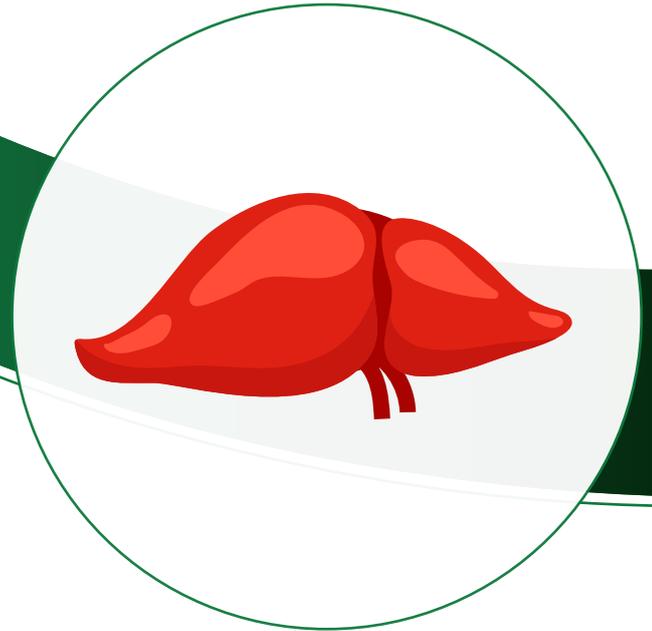




# IHC PANEL MARKERS

## L i v e r c a n c e r



BioGenex offers wide-ranging antibodies for several IHC panel for initial differentiation, tumor origin, treatment methods, and prognosis. All BioGenex antibodies are validated on human tissues to ensure sensitivity and specificity. BioGenex comprehensive IHC panels include a range of mouse monoclonal, rabbit monoclonal, and polyclonal antibodies to choose from.

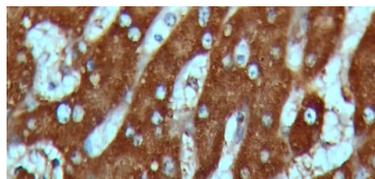
BioGenex offers a vast spectrum of high-quality antibodies for both diagnostic and reference laboratories. BioGenex strives to support efforts in clinical diagnostics and drug discovery development as we continue to expand our antibody product line offering in both ready-to-use and concentrated formats for both manual and automation systems.

### Antibodies for Liver Cancer

Glypican-3, CK LMW, AFP, CK19, CK7, CK20, TTF1, CD15, Beta-Catenin, CA125, CK18, CK8&18, E-Cadherin, HSP-70, p53, VEGF, Arginase 1, Serum Amyloid A, Adipophilin, Caspase-3, Alpha-1-Antitrypsin, Transferrin, Macrophage, Mitochondrial, Antichymotrypsin, HSA, Serum Amyloid P, Transthyretin, Filaggrin, Myeloperoxidase (AMD37), MHC Class I (AMD57).



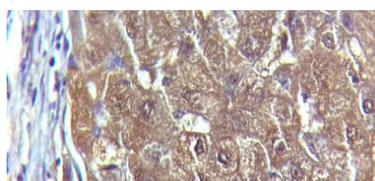
## HSA



Hepatocyte Specific Antigen (HSA), also called Hepatocyte Paraffin 1 or Hep-Par 1, is present in mitochondria of both normal adult and fetal liver tissue. It is a specific marker for normal and neoplastic hepatocytes in both benign and malignant liver-derived tissues including such tumors as hepatoblastoma, hepatocellular carcinoma, and hepatic adenoma.

Antibody	Clone	Localization	Catalog Family
HSA	OCH1E5	Cytoplasm	AMC47, AXC47, MUC47
HSA	HSA/E8	Cytoplasm	AM550, AX550, MU550

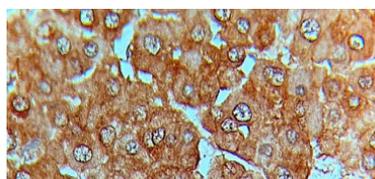
## Arginase 1



Arginase 1 (also known as liver type arginase or Type 1 arginase ,ARG1) is a 35 40 kDa member of the arginase family of enzymes that catalyzes the breakdown of L-arginine into ornithine and urea. It demonstrates two distinct functions: it catalyzes the conversion of arginine to ornithine and urea in the hepatocyte cytoplasm, while in multiple cells, it degrades arginine, thus indirectly downregulating Nitric Oxide synthase activity by depriving this enzyme of its substrate.

Antibody	Clone	Localization	Catalog Family
Arginase 1	ARG1/1126	Cytoplasm	AMC21, AXC21, MUC21
Arginase 1	C-2	Cytoplasm	AMB81, AXB81, MUB81

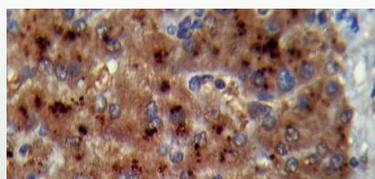
## Serum Amyloid A



SAA proteins plays a major role in physiological processes, including the recruitment of immune cells to inflammatory sites, the transport of cholesterol to the liver for secretion into the bile and the induction of enzymes that degrade extracellular matrix. It is expressed in the normal liver, adipose tissue, breast, salivary gland, brain, and can be used as panel with  $\kappa$  and  $\lambda$  Ig light chains, TransthTransthyretin in recognizing most forms of amyloid.

Antibody	Clone	Localization	Catalog Family
Serum Amyloid A	SAA/326	Cytoplasm	AMC42, AXC42, MUC42

## Adipophilin

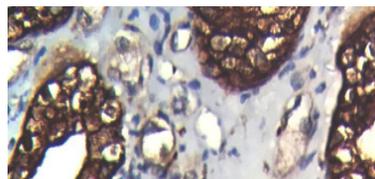


Adipophilin (ADFP, adipocyte differentiation-related protein) belongs to the perilipin family associated with lipid globule surface membranes and intracellular lipid storage droplets in various normal cells. It is a major constituent of the globule surface and involved in the development and maintenance of adipose tissue. Anti-Adipophilin is considered a useful marker of cytoplasmic lipids, sebocytes, and lipid accumulation, and can be used to identify sebaceous lesions and carcinomas.

Antibody	Clone	Localization	Catalog Family
Adipophilin	ADFP/1494	Cytoplasm	AMA76, AXA76, MUA76



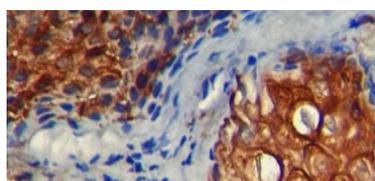
## Caspase-3



Caspase-3, also known as apopain, SCA-1, Yama and CPP32, is an aspartate-specific cysteine protease that belongs to the interleukin-1  $\beta$ -converting enzyme subfamily of caspases. Caspase-3 is synthesized as an inactive proenzyme (32 kDa) that is processed in cells undergoing apoptosis by self-proteolysis and/or further cleaved by another upstream protease generating two subunits of 17 kDa and 12 kDa.

Antibody	Clone	Localization	Catalog Family
Caspase-3	31A1067	cytoplasm	AMB42, AXB42, MUB42

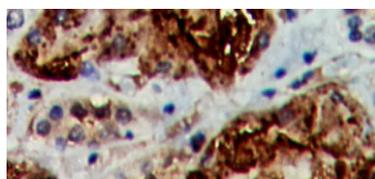
## Filaggrin



Filaggrin protein is an intermediate filament-associated protein that aggregates keratin intermediate filaments in epidermis. It is initially synthesized as a polyprotein precursor molecule, profilaggrin (a large, insoluble, highly phosphorylated precursor protein containing several tandem copies of a 324 amino acid). Filaggrin expression is seen only in well differentiated keratinized epithelial cells. Mutations in this gene are associated with ichthyosis vulgaris with viral, premalignant and malignant conditions.

Antibody	Clone	Localization	Catalog Family
Filaggrin	FLG/1562	Cytoplasm	ANB37, AYB37, NUB37

## Transthyretin



Transthyretin (TTR), previously called thyroxin-binding Prealbumin, is a 55 kDa homotetramer of 14-15 kDa monomers that is found in plasma. It is a homo-tetrameric carrier protein, which transports thyroid hormones in the plasma and cerebrospinal fluid. It is also involved in the transport of retinol (vitamin A) in the plasma by associating with retinolbinding protein. This protein may also be involved in other intracellular processes including proteolysis, nerve regeneration, autophagy and glucose homeostasis.

Antibody	Clone	Localization	Catalog Family
Transthyretin	TTR/4292	Cytoplasm	AMA93, AXA93, MUA93

## Serum Amyloid P

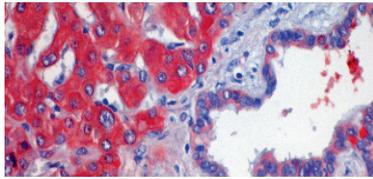


Serum Amyloid P (SAP), a member of pentraxin family, is a glycoprotein which has a characteristic pentameric organization. It is an acute phase protein, structurally related to C-reactive protein. SAP is made by hepatocytes and secreted into the blood. SAP is the single normal circulating protein that shows specific calcium-dependent binding to DNA and chromatin in physiological conditions.

Antibody	Clone	Localization	Catalog Family
Serum Amyloid P	APCS/3240	Cytoplasm	AMA93, AXA93, MUA93



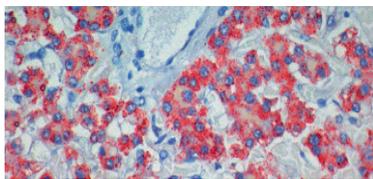
## Alpha-1-Antichymotrypsin



Alpha-1-Antichymotrypsin (ACT) is a serine protease inhibitor. It forms a complex with serine protease, a prostate-specific antigen in human serum. ACT can be found in most cells of myeloid lineage and is, therefore, useful in the identification of neoplastic myeloid cells within extramedullary tissues such as acute myeloid leukemia. This enzyme is also localized in the spindle cells and round cells of true histiocytic lymphomas as well as in most thyroid papillary carcinomas. ACT is expressed in various normal and neoplastic cells.

Antibody	Clone	Localization	Catalog Family
Alpha-1-Antichymotrypsin	a1A88	Cytoplasm	AM388, AX388, MU388

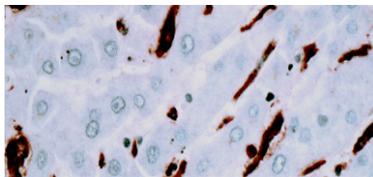
## Mitochondrial Antigen



Monoclonal antibody clone 113-1 recognizes a 60 kD antigen of human mitochondria. This marker may be useful in identification of mitochondria in cells, tissues, and biochemical preparations. It produces a "spaghetti-like" staining pattern in the cytoplasm of human cells and may be used as a marker of biliary cirrhosis.

Antibody	Clone	Localization	Catalog Family
Mitochondrial Antigen	113-1	Cytoplasm	AM213, AX213, MU213

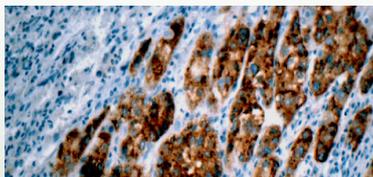
## Macrophage



LN5 stains an unidentified antigen in cytoplasm of macrophages and histiocytes in hematopoietic organs. It stains mantle zone B lymphocytes of the lymph node and spleen, spermatogonia, chief cells of the stomach, ductal epithelium of breast and tubular epithelium of kidney. It is strongly reactive with cases of true histiocytic lymphoma but is negative, except for macrophages, in Hodgkin's disease and non-Hodgkin's lymphomas. It can be an important tool for the study of malignant and benign histiocytic lesions.

Antibody	Clone	Localization	Catalog Family
Macrophage	LN5	Cytoplasm	AM165, AX165, MU165

## Glypican-3

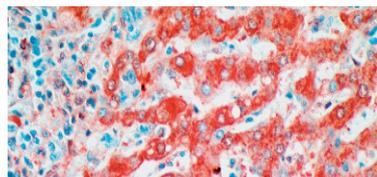


Glypican-3 (GPC3) is a glycosylphosphatidyl inositol-anchored membrane protein, which may also be found in a secreted form. GPC3 belongs to the glypican family of heparan sulfate proteoglycans. This protein may be involved in the suppression/modulation of growth in the predominantly mesodermal tissues and organs. Glypican-3 is thought to regulate tissue and organ growth through interactions with growth factors such as insulin-like growth factor II or fibroblast growth factor 2. GPC3 is a biomarker that is sensitive and specific to hepatocellular carcinoma.

Antibody	Clone	Localization	Catalog Family
Glypican-3	GPC3-88	Cytoplasm/Membrane	AM539, AX539, MU539



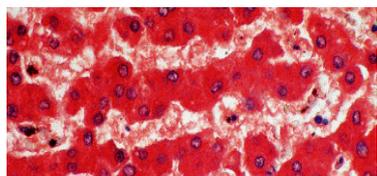
## Alpha-1-Antitrypsin



Alpha-1-Antitrypsin (AAT) is a 54 kD glycoprotein. Most of the anti-proteolytic enzyme activity of serum resides in this fraction. It is also found in lymph, mucus, saliva, synovial fluid, gastrointestinal tract secretions, semen, amniotic fluid and colostrum. It is a useful marker for benign and malignant hepatic neoplasms, endodermal sinus tumors, and for histiocytic differentiation in benign and malignant fibrous histiocytomas.

Antibody	Clone	Localization	Catalog Family
Alpha-1-Antitrypsin	Polyclonal	Cytoplasm	AR015, AW015, PU015

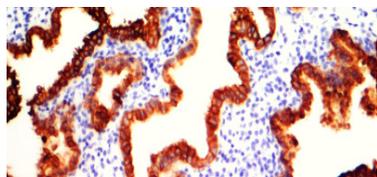
## Transferrin



Human Transferrin, an iron-binding protein, is produced mainly in the liver and can be demonstrated within hepatocytes. Transferrin-positive hepatocytes occur in groups or singularly and do not follow a distinct pattern, although some tendency towards periportal clustering is observed. Moderate staining in Kupffer cells is seen in some specimens. Transferrin has also been demonstrated by immunohistochemistry in a wide variety of other tissues including stomach, duodenum, gall bladder, thyroid, kidney, male and female reproductive tracts, skin, and in histiocytes.

Antibody	Clone	Localization	Catalog Family
Transferrin	HT1/13.6.3	Cytoplasm	AM025, AX025, MU025

## Cytokeratin 7



Anti-Cytokeratin 7 (CK7) antibody recognizes an intermediate filament protein (IFP) of 55 kDa. This monoclonal antibody (mAb) is highly specific to cytokeratin 7 and shows no cross-reaction with other IFPs. Cytokeratin 7 is a basic cytokeratin and belongs to type II cytokeratin. Type II cytokeratin is specifically expressed in the simple epithelia lining the cavities of the internal organs and in the gland ducts and blood vessels and is found in most glandular and transitional epithelia; but not in the stratified squamous epithelia. Cytokeratin 7 is expressed in the epithelial cells of the ovary, lung, and breast but not of the colon, prostate, or gastrointestinal tract. Anti-Cytokeratin 7 mAb is highly useful in distinguishing ovarian carcinomas (CK 7+) from colon carcinomas (CK 7-).

Antibody	Clone	Localization	Catalog Family
Cytokeratin 7	KRT7/760	Cell Membrane	AM944, AX944, MU944
Cytokeratin 7	OV-TL12/30	Cytoplasm	AM255, AX255, MU255

## Cytokeratin, Low MW

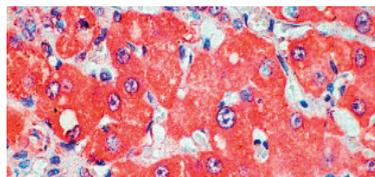


The cytokeratins are a family of water insoluble proteins (40-70kD) found in almost all epithelial cell types. Low molecular weight cytokeratin antibody AE1 has proven to be a widespread histological marker for the restricted staining of the epidermal basal layer of skin and almost all epithelially derived tumors. It can be used as a marker for cells of epithelial origin. This antibody recognizes most type I keratins and shows broad species specificity reacting with keratins of many species including human, rabbit, mouse, bovine, and chick. Staining is usually stronger in alcohol-fixed tissues than in formalin-fixed tissues.

Antibody	Clone	Localization	Catalog Family
Cytokeratin, Low MW	AE1	Cytoplasm	AM075, AX075, MU075



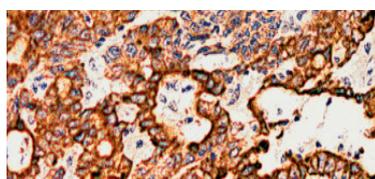
## Alpha-Fetoprotein (AFP)



Alpha-Fetoprotein (AFP) is a 64 kD tumor-associated embryonal antigen produced by fetal liver, hepatoma, yolk sac, and several germ cell tumors of testicular and ovarian origin. Of the germ cell tumors, only embryonal carcinoma and endodermal sinus tumors stain positive for AFP and not teratomas. The positive results are useful in distinguishing embryonal carcinoma from seminoma. AFP is present in the mononuclear embryonal carcinoma cell and in the intracellular or extracellular hyaline droplets. This antibody stains positive for alpha fetoprotein in the cytoplasm of positive cells.

Antibody	Clone	Localization	Catalog Family
Alpha-Fetoprotein (AFP)	C3	Cytoplasm	AM008, AX008, MU008

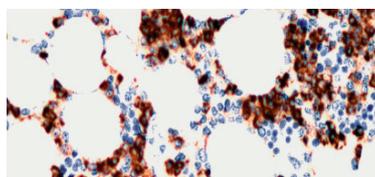
## Cytokeratin 19



Cytokeratin 19 (molecular mass 40 kD) is a marker of simple epithelia. Cytokeratin 19 has been found in mesothelial and mesothelioma cells, ovarian cysts, cystadenomas, and ovarian carcinomas, in adenocarcinomas of the lung and in tumor cells of pulmonary metastases, in the ductal cells of normal pancreas and in pancreatic cancers. It has been shown to be present in the basal layer of non-keratinizing stratified squamous epithelia such as the oral cavity and the ectocervix.

Antibody	Clone	Localization	Catalog Family
Cytokeratin 19	RCK108	Cytoplasm	AM246, AX246, MU246

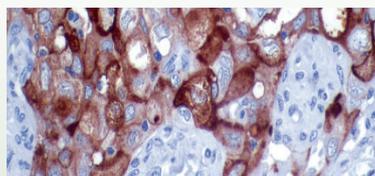
## CD15 (Blood Group Antigen Lewis X)



CD15 (BRA4F1) reacts with human CD15 antigen present on myeloid cells, mainly granulocytes but not on B cells, T cells, monocytes, erythrocytes or platelets. It also reacts with Hodgkin's and Reed- Sternberg cells in individuals with Hodgkin's disease. This antibody stains CD15 antigen in positive cells.

Antibody	Clone	Localization	Catalog Family
CD15	BRA4F1	Membrane/Cytoplasm	AM302, AX302, MU302

## CA125

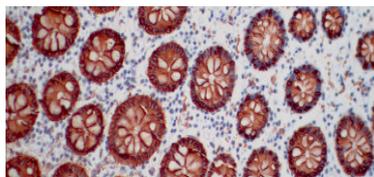


CA125 monoclonal antibody reacts with repetitive protein determinant expressed in the protein core of the CA125 human ovarian cancer antigen. This marker is usually associated with ovarian epithelial malignancies. Immunohistochemistry with CA125 antibody in conjunction with other markers is found to be useful in tracing the origin of adenocarcinoma of unknown origin. This antibody stains membrane in ovarian cancer cells.

Antibody	Clone	Localization	Catalog Family
CA125	Ov185:1	Membrane/Cytoplasm	AM429, AX429, MU429



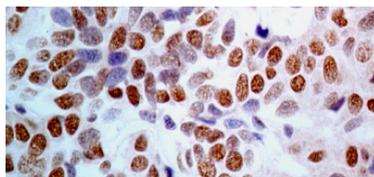
## Cytokeratin 20



Intermediate-sized filament (IF) protein designated cytokeratin 20 (CK20) is a major cellular protein of mature enterocytes and goblet cells commonly found in mucosal epithelium of the mammalian gastrointestinal tract. Results strongly suggest that transcriptional regulation of keratin genes in the intestinal epithelium occurs at the level of both immature and terminally differentiated epithelial cells, and is tightly regulated during both fetal development and crypt-to-villus differentiation of the intestinal epithelium. CK20 has recently been reported to be useful to distinguish between primary and metastatic lung adenocarcinoma. CK20 expression was significantly more prevalent in adenocarcinoma that originated in the GI tract than that of pulmonary or breast origin.

Antibody	Clone	Localization	Catalog Family
Cytokeratin 20	EP23	Cytoplasm	AN849, AY849, NU849
Cytokeratin 20	IT-Ks20.8	Cytoplasm	AM315, AX315, MU315
Cytokeratin 20	KRT20/1992	Membrane	AM946, AX946, MU946

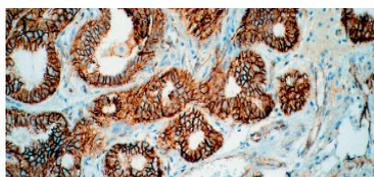
## Thyroid Transcription Factor (TTF-1)



Thyroid Transcription Factor-1 (TTF-1), also known as thyroid-specific enhancer-binding protein (T/EBP), is a 40 kD protein that is a member of NKx2 family of homeodomain transcription factors that regulates the expression of thyroid- and lung-specific genes. It is a very selective marker for adenocarcinomas of lung and thyroid origin. Nuclear localization of this protein is seen in the epithelial cells of thyroid gland and lung. The anti-TTF-1 antibody is a useful tool for differentiating pulmonary adenocarcinoma from metastatic breast carcinoma and mesothelioma.

Antibody	Clone	Localization	Catalog Family
Thyroid Transcription Factor (TTF-1)	SP141	Nucleus	AN887, AY887, NU887

## Beta-Catenin

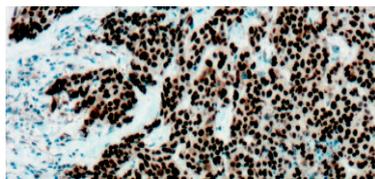


Beta-Catenin is a key regulatory protein involved in cell adhesion and signal transduction through the Wnt pathway, and plays important roles in development, cellular proliferation, and differentiation. Mutations of this gene are commonly found in a variety of cancers: in primary hepatocellular carcinoma, colorectal cancer, ovarian carcinoma, breast cancer, lung cancer and glioblastoma. Mutations in the Beta-Catenin gene CTNNB1 leading to stabilization of Beta-Catenin in the cytoplasm and translocation to the nucleus have been implicated in various forms of tumor including familial adenomatous polyposis, fibromatosis, solitary fibrous tumors and endometrial carcinoma. Nuclear accumulation of Beta-Catenin in fibromatosis (desmoid tumor) in various locations including breast and mesentery is useful in the differentiation of this tumor from another fibroblast like lesions.

Antibody	Clone	Localization	Catalog Family
Beta-Catenin	EP35	Nuclear and cytoplasm	AN778, AY778, NU778



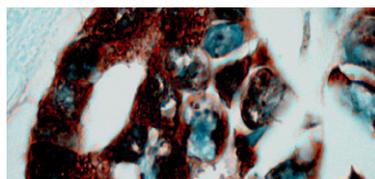
## p53



Tumor protein p53, a nuclear protein, plays an essential role in the regulation of cell cycles, specifically in the transition from G0 to G1. It is found in very low levels in normal cells, and it functions as a tumor suppressor within a variety of tumors by either stimulating apoptosis or growth arrest in deference to cell type and physiological factors. p53 is overexpressed in over 50% of human cancers. Positive staining of p53 detected by immunohistochemistry has been observed in colon cancer, breast cancer, lung cancer, prostate cancer and ovary cancer.

Antibody	Clone	Localization	Catalog Family
p53	EP9	Nucleus	AN728, AY728, NU728
p53	BP53-12-1	Nucleus	AM195, AX195, MU195
p53	1801	Nucleus	AM240, AX240, MU240
p53	DO7	Nucleus	AM239, AX239, MU239

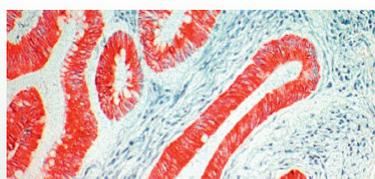
## Heat Shock Protein (HSP-70)



HSP-70 is a member of a multigene family encoding several closely related 70-73 kD stress proteins (the HSP-70 family). These genes differ in their intracellular location and regulation and are thought to be involved in protein-protein interactions such as those of the protein products of the p53 tumor suppressor gene and the human c-myc oncogene. This antibody stains HSP-70 localized in the cytoplasm and/ or nuclei in tissue from breast carcinoma, brain tumors, Alzheimer's disease and alcoholic liver disease. HSP70 is a good biomarkers for hepatocellular carcinoma diagnosis.

Antibody	Clone	Localization	Catalog Family
HSP-70	BRM-22	--	AM289, AX289, MU289

## Cytokeratin 18



Cytokeratins 8 (52 kD) and 18 (45 kD) comprise a cytokeratin pair as markers for simple epithelia. The monoclonal antibodies specific for cytokeratin 18 stain all carcinomas derived from simple epithelia but do not stain well-differentiated squamous cell carcinoma. It is useful to use monoclonal antibodies to Cytokeratins 8 and 18 in combination with other anti-cytokeratin monoclonal antibodies when studying cytokeratin expression patterns. This antibody stains Cytokeratin 18 in the cytoplasm of epithelial cells.

Antibody	Clone	Localization	Catalog Family
Cytokeratin 18	DC-10	Cytoplasm	AM143, AX143, MU143



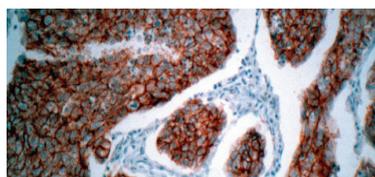
## Cytokeratins 8 & 18



Carcinomas may be classified precisely by the analysis of their keratin patterns. Cytokeratin 8 & 18 recognizes an epitope restricted to a few members of the cytokeratin subclasses, specifically Cytokeratins 8 and 18. This antibody reacts with all simple epithelia including glandular epithelium and ciliated pseudostratified columnar epithelium localized in thyroid, female breast, gastrointestinal and respiratory tract. 5D3 may be a useful marker for demonstrating columnar cell differentiation when studying biphasic differentiation of basal cells of respiratory or intermediate epithelium. E-cadherin is an important adhesion molecule whose loss is associated with progression and poor prognosis of liver cancer.

Antibody	Clone	Localization	Catalog Family
Cytokeratins 8 & 18	5D3	--	AM131, AX131, MU131

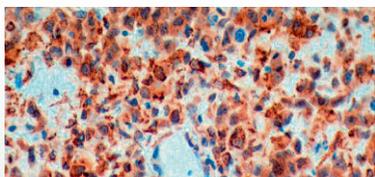
## E-Cadherin



E-Cadherin (123-kD) is a cell surface glycoprotein responsible for Ca<sup>2+</sup>-dependent intercellular adhesion between epithelial cells. Alterations in the cell-cell adhesion mechanism mediated by E-Cadherin which is lightly associated with alpha catenin may have implications in the metastatic potential of prostate cancer. E-Cadherin may also play a role in adhesion of dendritic epidermal T cells to keratinocytes. Clone 36 may be used to investigate the process of tumor invasion.

Antibody	Clone	Localization	Catalog Family
E-Cadherin	36	Membrane	AM390, AX390, MU390
E-Cadherin	EP6	Membrane	AN725, AY725, NU725

## VEGF



Vascular endothelial factors (VEGFs) are a family of closely related growth factors having a conserved pattern of eight cysteine residues and share common VEGF receptors. VEGF receptors stimulate the proliferation of endothelial cells, induce angiogenesis, and increase vascular permeability in both large and small vessels. The mitogenic activity of VEGF appears to be mediated by specific VEGF receptors.

Antibody	Clone	Localization	Catalog Family
VEGF	Polyclonal	Cytoplasm	AR483, AW483, PU483



## BioGenex Primary Antibody Format and Pack Size

BioGenex antibodies are optimized to provide a maximum signal with the minimum background for immunohistochemical staining. All our antibodies are optimized and recommended for use with all Super Sensitive™ Detection Systems to provide optimum staining.

BioGenex Ready-to-Use (RTU) antibodies are fully optimized for use with BioGenex Detection Systems without the need for further dilution or titration. BioGenex concentrated antibodies are provided with recommended dilutions for optimal use with BioGenex Detection Systems, allowing rapid titration and testing.

Prefix	Type	Species	Suffix	Volume and Format
AM/AN	Monoclonal	AM-Mouse/AN-Rabbit	-5M/5ME	6 mL - Ready-to-use (manual)
AM/AN	Monoclonal	AM-Mouse/AN-Rabbit	-10M/10ME	10 mL - Ready-to-use (i6000™)
AX/AY	Monoclonal	AX-Mouse/AY-Rabbit	-YCD/YCDE and -50D/50DE	16 mL and 5 mL Ready-to-use (Xmatrix®)
AR	Polyclonal	Rabbit	-5R/5RE	6 mL - Ready-to-use (manual)
AR	Polyclonal	Rabbit	-10R/10RE	10 mL - Ready-to-use (i6000™)
AW	Polyclonal	Rabbit	-YCD/YCDE and -50D/50DE	16 mL and 5 mL Ready-to-use (Xmatrix®)
MU/NU	Monoclonal	AM- Mouse/AN-Rabbit	-UC/UCE and -5UC/5UCE	1 mL and 0.5 mL Concentrate
PU	Polyclonal	Rabbit	-UC/UCE and -5UC/5UCE	1 mL and 0.5 mL Concentrate

### Other Panel Markers from BioGenex

Breast cancer panel	Neuroendocrine tumor
B&T cell Associated Lymphoma	Pancreas tumor
Cervical cancer	Kidney cancer
Colorectal and stomach cancer	Head & neck cancer
Lung cancer	Bladder cancer
Melanoma	Germ cell tumor
Muscle cancer	Vascular tumor
Ovarian cancer	Pituitary gland
Prostate/Testicular cancer	Esophagus cancer

For specific information on the individual antibody, please refer to the datasheets available on [www.biogenex.com](http://www.biogenex.com) or call BioGenex Technical Support at **1(800)421-4149** or write to [support@biogenex.com](mailto:support@biogenex.com).



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