

Epithelial Tumor Markers

Keratin

Highly Sensitive Marker for epithelial Cells

Epithelial Membrane Antigen (EMA)

High molecular weight protein that is helpful for determining the site of tumor

Carcinoembryonic Antigen (CEA)

Oncofetal antigen in carcinomas of GIT, pancreas, lung, breast, ovary, uterus, and cervix

Thyroid Transcription Factor-1 (TTF-1)

Useful for distinguishing lung adenocarcinomas from mesotheliomas from the mesothelium

Prostate Specific Antigen (PSA)

Extremely useful in diagnosis of prostatic adenocarcinoma

Intermediate Filament Markers

Actin

Tumors of smooth, skeletal, and cardiac muscle

Vimentin

Melanoma
Schwannomas

Desmin

Leiomyoma
Rhabdomyosarcoma

Glial Fibrillary Acidic Protein (GFAP)

Astrocytoma	If negative: Non-
Ependymomas	CNS Tumors
Oligodendrogliomas	Meningiomas
Medulloblastoma	Metastatic
	Carcinomas
	Lymphomas

Neurofilaments

Neurofilaments (NF)

Neuroblastoma	Note: Show neuroe-
Ganglioneuromas	ndocrine different-
Chemodectomas	iation
Pheochromocytomas	

Intermediate Filament Markers (cont)

S100 Protein

Mesenchymal Tumor Markers

Myogenic Tumors

Tumors of skeletal muscle origin (Positive for muscle-specific actin and desmin)

Fibrohist-ocytic Tumor (CD68 and FAM 56)

Malignant fibrohist-ocytic sarcomas	Note: Combined with alpha1-Antitrypsin and alpha1-antichymotrypsin
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Vascular Tumor Factor VII-related Antigen, CD31, Ulex Europaeus 1 (UEA)

Cancer-Associated Genes

p53

Tumor suppressor gene

C-erb-2/c-myc/ras

Cellular oncogene found to be activated in breast cancer

Epithelial Membrane Antigen (EMA)

EMA+

Adenocarcinoma of Breast
Adenocarcinoma of Lungs
Adenocarcinoma of Kidneys

EMA-

Non-epithelial tumors
Sarcomas
Lymphomas
Melanomas

EMA Non-reactive

Hepatocellular Carcinoma
Adrenal Carcinoma
Embryonal Carcinoma

Carcinoembryonic Antigen (CEA)

CEA+

Adenocarcinoma

CEA-

Mesothelioma

CEA Non-reactive

Prostate Carcinoma
Thyroid Carcinoma
Renal Carcinoma

Prostate Specific Antigen (PSA)

PSA+

Prostatic Adenocarcinoma
Pancreatic Tumor
Salivary Gland Tumor

Germ Cell Tumor Markers

Human Chorionic Gonadotropin (HCG)

Marker for Chorio-carcinoma

Alpha-fetoprotein (AFP)

Embryonal Carcinomas
Treatomas
Hepatocellular Carcinomas

Placenta-like Alkaline Phosphatase (PLAP)

Most embryonal CA
Choriocarcinoma
Endodermal Sinus Tumors
Majority of seminomas

Lymphomas

Leukocyte Common Antigen (LCA)

CD45

T-cells

CD3, CD4, CD8

B-cells

CD19, CD20, CD23

Reed-Sternberg Cells

CD15, CD30

Immunoglobulin Light and Heavy Chains



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CK7+, CK20-

CK7+, CK20-

Lung Carcinoma
Breast Carcinoma
Uterus Carcinoma
Ovaries Carcinoma
Serous Tumors

CK7-, CK20+

Colon Carcinoma
Stomach Carcinoma

CK7+, CK20+

Transitional Cell Carcinoma (Bladder)
Mucinous Ovarian Tumor

CK7-, CK20-

Renal Cell Carcinoma
Hepatocellular Carcinoma
Prostatic Adenocarcinoma
Thyroid Carcinoma
Squamous Cell Carcinoma

Thyroid Transcription Factor-1 (TTF-1)

TTF-1+

Thyroid, Lung, Neuroendocrine Tumors
Medullary Carcinoma
Carcinoid Tumor
Small Cell Tumor of Lungs

Neuroendocrine Markers

Neuron-Specific Enolase

Provides strong evidence of neural or neuroendocrine differentiation

Chromogranin

Neuroendocrine differentiation	K+,C- Neuroendocrine Carcinoma	K-,C+ Paranganglioma
Granular immunoreactivity		

Synaptophysin

Associated with presynaptic vesicles of neurons

Melanomas

Melanosome (HMB-45)

Detection of primary and secondary melanomas	Highly sensitive and specific
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Melan-A (MART-1)

Encodes melanoma-specific antigen in normal pigmented cells of skin, retina, and certain adrenocortical tumors

Cell Proliferation Markers

Ki-67 (MIB-1) and Proliferating Cell Nuclear Antigen (PCNA)

Assess the proliferation of tumor cells

