

Anatomic Pathology Special Stains

Group I for Microorganisms

Special Stains Group I 88312

Fite stain
Gomori's methenamine silver (GMS)
Gram
Gridley
Steiner
PAS/light green counterstain
Warthin-Starry
Ziehl-Neelsen AFB

Primary Demonstration of:

Stains for *mycobacteria leprae*
Fungus, Pneumocystis, Bacteria
Gram-positive and gram-negative bacteria
Fungus
Spirochetes, Bacteria
Fungus
Bacteria, Spirochetes
Acid-fast mycobacterium

Group II (All Other)

Special Stains Group II 88313

Alcian Blue, pH 2.5
Alcian Blue/Hyaluronidase
Alcian Blue/PAS
Aldehyde fuchsin
ASD 'Leder's modification'
Bielschowsky
Bile, Hall's method
Bodian
Colloidal iron
Colloidal Iron/Hyaluronidase
Congo Red
Copper (Rhodanine)
Crystal Violet
Elastic stain (EVG)
Fontana-Masson
Giemsa (mast cell)
Grimelius
Iron stain
Jones methenamine silver
Luxol fast blue
Masson trichrome
Melanin bleach
Movat
Mucicarmine
Oil Red O
Orcein
PAS/amylase (PAS/D)
Periodic acid-Schiff (PAS)
PTAH
Reticulum
SAB
Thioflavin S

Primary Demonstration of:

Acid mucopolysaccharides
Differentiation of epithelial and connective tissue mucins
Acid and neutral mucins
Copper-binding protein, Elastic fibers
Esterase, Mast cells
Neurofibrils
Bilirubin
Nerve fibers
Mucopolysaccharides, Collagen
Differentiation of epithelial and connective tissue mucins
Amyloid
Copper
Amyloid
Elastic fibers, Collagen
Argentaffin granules or Melanin
Eosinophilic granules and Mast cells
Argyrophil granules, Argentaffin
Iron
Basement membranes, Reticular fibers
Myelin
Collagen
Eliminates melanin
Elastic fibers, Collagen, Mucin, Fibrin and Muscle
Mucosubstances
Fat
Copper-binding Protein, Elastic fibers
Eliminates glycogen
Glycogen, Neutral mucopolysaccharides and Basement membranes
Collagen, Fibrin, Coarse elastic fibrils
Stains for reticulum fibers
Amyloid
Amyloid

Group II (All Other cont.)

Special Stains Group II 88313

Toluidine Blue
Uric acid
Von Kossa

Primary Demonstration of:

Mast cell granules
Urate crystals
Calcium

Histochemical Stains (Enzyme) 88319

Acetylcholinesterase (ACE)
Acid phosphatase
Alkaline phosphatase
ATP (4.6, 9.8)
Cytochrome C
Esterase
NADH
Phosphofructokinase
Phosphorylase
Succinic dehydrogenase (SDH)

Primary Demonstration of:

Nerve fibers/Hirschsprung's disease
Muscle fibers undergoing degeneration
Basement membranes and regenerating fibers
Muscle fiber types
Cytochrome oxidase
Denervated muscle fibers
Whorls, Target fibers, Central cores, Moth-eaten fibers
PFK activity
Phosphorylase activity
Mitochondrial disease

Immunohistochemistry Stains

Stain

Antibody Specificity

ACTH
Actin HHF35
Actin SM
Adenovirus
AFP
ALK (D5F3)
ALK-1
Amyloid Kappa (AMY-K)
Amyloid Lambda (AMY-L)
Androgen Recept
Arginase 1
β-Catenin
BCL-2
BCL2 EP36
BCL-6

B72.3
BOB-1
BRAF
CA9
CA 125
Calcitonin (CALC)
Calponin
Calretinin (CALR)
Cathepsin K
C3d
C4d
CD1a
CD2
CD3 (2VG6)

Human adrenocorticotrophic hormone
Human muscle actin
Alpha-smooth muscle isoform, Myoepithelium, etc.
Adenovirus
Alpha fetoprotein
Anaplastic lymphoma kinase, clone D5F3
ALK-1
Amyloidosis
Amyloidosis
Androgen Receptor
Identify normal liver cells
Beta Catenin
Follicular lymphoma, Apoptosis inhibin protein
BCL2, clone EP36
Follicular and diffuse lymphomas, Burkitt's lymphoma &
Lymphocyte predominant Hodgkin's disease
Tumor associated glycoprotein
Transcription coactivator for Oct-1 and Oct-2
Hairy cell Leukemia
Carbonic Anhydrase IX
Tumor marker for ovarian, endometrial, breast, GI cancer
Calcitonin
Myoepithelial differentiation and diagnosis of myoepithelial neoplasms
Calcium-binding protein, Mesothelial cells
Renal angiomyolipoma
Complement 3d, transplant rejection biomarker
Complement 4d, transplant rejection biomarker
Cortical thymocytes-langerhans cells
Lymphocyte function-associated antigen 2
T-Cells

Stain

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	Identify monocytes and histiocytes
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 and B-cells
C30 (1G12)	Ki-1: Activated T, B, RS 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
CD45RO	Helper, Inducer T-cells
CD56	Natural killer cells
CD57	Neural and neuroendocrine marker NK cells, Stromal tumors
CD61	GP111A
CD68 (KP1)	Sarcomas and 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
CDX-2	Metastatic colon CA
CEA	Carcinoembryonic antigen
Chromogranin (CHROMO)	Chromogranin A
Clusterin	Apoptosis
Cox-2	Inflammation
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 5/6
Cytokeratin 7	Keratin: 54 kD
Cytokeratin 19	Human cytokeratin 19 polypeptide
Cytokeratin 20	Keratin: 54 kD
Cytokeratin KER903	High molecular weight cytokeratins
CMV	Cytomegalovirus
c-MYC	Lymphoma marker
CXCL-13	B-Lymphocyte chemoattractant
D2-40	Podoplanin, lymphatic endothelial marker

Stain

Desmin
EBNA-2
DOG-1
EBV
E-cadherin (CADH)
EGFR
EMA
Enolase (NSE)
EP4-Ber
ERG
ER
Factor VIII
Factor XIII
Fascin
FGFR3
FOXP1
FOX-P3
FSH
Galectin
Gastrin
GATA3
GCDFP-24
GCET1
GFAP
GH
Glucagon
Glutamine Synthetase
Glypican-3
Granzyme-B
Hemoglobin-A
HBcAg
HBsAg
H-Caldesmon (HCAL)
H.pylori
BHCG
Hepatocyte
Herpes (HSV I&II)
HER2 Neu (4B5)
HHV8
HMB 45
HPV
IDH-1
IgA
IgD
IgG
IgG4
IgM
INI1
Inhibin
Insulin
Ki67

Antibody Specificity

Desmin
Stains nuclei of EBV-infected lymphoblastoid cells
GIST marker
Epstein-Barr virus
Epithelial marker
Epithelial growth-factor receptor
Epithelial membrane antigen
Neuron specific enolase
Epithelial antigen
Vascular marker and prostate malignancy marker
Estrogen receptor
Von Willebrand factor, Endothelium and megakaryocytes
Fibrohistiocytic tumors, Dendritic interstitial cells
Hodgkin's disease, High grade breast carcinoma
CD333, Fibroblast growth factor receptor 3
Prognosis of lymphoma, leukemia, carcinoma
T regulatory cell marker
Follicle stimulating hormone
Inflammation and cancer
Gastrin secreting tumors, G-cell hyperplasia
Urothelial carcinoma marker
Gross cystic disease fluid protein-15
Germinal center B-cell marker
Human glial fibrillary acidic protein
Growth hormone
Glucagon
Hepatocellular carcinoma marker
Hepatocellular carcinoma marker
Serine protease
Hemoglobin-A
Hepatitis B core antigen
Hepatitis B surface antigen
Smooth muscle differentiation
Helicobacter pylori
HCG in trophoblastic elements of germ cell tumors
Hep-par1
HSV I/II
Erb-2 oncoprotein, Clone 4B5
Human herpesvirus 8
Melanoma associated marker
Human papilloma virus subtype
Glioma Marker
Immunoglobulin A
Immunoglobulin D
Immunoglobulin G
Autoimmune pancreatitis
Immunoglobulin M
Malignant rhabdoid tumor marker
Granulosa cell tumor, Sex cord stromal tumor
Insulin
Cell proliferation marker

Stain

Kappa
Lambda
Langerin
LEF1
LH
LMO2
Mammaglobin
MDM2
Melan A
MiTF
MLH-1
MOC-31
MSH-2
MSH-6
MUC-4
MUM-1
Muramidase
Myeloperoxidase
MyoD1
Myogenin
Napsin A
NeuN
Neurofilament
Neurofilament Cocktail
NK1/C3
NKX3.1
OCT-2
OCT3/4
p16
p40
P501s Protein
p53
p57
p63
p63/ERG Double Stain
PAP
PAX-2
PAX-5
PAX-8
Perforin
PD1
PDGFR
PIN cocktail (p63&AMACR)
Prolactin
PLAP
PMS2
PR
PSA
PSMA
PTEN

Antibody Specificity

Kappa light chain
Lambda light chain
Langerhans cell histiocytosis
Chronic lymphocytic (CLL)/small lymphocytic (SLL) leukemias
Luteinizing hormone
Large B-cell lymphoma marker
Primary and metastatic breast carcinoma marker
Liposarcoma
Malignant melanoma marker
Melanocyte development regulator, melanoma oncogene
Mismatch repair gene MLH-1
Differentiate carcinomas from mesothelial cells and mesotheliomas
Mismatch repair gene MSH-2
Mismatch repair gene MSH-6
Fibromyxoid sarcoma
Multiple myeloma oncogene-1
Muramidase/Lysozyme
Neutrophilic granulocytes and monocytes
Rhabdomyosarcoma marker
Rhabdomyosarcoma marker
Lung adenocarcinoma marker
Neuronal cell loss in drug resistant epilepsy
Neurofilament
Cocktail of clones 2F11 and SMI-32
Melanoma marker
Differential marker for prostate carcinoma vs. urothelial carcinoma
Octamer transcription factor 2
Marker for undifferentiated cells
Cervical cancer marker
Pulmonary squamous cell carcinoma marker
Confirm prostatic origin of metastatic carcinoma
Overexpression of the p53 oncogene
Differential diagnosis of complete vs partial hydatidiform molar pregnancy
Prostate cancer marker
A double stain for prostate cancer
Normal hyperplastic and neoplastic, Prostatic cells
Tumor marker for kidney, prostate, breast, ovary
B-cell specific activator protein
Nephritic cell lineage marker
T-cell and NK cell lymphoma
T-cell regulator
oligodendrocytic progenitor cells
p63 and AMACR
Prolactin in pituitary
Placental alkaline phosphatase, Germ cell and adenocarcinoma
Mismatch repair gene PMS-2
Progesterone receptor
Prostate specific antigen
Prostate specific membrane antigen
Differentiate breast, prostate carcinoma from normal

Stain

PTH
Racemase (AMACR)
RCC
S-100
SALL4
Serotonin
SF-1
SMMS1
SOX-10
SOX-11
pSTAT 5
Synaptophysin
Syph
Tau/Beta-amyloid DS
TCL-1A
TCR β F1
TCR-Gamma
TdT
TFE-3
Thyroglobulin
TIA
Transthyretin
Tryptase (MC trypt)
TSH
TTF-1
Tyrosinase
Ubiquitin
Vimentin
VS38C
WT1 (6F-H2)
14-3-3

CISHs (+NEG & ALU or U6)

CISH EBER
CISH Kappa
CISH Lambda

Antibody Specificity

Parathyroid hormone
Prostate adenocarcinoma marker
Renal Cell Carcinoma marker
S100 protein
Yolk sac tumor marker
Carcinoid syndrome
Adrenocortical tumor marker
Smooth muscle myosin
Identify melanoma and nerve sheath tumors
Mantle cell lymphoma marker
Surrogate marker of JAK2 V617F mutation
Synaptophysin
T. pallidum
Neurofibrillary tangle and amyloid in Alzheimer's postmortem specimens
Mature T-cell leukemia
T-cells
T-cells
Blasts, Immature lymphocytes
Xp11 translocation renal cell carcinoma
Thyroglobulin
Cytolytic effector cells in lymphocytic infiltrates
Amyloidosis
Human mast cells
Thyrotropic cells of pituitary
Thyroid and pulmonary carcinomas
Metastatic melanoma
Neurofibrillary tangles of Alzheimer's disease
Vimentin
Plasma cell
Wilms tumor
14.3.3 Sigma, epithelial cell marker

Chromogenic *in situ* hybridization for EBV
Chromogenic *in situ* hybridization for Kappa
Chromogenic *in situ* hybridization for Lambda



Cleveland Clinic

Every life deserves world class care.

9500 Euclid Avenue, Cleveland, OH 44195

Cleveland Clinic is an integrated healthcare delivery system with a main campus, 18 family health centers, eight community hospitals and locations in Ohio, Florida, Nevada, Toronto and Abu Dhabi. It is a not-for-profit group practice where nearly 3,000 staff physicians and scientists in 120 medical specialties collaborate to give every patient the best outcome and experience. Cleveland Clinic is ranked among America's top hospitals overall, and among the nation's leaders in every major medical specialty (*U.S. News & World Report*).

clevelandclinic.org

© The Cleveland Clinic Foundation 2015