LEAF™ : Low Endotoxin, Azide Free

Bioactive Antibodies

Stand Up for Purity

LEAF™ and Ultra-LEAF™ Antibodies

The Finest for Functional Assays

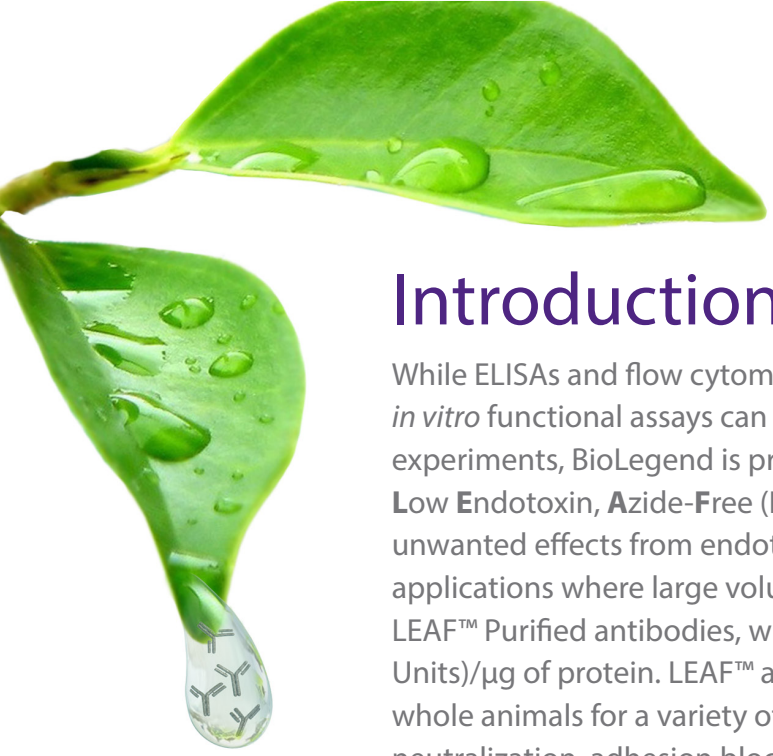
BioLegend is ISO 9001:2008 and ISO 13485:2003 Certified

BioLegend®

Toll-Free Tel: (US & Canada): 1.877.BIOLEGEND (246.5343)
Tel: 858.768.5800
biolegend.com

02-0008-00

World-Class Quality | Superior Customer Support | Outstanding Value



Introduction

While ELISAs and flow cytometry are useful tools for scientific analysis, *in vivo* and *in vitro* functional assays can provide a unique set of answers. For these types of experiments, BioLegend is proud to provide 0.2 micron sterile-filtered, **L**ow **E**ndotoxin, **A**zide-**F**ree (**LEAF™**) antibody formulations, which eliminate unwanted effects from endotoxin and sodium azide. For highly sensitive assays or applications where large volumes of antibody are required, we also provide Ultra-LEAF™ Purified antibodies, which are guaranteed to have less than 0.01 EU (Endotoxin Units)/µg of protein. LEAF™ and Ultra-LEAF™ antibodies can be used on live cells or whole animals for a variety of functional assays, including cell depletion, cytokine neutralization, adhesion blocking, activation, and functional inhibition. BioLegend also provides custom LEAF™ formulations of our purified antibodies upon request. For details visit: **biolegend.com/LEAF**

Comparison of LEAF™ and Ultra-LEAF™ formats

LEAF™

- < 0.1 EU/µg of protein.
- Best value.
- Typically provided in 50 and 500 µg sizes (some 1 mg sizes available).
- Over 330 specificities available.

Ultra-LEAF™

- < 0.01 EU/µg of protein.
- Best for *in vivo* or sensitive assays.
- Provided in 100 µg and 1 mg sizes.
- Over 50 specificities available.

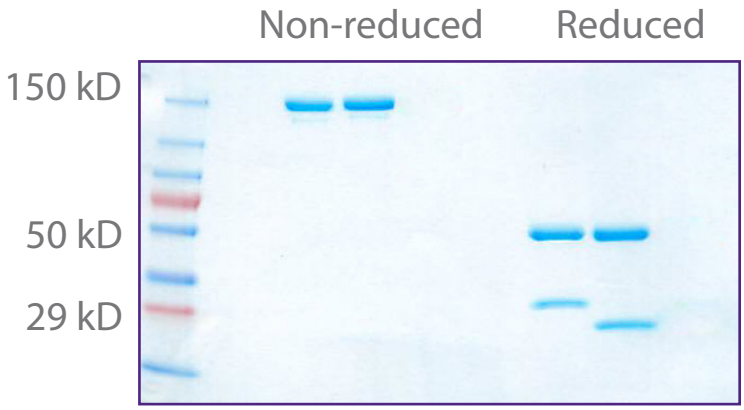
Buy LEAF™ in Bulk: Advantages

- Outstanding value.
- Each lot is quality-tested and backed by our 100% guarantee.
- Bulk orders provided as Ultra-LEAF™ = ten-fold lower endotoxin limit (<0.01 EU/µg of protein) compared to catalog LEAF™ products.
- Rapid turnaround time (typically 2-3 weeks).

Custom Options

- Bulk production from your hybridoma.
- Custom concentrations available.
- Custom endotoxin limits.
- Custom LEAF™ formulation of purified or fluorochrome-conjugated antibody.
- Flexible packaging

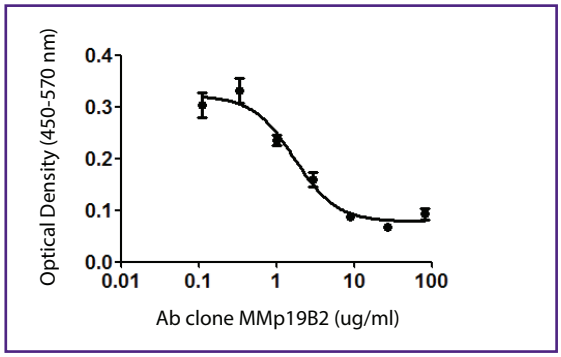
Purity Determination



Each lot of Purified, LEAF™ and Ultra-LEAF™ Purified Antibody is assessed for purity by SDS-PAGE.

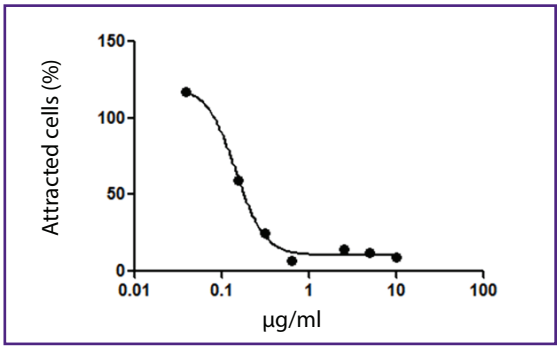
BioLegend LEAF™ Products in Functional Assays

LEAF™ Purified anti-mouse IL-23 (p19)



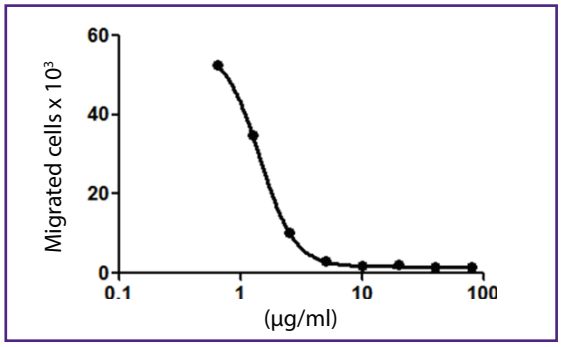
LEAF™ Purified anti IL-23 (clone MMp19B2) Inhibited IL-17A production induced by recombinant mouse IL-23 (5 ng/ml), PMA, and IL-2 (20 ng/ml) in splenocytes .

LEAF™ Purified anti-human CXCR3



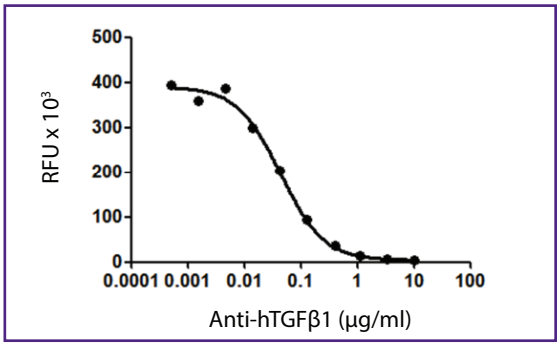
Anti-human CXCR3 (G025H7) blocked the chemotaxis of Baf3-hCXCR3 transfectants.

LEAF™ Purified anti-human CCR7



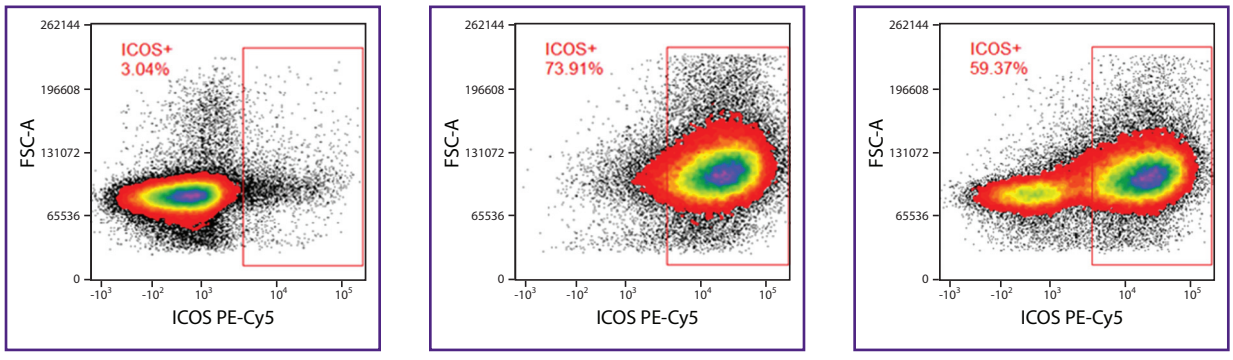
Chemotaxis of human CCR7-transfected BaF3 cells was performed in the presence of 15 ng/ml of recombinant human CCL19. Addition of LEAF™ Purified anti-human CCR7 (clone G043H7) inhibited migration of hCCR7 transfected BaF3 cells (ED 1.42 µg/ml).

LEAF™ Purified anti-human TGF-β1



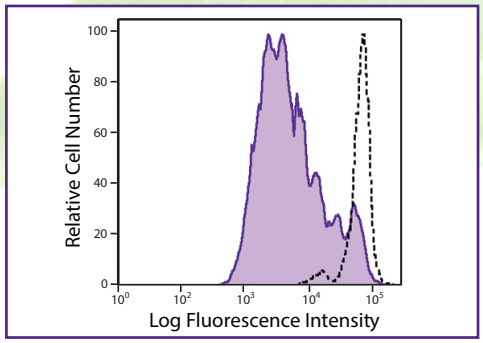
Addition of LEAF™ Purified anti-human TGF-β1 inhibited TGF-β1 bioactivity in Mv1Lu-(caga)12-Luc reporter cells.

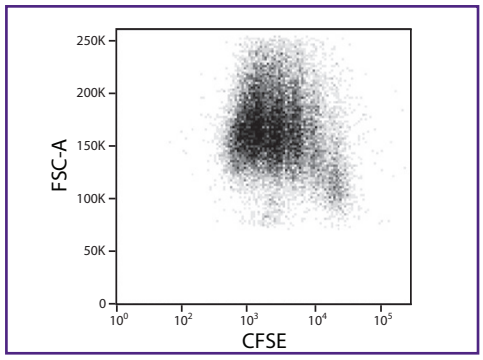
Suppression of T cell activation by anti-VISTA treatment



Lymph nodes from Balb/c mice were treated with isotype control ***(left)***, 50 µg Ultra-LEAF™ anti-mouse CD3ε (clone 145-2C11) ***(middle)***, or 50 µg each of Ultra-LEAF™ anti-mouse CD3 (clone 145-2C11) and LEAF™ anti-mouse VISTA (clone MH5A) for 24 hours (3 mice per group). **P<0.01 between CD3 and CD3, VISTA-treated mice.

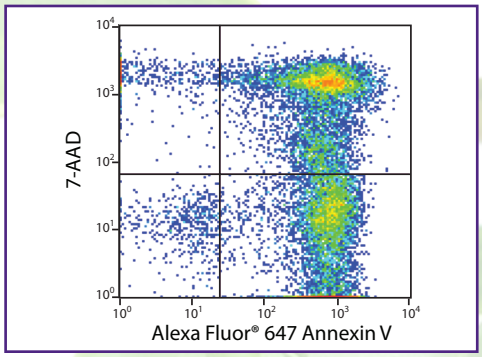
LEAF™ Purified anti-human CD3
LEAF™ Purified anti-human CD28

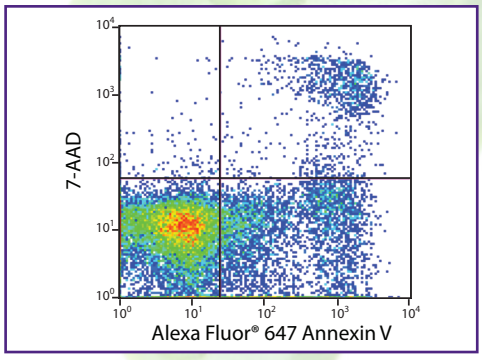




Human peripheral blood mononuclear cells were stained with CFSE on day 0, and then stimulated with (filled histogram) or without (open histogram) immobilized LEAF™ Purified CD3 (clone UCHT1) and LEAF™ Purified CD28 (clone CD28.2) for 3 days. On day 4, cells were harvested and stained with CD4 Brilliant Violet 711™. Dot plot ***(bottom)*** was analyzed on live cells. Histogram data was analyzed by gating on $CD4^+$ cells ***(top)***.

LEAF™ Purified anti-human CD95

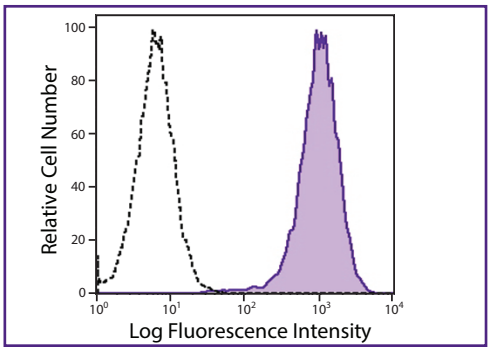




Human T-cell leukemia cell line, Jurkat, was stimulated (5 hours) with ***(top)*** or without ***(bottom)*** LEAF™ Purified anti-CD95 (clone EOS9.1), then stained with Annexin V Alexa Fluor® 647 and 7-Aminoactinomycin D (7-AAD).

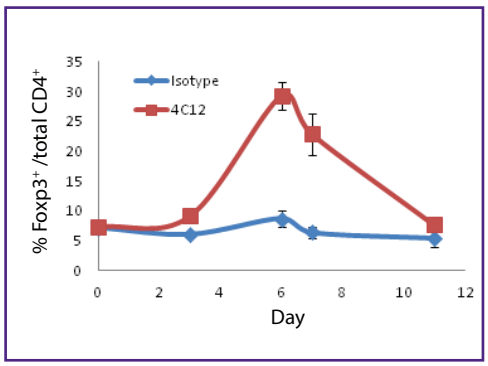
LEAF™ Purified anti-mouse DR3 (TNFRSF25)

Flow Cytometry staining



DR3-transfected p815 cells were stained with LEAF™ anti-DR3 (clone 4C12) (filled histogram) or LEAF™ Armenian Hamster IgG (open histogram) followed by anti-hamster- PE.

Treg Expansion



C57BL/6 mice were IP injected with 100 mg LEAF™ anti-DR3 (clone 4C12) (3 mice) or LEAF™ Armenian Hamster IgG (3 mice). On day 0, 3, 6, 7 and 11, the blood was drawn and stained with CD4-APC followed by intracellular staining with Foxp3-PE. The data were analyzed as percentage of $Foxp3^+$ cells of total $CD4^+$ cells. Error bars are ± SD. ***$p < 0.001$ between 4C12 and isotype injection.

LEAF™ and Ultra-LEAF™ Products Available: Mouse

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
4-1BB Ligand (CD137L)	TKS-1	FC, Block	107108	-
α-GalCer:CD1d complex	L363	FC, IF, Block	140504	-
Allergin-1	TX83	FC, Block	141804	-
Asialo-GM1	Poly21460	FC, Depletion	-	146002
B7-H4 (B7S1)	HMH4-5G1	FC	139404	-
CD1d (CD1.1, Ly-38)	1B1	FC, IHC, IP, Block	123504, 123515	-
CD1d	K253	FC, Block, ELISA, IF	140804	-
CD2	RM2-5	FC, IP, Block, Costim	100110	-
CD3	17A2	FC, IHC, Activ, CMCD, Depletion	100207, 100208, 100223	100238
CD3ε	145-2C11	FC, IHC, IP, WB, CMCD, Block, Apop, Depletion, Activ, IF	100313, 100314, 100331	100339, 100340
CD4	GK1.5	FC, Block, Costim, Depletion, IHC, IP	100415, 100416, 100435	100441, 100442
CD4	RM4-5	FC, Depletion, Block, IHC, CYTOF®	100520	-
CD8a	53-6.7	FC, IHC, IP, Depletion, Block, CYTOF®	100715, 100716, 100735	100745, 100746
CD11a	M17/4	FC, IHC, IP, Block	101109, 101110, 101115	101118
CD11b	M1/70	FC, IP, Block, Depletion, IHC, IF, CYTOF®	101213, 101214, 101231	101248
CD14	Sa14-2	FC	123304	-
CD16/32	93	FC, IP, Block	101309, 101310, 101321	101330
CD18	M18/2	FC, IP, WB, Block, Stim, IHC	101409, 101410	-
CD19	6D5	FC, IF, CYTOF®	115514	-
CD21/CD35 (CR2/CR1)	7E9	FC, FA	123404	-
CD24	M1/69	FC, WB, IHC, IF, Activ, CMCD	101810	-
CD25	3C7	FC, IHC, Block, CYTOF®	101906	-
CD25	PC61	FC, IP, IHC, Block, Depletion	102013, 102014, 102031	102039, 102040
CD27	LG.3A10	FC, IHC, IP, FA	124204	-
CD28	37.51	FC, IP, IHC, Costim, Block	102111, 102112	102115, 102116
CD28	E18	FC, Costim, Block	122003, 122004	-
CD29	HMß1-1	FC, IP, Block, IHC	102209, 102210	-
CD31	390	FC, IP, Block, IHC	102412	-
CD31	MEC13.3	FC, IP, Block, IHC	102511, 102512	-
CD40	1C10	FC, IP, Costim, Block	102809, 102810	102812
CD40	3/23	FC, IHC, FA	124604, 124619	124628
CD40	HM40-3	FC, Block, Costim, IHC	102907, 102908	-
CD41	MWReg30	FC, FA	133909, 133910	-
CD44	IM7	FC, ELISA, IHC, IP, CMCD, Stim, CYTOF®	103013, 103014, 103033	103046
CD45	30-F11	FC, IP, CMCD, IHC, WB, CyTOF®	103119, 103120	-
CD45R (B220)	RA3-6B2	FC, IP, Activ, IHC, CYTOF®	103216	-
CD47	miap301	FC, Block	127511, 127512	-
CD48	HM48-1	FC, IP, Costim, Block	103408	103429, 103430
CD49b	HMα2	FC, IP, Block	103507	-
CD49d	9C10 (MFR4.B)	FC, Block, IHC	103707, 103708	-
CD49d	R1-2	FC, IP, Block, IHC	103610	-
CD49e	5H10-27(MFR5)	FC, Block, Costim, IHC	103807, 103808	-
CD49f	GoH3	FC, IF, Block, IHC, IP	313613, 313614	-

Activ = Activation, **Apop** = Apoptosis, **BA** = Bioassay, **Block** = Blocking, **CMCD** = Complement Mediated Cell Depletion, **Costim** = Costimulation, **Cyt** = Cytotoxicity, **CyTOF®** = Mass Cytometry, **FA** = Functional Assay, **FC** = Flow Cytometry, **ICC** = Immunocytochemistry, **ICFC** = Intracellular Staining for Flow Cytometry, **IF** = Immunofluorescence Microscopy, **IHC** = Immunohistochemistry, **IP** = Immunoprecipitation, **Neut** = Neutralization, **Stim** = Stimulation, **WB** = Western Blotting

LEAF™ and Ultra-LEAF™ Products Available: Mouse

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
CD51	RMV-7	FC, IP, Block	104107, 104108	-
CD54	YN1/1.7.4	FC, Block, IHC, IP, WB	116109, 116110	-
CD61	2C9.G2 (HMß3-1)	FC, Block, Activ, IHC	104309, 104310	-
CD62L	MEL-14	FC, IP, CMCD, Block, IHC, CYTOF®	104416	-
CD66a (CEACAM1a)	MAb-CC1	FC, WB, IP, IHC, ELISA, Block	134504	-
CD70	FR70	FC, Block, IHC, IP	104608	-
CD80	16-10A1	FC, IHC, IP, Block	104710	-
CD81	Eat-2	FC, IP, WB, Activ, Stim	104908	-
CD86	GL-1	FC, Block, IF, IHC, IP	105010	-
CD88 (C5aR)	20/70	FC, Block	135804	-
CD90	G7	FC, Activ, Apop, IHC	105203	-
CD90.2	30-H12	FC, Depletion, Costim, IHC	105309, 105310	-
CD96 (TACTILE)	3.3	FC, Block	131704	-
CD106	429 (MVCAM.A)	FC, IP, Block, IHC	105708	-
CD115 (CSF-1R)	AFS98	FC, Block	135503, 135504	-
CD117 (c-Kit)	ACK2	FC, Block, Depletion	135104	135114
CD120a (TNFR Type I/p55)	55R-170	FC, IP, Block	112902	-
CD120a (TNFR Type I/p55)	55R-593	FC, IP, Block	113102	-
CD120b (TNFR Type II/p75)	TR75-32.4	FC, IP, Block	113202	-
CD120b (TNFR Type II/p75)	TR75-54.7	FC, Block, IP, ELISA Capture, WB	113302	-
CD122 (IL-2Rβ)	TM-β1	FC, IP, Block, Depletion	123203, 123204	-
CD126 (IL-6Rα chain)	D7715A7	FC, IP, Block, Neut	115807, 115808, 115809	-
CD127 (IL-7Rα)	A7R34	FC, IP, WB, Block, IHC, IF	135004	-
CD132 (common γ chain)	TUGm2	FC, Block	132304	-
CD134 (OX-40)	OX-86	FC, IHC, Costim	119407, 119408	-
CD137	17B5	FC, Block	106107	-
CD140b	APB5	FC, Block	136004	-
CD144 (VE-cadherin)	BV13	FC, WB, IF, Block	138003	-
CD150 (SLAM)	TC15-12F12.2	FC, IP, Costim, Block	115905	-
CD152	9H10	ELISA, FC, Block, Costim	106204	-
CD152	UC10-4B9	FC, Block, IP, ELISA	106308	-
CD154	MR1	FC, IHC, Block	106508	-
CD155 (PVR)	4.24.1	FC	132204	-
CD172a (SIRPα)	P84	FC, Block, IHC, IF, IP	144003, 144004	-
CD178 (FasL)	MFL3	FC, Block, Apop, IF	106608	-
CD178 (FasL)	MFL4	FC, Block	106706	-
CD178.1 (FasL)	Kay-10	FC, Block, IHC	106808	-
CD183 (CXCR3)	CXCR3-173	FC, Block	126509, 126517	126525, 126526
CD193 (CCR3)	J073E5	FC	144503, 144504	-
CD200R (OX2R)	OX-110	FC, FA	123912	-
CD200R3	Ba13	FC, Activ	142203, 142204	-
CD200R3	Ba160	FC	142304	-
CD210 (IL-10R)	1B1.3a	FC, Block	112707, 112708	112709, 112710
CD223 (LAG-3)	C9B7W	FC, FA, IP, ELISA	125204	-
CD226 (DNAM-1)	480.1	FC	132003, 132004	-

LEAF™ and Ultra-LEAF™ Products Available: Mouse

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
CD252 (OX40L)	RM134L	FC, Block, IHC	108808	-
CD253 (TRAIL)	N2B2	FC, Block	109308	-
CD254 (TRANCE, RANKL)	IK22/5	FC, IP, WB, Block	510007, 510008	-
CD255 (TWEAK)	MTW-1	FC, Block	120008	-
CD258 (LIGHT)	15B2	ELISA, Block, IP	137104	-
CD262 (DR5, TRAIL-R2)	MD5-1	FC, Cyt	119907	-
CD272 (BTLA)	6A6	FC, IP, Block	139104	-
CD273 (B7-DC, PD-L2)	TY25	FC, WB, IP, Block, IHC	107208	-
CD274 (B7-H1, PD-L1)	10F.9G2	FC, IF, Block	124303, 124304, 124309	124318
CD275 (B7-H2, B7-RP1, ICOSL)	HK5.3	FC, Block	107407, 107408	107410
CD276 (B7-H3)	MIH35	FC, FA	135604	-
CD278 (ICOS)	7E.17G9	FC, Block	117407, 117408	-
CD278 (ICOS)	C398.4A	FC, IHC, IP, Costim	313511, 313512	-
CD279 (PD-1)	29F.1A12	FC, Block	135203, 135204	-
CD279 (PD-1)	RMP1-14	FC, IHC, WB, FA	114107, 114108	-
CD284 (TLR4)/MD2 Complex	MTS510	FC, IHC, ICFC, IF, IP, Block	117607, 117608	117612
CD314 (NKG2D)	C7	FC, Block	115710	-
CD314 (NKG2D)	CX5	FC, Block	130204	-
CD317 (BST2, PDCA-1)	927	FC, IF, IP, FA, Depletion	127004	-
CD335 (NKp46)	29A1.4	FC, IHC, Activ	137613, 137614	-
CD351 (Fc α/μ receptor)	TX61	FC, Block	137303	-
CD355 (CRTAM)	11-5/CRTAM	FC, WB	142004	-
CD357 (GITR)	DTA-1	FC, IP, FA	126303, 126304	-
CXCR7	8F11-M16	FC	331110	-
Delta-like 4 (DLL4)	HMD4-1	FC, IHC, FA	130804	-
DR3 (TNFRSF25)	4C12	Agonist, FC	144403, 144404	-
F4/80	BM8	FC, IHC, WB	123103	-
FcεRIα	MAR-1	FC, Depletion, IHC	134312	-
FR4 (Folate Receptor 4)	TH6	FC, Cyt	125102	-
Galectin-9	RG9-35	ICFC, Block	136106	-
GM-CSF	MP1-22E9	ELISA Capture, ELISPOT Capture, ICC, IHC, Neut	505407, 505408	-
I-A/I-E	M5/114.15.2	FC, IP, IHC, Block	107610	-
Integrin β7	FIB27	FC, IP, Block	121003	-
Integrin β7	FIB504	FC, Block	321218	-
IFNAR-1	MAR1-5A3	FC, IP, WB, ELISA, Block	127303, 127304	127321, 127322
IFN-β	MIB-5E9.1	IP, Neut, WB	508103, 508104	-
IFN-γ	AN-18	ELISPOT Capture, ELISA Capture, IP, Neut	517903, 517904	-
IFN-γ	H22	WB, Neut, ELISA, IF, IP	513205, 513206	-
IFN-γ	R4-6A2	ELISA Capture, ELISPOT Capture, IHC, Neut	505705, 505706, 505707	-
IFN-γ	XMG1.2	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, WB, CyTOF®	505811, 505812, 505827	505833, 505834
IL-1α	ALF-161	ELISA Capture, ELISPOT Capture, ICFC, IP, Neut, WB	503206	-
IL-1β	B122	ELISA Capture, ELISPOT Capture, Depletion, IHC, IP, Neut, WB	503504	-
IL-2	JES6-1A12	ELISA Capture, ELISPOT Capture, Neut, WB	503704	503705, 503706

LEAF™ and Ultra-LEAF™ Products Available: Mouse

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
IL-2	JES6-5H4	ELISA, Neut, ICFC, IP, IHC	503812	-
IL-3	MP2-8F8	ELISA Capture, ELISPOT Capture, Neut	503906	-
IL-4	11B11	ELISA Capture, ELISPOT Capture, ICC, IHC, IP, Neut, CyTOF®	504107, 504108, 504115	504121, 504122
IL-5	TRFK5	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, WB, CyTOF®	504307, 504308	-
IL-6	MP5-20F3	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, CyTOF®	504505, 504506	-
IL-9	D8402E8	ELISA Capture	504704	-
IL-9	D9302C12	Neut, WB	504802	-
IL-10	JES5-2A5	ELISA Capture, ELISPOT Capture, Neut,	504903, 504904	-
IL-10	JES5-16E3	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, CyTOF®	505011, 505012	-
IL-12/IL-23 p40 (monomer, dimer, heterodimer)	C15.6	ELISA Capture, ELISPOT Capture, ICFC, IHC, IP, WB	505207, 505208	-
IL-12/IL-23 p40 (monomer, dimer, heterodimer)	C17.8	ELISA, Neut, ICFC, IP, WB	505303, 505304, 505305	505307, 505308
IL-17A	TC11-18H10.1	ELISA Capture, ELISPOT Capture, Neut, WB, CyTOF®	506905, 506906, 506923	-
IL-17A	TC11-8H4	ELISA, WB	507004	-
IL-23 (p19)	MMp19B2	Block	513805, 513806	-
IL-25	35B	ELISA, Neut	514403, 514404	-
IL-27 p28	MM27-7B1	ICFC, Neut	-	516912
Jagged 2	HMJ2-1	FC, IHC	131004	-
LAP (TGF-β1)	TW7-20B9	FC, IP, Neut, WB	141303, 141304	-
Ly-6C	HK1.4	FC, Activ, IHC	128020	-
Ly-6G	1A8	FC, Depletion, IHC	127620	127631, 127632
Ly-6G/Ly-6C (Gr-1)	RB6-8C5	FC, IP, CMCD, Depletion, IHC, WB	108413, 108414	108435, 108436
Ly49H	3D10	FC, IP, Block	144703, 144704	-
MAdCAM-1	MECA-367	FC, IP, WB, IHC, Block	120704	-
MCP-1	2H5	ELISA Capture, ELISPOT Capture, IHC, Neut, WB	505905, 505906	-
NK-1.1	PK136	FC, IP, CMCD, Depletion, Block, Activ, IHC, IF, CYTOF®	108711, 108712	-
PD-1H (VISTA)	MH5A	FC, Block, WB, IHC	143703, 143704	-
TCR β chain	H57-597	FC, IP, Stim, Depletion, IHC, CYTOF®	109214	-
TCR γ/δ	GL3	FC, IHC, IP	118114	-
TCR γδ	UC7-13D5	FC, IP, Stim, Depletion	107506	-
TER-119/Erythroid Cells	TER-119	FC, IP, WB, IHC, CMCD	116214, 116229	-
TGF-β1	19D8	Block	521703, 521704	-
Tim-4	RMT4-54	FC, FA	130004	-
TNF-α	6B8	ELISA Capture, ELISPOT Capture	510803	-
TNF-α	MP6-XT22	ELISA, ICFC, Neut, WB, IHC, CyTOF®, IF	506309, 506310, 506325	506331, 506332
TNF-α	TN3-19.12	ELISA Capture, ELISPOT Capture, ICFC, IP, Neut, WB	506105, 506106	-
VEGF-A	2G11-2A05	Neut, WB, ELISA, IHC, FA	512807, 512808	-
VEGFR-3 (FLT-4)	AFL4	IHC, IP, WB, ELISA, Block	140903, 140904	-

LEAF™ and Ultra-LEAF™ Products Available: Human

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
Asialo-GM1	Poly21460	FC, Depletion	-	146002
C3a/C3a(desArg)/C3	K13/16	ELISA Capture, WB, IP, Neut	518103, 518104	-
C5a/C5a(desArg)/C5	G25/2	ELISA Capture, WB, IP, Neut	518303, 518304	-
CD1d	51.1	FC, WB, IP, IHC, Stim	350304	-
CD2	RPA-2.10	FC, IHC, Block	300212	-
CD2	TS1/8	FC, Block	309212	-
CD3	HIT3a	FC, IHC, IP, Activ	300313, 300314	300331, 300332
CD3	OKT3	FC, IHC, Activ	317303, 317304, 317315	317325, 317326
CD3	UCHT1	FC, IHC, IP, Activ, WB, CyTOF®	300413, 300414, 300432	300437, 300438
CD4	OKT4	FC, IHC	317403, 317404	-
CD4	RPA-T4	FC, IHC, Block, CyTOF®	300515, 300516	-
CD8a	RPA-T8	FC, IHC, Costim, CyTOF®	301018	-
CD11a	HI111	FC, Block, IHC, WB	301213, 301214	-
CD11b (activated)	CBRM1/5	FC, IP, Block	301407	-
CD11b	ICRF44	FC, IHC, Block, IF, CyTOF®	301311, 301312	-
CD11b	M1/70	FC, IP, Block, Depletion, IHC, IF, CyTOF®	101213, 101214, 101231	101248
CD11c	3.9	FC, IHC, Block, CyTOF®	301616	301632
CD13	WM15	FC, IHC, Block	301708	-
CD14	M5E2	FC, IF, IHC, Block, CyTOF®	301809, 301810	-
CD16	3G8	FC, IHC, IP, Stim, Block, CyTOF®	302013, 302014, 302033	302050
CD18	TS1/18	FC, Block	302111, 302112	302116
CD19	HIB19	FC, IHC, Block, CyTOF®	302214	-
CD27	LG.3A10	FC, IP, IHC, FA	124204	-
CD28	CD28.2	FC, IHC, IP, Activ, Costim	302913, 302914, 302923	302933, 302934
CD29	TS2/16	FC, IF, IHC, IP, Activ	303009, 303010	-
CD31	WM59	FC, IF, IHC, Block	303108	-
CD33	WM53	FC, IP, WB, Costim, CyTOF®	303410	-
CD40	5C3	FC, Block, Activ	334303, 334304	-
CD40	G28.5	FC, FA, WB, IF	303607, 303608, 303611	303614
CD40	HB14	FC, Costim	313009, 313010	-
CD41	HIP8	FC, IHC, Block, CyTOF®	303712	-
CD42b	HIP1	FC, IHC, WB, Block	303908	-
CD44	IM7	FC, ELISA, IHC, IP, CMCD, Stim, CyTOF®	103013, 103014, 103033	103046
CD45R/B220	RA3-6B2	FC, IHC, IP, Activ, CyTOF®	103216	-
CD49b	P1E6-C5	FC, Block, IP, ELISA	359303, 359304	-
CD49d	9F10	FC, IHC, Costim	304309, 304310	-
CD49e	NKI-SAM-1	FC, IP, ELISA, Block	328004	-
CD49f	GoH3	FC, IF, Block, IHC, IP	313613, 313614	-
CD51	NKI-M9	FC, ELISA, Block, IP	327904	-
CD51/61	23C6	FC, IHC, Block, IF, IP	304413	-
CD54	HA58	FC, IHC	353103, 353104	-
CD54	HCD54	FC, IHC, Block	322703, 322704	-
CD56 (NCAM)	HCD56	FC, FA, CyTOF®	318324	-
CD56 (NCAM)	MEM-188	FC, IHC, IP, WB	304622	-
CD58	TS2/9	FC, IP, IHC, Block	330911, 330912	-
CD62E	HAE-1f	FC, FA	336004	-
CD62L	DREG-56	FC, WB, Block	304811, 304812	-
CD62P (P-Selectin)	AK4	FC, IHC, Block	304911	-
CD63	H5C6	FC, IF, IP, WB	353013, 353014	-
CD64	10.1	FC	305015, 305016	-
CD80	2D10	FC, IHC, IP, WB, Block	305211, 305212	-
CD85d (ILT4)	42D1	FC, FA	338704	-
CD85g (ILT7)	17G10.2	FC, FA	326403	-
CD85j (ILT2)	GHI/75	FC, FA	333704	-

LEAF™ and Ultra-LEAF™ Products Available: Human

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
CD86	IT2.2	FC, IHC, WB, Block	305409, 305410	-
CD95 (Fas)	DX2	FC, IF, IHC, Apop	305613, 305614	-
CD95 (Fas)	EOS9.1	FC, Apop	305703, 305704	-
CD96	NK92.39	FC, FA	338404	-
CD117 (c-kit)	A3C6E2	FC, Block	323404	-
CD119 (IFN-γ R α chain)	GIR-208	FC, IHC, IP, WB, Block	308604	-
CD122 (IL-2Rβ)	TU27	FC, FA	339004	-
CD129 (IL-9 R)	AH9R7	FC, Block, ELISA	310408	-
CD132 (common γ chain)	TUGh4	FC, FA	338604	-
CD137 (4-1BB)	4B4-1	FC, IP, ELISA, FA	309811	-
CD147	HIM6	FC, IHC, WB, Block	306206	-
CD150 (SLAM)	A12 (7D4)	FC, IHC, IP, Costim	306310	-
CD151 (PETA-3)	50-6	FC, Block, WB, ICC	350404	-
CD152 (CTLA-4)	L3D10	FC, Block	349903, 349904	-
CD154	24-31	FC, IF, Block	310811, 310812	310827, 310828
CD158d (KIR2DL4)	mAb 33 (33)	FC, Activ	347003	-
CD178 (Fas-L)	NOK-1	FC, ICC, IF, IP, Block, WB	306408, 306409	-
CD180 (RP105)	MHR73-11	FC, ICFC, IHC, IP, Stim	312907	-
CD183 (CXCR3)	G025H7	Block, FC	353717, 353718	-
CD184 (CXCR4)	12G5	FC, ICC, IF, IHC, Block, CyTOF®	306512	-
CD197 (CCR7)	G043H7	FC, Block	353221, 353222	-
CD206 (MMR)	15-2	FC, IF, IHC, WB, Block	321111, 321112	-
CD210 (IL-10 R)	3F9	FC, IP, Block	308805, 308806, 308807	308810
CD218a (IL-18Rα)	H44	FC, IHC	313802	-
CD221 (IGF-1R)	1H7/CD221	FC, Block, IHC, IP, WB	351804	-
CD229 (Ly-9)	HLy-9.1.25	FC, IP, ICC, FA	326104	-
CD243 (MDR-1)	UIC2	FC, Block, IP, IHC	348603	-
CD253 (TRAIL)	RIK-2	FC, Block	308207, 308208	-
CD255 (TWEAK)	CARL-1	FC, Neut, IHC	308307	-
CD258 (LIGHT)	15B2	ELISA, Block, IP	137104	-
CD272 (BTLA)	MIH26	FC, Agonist	344503, 344504	-
CD273 (B7-DC, PD-L2)	24F.10C12	FC, IHC, FA	329610	-
CD273 (B7-DC, PD-L2)	MIH18	FC, IHC, IF, Block	345504	-
CD274 (B7-H1, PD-L1)	29E.2A3	FC, IHC, FA	329709, 329710, 329711	329715, 329716
CD276 (B7-H3)	MIH35	FC, FA	135604	-
CD278 (ICOS)	C398.4A	FC, IHC, IP, Costim	313511, 313512	-
CD279 (PD-1)	EH12.2H7	FC, Block	329911, 329912	329925, 329926
CD282 (TLR2)	TL2.1	FC, IHC, IP, WB, Block	309709, 309710	309716
CD284 (TLR4)	HTA125	FC, IHC, IF, Block	312807, 312808	312814
CD290 (TLR10)	3C10C5	FC	354601, 354602	-
CD314 (NKG2D)	1D11	FC, IP, FA	320809, 320810	320814
CD325 (N-Cadherin)	8C11	FC, IF, Block, WB	350804	-
CD335 (NKp46)	9E2	FC, FA	331904	-
CD336 (NKp44)	P44-8	FC, Block	325104	-
CD337 (NKp30)	P30-15	FC, ELISA, Block	325203, 325204	-
CD351 (Fc α/μ receptor)	TX61	FC, Block	137303	-
CD352 (NTB-A)	NT-7	FC, Block	317204	-
CD354 (TREM-1)	TREM-26	FC, WB, Activ	314907	-
CD355 (CRTAM)	Cr24.1	FC, FA	339104	-
CD360 (IL-21R)	17A12	FC, IF	359503, 359504	-
CXCR7	8F11-M16	FC	331110	-
Delta-like protein 4 (DLL4)	MHD4-46	FC	346504	-
FcεRIα	AER-37 (CRA-1)	FC, Activ	334604	-

LEAF™ and Ultra-LEAF™ Products Available: Human

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
Galectin-9	9M1-3	ICFC, FC, Block	348903, 348904	-
G-CSF	BVD13-3A5	ELISA Capture, ELISPOT Capture, IHC, Neut	502104	-
GM-CSF	BVD2-23B6	ELISA Capture, ELISPOT Capture, IP, Neut, WB	502203, 502204	-
HLA-A,B,C	W6/32	FC, IHC, IP, WB, Block, Activ	311411, 311412, 311423	311428
HLA-DR	L243	FC, IHC, IP, WB, Block, CyTOF®	307611, 307612	307648
HLA-G	87G	FC, IHC, ELISA, FA	335904	-
IFN-β	IFNb/A1	WB, ELISA, Neut	514003, 514004	-
IFN-γ	B27	ELISA, ICFC, IP, IHC, Neut, WB, CyTOF®	506512, 506513	-
IFN-γ	MD-1	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, WB	507513	-
IFN-γ	NIB42	ELISA Capture, ELISPOT Capture, Neut	502403, 502404	-
Integrin α9β1	Y9A2	FC, IP, IF, Block	351603	-
Integrin β7	FIB27	FC, IP, Block	121003	-
Integrin β7	FIB504	FC, Block	321218	-
IL-1α	364-3B3-14	ELISA Capture, ELISPOT Capture, ICFC, IHC	500102	-
IL-1β	H1b-27	ELISA Capture, ELISPOT Capture, Block	511604	-
IL-2	MQ1-17H12	ELISA Capture, ELISPOT Capture, ICFC, IHC, IP, CyTOF®	500313	-
IL-4	8D4-8	ELISA Capture, ELISPOT Capture, ICFC, IHC, IP, Neut	500706, 500707	-
IL-4	MP4-25D2	ELISA, ICFC, IHC, IP, Neut, WB, CyTOF®	500814, 500815	-
IL-5	JES1-39D10	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, WB	500907	-
IL-5	JES1-5A10	ELISA Capture, ELISPOT Capture, Neut	501004	-
IL-5	TRFK5	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, WB, CyTOF®	504307, 504308	-
IL-6	MQ2-13A5	ELISA Capture, ELISPOT Capture, ICFC, Neut, CyTOF®	501109, 501110	-
IL-7	BVD10-40F6	ELISA Capture, ELISPOT Capture, Neut, WB	501303	-
IL-9	MH9A3	ELISA, Neut	507704	-
IL-9	MH9D1	ELISA, Neut	512004	-
IL-10	JES3-19F1	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut	506810	-
IL-10	JES3-9D7	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut	501406, 501407	-
IL-12/IL-23 p40 (monomer, homodimer)	C8.3	ELISA Capture, ELISPOT Capture	501704	-
IL-12/IL-23 p40 (monomer, homodimer, heterodimer)	C8.6	ICFC, IP, Neut, WB	508803, 508804	-
IL-12/IL-23 p40 (monomer, homodimer, heterodimer)	C11.5	ICFC, Block, IHC, Neut, WB	501813	-
IL-13	JES10-5A2	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, WB	501909, 501910	-
LT-α (TNF-β)	359-238-8	ELISA Capture, ELISPOT Capture, Neut	503004	-
Lymphotoxin β R (LT-βR)	31G4D8	FC, IP, WB, Apop	322004	-
MICA/MICB	6D4	FC, IHC, Block, IP	320909, 320910	-
MCP-1	2H5	ELISA Capture, ELISPOT Capture, IHC, Neut, WB	505905, 505906	-
MCP-1	5D3-F7	ELISA Capture, ELISPOT Capture, ICFC, IHC, IP, Neut, WB	502606, 502607	-
NKp80	5D12	FC, IP, Block	346703	-
Notch 1	MHN1-519	FC, Block	352103, 352104	-
TCR γ/δ	B1	FC, FA, IHC	331203, 331204	-
TGF-β1	19D8	Block	521703, 521704	-
Tim-3	F38-2E2	FC, Costim, Block	345003, 345004	345009, 345010
TNF-α	MAb1	ELISA, Neut, WB	502803, 502804	-
TNF-α	MAb11	ELISA Capture, ELISPOT Capture, ICFC, ICC, IHC, Neut, CyTOF®	502922	-
TSLP	15B11.3	ELISA Capture, ELISPOT Capture, Neut	512203, 512204	-

LEAF™ and Ultra-LEAF™ Products Available: Rat

Specificity	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
Asialo-GM1	Poly21460	FC, Depletion	-	146002
CD3	1F4	FC	201410	-
CD8a	OX-8	FC, IP, FA	201714	-
CD27	LG.3A10	FC, IP, IHC, FA	124204	-
CD29	HMß1-1	FC, IHC, IP, Block	102209, 102210	-
CD61	2C9.G2 (HMß3-1)	FC, IHC, Block, Activ	104309, 104310	-
CD81	Eat-2	FC, IP, WB, Activ, Stim	104908	-
CD126 (IL-6Rα chain)	D7715A7	FC, IP, Block, Neut	115807, 115808, 115809	-
CD178 (FasL)	MFL4	FC, Block	106706	-
CD278 (ICOS)	C398.4A	FC, IHC, IP, Costim	313511, 313512	-
IFN-γ	DB-1	ELISA Capture, Neut, ICFC, IHC, WB, ELISPOT Capture	507808	-
IL-1β	B122	ELISA Capture, ELISPOT Capture, Depletion, IHC, IP, Neut, WB	503504	-
MCP-1	2H5	ELISA Capture, ELISPOT Capture, ICFC, IHC, Neut, WB	505905, 505906	-
TNF-α	TN3-19.12	ELISA Capture, ELISPOT Capture, ICFC, IP, Neut, WB	506105, 506106	-

LEAF™ and Ultra-LEAF™ Products Available: Isotype controls

Description	Clone	Applications	LEAF™ Cat. No.	Ultra-LEAF™ Cat. No.
Mouse IgG1, κ Isotype control	MG1-45	FC, ICFC, WB, IP, ICC, IF, FA	401403, 401404, 401405	401407, 401408
Mouse IgG1, κ Isotype control	MOPC-21	FC, ICFC, WB, IP, ICC, IF, FA	400123, 400124, 400153	400165, 400166
Mouse IgG2a, κ Isotype control	MG2a-53	FC, ICFC, WB, IP, ICC, IF, IHC, FA	401503, 401504	-
Mouse IgG2a, κ Isotype control	MOPC-173	FC, WB, IP, ICFC, ICC, IF, IHC, FA	400223, 400224	400263, 400264
Mouse IgG2b, κ Isotype control	MG2b-57	FC, ICFC, WB, IP, ICC, IF, FA	401212	-
Mouse IgG2b, κ Isotype control	MPC-11	FC, ICFC, WB, IP, ICC, IF, FA	400323, 400324, 400339	400348
Mouse IgG3, κ Isotype control	MG3-35	FC, ICFC, IP, WB, ICC, IF, FA	401310, 401313	-
Mouse IgM, κ Isotype control	MM-30	FC, ICFC, ICC, IF, FA	401604	-
Rat IgG1, κ Isotype control	RTK2071	FC, ICFC, WB, IP, ICC, IF, IHC, FA	400413, 400414, 400427	400431, 400432
Rat IgG2a, κ Isotype control	RTK2758	FC, ICFC, WB, IP, ICC, IF, IHC, FA	400515, 400516, 400533	400543, 400544
Rat IgG2b, κ Isotype control	RTK4530	FA, FC, ICC, ICFC, IF, IHC, IP, WB	400621, 400622, 400637	400643, 400644
Rat IgG2c, κ Isotype control	RTK4174	FC, ICFC, WB, IP, ICC, IF, FA	400709, 400710	-
Arm Ham IgG Isotype control	HTK888	FA, FC, ICC, ICFC, IF, IP, WB	400915, 400916, 400933	400939, 400940
ArmHam IgM Isotype control	HTK204	FC, ICFC, WB, IP, ICC, IF, FA	401005, 401006	-
Syrian Ham IgG Isotype control	SHG-1	FC, ICFC, WB, IP, ICC, IF, IHC, FA	402014	-

Upcoming LEAF™ and Ultra-LEAF™ Antibodies

BioLegend consistently releases new specificities in **LEAF™** and **Ultra-LEAF™** formats. Stay current with our new releases: biolegend.com/new_products

If you need a LEAF™ or Ultra-LEAF™ product that you don't see in our catalog, contact our sales team. They can assist you with custom products and bulk orders: biolegend.com/contact_sales_rep

Learn More about LEAF™ and Ultra-LEAF™ at: biolegend.com/LEAF

Frequently Asked Questions

I am going to do a functional assay. Which grade of purified antibody should I choose?

BioLegend's LEAF™ (Low Endotoxin, Azide-Free) purified antibodies are specifically designed for functional analyses, providing the most accurate results with minimal negative effects. LEAF™ antibodies are tested for sterility, and endotoxin is <0.1 EU/µg of antibody. For those using a particularly sensitive system or large volume of antibody, we would recommend the Ultra-LEAF™ format (endotoxin level <0.01 EU/µg of antibody).

How much antibody should I use for neutralization/ blocking?

As there can be many variables to functional assays and *in vivo* work, it is beyond our scope to give a concentration of antibody that would work universally in all systems. We would recommend a literature search to find a system set up similarly to yours. This can provide a foundation for your experimental setup.

Does BioLegend test each LEAF™ antibody by functional assay?

Due to the possible complexities and variations of uses of biofunctional antibodies in different assays, BioLegend does not currently perform functional assays as routine quality control (QC). However, we do provide references in which the antibodies were used for functional assays. We also perform QC to verify the specificity and quality of the antibody based on our strict specification criteria.

Does BioLegend test each LEAF™ antibody for potential pathogens?

No, BioLegend does not test for pathogens in-house. However, we can recommend an outside vendor to perform this testing as needed.

Recent References Using BioLegend LEAF™

Human CD3

1. Babich, A. *et al*. 2012. *J. Cell Biol*. 197:775
2. Qi, Y. *et al*. 2012. PLoS *One*. 7:e9072.
3. Sanford, D.E. *et al*. 2013. *Clin. Cancer Res.* 19:3404.

Human CD16

1. Van der Heijden, J. *et al*. 2012. *J. Immunol*. 188:1318.

Human CD18

1. Valenzuela, N.M. *et al*. 2013. *J. Immunol.* 190:6635.

Human CD28

1. Newell, E. W. *et al*. 2012. *Immunity*. 36:142.

Human CD40

1. Iwata, Y. *et al*. 2011. *Blood*. 117:530.

Human CD42b

1. Meyer dos Santos, S. *et al*. 2011. *Blood*. 117:4999.

Human CD49d

1. Mattapallil, M.J. *et al*. 2011. *J. Immunol.* 187:1977.

Human CD206 (MMR)

1. Sorvillo, N. *et al*. 2012. *Blood*. 119:3828.

Human CD282 (TLR2)

1. Ching-Liang, C. *et al*. 2012. *PLoS One*. 7:e40873.

Human CD352 (NTB-A)

1. Uzana, R. *et al*. 2012. *J. Immunol.* 188:632.

Human HLA-A, B, C

1. Chan, W.K. *et al*. 2012. *Clin. Cancer Res.* 18:6296.
2. Everds, N. *et al*. 2013. *Toxicol. Pathol*. [epub ahead of print]

Human HLA-DR

1. Dillon, S.M. *et al*. 2012. *J. Immunol.* 189:885.

Human IL-2

1. Okano, S. *et al*. 2011. *J. Immunol.* 186:1828.

Human Tim-3

1. Elahi, S. *et al*. 2012. *Blood*. 119:4192.
2. Moorman, J.P. *et al*. 2012. *J. Immnol.* 189:755.
3. Wang, J.M. *et al*. 2013. *J. Virol.* 87:4372.

Mouse CD3ε

1. Ashkenazi, A. *et al*. 2013. *Blood*. 121:2244.
2. Cheng-Chi, W. *et al*. 2012. *Cell Immunol*. 273:30.

Mouse CD16/32

1. Housley, W.J. *et al*. 2011. *J. Immunol.* 187:4161.
2. Lochhead, R.B. *et al*. 2012. *J. Immunol.* 189:2488.
3. Parra, D. *et al*. 2012. *J. Leukoc. Biol*. 91:525.

Mouse CD25

1. Tewalt, E.F. *et al*. 2012. *Blood*. 120:4772.

Mouse CD28

1. Myers, R.C. *et al*. 2013. *J. Immunol.* 190:6287.
2. Rybakin, V. *et al*. 2012. *PLoS One.* 7:e43191.

Mouse CD47

1. Azcutia, V. *et al*. 2012. *J. Immunol.* 189:2553.

Mouse CD54

1. Lask, A. *et al*. 2013. *Blood*. 121:3033.

Mouse CD115 (CSF-1R)

1. Gómez-Nicola, D. *et al*. 2013. *J. Neurosci.* 33:2481.

Mouse CD134 (OX-40)

1. Takanori, S. *et al*. 2011. *J. Immunol.* 186:3547.

Mouse CD178 (FasL)

1. Nakahira, M. and Nakanishi, K. 2011. *Int. Immunol.* 23:761.

Mouse CD274

1. Muthumani, K. *et al*. 2011. *J. Immunol.* 187:2932.

Mouse IFN-β

1. Zaric, S.S. *et al*. 2011. *J. Biol. Chem.* 286:29492.

Mouse IFN-γ

1. Krishnaswamy, J.K. *et al*. 2012. *Am. J. Respir. Cell Mol. Biol*. 47:852.

Mouse IL-2

1. Sitrin, J. *et al*. 2013. *J. Exp. Med.* 190:5037.

Mouse IL-10

1. Guo, Z. *et al*. 2013. *J. Immunol.* 190:4337.

Mouse IL-17A

1. Guo, X. *et al*. 2011. *Vaccine*. 29:772.

Mouse LAP (TGF-β1)

1. Zhidan, T. *et al*. 2012. *Invest. Opthalmol. Vis. Sci.* 53:959.

Mouse TLR4 (CD284)/MD2 Complex

1. Yonggang, M. *et al*. 2012. *PLoS One*. 7:e40763.

Mouse TNF-α

1. Gómez-Hernández, A. *et al*. 2013. *Endocrinology*. 154:2352.
2. Gómez-Hernández, A. *et al*. 2012. *Endocrinology*. 153:1242.

Mouse VEGF-A

1. Lu, R. *et al*. 2012. *Cancer Res*. 72:2239.

Visit: biolegend.com/LEAF

Contact BioLegend

Customer Service:
US & Canada Toll-Free: 1.877.246.5343 (877-BIOLEGEND)
International: 1.858.768.5800
Fax: 1.877.455.9587
email: cs@biolegend.com

Technical Service:
US & Canada Toll-Free: 1.877.273.3103
International: 1.858.768.5801
email: techserv@biolegend.com

USA Headquarters:
9727 Pacific Heights Blvd.
San Diego, CA 92121

International Offices

Japan:
BioLegend
8F, SB bldg., 1-4-6, Nezu, Bunkyo-ku, Tokyo
113-0031, Japan
Tel: +81-3-3823-9071
Fax: +81-3-3823-9072
email: supportjp@biolegend.com
biolegend.com/jp

United Kingdom:
BioLegend
4B Highgate Business Centre
33 Greenwood Place
London NW5 1LB
United Kingdom
Tel: +44 (0) 20 3475 3880
Fax: +44 (0) 20 3318 3271
email: salesuk@biolegend.com
biolegend.com/uk

BioLegend European Distribution Center:
4B Highgate Business Centre
33 Greenwood Place
London NW5 1LB
United Kingdom
Tel: +44 (0) 20 3475 3880
Fax: +44 (0) 20 3318 3271
email Inquiries: infoeurope@biolegend.com
email Technical Support: techeurope@biolegend.com

Germany:
BioLegend
Zum Grundtal 1
D- 54341 Fell
Germany
Tel: +49 (0)6502- 4042086
Fax: +49 (0)6502- 4042087
email: bl-gmbh@biolegend.com
biolegend.com/de

BioLegend®

For a complete listing of worldwide distributors, visit:
biolegend.com/distributors