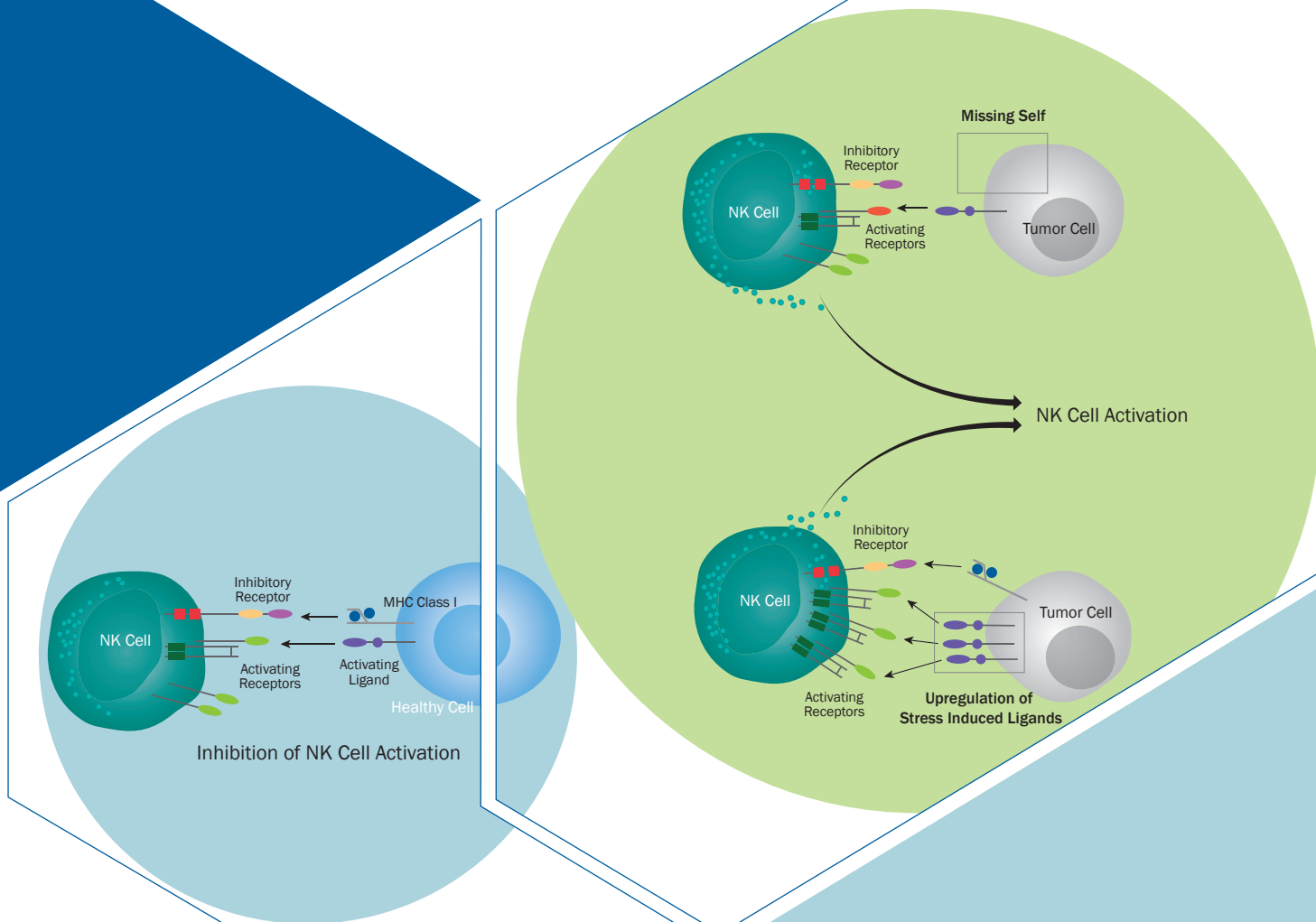


Products for Natural Killer Cell Research



Natural Killer Cells

Natural killer (NK) cells are innate lymphoid cells that function as both cytotoxic effector cells and initiators of the adaptive immune response. Their activation is regulated by multiple inhibitory and activating cell surface receptors including the human killer immunoglobulin-like receptors (KIRs), mouse Ly49 family receptors, CD94-NKG2 heterodimeric receptors, NKG2D, and the natural cytotoxicity receptors (NCRs). These receptors regulate NK cell activation by detecting abnormalities in cells that are associated with infection or malignant transformation, such as the loss of MHC class I expression or the elevated expression of specific stress-induced ligands. Once activated, NK cells secrete pro-inflammatory cytokines and trigger Perforin/Granzyme-induced target cell lysis. Their ability to specifically attack and eliminate stressed cells, while maintaining tolerance to normal, healthy cells has led to the compelling suggestion that NK cells may have therapeutic potential as anti-cancer agents. R&D Systems offers a wide selection of reagents for culturing and characterizing NK cells and investigating NK cell-tumor cell interactions including recombinant proteins, fluorochrome-conjugated antibodies, blocking/neutralization antibodies, and ELISA Kits.

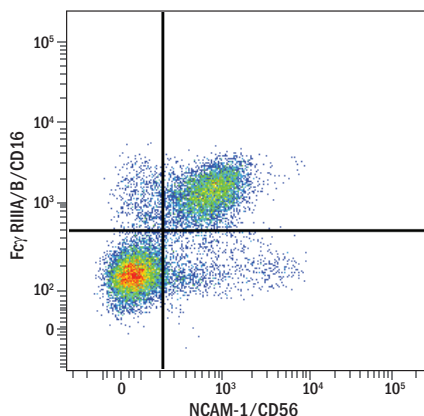
Antibodies for Select Markers Commonly used to Identify NK Cells by Flow Cytometry

Human NK Cells	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)							Unconjugated Antibodies (Applications)
	APC	Fluorescein	PE	PerCP	Alexa Fluor® 488	Alexa Fluor® 700	New Alexa Fluor® conjugates 405/594/647/750	
CD3	FAB100A	FAB100F	FAB100P	FAB100C	FAB100G	FAB100N	FAB100V/FAB100T/ FAB100R/FAB100S	MAB100 (FA, FC, ICC/IF, IP)
CD56	FAB2408A		FAB2408P					MAB2408 (E, FC, WB); MAB24081 (FC, IHC, WB); AF2408 (FC, ICC/IF, WB)
Fcγ RIIIA/B (CD16a/b)	FAB2546A	FAB2546F	FAB2546P	FAB2546C		FAB2546N		MAB2546 (FC)
IFN-γ	IC285A	IC285F	IC285P	IC285C	IC285G			MAB2851 (B/N, FC, ICC/IF)
Mouse NK Cells								
CD3	FAB4841A	FAB4841F	FAB4841P	FAB4841C	FAB4841G	FAB4841N	FAB4841V/FAB4841T/ FAB4841R/FAB4841S	MAB4841 (FA, FC, ICC/IF, IHC, IP)
CD27/TNFRSF7	FAB5741A		FAB5741P					MAB5741 (FC)
CD161/NK1.1	FAB8319A		FAB8319P		FAB8319G	FAB8319N		
	FAB7614A		FAB7614P		FAB7614G			MAB7614 (FC)
IFN-γ	IC485A	IC485F	IC485P			IC485N		MAB485 (B/N, FC, WB)
Integrin α2/CD49b	FAB1740A		FAB1740P					MAB1740 (FC); AF1740 (FC, ICC/IF, WB)
Integrin αM/CD11b	FAB1124A	FAB1124F	FAB1124P	FAB1124C		FAB1124N	FAB1124V/FAB1124T/ FAB1124R/FAB1124S	MAB1124 (FC, ICC/IF, IHC, IP)
NKp46/NCR	FAB22252A		FAB22252P	FAB22252C	FAB22252G	FAB22252N		MAB22252 (FC)
		FAB2225F	FAB2225P					AF2225 (FA, FC, WB)

Application Key:

B/N Blocking/Neutralization E ELISA FA Functional Assay FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation WB Western Blot

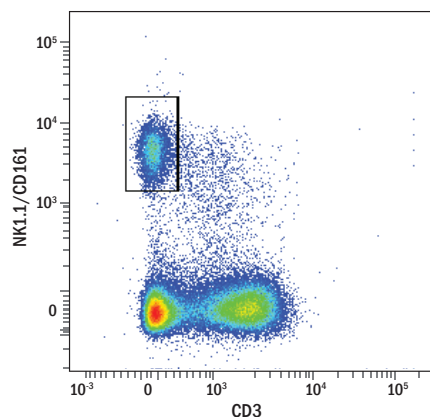
Identification of Human Natural Killer Cells by Flow Cytometry



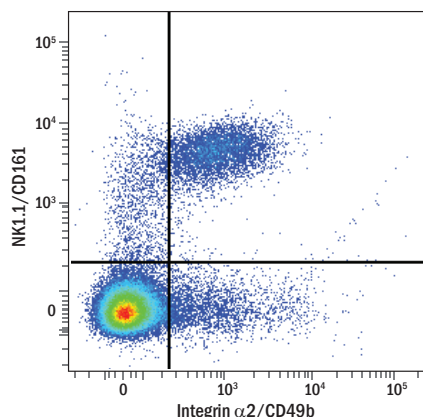
Detection of CD3⁻CD56⁺CD16^{-/-} Human Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408P) and a Fluorescein-conjugated Mouse Anti-Human Fcγ RIIIA/B/CD16 Monoclonal Antibody (Catalog # FAB2546F). Cells were gated on CD3⁻ lymphocytes.

Learn more | randsystems.com/nkcells

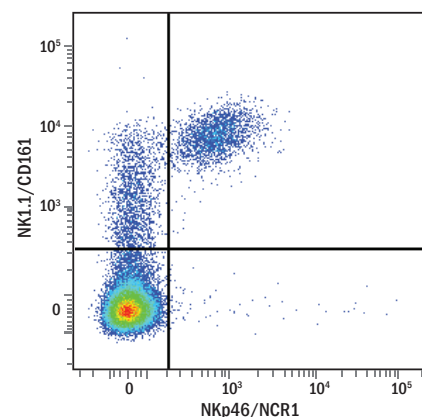
Identification of Mouse Natural Killer Cells by Flow Cytometry



Detection of CD3⁺NK1.1⁺ Mouse Splenocytes by Flow Cytometry. Mouse splenocytes were stained with an Alexa Fluor 594-conjugated Rat Anti-Mouse CD3 Monoclonal Antibody (Catalog # FAB4841T) and an APC-conjugated Mouse Anti-Mouse NK1.1/CD161 Monoclonal Antibody (Catalog # FAB8319A).



Detection of Integrin α 2/CD49b⁺NK1.1⁺ Mouse Splenocytes by Flow Cytometry. Mouse splenocytes were stained with a PE-conjugated Rat Anti-Mouse Integrin α 2/CD49b Monoclonal Antibody (Catalog # FAB1740P) and an APC-conjugated Mouse Anti-Mouse NK1.1/CD161 Monoclonal Antibody (Catalog # FAB8319A).



Detection of Nkp46⁺NK1.1⁺ Mouse Splenocytes by Flow Cytometry. Mouse splenocytes were stained with an APC-conjugated Rat Anti-Mouse Nkp46/NCR1 Monoclonal Antibody (Catalog # FAB22252A) and a PE-conjugated Mouse Anti-Mouse NK1.1/CD161 Monoclonal Antibody (Catalog # FAB8319P).

Natural Killer Cell Selection Kits

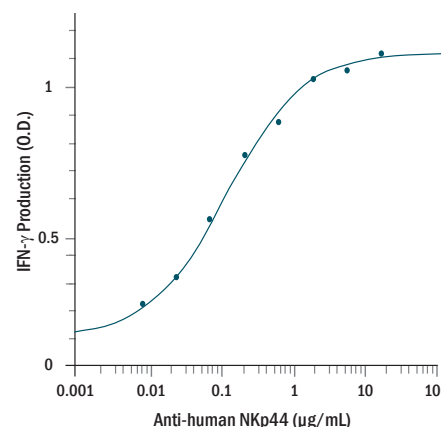
Kit	Catalog #
MagCollect™ Human NK Cell Isolation Kit	MAGH109
MagCollect™ Mouse NK Cell Isolation Kit	MAGM210

Select Recombinant Proteins for Culturing NK Cells

Molecule	Species	Catalog #
IL-2	Human	202-IL
	Mouse	402-ML
IL-12	Human	219-IL
	Mouse	419-ML
IL-15	Human	247-IL
	Mouse	447-ML
IL-18	Human	B003
	Mouse	B004
IL-21	Mouse	594-ML
	Human <i>coming soon!</i>	8879-IL

IL-2, IL-12, and IL-15 are also available as GMP-grade proteins.

Learn more | rndsystems.com/gmp



Detection of Anti-Nkp44-induced IFN- γ Secretion from IL-2-activated Human NK Cells Enriched using the MagCollect Human NK Cell Isolation Kit. Human peripheral blood natural killer (NK) cells were isolated using the MagCollect Human NK Cell Isolation Kit (Catalog # MAGH109). Isolated cells were treated with Recombinant Human IL-2 (Catalog # 202-IL), and the indicated concentrations of immobilized Goat Anti-Human Nkp44 Antigen Affinity-purified Polyclonal Antibody (Catalog # AF2249). IFN- γ secretion was measured using the Human IFN- γ Quantikine® ELISA Kit (Catalog # DIF50).

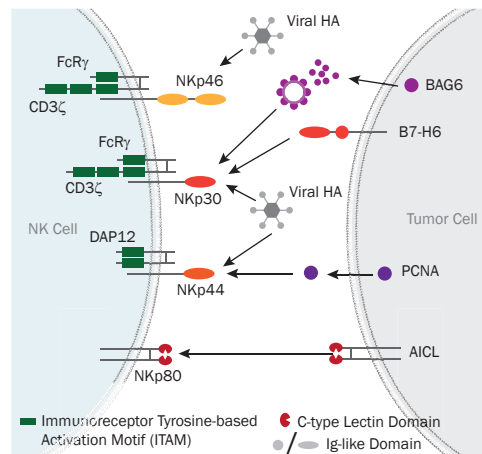
Select ELISAs and ELISpot Kits for Detecting Molecules Secreted by NK Cells

Molecule	Species	Quantikine® ELISA Catalog #	DuoSet® ELISA Catalog #	ELISpot Kit Catalog #	ELISpot Development Module Catalog #
GM-CSF	Human	DGM00	DY215		SEL215
	Mouse	MGM00	DY415		SEL415
Granzyme B	Human			EL2906	SEL2906
	Mouse		DY1865	EL1865	SEL1865
IFN- γ	Human	DIF50	DY285	EL285	SEL285
	Mouse	MIF00	DY485	EL485	SEL485
IL-10	Human	D1000B	DY217B	EL217B	SEL217B
	Mouse	M1000B	DY417	EL417	SEL417
TNF- α	Human	DTA00C	DY210		SEL210
	Mouse	MTA00B	DY410	EL410	SEL410

IFN- γ /Granzyme B and IFN- γ /IL-10 Dual Color ELISpot and FluoroSpot Kits are also available.

Natural Cytotoxicity Receptors

Natural cytotoxicity receptors (NCRs) are expressed almost exclusively by natural killer (NK) cells and play a central role in triggering their activation. In humans, NKp30 and NKp46 are constitutively expressed on resting and activated NK cells, while NKp44 expression is induced following activation. Most tumor-associated ligands of the NCR family are unknown, but recent research demonstrated that B7-H6, which is expressed on multiple tumor cell lines, binds to NKp30 and induces NK cell activation. R&D Systems offers a wide selection of flow cytometry antibodies to detect natural cytotoxicity receptors on human and mouse cells and the only fluorochrome-conjugated Anti-Human B7-H6 antibody on the market. Additionally, we offer bioactive Recombinant Human B7-H6 and NKp30 proteins. In-house studies have shown that immobilized recombinant B7-H6 protein binds to NKp30 and stimulates NK cell activation.

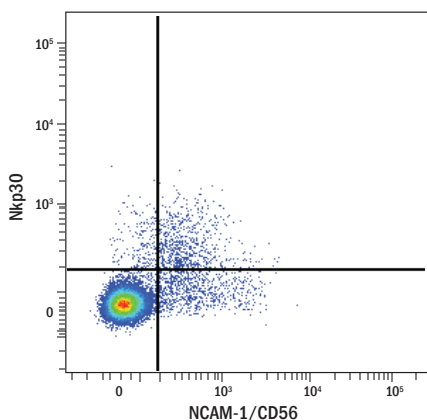


Products for Natural Cytotoxicity Receptors & Ligands

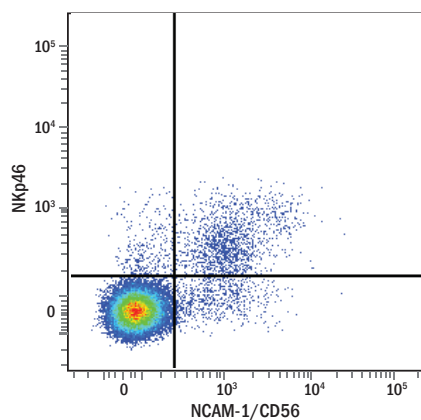
Antibodies

Molecule	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)							Unconjugated Antibodies (Applications)
	Species	APC	Fluorescein	PE	PerCP	Alexa Fluor 488	Alexa Fluor 700	
B7-H6	Human	FAB7144A		FAB7144P				MAB7144 (FC)
NKp30	Human	FAB1849A		FAB1849P		FAB1849G		MAB1849 (FA, FC); MAB18491 (FA); AF1849 (WB)
NKp44	Human	FAB22491A		FAB22491P				MAB22491 (FA, FC); MAB2249 (WB); AF2249 (FA, WB)
NKp46/NCR1	Human	FAB1850A	FAB1850F	FAB1850P				MAB1850 (FA, FC, ICC/IF, WB); AF1850 (ICC/IF, WB)
	Mouse	FAB22252A		FAB22252P	FAB22252C	FAB22252G	FAB22252N	MAB22252 (FC)
			FAB2225F	FAB2225P				AF2225 (FA, FC, WB); MAB2225 (WB)
NKp80/KLRF1	Human	FAB1900A		FAB1900P				MAB1900 (FC); AF1900 (FC, WB)

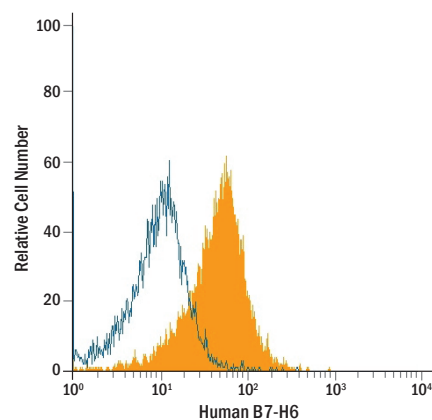
Most fluorochrome-conjugated antibodies are available in both a 25-test and 100-test size.



Detection of NKp30 on Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with an APC-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408A) and a PE-conjugated Mouse Anti-Human NKp30 Monoclonal Antibody (Catalog # FAB1849P).



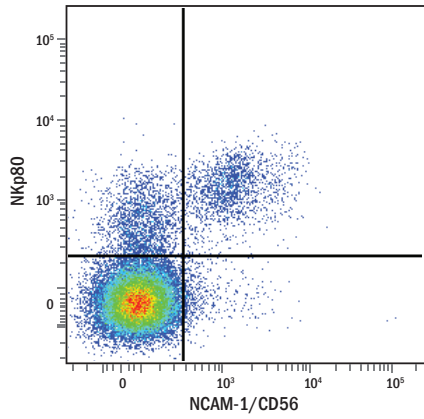
Detection of NKp46 on Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408P) and a Fluorescein-conjugated Mouse Anti-Human NKp46 Monoclonal Antibody (Catalog # FAB1850F).



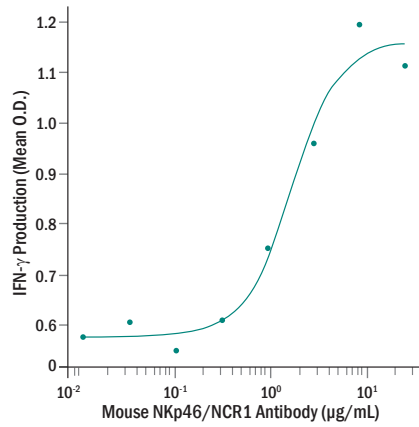
Detection of B7-H6 on HeLa Cells by Flow Cytometry. The HeLa human cervical epithelial carcinoma cell line was stained with an APC-conjugated Mouse Anti-Human B7-H6 Monoclonal Antibody (Catalog # FAB7144A; filled histogram) or an APC-conjugated Mouse IgG₁ Isotype Control (Catalog # IC002A; open histogram).

Application Key:

B/N Blocking/Neutralization E ELISA FA Functional Assay FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation WB Western Blot



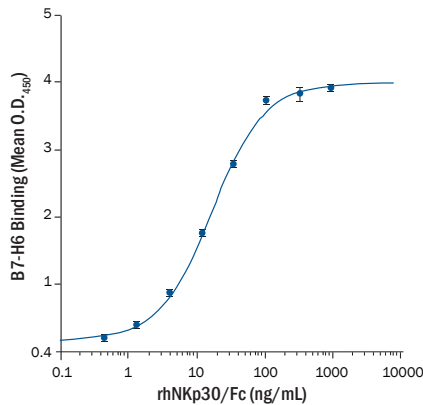
Detection of NKp80 on Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408P) and an APC-conjugated Mouse Anti-Human NKp80 Monoclonal Antibody (Catalog # FAB1900A).



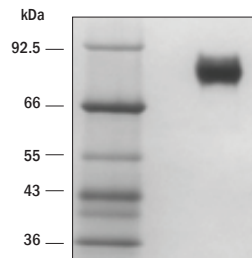
Mouse NKp46/NCR1 Antibody Induces IFN- γ Secretion from Activated Mouse Natural Killer Cells. Mouse natural killer cells were activated with Recombinant Mouse IL-2 (Catalog # 402-ML), Recombinant Mouse IL-12 (Catalog # 419-ML), and the indicated concentrations of Goat Anti-Mouse NKp46/NCR1 Antigen Affinity-purified Polyclonal Antibody (Catalog # AF2225). IFN- γ secretion was measured using the Mouse IFN- γ Quantikine ELISA Kit (Catalog # MIF00).

Recombinant Proteins

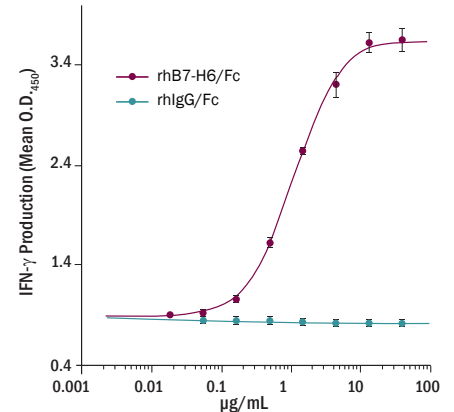
Molecule	Species	Catalog #
B7-H6	Human	7144-B7
NKp30	Human	1849-NK
NKp44	Human	2249-NK
NKp46	Human	1850-NK
	Mouse	2225-NK
NKp80	Human	1900-NK



Recombinant Human B7-H6 Binds to NKp30. Immobilized Recombinant Human B7-H6 Fc Chimera (Catalog # 7144-B7; 0.5 μ g/mL) was incubated with increasing concentrations of Recombinant Human NKp30 Fc Chimera (Catalog # 1849-NK). The concentration of Recombinant Human NKp30 Fc Chimera that produces 50% of the optimal binding response was approximately 8–40 ng/mL.



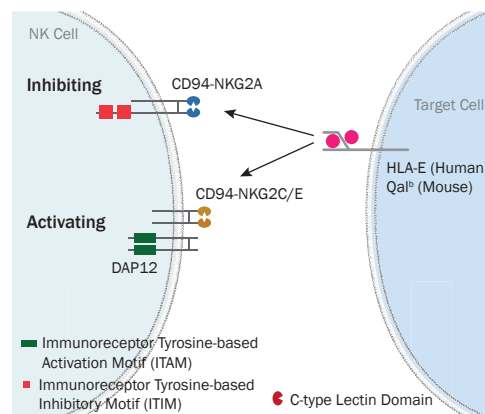
SDS-PAGE Analysis of Recombinant Human B7-H6 under Reducing Conditions. Recombinant Human B7-H6 Fc Chimera (Catalog # 7144-B7) was resolved by SDS-PAGE and visualized by silver staining under reducing conditions.



B7-H6 Induces IFN- γ Secretion from NK-92 Cells. The NK-92 human natural killer lymphoma cell line was incubated with the indicated concentrations of immobilized Recombinant Human B7-H6 Fc Chimera (Catalog # 7144-B7) or Recombinant Human IgG₁/Fc (Catalog # 110-HG) for 24 hours. IFN- γ secretion was measured using the Human IFN- γ Quantikine[®] ELISA Kit (Catalog # DIF50). The ED₅₀ for this effect is typically 0.6–3 μ g/mL.

NKG2 Family Receptors

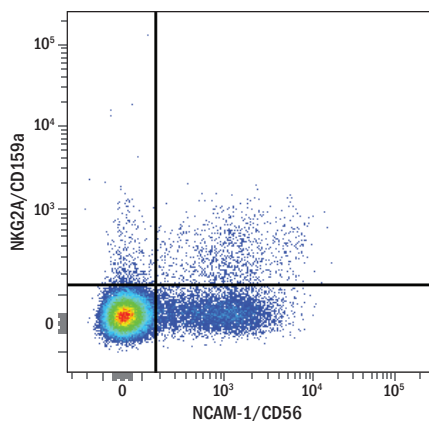
Human CD94-NKG2 heterodimeric receptors have either inhibitory or activating effects on natural killer (NK) cells depending on the NKG2 family member. CD94-NKG2C and CD94-NKG2E are both activating receptors, while CD94-NKG2A inhibits NK cell activation. Heterodimers of human CD94-NKG2A, C, or E recognize human leukocyte antigen (HLA)-E, while the corresponding mouse heterodimers recognize Qa1^b. R&D Systems exclusively offers fluorochrome-conjugated Anti-Human NKG2C antibodies, in addition to fluorochrome-conjugated Anti-Human CD94 and Anti-Human and Mouse NKG2A antibodies.



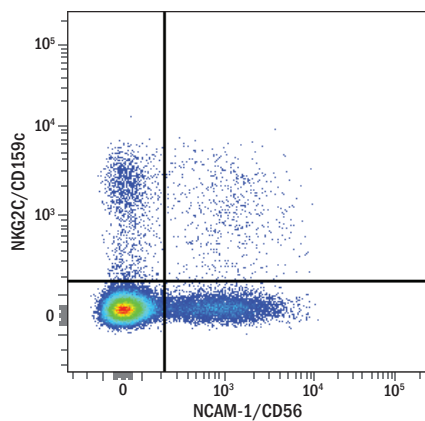
Products for NKG2 Family Receptors

Antibodies

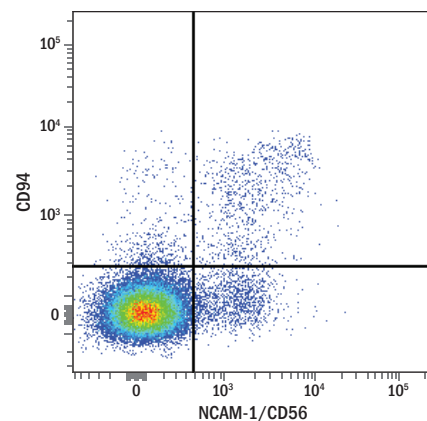
Molecule	Species	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)							Unconjugated Antibodies (Applications)
		APC	Fluorescein	PE	PerCP	Alexa Fluor 488	Alexa Fluor 647	Alexa Fluor 700	
CD94	Human	FAB1058A	FAB1058F	FAB1058P					MAB1058 (B/N, FC)
NKG2A	Human	FAB1059A		FAB1059P	FAB1059C			FAB1059N	MAB1059 (FC)
	Mouse	FAB6867A		FAB6867P		FAB6867G			MAB6867 (FC)
NKG2C	Human	FAB138A		FAB138P	FAB138C	FAB138G	FAB138R	FAB138N	MAB138 (FC); MAB1381 (FC)



Detection of NKG2A/CD159a in Human Peripheral Blood Mononuclear Cells by Flow Cytometry. Human peripheral blood mononuclear cells were stained with an APC-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408A) and a PE-conjugated Mouse Anti-Human NKG2A/CD159a Monoclonal Antibody (Catalog # FAB1059P).



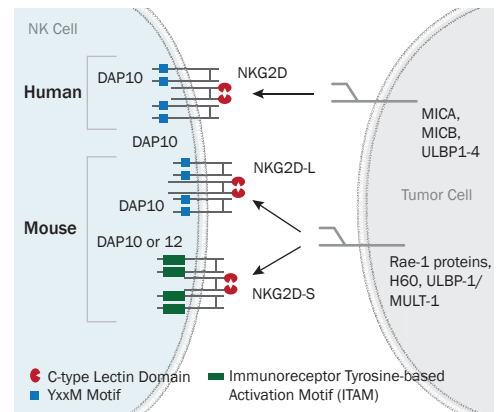
Detection of NKG2C/CD159c in Human Peripheral Blood Mononuclear Cells by Flow Cytometry. Human peripheral blood mononuclear cells were stained with an APC-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408A) and a PE-conjugated Mouse Anti-Human NKG2C/CD159c Monoclonal Antibody (Catalog # FAB138P).



Detection of CD94 in Human Peripheral Blood Mononuclear Cells by Flow Cytometry. Human peripheral blood mononuclear cells were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408P) and an APC-conjugated Mouse Anti-Human CD94 Monoclonal Antibody (Catalog # FAB1058A).

NKG2D

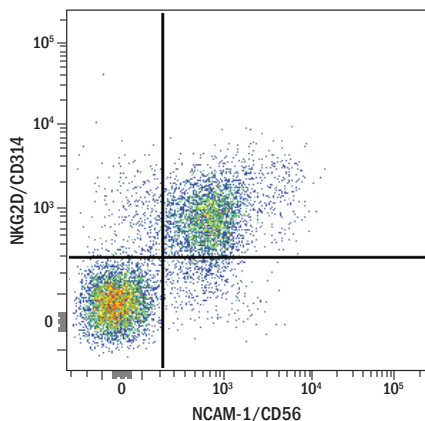
NKG2D is a homodimeric, natural killer (NK) cell-activating receptor that is distantly related to the NKG2 family. It recognizes several tumor-associated and stress-induced ligands such as MICA, MICB, and ULBP1-6 in human and members of the Rae1 family, H60, and MULT-1/ULBP-1 in mouse. R&D Systems exclusively offers fluorochrome-conjugated antibodies for detecting tumor-associated NKG2D ligands, as well as fluorochrome-conjugated Anti-Human and Anti-Mouse NKG2D antibodies. Recombinant proteins and unconjugated blocking/neutralization antibodies are also available to investigate NK cell – tumor cell interactions and the effects of different tumor-associated ligands on NK cell activity.



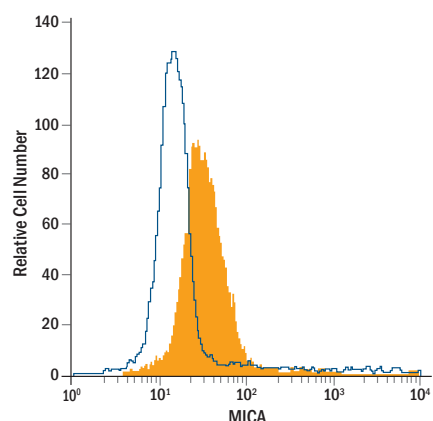
Products for NKG2D and NKG2D Ligands

Antibodies

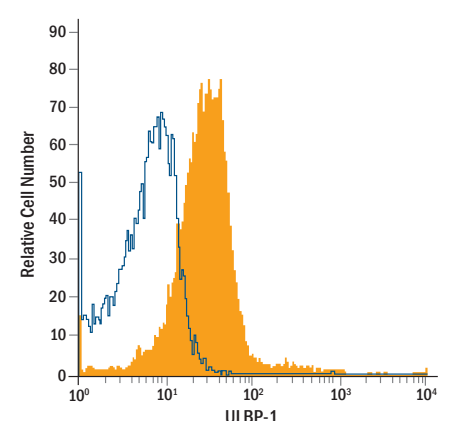
Molecule	Species	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)						Unconjugated Antibodies (Applications)
		APC	Fluorescein	PE	PerCP	Alexa Fluor 488	Alexa Fluor 700	
NKG2D	Human	FAB139A		FAB139P	FAB139C	FAB139G	FAB139N	MAB139 (B/N, FA, FC, WB)
	Mouse	FAB1547A	FAB1547F	FAB1547P				MAB1547 (B/N, FC, WB)
H60	Mouse	FAB1155A		FAB1155P		FAB1155G	FAB1155N	MAB1155 (B/N, E, FC, WB)
MICA	Human	FAB1300A		FAB1300P		FAB1300G		MAB1300 (B/N, FC, WB)
MICB	Human	FAB1599A		FAB1599P	FAB1599C	FAB1599G	FAB1599N	MAB1599 (E, FC, WB)
MICA/B	Human	FAB13001A		FAB13001P		FAB13001G	FAB13001N	MAB13001 (B/N, FC, IHC)
Rae-1 Pan	Mouse	FAB17582A	FAB17582F	FAB17582P	FAB17582C		FAB17582N	MAB17582 (FC)
Rae-1 $\alpha/\beta/\gamma$	Mouse	FAB1758A				FAB1758G		MAB1758 (B/N, FC)
Rae-1 ϵ	Mouse	FAB1135A		FAB1135P				MAB1135 (B/N, FC)
ULBP-1	Human	FAB1380A		FAB1380P	FAB1380C	FAB1380G		MAB1380 (B/N, FC)
	Mouse	FAB2588A		FAB2588P	FAB2588C		FAB2588N	MAB2588 (FC)
ULBP-2/5/6	Human	FAB1298A	FAB1298P		FAB1298C			MAB1298 (B/N, FC)
ULBP-3	Human	FAB1517A		FAB1517P				MAB1517 (B/N, FC)
ULBP-4/RAET1E	Human	FAB6285A		FAB6285P				MAB6285 (FC, IHC, WB)



Detection of NKG2D in Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with an APC-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408A) and a PE-conjugated Mouse Anti-Human NKG2D/CD314 Monoclonal Antibody (Catalog # FAB139P). Cells were gated on CD3⁺ lymphocytes.



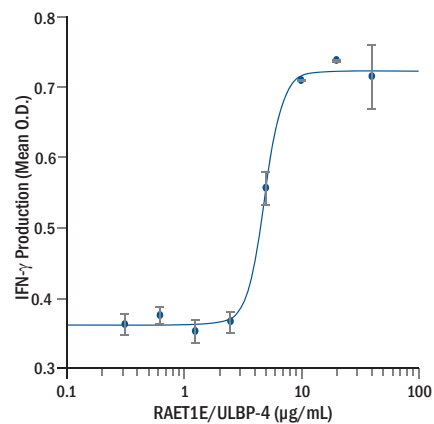
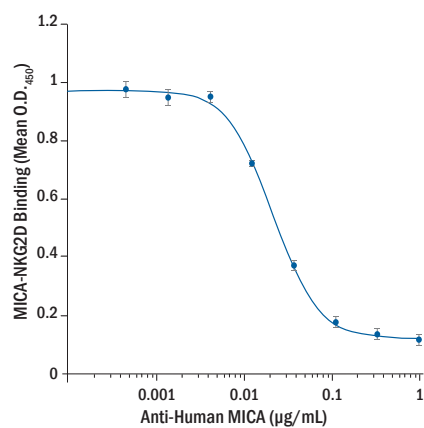
Detection of MICA on K562 Cells by Flow Cytometry. The K562 human chronic myelogenous leukemia cell line was stained with an Alexa Fluor[®] 488-conjugated Monoclonal Antibody (Catalog # FAB1300G; filled histogram) or Alexa Fluor 488-conjugated Mouse IgG_{2b} Isotype Control (Catalog # IC0041G; open histogram).



Detection of ULBP-1 on Jurkat Cells by Flow Cytometry. The Jurkat human acute T cell leukemia cell line was stained with an APC-conjugated Mouse Anti-Human ULBP-1 Monoclonal Antibody (Catalog # FAB1380A; filled histogram) or an APC-conjugated Mouse IgG_{2a} Isotype Control (Catalog # IC003A; open histogram).

Recombinant Proteins

Molecule	Species	Catalog #
NKG2D	Human	1299-NK
	Mouse	139-NK
H60	Mouse	1155-H6
MICA	Human	1300-MA
MICB	Human	1599-MB
Rae-1 α	Mouse	1158-RA
Rae-1 β	Mouse	1198-RA
Rae-1 γ	Mouse	1136-RA
Rae-1 δ	Mouse	1134-RA
Rae-1 ϵ	Mouse	1135-RA
ULBP-1	Human	1380-UL
	Mouse	2588-MU
ULBP-2	Human	1298-UL
ULBP-3	Human	1517-UL
ULBP-4/RAET1E	Human	6285-UL
ULBP-5	Human	7149-UL
ULBP-6/RAET1L	Human	7485-UL

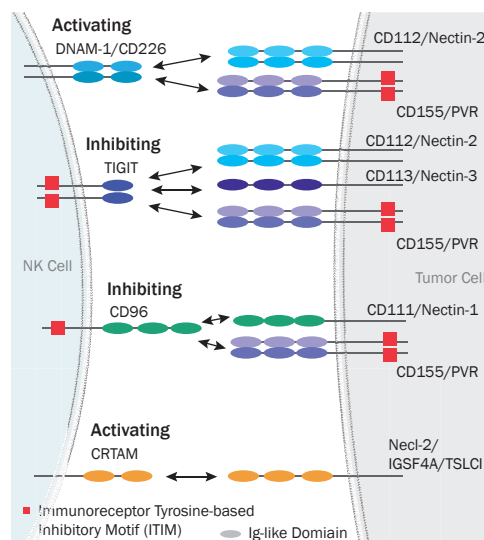


Neutralization of Recombinant Human MICA Binding to NKG2D. Binding of Recombinant Human MICA Fc Chimera (Catalog # 1300-MA; 50 ng/mL) to immobilized Recombinant Human NKG2D Fc Chimera (Catalog # 1299-NK; 2 µg/mL) was blocked with increasing concentrations of Mouse Anti-Human MICA Monoclonal Antibody (Catalog # MAB1300). 50% of the binding was blocked by 0.02–0.06 µg/mL of this antibody.

RAET1E/ULBP-4 Induces IFN- γ Secretion from NK-92 Cells. The NK-92 human natural killer lymphoma cell line was treated with increasing concentrations of immobilized Recombinant Human RAET1E/ULBP-4 (Catalog # 6285-UL). IFN- γ secretion was measured using the Human IFN- γ Quantikine ELISA Kit (Catalog # DIF50).

Nectin and Nectin-like Binding Receptors

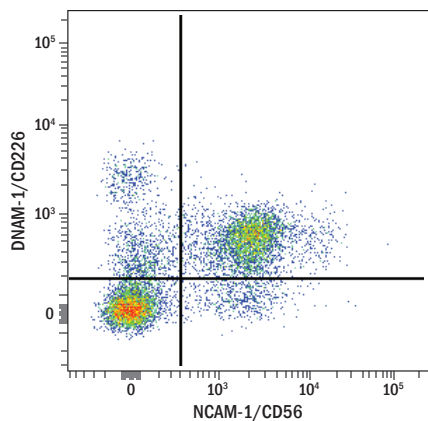
Natural killer (NK) cells and CD8⁺ T cells express the nectin and nectin-like binding receptors, DNAM-1/CD226, TIGIT, CRTAM, and CD96. DNAM-1/CD226 and TIGIT both bind to CD112/Nectin-2 and CD155/PVR, two proteins which are frequently up-regulated on tumor cells, but they have opposing effects on NK cell activity. DNAM-1/CD226 is expressed on resting NK cells and promotes NK cell activation, while TIGIT expression is elevated following NK cell activation and negatively regulates NK cell cytotoxicity. Additionally, CD96 competes with DNAM-1/CD226 for binding to CD155/PVR and inhibits IFN- γ production by NK cells, suggesting that blockade of the interactions between TIGIT and CD155/PVR and/or CD96 and CD155/PVR may have beneficial anti-tumor effects. As preliminary research has revealed the complexity of the interactions among these receptors and their involvement in tumor surveillance, the effects of these receptors on NK cells warrant further investigation. R&D Systems offers Recombinant Human or Mouse DNAM-1/CD226, TIGIT, CRTAM, CD155/PVR, Necl2/TSCL1, and Nectin-2/CD112, as well as fluorochrome-conjugated antibodies for all of these targets.



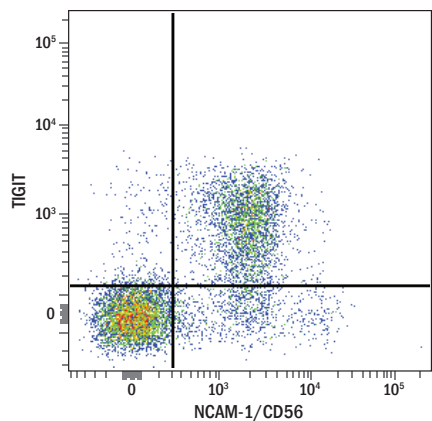
Products for Nectin and Nectin-like Binding Receptors and Ligands

Antibodies

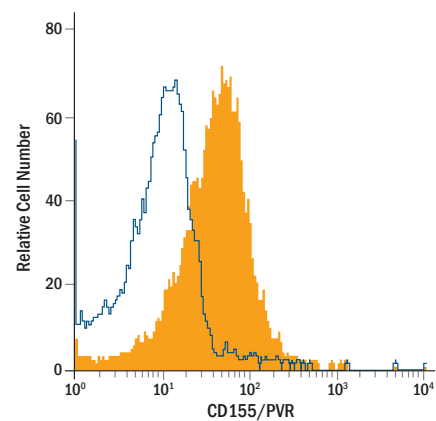
Receptors	Species	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)						Unconjugated Antibodies (Applications)
		APC	Fluorescein	PE	PerCP	Alexa Fluor 488	Alexa Fluor 700	
CD96	Mouse	FAB5690A		FAB5690P				MAB5690 (FC)
CD96v2	Human	FAB6199A						MAB6199 (FC)
CRTAM	Human	FAB16951A		FAB16951P				MAB16951 (FC, WB)
DNAM-1/CD226	Human	FAB666A	FAB666F	FAB666P				MAB666 (B/N, FC, WB)
	Mouse	FAB4436A		FAB4436P				MAB4436 (FC)
TIGIT	Human	FAB7898A		FAB7898P			FAB7898N	MAB7898 (FC)
	Mouse	FAB7267A				FAB7267G		AF7267 (FC)
Ligands								
CD155/PVR	Human	FAB25301A	FAB25301F	FAB25301P	FAB25301C			MAB25301 (FC, ICC/IF, WB)
	Mouse	FAB6909A		FAB6909P		FAB6909G		MAB6909 (FC, ICC/IF, WB)
IGSF4A/SynCAM1/Necl2	Mouse							AF1459 (WB)
Nectin-1	Human	FAB2880A						MAB2880 (FC)
	Human/Mouse							AF2880 (WB)
Nectin-2/CD112	Human	FAB2229A		FAB2229P		FAB2229G	FAB2229N	AF2229 (WB)
	Mouse	FAB3869A		FAB3869P		FAB3869G		MAB3869 (FC); AF3869 (WB)
Nectin-3/CD113	Human							AF3064 (FC, IHC, WB)



Detection of DNAM-1/CD226 on Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408P) and a Fluorescein-conjugated Mouse Anti-Human DNAM-1/CD226 Monoclonal Antibody (Catalog # FAB666F). Cells were gated on CD3⁺ lymphocytes.



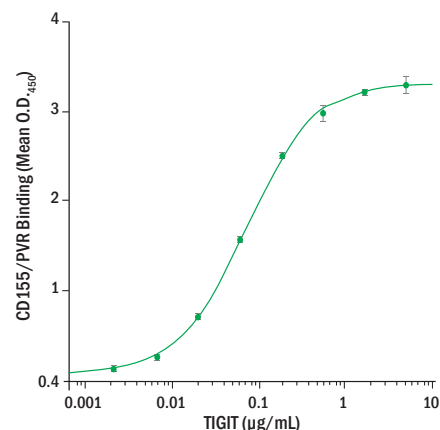
Detection of TIGIT on Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408P) and an APC-conjugated Mouse Anti-Human TIGIT Monoclonal Antibody (Catalog # FAB7898A). Cells were gated on CD3⁺ lymphocytes.



Detection of CD155/PVR on U937 Cells by Flow Cytometry. The U937 human histiocytic lymphoma cell line was stained with an APC-conjugated Mouse Anti-Human CD155/PVR Monoclonal Antibody (Catalog # FAB25301A; filled histogram) or an APC-conjugated Mouse IgG₁ Isotype Control (Catalog # IC002A; open histogram).

Recombinant Proteins

Molecule	Species	Catalog #s
CD96	Mouse	5690-CD
CD155/PVR	Human	2530-CD
	Mouse	6909-CD
CRTAM	Human	1695-CR
	Mouse	3687-CR
DNAM-1/CD226	Human	666-DN
	Mouse	4436-DN
IGSF4A/SynCAM1/Nect12	Human	3519-S4
	Mouse	1459-S4
Nectin-1	Human	2880-N1
Nectin-2/CD112	Human	2229-N2
	Mouse	3869-N2
Nectin-3/CD113	Human	3064-N3
TIGIT	Human	7898-TG
	Mouse	7267-TG



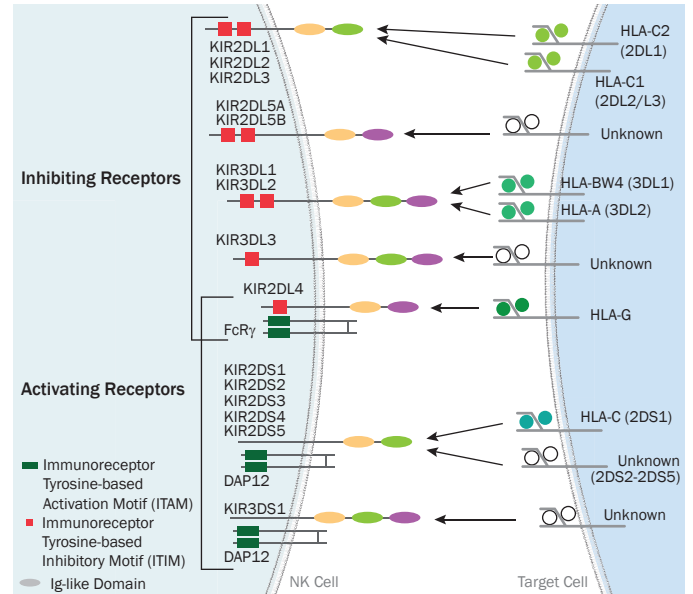
CD155/PVR Binds to TIGIT. Immobilized Recombinant Human CD155/PVR (Catalog # 2530-CD; 2.5 µg/mL) was incubated with increasing concentrations of Recombinant Human TIGIT (Catalog # 7898-TG). The concentration of Recombinant Human TIGIT that produces 50% of the optimal binding response is typically 0.02–0.1 µg/mL.

Application Key:

B/N Blocking/Neutralization E ELISA FA Functional Assay FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation WB Western Blot

Killer Immunoglobulin-like Receptors

Killer immunoglobulin-like receptors (KIRs) are a highly polymorphic family of natural killer cell receptors that interact with MHC class I molecules and elicit inhibitory, activating, or dual signals. The high degree of sequence identity shared between KIR family members has led to difficulty in producing monoclonal antibodies with specificity for a single KIR family member. R&D Systems® KIR antibodies have been rigorously tested in-house to maximize the selection of highly specific clones. Selected clones have either a confirmed lack of cross-reactivity with other KIR family members or minimal cross-reactivities that are reported on our data sheets.



Products for Killer Immunoglobulin-like Receptors (KIRs)

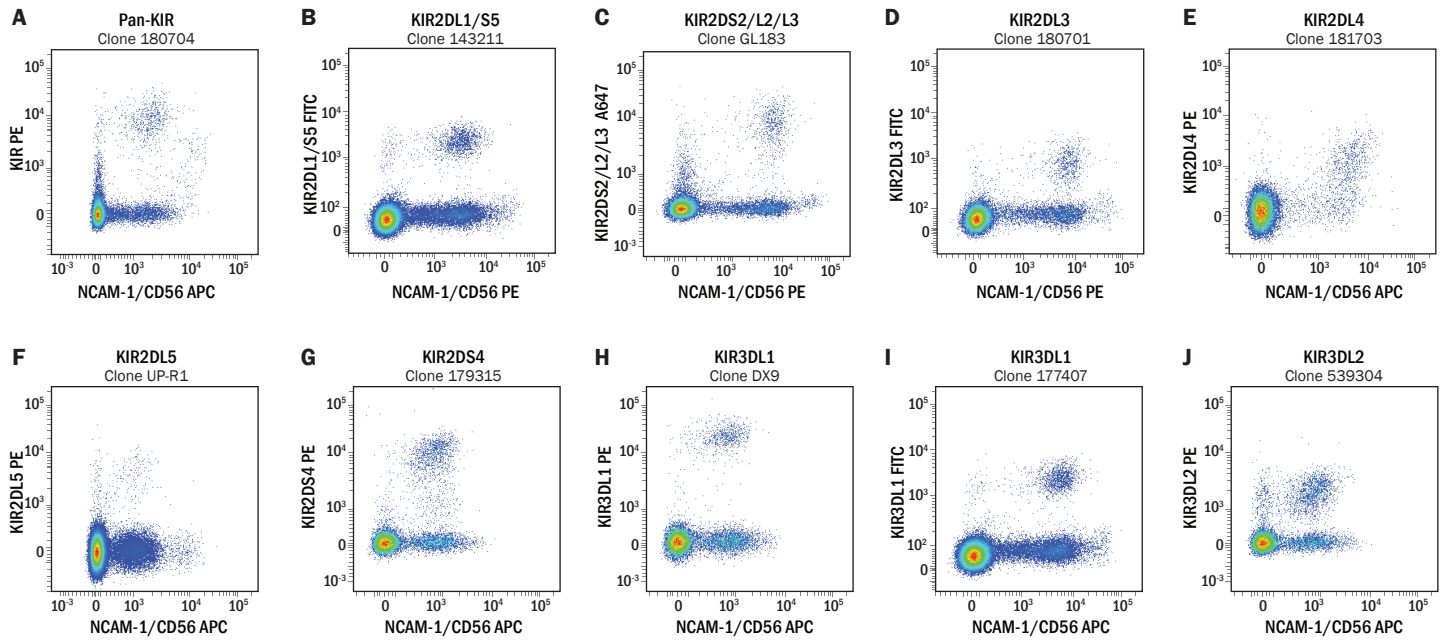
Antibodies

Molecule	Species	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)						Unconjugated Antibodies (Applications)
		APC	Fluorescein	PE	PerCP	Alexa Fluor 488	Alexa Fluor 700	
KIR pan/CD158	Human	FAB1848A	FAB1848F	FAB1848P				MAB1848 (FC)
Inhibitory receptors								
KIR2DL1/S5	Human	FAB1844A	FAB1844F	FAB1844P	FAB1844C	FAB1844G	FAB1844N	MAB1844 (FC)
KIR2DL3	Human	FAB2014A	FAB2014F	FAB2014P	FAB2014C			MAB2014 (FC)
KIR2DL4	Human	FAB2238A	FAB2238F	FAB2238P				MAB2238 (FA, FC)
KIR3DL1	Human	FAB1225A		FAB1225P				MAB1225 (B/N, FC)
		FAB12251A	FAB12251F	FAB12251P				MAB12251 (FC)
KIR3DL2	Human	FAB2878A		FAB2878P	FAB2878C		FAB2878N	MAB2878 (FC)
Activating receptors								
KIR2DL1/S5	Human	FAB1844A	FAB1844F	FAB1844P	FAB1844C	FAB1844G	FAB1844N	MAB1844 (FC)
KIR2DL4	Human	FAB2238A	FAB2238F	FAB2238P				MAB2238 (FA, FC)
KIR2DS4	Human	FAB1847A		FAB1847P		FAB1847G		MAB1847 (FC, WB)

Most fluorochrome-conjugated antibodies are available in both a 25-test and 100-test size.

COMING SOON Anti-Human KIR2DS1, Anti-Human KIR2DS5, Anti-Human KIR3DL3, and Anti-Human KIR2DS2/L2/L3 Antibodies.

R&D Systems® KIR Antibodies Are Rigorously Tested for the Selection of Highly Specific Clones



Staining of Primary Natural Killer Cells with Anti-KIR Antibodies. Primary natural killer cells from freshly isolated peripheral blood mononuclear cells (PBMCs) were stained with either an APC- or PE-conjugated NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408A or # FAB2408P) and a (A) PE-conjugated Mouse Anti-Human KIR/CD158 (Catalog # FAB1848P), (B) Fluorescein-conjugated Mouse Anti-Human KIR2DL1/CD158a (Catalog # FAB1844F), (C) Alexa Fluor® 647-conjugated Mouse Anti-Human KIR2DS2/L2/L3 (D) FITC-conjugated Mouse Anti-Human KIR2DL3/CD158b2 (Catalog # FAB2014F), (E) PE-conjugated Mouse Anti-Human KIR2DL4/CD158d (Catalog # FAB2238P)*, (F) PE-

conjugated Mouse Anti-Human KIR2DL5/CD158f, (G) PE-conjugated Mouse Anti-Human KIR2DS4/CD158i (Catalog # FAB1847P), (H) PE-conjugated Mouse Anti-Human KIR3DL1 (Catalog # FAB1225P), (I) Fluorescein-conjugated Mouse Anti-Human KIR3DL1 (Catalog # FAB12251F), or (J) PE-conjugated Mouse Anti-Human KIR3DL2/CD158k (Catalog # FAB2878P). *KIR2DL4/CD158d staining was performed on IL-2-activated PBMCs. All plots are gated on live lymphocytes. Alexa Fluor® 647-conjugated Anti-KIR2DS2/L2/L3 and PE-conjugated Anti-KIR2DL5 monoclonal antibodies are from Novus Biologicals. All other antibodies are from R&D Systems.

	2DL1	2DL2	2DL3	2DL4	2DL5	2DS1	2DS2	2DS3	2DS4	2DS5	3DL1	3DL2	3DL3	3DS1
Pan KIR 180704														
KIR2DL1/2DS5 143211														
KIR2DL3 180701														
KIR2DL4 181703														
KIR2DL5 UP-R1														
KIR2DS1 1127b*														
KIR2DS2/L2/L3 545718*														
KIR2DS2/L2/L3 GL183														
KIR2DS4 179315														
KIR3DL1 DX9														
KIR3DL1 177407														
KIR3DL2 539304														
KIR3DL3 1136b*														

Summary of the Confirmed Reactivities of KIR Antibodies on Primary NK Cells. Using a panel of transfectants and primary natural killer cells, R&D Systems® anti-KIR monoclonal antibodies and KIR clones in development* were tested for cross-reactivity. The results are summarized in the map shown. The cross-hatched box for KIR2DS1 indicates allele-specific reactivity.

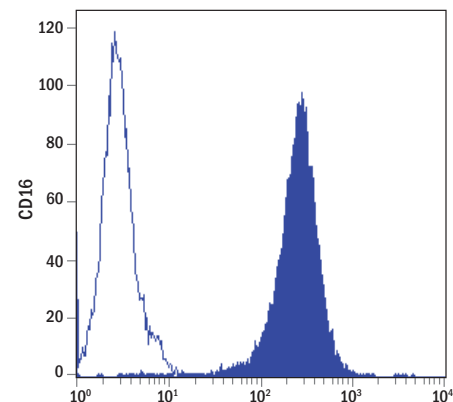
Application Key:

B/N Blocking/Neutralization E ELISA FA Functional Assay FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation WB Western Blot

Recombinant Proteins

In addition to our KIR antibodies, R&D Systems offers a wide selection of recombinant KIR proteins that can be used to characterize natural killer cell – target cell interactions. These proteins are all developed and tested in-house to ensure purity, low endotoxin levels, and bioactivity.

Inhibitory Receptors		
Molecule	Species	Catalog #
KIR2DL1	Human	1844-KR
KIR2DL2	Human	3015-KR
KIR2DL3	Human	2014-KR
KIR2DL4	Human	2238-KR
KIR2DL5	Human	6634-KR
KIR3DL1	Human	1225-KR
KIR3DL2	Human	2878-KR
Activating Receptors		
KIR2DL4	Human	2238-KR
KIR2DS4	Human	1847-KR
KIR3DS1	Human	4136-KR



KIR3DL2 Binds to MDA-MB-231 Human Breast Cancer Cells. The MDA-MB-231 human breast cancer cell line was stained with Recombinant Human KIR3DL2/CD158k Fc Chimera (Catalog # 2878-KR; filled histogram) or Recombinant Human IgG₂/Fc (Catalog # 110-HG; open histogram). Binding was detected using a Biotin-conjugated Anti-Human IgG and PE-conjugated Streptavidin (Catalog # F0040).

Other Select NK Cell Receptor/Ligand Pairs

Antibodies

Molecule	Species	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)						Unconjugated Antibodies (Applications)
		APC	Fluorescein	PE	PerCP	Alexa Fluor 488	Alexa Fluor 700	
2B4/CD244/ SLAMF4	Human		FAB1039F	FAB1039P				MAB1039 (WB); AF1039 (E, FA, FC, IHC, WB)
	Mouse							AF1050 (FC, IHC, WB)
CD48/SLAMF2	Human	FAB3644A		FAB3644P				MAB3644 (FC, WB); MAB36441 (WB, ICC/IF); AF3644 (FC, WB)
	Mouse							MAB3327 (FC, WB); AF3327 (E, FC, ICC/IF, WB)
CD72	Mouse							MAB1279 (WB); AF1279 (ICC/IF, WB)
CD160	Human	FAB6700A		FAB6700P		FAB6700G	FAB6700N	MAB6700 (FC); AF6177 (WB)
	Mouse							MAB3899 (WB); MAB38991 (ICC/IF); AF3899 (FC, ICC/IF)
CEACAM-1	Human	FAB2244A		FAB2244P				MAB2244 (FC, WB); MAB22441 (E, IHC, WB); AF2244 (IHC, WB)
	Mouse	FAB6480A		FAB6480P		FAB6480G	FAB6480N	MAB6480 (FC, IHC, WB); AF6480 (FC, IHC, WB)
CRACC/SLAMF7	Human	FAB1906A		FAB1906P		FAB1906G	FAB1906N	MAB1906 (FC); AF1906 (WB)
	Mouse	FAB4628A	FAB4628F					AF4628 (FC, WB); MAB4628 (WB); MAB46281 (FC)
KLRG1	Human							MAB70291 (WB)
	Mouse	FAB6944A		FAB6944P		FAB6944G		MAB6944 (FC)
IL-2 Rβ	Human	FAB224A	FAB224F	FAB224P				MAB224 (B/N, FC, IHC); MAB2241 (WB); AF-224-NA (B/N, WB)
	Mouse							MAB589 (WB); MAB5891 (FC); AF589 (WB)
IL-12 Rβ1	Human	FAB839A	FAB839F	FAB839P	FAB839C		FAB839N	MAB839 (FC); AF839 (WB)
	Mouse		FAB1998F	FAB1998P				AF1998 (WB)
IL-12 Rβ2	Human							MAB19591 (WB); AF1959 (B/N, WB)
	Human/ Mouse	FAB1959A		FAB1959P	FAB1959C	FAB1959G		
	Mouse							MAB8650 (B/N)

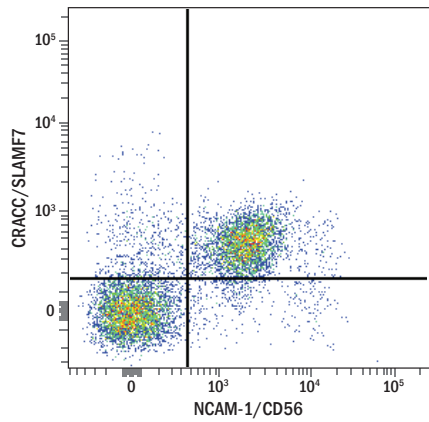
continued on next page

continued from previous page

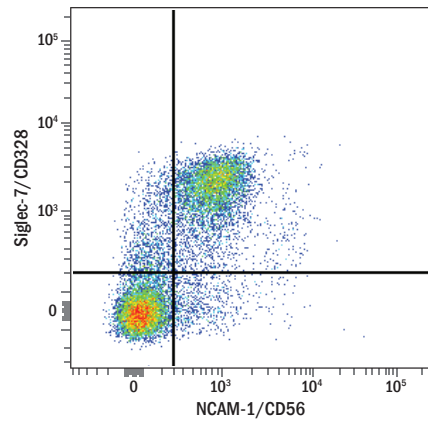
Molecule	Species	Fluorochrome-conjugated Antibodies for Flow Cytometry (Catalog #s)						Unconjugated Antibodies (Applications)
		APC	Fluorescein	PE	PerCP	Alexa Fluor 488	Alexa Fluor 700	
IL-15 R α	Human	FAB1471A		FAB1471P		FAB1471G	FAB1471N	MAB1471 (FC, WB); MAB147 (WB); AF247 (B/N, FC, IHC, WB)
	Mouse	FAB551A		FAB551P	FAB551C			AF551 (B/N, FC, WB); MAB551 (WB)
		FAB5511A		FAB5511P				MAB5511 (FC)
IL-18 R α	Human	FAB840A		FAB840P	FAB840C	FAB840G		MAB840 (B/N, FC, ICC/IF, IHC); MAB8401 (WB); AF840 (B/N, FC, IHC, WB)
	Mouse	FAB1216A	FAB1216F				FAB1216N	MAB1216 (FC, WB); MAB12161 (B/N, WB); AF856 (B/N, FC, WB)
IL-18 R β	Human		FAB118F	FAB118P				MAB118 (FC, WB); MAB1181 (B/N, WB); AF118 (B/N, WB)
	Mouse							AF199 (WB)
IL-21 R	Human	FAB9911A	FAB9911F	FAB9911P				MAB9911 (FC); MAB991 (WB); AF991 (FC, WB)
	Mouse			FAB5961P				MAB5961 (WB); MAB596 (WB); AF596 (FC, ICC/IF, WB)
LAIR1	Human	FAB2664A	FAB2664F	FAB2664P				MAB2664 (FC, WB); AF2664 (FC, WB)
LILRB1/CD85j/ILT2	Human	FAB20171A	FAB20171F	FAB20171P				MAB20171 (FC, WB); MAB20172 (B/N, WB); MAB2017 (WB); AF2017 (B/N, FC, WB)
NKR-P1A/KLRB1	Human	FAB7448A		FAB7448P		FAB7448G		MAB7448 (FC)
NTB-A/SLAMF6	Human	FAB19081A	FAB19081F	FAB19081P	FAB19081C			MAB19081 (FC); MAB1908 (WB); AF1908 (WB)
	Mouse							MAB3986 (WB); AF3986 (FC, WB)
OCIL/CLEC2d	Human	FAB3480A		FAB3480P				AF3480 (FC, WB)
	Mouse							AF3376 (WB)
PSGL1/CD162	Human	FAB9961A		FAB9961P		FAB9961G		MAB9961 (FC); MAB996 (B/N, FC); AF3345 (WB)
L-Selectin/CD62L	Human		BBA33					BBA24 (E, FC); AF728 (B/N, WB)
	Mouse		FAB5761F	FAB5761P				MAB5761 (FC); MAB5762 (E, FC, WB); MAB576 (FC, WB); AF576 (WB)
Semaphorin 4D/CD100	Human	FAB74701A		FAB74701P		FAB74701G		MAB74701 (FC, WB); MAB7470 (ICC/IF)
	Mouse			FAB52351P	FAB52351C	FAB52351G		MAB52351 (FC); MAB5235 (WB); AF5235 (FC, IHC, WB)
Siglec-3/CD33	Human	FAB1137A	FAB1137F	FAB1137P				MAB1137 (FC, WB)
	Mouse							MAB2220 (WB); AF2220 (WB)
Siglec-7/CD328	Human	FAB11381A		FAB11381P		FAB11381G		MAB11381 (FC); MAB1138 (WB); AF1138 (B/N, FC, IHC, WB)
Siglec-9	Human	FAB1139A	FAB1139F	FAB1139P	FAB1139C	FAB1139G	FAB1139N	MAB1139 (B/N, E, FC, WB); AF1139 (FC, ICC/IF, WB)

Application Key:

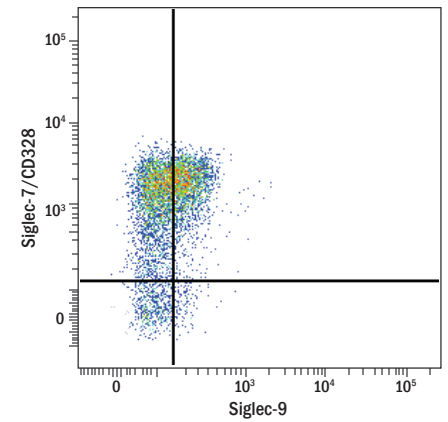
B/N Blocking/Neutralization E ELISA FA Functional Assay FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation WB Western Blot



Detection of CRACC/SLAMF7 on Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB2408P) and an APC-conjugated Mouse Anti-Human CRACC/SLAMF7 Monoclonal Antibody (Catalog # FAB1906A). Cells were gated on CD3⁺ lymphocytes.



Detection of Siglec-7/CD328 on Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a PE-conjugated Mouse Anti-Human NCAM-1/CD56 Monoclonal Antibody (Catalog # FAB11381A) and an APC-conjugated Mouse Anti-Human Siglec-7/CD328 Monoclonal Antibody (Catalog # FAB11381A). Cells were gated on CD3⁺ lymphocytes.



Detection of CD3/CD56⁺/Siglec-7⁺/Siglec-9⁺ Human Peripheral Blood Lymphocytes by Flow Cytometry. Human peripheral blood lymphocytes were stained with a Fluorescein-conjugated Mouse Anti-Human Siglec-9 Monoclonal Antibody (Catalog # FAB1139F) and an APC-conjugated Mouse Anti-Human Siglec-7/CD328 Monoclonal Antibody (Catalog # FAB11381A). Cells were gated on CD3⁺CD56⁺ lymphocytes.

Recombinant Proteins

Molecule	Species	Catalog #
2B4/CD244/SLAMF4	Human	1039-2B
	Mouse	3514-2B
CD48/SLAMF2	Human	3644-CD
	Mouse	3327-CD
CD72	Human	5405-CD
CD160	Human	6177-CD
	Mouse	3899-CD
CEACAM-1	Human	2244-CM
CRACC/SLAMF7	Mouse	4628-SF
KLRG1	Mouse	6944-KR
LAIR1	Human	2664-LR
	Mouse	4016-LR
LILRB1/CD85j/ILT2	Human	2017-T2
NKR-P1A/KLRB1	Human	7448-CD
NTB-A/SLAMF6	Human	1908-NT
	Mouse	3986-NT
PSGL1	Human	3345-PS
	Mouse	7407-PS
L-Selectin/CD62L	Human	728-LS
	Mouse	576-LS
Semaphorin 4D/CD100	Human	7470-S4
	Mouse	5235-S4
Siglec-3	Human	1137-SL
Siglec-7	Human	1138-SL
Siglec-9	Human	1139-SL

R&D SYSTEMS

 **NOVUS**
BIOLOGICALS

TOCRIS

protein  simple

bio-techne[®]

Global info@bio-techne.com bio-techne.com/find-us/distributors TEL +1 612 379 2956
North America TEL 800 343 7475 Europe | Middle East | Africa TEL +44 (0)1235 529449
China info.cn@bio-techne.com TEL +86 (21) 52380373

bio-techne.com

