

Stem Cell Markers Antibodies to Hematopoietic Stem Cells

Multipotent stem cells, hemangioblasts, are derived from the mesoderm and differentiate toward hematopoietic and endothelial cell lineages. Hematopoietic stem cells (HSCs) can be found in the bone marrow, peripheral blood, and umbilical cord blood. HSCs are multipotent stem cells that give rise to all the blood cell types from the myeloid (monocytes and macrophages, neutrophils, basophils, eosinophils, erythrocytes, megakaryocytes/platelets, dendritic cells), and lymphoid lineages (T-cells, B-cells, NK-cells). HSCs are the most clinically used stem cell population and are used to treat hematopoietic malignancies and disorders.

Two populations of hematopoietic stem cells have been identified, long term and short term. Long term HSCs are capable of self renewal. Short term HSCs, also called progenitor or precursor cells, can differentiate into all types of blood cell but do not have the capacity for self renewal. These properties of HSCs are used in transplant therapies to treat leukemia and congenital immunodeficiency disorders.

Hematopoietic stem cells represent approximately 1 in 10,000 cells of the bone marrow and 1 in 100,000 cells in the blood. In addition, hematopoietic stem cells are morphologically very similar to white blood cells. Thus, isolation and identification of HSCs are dependent on the detection of cell surface markers and cluster of differentiation antigens. HSCs are commonly characterized by the absence of lineage-specific marker expression. Human hematopoietic stem cells are determined as CD34+, CD59+, CD90+, CD38low/–, c-Kit–/low and Lin–. Mouse hematopoietic stem cells are considered CD34low/–, SCA-1+, CD90+/low, CD38+, c-Kit+ and Lin–.

CD34

CD34 is a sialomucin molecule that is expressed on primitive hematopoietic stem cells and downregulated as they differentiate into mature cells. Although its precise function remains unknown, the pattern of expression of CD34 suggests that it plays a significant role in early hematopoiesis.

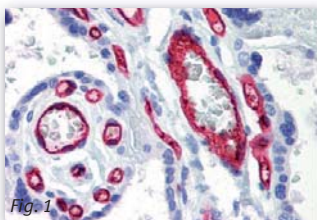


Fig. 1

Fig. 1: Formalin-fixed, paraffin-embedded (FFPE) human placenta tissue stained with CD34 antibody Cat.-No. AM08318PU-N

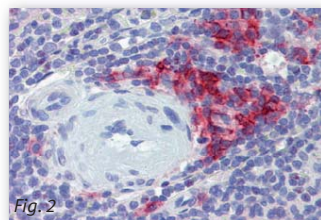


Fig. 2

Fig. 2: Spleen (FFPE) stained with CD38 antibody Cat.-No. AM20475SU-N

CD38

CD38 is a type II transmembrane protein that functions as a signaling molecule and mediates the adhesion between lymphocytes and endothelial cells. It also functions enzymatically in the formation and hydrolyzation of the second messenger cyclic ADP ribose. In the hematopoietic system, CD38 is most highly expressed on plasma cells.

CD59

CD59 is a GPI-anchored membrane glycoprotein that functions to inhibit formation of the complement membrane attack complex and thereby prevents cell injury. CD59 is expressed on erythrocytes and on all peripheral blood leukocytes. In mouse, the gene encoding CD59 has been duplicated, giving rise to CD59a and CD59b. The two proteins are differentially expressed in tissues and share approximately 65 % amino acid sequence identity.

CD90

CD90, also known as Thy1, is a GPI-linked glycoprotein expressed by endothelial cells, hematopoietic stem cells, and in developing nervous tissue. Unlike human CD90, mouse CD90 is also highly expressed on T cells and is involved in T cell activation.

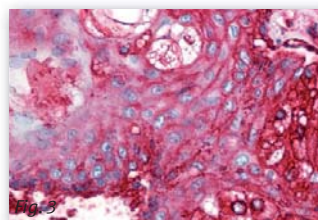


Fig. 3

Fig. 3: Skin (pilosebaceous unit; FFPE) stained with CD59 antibody Cat.-No. AM08314PU-N

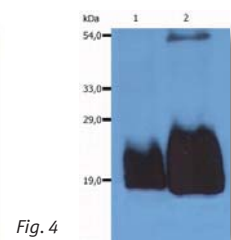


Fig. 4

Fig. 4: Western blotting analysis (non-reducing conditions) of whole cell lysate of HPB-ALL using CD59 antibody (clone MEM-43/5) Cat.-No. SM3033P: Lane 1: original cell lysate; Lane 2: material immunoprecipitated with CD59 antibody (clone MEM-43) Cat.-No. SM1145PS

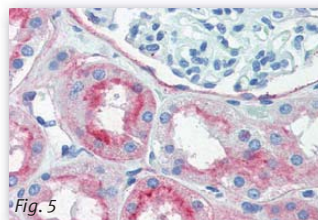


Fig. 5

Fig. 5: Human kidney (FFPE) stained with CD90 antibody Cat.-No. AM20160PU-N

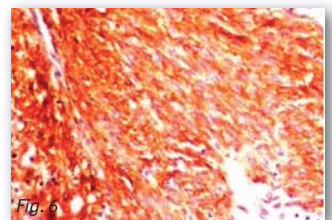


Fig. 6

Fig. 6: Human gastrointestinal stroma tumor stained with c-kit ligand antibody Cat.-No. AM11098PU-N

c-Kit

Stem cell factor receptor (CD117, the gene product of the c-kit protooncogene) and its ligand, stem cell factor (also named c-kit ligand, mast cell growth factor), play essential roles in gametogenesis, melanogenesis and hematopoiesis. It is a transmembrane tyrosine kinase that is expressed on endothelial cells, mast cells, megakaryocytes, stem cells and multiple embryonic cells, such as melanoblasts and primordial germ cells.

SCA-1

SCA-1 is an 18 kDa phosphatidylinositol-anchored protein that is a member of the lymphocyte antigen 6 (Ly-6) family. SCA-1 is encoded by the strain-specific Ly-6 E/A allelic gene. Its expression on multipotent hematopoietic stem cells (HSC) has been used as a marker of HSCs in mice of both Ly-6 haplotypes. SCA-1-positive HSCs can be found in the adult bone marrow, fetal liver, and mobilized peripheral blood and spleen

in the adult animal. However, SCA-1 has also been discovered in several non-hematopoietic tissues and can be used to enrich other progenitor cell populations as well. It is suggested that SCA-1 could be involved in regulating both B and T cell activation.

The table below summarizes Acris Antibodies hematopoietic stem cell antibodies. Refer to www.acris-antibodies.com and our other FocusOn antibody panel for a comprehensive listing of our products for stem cells research:

- FocusOn 104: Primordial Germ Cells and Ectoderm
- FocusOn 105: Neural Stem Cells
- FocusOn 106: Embryonic Stem Cells
- FocusOn 053: Mesenchymal Stem Cells
- FocusOn 054: Hematopoietic Stem Cells
- FocusOn 055: Induced Pluripotency (iPS)

Selected Acris Antibodies Panel to Hematopoietic Stem Cell Markers

Name	Host/Isotype	Clone	Reactivity	Application	Format	Catalog-No.*	other Formats
CD34	Mouse IgG1	4H11[APG]	Hu	F, P, WB	Purified	AM08318PU-N	- - - - -
	Mouse IgG1	34C02	Hu	C, F	Purified	DM3515P	- - - - -
	Mouse IgG1	QBEND/10	Hu	P	Supernatant	AM11104PU-S	- - - - -
	Mouse IgG1	AT4C2	Hu	E, WB	Purified	AM09079PU-S	- - - - -
	Rabbit	-	Hu	P	Purified	AP15437PU-S	- - - - -
	Rabbit IgG	-	Hu	P, WB	Aff-Purified	AP08362PU-N	- - - - -
	Rat IgG2a	3H1240	Ms	C, F, IP, P	Purified	AM08428PU-N	- - - - -
	Rat IgG2a	MEC14.7	Ms	F, IP	Purified	SM1603P ⁵	LE - BT ⁵ FC ⁵ PE ⁵
Mouse IgG1	1H6	Can	F, WB	Purified	SM2257P	- - - FC PE	
CD38	Mouse IgG1	6E12D	Hu	E, P, WB	Ascites	AM20475SU-N	- - - - -
	Mouse IgG1	HIT2	Hu	C, F, P, WB	Purified	SM3083P	- APC BT FC PE ^F
	Mouse IgG1	AT13/5	Hu	C, F, IP, P	Purified	SM1106P ⁵	AF - BT ⁵ FC ⁵ PE ⁵
	Mouse IgG1	TME-2	Hu	F	Purified	AM05191PU-N	- - - FC PE
	Rat IgG2a	NIMR-5	Ms	C, F, FN, IP	Purified	AM08041PU-N	LE APC BT FC PE
CD59	Mouse IgG1	1F5	Hu	F, P	Purified	AM06017PU-N	- - - - -
	Mouse IgG2b	MEM-43/5	Hu	F, IP, P, WB	Purified	SM3033P	- - - - PE ⁵
	Mouse IgG2a	MEM-43	Hu	F, IP, P	Purified	SM1145PS	AF - BT ⁵ FC ⁵ PE ⁵
	Rat IgG2b	YTH53.1	Hu	C, F, P, WB	Purified	SM1768 ⁵	- - - FC PE ⁵
	Mouse IgG1	1B4	Rt	F, IP, WB	Purified	SM806P	- - - - -
CD90	Mouse IgG1	5E10	Hu, Mky	C, F, IP, P	Aff-Purified	AM20160PU-N	- - - - -
	Mouse IgG1	F15-42-1	Hu, Mky	C, F, IP	Purified	SM1170P ⁵	AF - BT ⁵ FC ⁵ PE ⁵
	Mouse IgG2b	5a-8	Ms	C, CT, F	Purified	CL039P	- - BT FC PE
	Rat IgG2c	G7	Ms	C, F, FN	Purified	AM08054PU-N	LE APC BT FC PE
	Mouse IgG1	OX-7	GP, Ms, Rb, Rt	C, F, IP, WB	Purified	SM049P ⁵	LE - BT ⁵ FC ⁵ PE ⁵
c-Kit / CD117	Rabbit IgG	SP26	Hu	P	Supernatant	AM11098PU-N	- - - - -
	Rabbit IgG	R21-V	Hu	P	Aff-Purified	AM08009PU-S	- - - - -
	Rat IgG2b	2B8	Ms	F	Purified	SM052P ⁵	- - - - PE ⁵
	Mouse IgG2a	kit2c75	Chk	F	Purified	AM08136PU-N	- - BT FC PE
	Rabbit	-	Hu, Ms	E, If, P, WB	Purified	AP14375PU-N	- - - - -
	Rabbit	-	Hu	E, P, WB	Purified	AP14374PU-N	- - - - -
	Rabbit	-	Hu	P	Purified	AP15416PU-S	- - - - -
	Rabbit	-	Hu, Ms, Rt	WB	Aff-Purified	AP08062PU-S	- - - - -
SCA1 / Ly6A/E	Rat IgG2a	D7	Ms	F, IP, WB	Purified	AM05666PU-N	LE APC BT FC PE ^F
	Mouse IgG2a	1147447	Ms	CT	Ascites	CL048	- - - - -

* Cat.-No for unconjugated format; other formats have different Cat.-No. endings; Please look up at www.acris-antibodies.com or inquire!

⁵ Sample size aquirable, ^F further Fluorochrome labels (PE-CY5, -Dy590, -DY647) available

Reactivity: Can: Canine, Eq: Horse, Fe: Cat, GP: Guinea pig, Hu: Human, Mky: Monkey, Ms: Mouse, Rb: Rabbit, Rt: Rat

Application: C: Immunohistochemistry on frozen sections, CT: Cytotoxicity assay, E: ELISA, F: Flow cytometry, FN: Functional assay, IF: Immunofluorescence, IP: Immunoprecipitation, P: Immunohistochemistry on formalin-fixed, paraffin-embedded tissue sections, WB: Western blot

Format: AF: Azide free, BT: Biotin label, FC: FITC label, LE: Low Endotoxin, PE: Phycoerythrin label

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