granulocytes and Monocytes

### **MyoD1**

Rhabdomyosarcoma Marker

### **Myogenin**

Rhabdomyosarcoma Marker

### **Napsin A**

Lung Adenocarcinoma Marker

### **NeuN**

Neuronal Cell Loss in Drug-Resistant Epilepsy

### **Neurofilament**

Neurofilament

### **Neurofilament Cocktail**

Cocktail of Clones 2F11 and SMI-32

### **NKI/C3**

Melanoma Marker

### **NKX3.1**

Differential Marker for Prostate  
vs. Urothelial Carcinoma

### **OCT-2**

Octamer transcription factor 2

### **OCT3/4**

Marker for Undifferentiated Cells

### **p16**

Cervical Cancer Marker

### **p40**

Pulmonary Squamous Cell Carcinoma Marker

### **p53**

Over-expression of the p53 Oncogene

### **p57**

Differential Diagnosis of Complete versus  
Partial Hydatidiform Molar Pregnancy

### **p63**

Prostate Cancer Marker

### **p63/ERG Double Stain**

Double Stain for Prostate Cancer

### **pSTAT 5**

Surrogate Marker of *JAK2* V617F Mutation

### ***P. jiroveci***

Detection of *Pneumocystis jirovecii*

### **PAX-2**

Breast, Kidney, Ovary, Prostate Tumor Marker

### **PAX-5**

B-Cell-Specific Activator Protein

### **PAX-8**

Nephritic Cell Lineage Marker

### **Perforin**

T-Cell and NK-Cell Lymphoma

### **PD-L1**

Clone 22C3 (LDT)

### **PD-L1**

Clone SP263 (IVD)

### **PIN Cocktail (p63/AMACR)**

p63 and AMACR

### **PLAP**

Placental Alkaline Phosphatase,  
Germ Cell, Adenocarcinoma

### **PMS2**

Mismatch Repair Gene PMS-2



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## Immunohistochemistry (IHC) Stains

*Stain name & antibody specificity*

**PR**

Progesterone Receptor

**Prolactin**

Prolactin in Pituitary

**PSA**

Prostate-Specific Antigen

**PSAP**

Normal, Hyperplastic, Neoplastic Prostatic cells

**PSMA**

Prostate-Specific Membrane Antigen

**PTH**

Parathyroid Hormone

**S-100**

S100 protein

**SALL4**

Yolk Sac Tumor Marker

**SATB2**

GI Epithelial Marker

**SDHA**

Succinate Dehydrogenase Subunit A

**SDHB**

Succinate Dehydrogenase Subunit B

**SF-1**

Adrenocortical Tumor Marker

**SMMS1**

Smooth Muscle Myosin

**SOX-10**

Identifies Melanomas, Nerve Sheath Tumors

**SOX-11**

Mantle Cell Lymphoma Marker

**STAT6**

Solitary Fibrous Tumor

**SV40**

Simian Virus 40, Polyomavirus Family

**Synaptophysin**

Synaptophysin

**Syphilis**

*Treponema pallidum*

**Tau/ $\beta$ -Amyloid DS**

Neurofibrillary Tangle and Amyloid in Alzheimer's Postmortem Specimens

**TCL-1A**

Mature T-Cell Leukemia

**TCR  $\beta$  F1**

T-Cells

**TCR-Delta**

T-Cells

**TdT**

Blasts, Immature Lymphocytes

**Thyroglobulin**

Thyroglobulin

**TIA1**

Cytolytic Effector Cells in Lymphocytic Infiltrates

**TLE-1 (1F5)**

Synovial Sarcoma Marker

**Transthyretin**

Amyloidosis

**Tryptase, Mast Cell**

Human Mast Cells

**TSH**

Thyrotropic Cells of Pituitary

**TTF-1**

Thyroid, Pulmonary Carcinomas

**Tyrosinase**

Metastatic Melanoma

**Ubiquitin**

Neurofibrillary Tangles of Alzheimer's Disease

**Vimentin**

Vimentin

**VS38C**

Plasma Cell

**WT1 (6F-H2)**

Wilms tumor

## Chromogenic *in situ* Hybridization (CISH)

**CISH EBER**

Epstein-Barr Virus (EBV)

**CISH HPV – Low Risk**

Human Papilloma Virus (HPV), Low-Risk Subtypes

**CISH HPV – High Risk**

Human Papilloma Virus (HPV), High-Risk Subtypes

**CISH Kappa**

Kappa

**CISH Lambda**

Lambda