



biomol

YOU HAVE THE VISION,
WE HAVE THE SUBSTANCE.

The background is a solid blue color. It features a dark blue silhouette of a human figure from the chest up. Overlaid on this are several light blue illustrations: a large, multi-lobed cell with cilia in the foreground; a smaller, similar cell in the upper right; and several star-shaped virus-like particles of varying sizes scattered throughout the scene.

insight

ISSUE 1

**IMMUNE CHECKPOINTS &
IMMUNOTHERAPY RESEARCH**

Immune Checkpoints and Cancer

Cancer immunotherapy seeks to use the many components of the immune system to attack cancer cells. More specifically, immunotherapy maximizes the effectiveness of components of the antigen-presentation and antigen-response system, primarily dendritic cells and lymphocytes, respectively. Ideally, this approach can offer more selective killing of cancer cells than other therapeutic modalities, such as chemotherapy.

Immune checkpoint therapy is a form of cancer immunotherapy that centers on lymphocyte signaling, with a current focus on T cells. These cells can be activated to multiply, secrete cytokines, and kill target cells with high selectivity. Activation requires the T cell receptor (TCR) be stimulated by an antigen presented by the major histocompatibility complex (Ag/MHC). Selectivity and strength of activation are regulated by co-stimulatory or inhibitory signals, the immune checkpoints.

The goal of immune checkpoint therapy is to enhance the ability of T cells to kill cancer cells, primarily by tweaking the regulatory checkpoints on T cells. The best-studied examples are co-receptors that suppress TCR-mediated activation of T cells. CTL-associated protein-4 (CTLA-4) is an inhibitory co-receptor on T cells that, when stimulated at the same time as TCR, blocks cell activation. Antibodies selective for CTLA-4 prevent its stimulation, allowing TCR-mediated T cell activation. While this approach has shown some effectiveness in treating cancer in patients, the response is slow and not always selective for cancer cells.^{1,2} One major problem is that CTLA-4 blockade works early in T cell development, when antigen-presenting cells are activating T cells to proliferate.

A better approach is to intervene when T cells meet cancer cells, where TCR-mediated activation initiates cell killing. Programmed death-1 (PD-1) is a lymphocyte receptor that binds PD-L1 or PD-L2. When PD-L1 is expressed on cancer cells, it causes PD-1 to negatively regulate TCR-mediated activation of T cells, limiting their cytotoxic activity. Several antibodies have been developed to block the ability of PD-L1 to interact with PD-1. Clinical trials using these antibodies to antagonize the PD-L1/PD-1 interaction have demonstrated tumor killing that is both specific and long-lasting.^{3,4} In May 2016, the first PD-L1 inhibitor was approved by the U.S. Food and Drug Administration for the treatment of bladder cancer.

Studies using antibodies to block the inhibitory checkpoint receptors CTLA-4 and PD-1 demonstrate the feasibility of this type of immunotherapy. Of course, antibody blockade of PD-1 will only be effective when cancer cells express ligands that stimulate PD-1. Other cancer cells may use different ligands to suppress the immune system. With this in mind, additional inhibitory checkpoints are being identified (Table 1), and approaches targeting checkpoint activation can also be considered.^{1,5}

In addition to signaling through surface membrane checkpoint proteins, effective therapies target immunosuppression through metabolic pathways, such as indoleamine dioxygenases (IDO) and arginase, as well as through soluble signaling factors (e.g., TGF- β , adenosine).⁶ These may be best targeted using traditional small molecule inhibitors. Combination therapies using both antibodies and inhibitors will be a central part of cancer treatment in the future.

References

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5. Collin, M. Immune checkpoint inhibitors: A patent review (2010-2015). *Expert Opin. Ther. Pat.* 26(5), 555-564 (2016).
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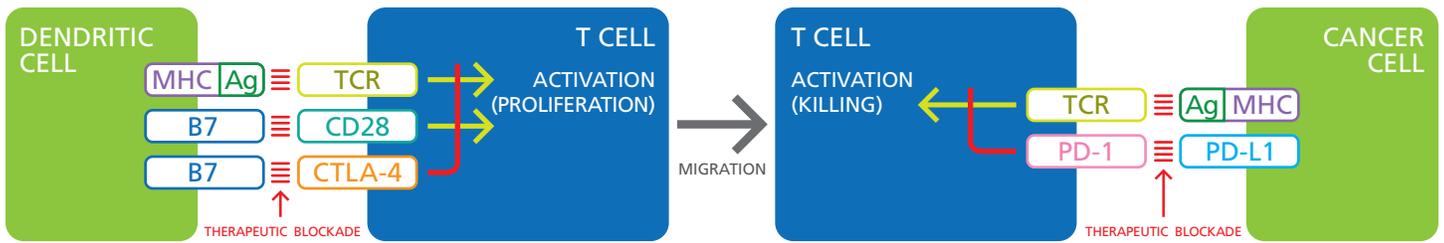


Figure. Co-stimulation of TCR and CD28 on T cells by Ag/MHC and B7 on dendritic cells activates T cells to proliferate and migrate. Negative regulation of TCR by B7:CTLA-4 signaling can be blocked by therapeutic antibodies. Similarly, signaling from Ag/MHC on cancer cells, through TCR, activates killing of cancer cells by T cells. Inhibition of this activation by PD-L1:PD-1 is another target of therapeutic blockade.

Antigen Presenting Cell	T Cell
Ligand/Receptor <i>Also known as</i>	Ligand/Receptor <i>Also known as</i>
CD40 <i>TNFRSF5</i>	CD40L <i>TNFSF5, CD154</i>
TL1A <i>TL1A, TNFSF15</i>	DR3 <i>TNFRSF25</i>
GITRL <i>TNFSF18</i>	GITR <i>TNFRSF18, CD357</i>
4-1BBL <i>TNFSF9, CD137L</i>	4-1BB <i>TNFRSF9, CD137</i>
OX40L <i>TNFSF4, CD252</i>	OX40 <i>TNFRSF4, CD134</i>
CD70 <i>TNFSF7, CD27L</i>	CD27 <i>TNFRSF7</i>
HHLA2	TMIGD2
ICOSL <i>B7-H2, CD275</i>	ICOS <i>CD278</i>
CD80 <i>B7-1</i>	CD28
CD86 <i>B7-2</i>	

Table 1. Ligand-receptor pairings relevant to immune checkpoint therapy. Pairings that evoke inhibitory signaling are shaded red, while co-stimulatory pairings are shaded green. (Adapted from Mahoney, K.M., Rennert, P.D., Freeman, G.J. Combination cancer immunotherapy and new immunomodulatory targets. *Nat. Rev. Drug Discov.* 14(8), 561-584 (2015))

Antigen Presenting Cell	T Cell
Ligand/Receptor <i>Also known as</i>	Ligand/Receptor <i>Also known as</i>
MHC Class I, II	KIR
	TCR
	LAG3 <i>CD223</i>
CD80 <i>B7-1</i>	CTLA-4 <i>CD152</i>
CD86 <i>B7-2</i>	
CD80 <i>B7-1</i>	PD-L1 <i>B7-H1, CD274</i>
PD-L1 <i>B7-H1, CD274</i>	PD-1 <i>CD279</i>
PD-L2 <i>B7-DC, CD273</i>	
PD-L1 <i>B7-H1, CD274</i>	CD80 <i>B7-1</i>
VISTA	N/A
BTNL2	N/A
B7-H3 <i>CD276</i>	N/A
B7-H4 <i>VTCN1</i>	N/A
CD48	N/A
Phosphatidylserine	TIM-3 <i>HAVcr-2</i>
Gal9	N/A
HVEM <i>TNFRSF14, CD270</i>	BTLA <i>CD272</i>
	CD160
	LIGHT <i>TNFSF14, HVEM</i>

Antibodies

Antibodies to Detect Immune Checkpoint Proteins



Catalog No.	Product Name	Cross Reactivity	Available Conjugate(s)	Application(s)
ARG55154	Anti-Adenosine Receptor A2A Polyclonal Antibody	Human		FC, IHC, WB
ARG64303	Anti-B7-H4 Polyclonal Antibody	Human		WB
ARG55418	Anti-BTLA / CD272 Polyclonal Antibody	Human		IHC, WB
ARG55520	Anti-BTLA / CD272 Polyclonal Antibody	Mouse, Rat		WB
ARG62793	Anti-CD27 Monoclonal Antibody (Clone LT27)	Human	APC, FITC, PE	FC
ARG20895	Anti-CD28 Monoclonal Antibody (Clone PV-1)	Mouse	APC, Biotin, FITC, PE, Spectral Red	FC, IP
ARG65430	Anti-CD28 Monoclonal Antibody (Clone CD28.2)	Human, Primate	APC, FITC, PE, PerCP	FA, FC, ICC, IF, IHC, IP, WB
ARG65471	Anti-CD28 Monoclonal Antibody (Clone JJ319)	Rat	FITC, PE	FA, FC, IP
ARG62796	Anti-CD28 Monoclonal Antibody, Functional Grade (Clone 37.51)	Mouse		FA, FC, ICC, IF, IHC, IP
ARG65637	Anti-CD28 Polyclonal Antibody	Mouse		WB
ARG65638	Anti-CD28 Polyclonal Antibody	Human		WB
ARG52770	Anti-CD40 Polyclonal Antibody	Human		IHC
ARG20924	Anti-CD40 Monoclonal Antibody (Clone 1C10)	Mouse	APC, Biotin, FITC, PE, Spectral Red	BL, FA, FC, IP
ARG62838	Anti-CD40 Monoclonal Antibody (Clone HI40a)	Human	FITC, PE, PerCP	FC
ARG65514	Anti-CD40L Monoclonal Antibody (Clone MR-1)	Mouse	FITC	FA, FC, ICC, IF, IHC, IP
ARG65039	Anti-CD80 Internal Polyclonal Antibody	Human		WB
ARG20951	Anti-CD80 Monoclonal Antibody (Clone 1G10)	Mouse	APC, Biotin, FITC, PE, Spectral Red	BL, FC, IP
ARG62932	Anti-CD80 Monoclonal Antibody (Clone 16-10A1)	Dog, Mouse		FA, FC, IHC, IP
ARG62931	Anti-CD80 Monoclonal Antibody (Clone MEM-233)	Human	APC, FITC, PE, PerCP	FC, IP
ARG21088	Anti-CD86 Monoclonal Antibody (Clone 2D10)	Mouse	APC, Biotin, FITC, PE, PE-Cy7, Spectral Red	BL, ELISA, FC, IHC, IP
ARG65423	Anti-CD86 Monoclonal Antibody (Clone BU63)	Human	APC, FITC, PE, PerCP	FA, FC, IHC, IP, WB
ARG62938	Anti-CD86 Monoclonal Antibody (Clone GL-1)	Mouse	FITC	FA, FC, ICC, IF, IHC, IP
ARG21001	Anti-CD152 / CTLA4 Monoclonal Antibody (Clone 1B8)	Mouse	Biotin, FITC, PE	ELISA, FC
ARG65419	Anti-CD152 / CTLA4 Monoclonal Antibody (Clone BNI3)	Human	PE	FC, ICC, IF, IHC, IP

Catalog No.	Product Name	Cross Reactivity	Available Conjugate(s)	Application(s)
ARG63868	Anti-HVEM / TR2 Polyclonal Antibody, Internal	Human		WB
ARG63890	Anti-INDO / IDO Polyclonal Antibody	Human		IHC
ARG64972	Anti-INDOL1 Polyclonal Antibody	Human		WB
ARG63796	Anti-PDCD1 Polyclonal Antibody, Internal	Human		WB
ARG63715	Anti-PD-L1 Polyclonal Antibody	Human		IHC, WB
ARG54798	Anti-TIM-3 Polyclonal Antibody	Human, Mouse		WB



Catalog No.	Product Name	Cross Reactivity	Available Conjugate(s)	Application(s)
BPS-71212	Anti-CTLA4 Neutralizing Monoclonal Antibody	Human		Neutr.
BPS-71120	Anti-PD-1 Neutralizing Monoclonal Antibody	Human, Monkey		Neutr.
BPS-71290	Anti-PD-1 Neutralizing Monoclonal Antibody, PE-labeled	Human, Monkey	PE	FC, IF
BPS-71213	Anti-PD-L1 Neutralizing Monoclonal Antibody	Human, Mouse		Neutr.
BPS-71214	Anti-PD-L1 Neutralizing Monoclonal Antibody, Biotin-labeled	Human, Mouse	Biotin	ELISA, WB



Catalog No.	Product Name	Cross Reactivity	Available Conjugate(s)	Application(s)
Cay-10011454	Anti-Adenosine Receptor A2A Monoclonal Antibody (Clone 7FG-G5-A2)	Human		WB
Cay-10004837	Anti-CD27 Monoclonal Antibody (Clone 203.6)	Human		FC, ICC, IHC
Cay-18842	Anti-CTLA-4 IgG [Mouse] Conjugated to R-Phycoerythrin*	Mouse	R-PE	FC, FM
Cay-18843	Anti-LAG-3 IgG [Rat] Conjugated to R-Phycoerythrin*	Mouse	R-PE	FC, FM
Cay-18844	Anti-PD-1 IgG [Rat] Conjugated to R-Phycoerythrin*	Mouse	R-PE	FC, FM
Cay-18845	Anti-PD-L1 IgG [Rat] Conjugated to R-Phycoerythrin*	Mouse	R-PE	FC, FM
Cay-10873	Anti-TRAF5 Monoclonal Antibody (Clone 55A219)	Human, Mouse		WB
Cay-18846	Anti-TIM-3 IgG [Rat] Conjugated to R-Phycoerythrin*	Mouse	R-PE	FC, FM

*Spectral characteristics of R-phycoerythrin-conjugated antibodies produced by Columbia Biosciences: excitation max. λ : 565>540>498 nm and emission max. λ : 578 nm

Antibodies (continued)

Antibodies to Detect Immune Checkpoint Proteins

Catalog No.	Product Name	Cross Reactivity	Application(s)
NSJ-R34176	Anti-Adenosine Receptor A2A Polyclonal Antibody	Human, Rhesus monkey	ELISA, WB
NSJ-R35936	Anti-B7-H4 Polyclonal Antibody	Human	ELISA, WB
NSJ-R34392	Anti-BTLA Polyclonal Antibody	Human, Mouse	ELISA, WB
NSJ-F43213	Anti-CD27 Polyclonal Antibody	Human	ELISA, FC, WB
NSJ-R32373	Anti-CD27 Polyclonal Antibody	Human	IHC, WB
NSJ-V2986	Anti-CD27 Monoclonal Antibody (Clone 203.6)	Human	FC, IF
NSJ-F49999	Anti-CD28 Polyclonal Antibody	Human	IF, WB
NSJ-V2053	Anti-CD28 Monoclonal Antibody (Clone C28/75)	Human	FA, FC, IHC, IP
NSJ-V2987	Anti-CD28 Monoclonal Antibody (Clone 204-12)	Human, Bovine, Mouse, Sheep, Swine	FA, FC, IF
NSJ-R30192	Anti-CD40 Polyclonal Antibody	Mouse	WB
NSJ-F45979	Anti-CD40 Polyclonal Antibody	Human	ELISA, WB
NSJ-F49677	Anti-CD40L Polyclonal Antibody	Human	ELISA, FC, IF, IHC, WB
NSJ-F44122	Anti-CD70 Polyclonal Antibody	Human	ELISA, IHC, WB
NSJ-V3033	Anti-CD70 Monoclonal Antibody (Clone BU69)	Human	ELISA, FA, FC, IF, IHC, IP
NSJ-F48980	Anti-CD80 Polyclonal Antibody	Human	ELISA, FC, WB
NSJ-V2988	Anti-CD86 Monoclonal Antibody (Clone C86/1146)	Human, Mouse, Rat	FC, IF, IHC, WB
NSJ-F51730	Anti-CTLA4 Polyclonal Antibody	Human	ELISA, IF, WB
NSJ-V3050	Anti-GITR (TNFRSF18) Monoclonal Antibody (Clone DTA-1)	Mouse	FC, IF
NSJ-F49456	Anti-ICOS Polyclonal Antibody	Human	ELISA, FC, IHC, WB
NSJ-R36409	Anti-ICOS Ligand Polyclonal Antibody	Human	ELISA, WB
NSJ-R30691	Anti-IDO Polyclonal Antibody	Human	WB
NSJ-R31969	Anti-IDO1 Polyclonal Antibody	Human, Mouse, Rat	IHC, WB
NSJ-R35561	Anti-IDO2 Polyclonal Antibody	Human	ELISA, WB
NSJ-F50003	Anti-LAG3 Polyclonal Antibody	Human	ELISA, IHC, WB
NSJ-R31251	Anti-OX40 Polyclonal Antibody	Human	WB
NSJ-R31252	Anti-OX40 Polyclonal Antibody	Mouse	WB
NSJ-R32104	Anti-OX40 Polyclonal Antibody	Human	IHC, WB
NSJ-R30141	Anti-PD-1 Polyclonal Antibody	Human, Rat	WB
NSJ-V7002	Anti-PD-1 Monoclonal Antibody (Clone PD203-1)	Human	FC, IF, IHC
NSJ-R30949	Anti-PD-L1 Polyclonal Antibody	Human, Mouse, Rat	WB
NSJ-R33263	Anti-PD-L1 Polyclonal Antibody	Human	ELISA, IHC, WB
NSJ-F53798	Anti-TIGIT Polyclonal Antibody	Human, Mouse	WB
NSJ-R34699	Anti-TIM-3 Polyclonal Antibody	Human	ELISA, WB

Catalog No.	Product Name	Cross Reactivity	Available Conjugate(s)	Application(s)
600-401-Z97	Anti-BTLA Polyclonal Antibody	Human		ELISA, IF, IHC, WB
200-308-N65	Anti-CD27 Monoclonal Antibody, Phycoerythrin Conjugated (Clone O323)	Human	APC, FITC, PE	FC
200-326-N66	Anti-CD28 Monoclonal Antibody, Allophycocyanin Conjugated (Clone CD28.2)	Human	APC, FITC, PE	FC, IHC, IP
200-302-N67	Anti-CD40 Monoclonal Antibody, Fluorescein Conjugated (Clone 5C3)	Human	APC, FITC, PE	FC
200-326-N76	Anti-CD40L Monoclonal Antibody, Allophycocyanin Conjugated (Clone 24-31)	Human	APC, FITC, PE	FC, IF
200-302-N74	Anti-CD80 Monoclonal Antibody, Fluorescein Conjugated (Clone 2D10)	Human	APC, FITC, PE	FC, IHC, WB
200-B02-N89	Anti-CD80 (Armenian Hamster) Monoclonal Antibody, Fluorescein Conjugated (Clone 16-10A1)	Mouse	APC, FITC, PE	FC, IF, IHC, IP
200-502-N90	Anti-CD86 Monoclonal Antibody, Fluorescein Conjugated (Clone GL-1)	Mouse	APC, FITC, PE	FC, IF, IHC
600-401-BL0	Anti-GITRL Polyclonal Antibody	Human, Mouse		ELISA, WB
200-301-E57	Anti-IDO1 Monoclonal Antibody (Clone 10.1)	Human, Mouse		ELISA, IF, IHC, IP, WB
600-401-C69	Anti-IDO2 Polyclonal Antibody	Human, Mouse		ELISA, IF, IP, WB
200-301-DK3	Anti-PD-1 Monoclonal Antibody (Clone 7A11B1)	Human, Mouse, Rat		ELISA, IF, IHC, WB
600-401-A71	Anti-PD-L1 Polyclonal Antibody	Human, Mouse, Rat		ELISA, IF, WB
600-401-DK8	Anti-PD-L2 Polyclonal Antibody	Human, Mouse, Rat		ELISA, IF, IHC, WB

FAQ: Does the buffer formulation of an antibody interfere with labeling?

Different conjugation methods can be impacted to varying extents by substances commonly found in preparations of antibodies, but the majority of labeling methods exploit lysine residues. Therefore, buffers and other additives with primary amines (e.g., >20 mM Tris) should be avoided in labeling procedures. Sometimes it may be necessary to re-purify prior to carrying out the labeling reaction, especially if there are stabilizing proteins (e.g., BSA) or low molecular weight substances, such as sodium azide (>0.1%) or glycine.

APPLICATIONS LEGEND

<i>BL</i>	Blocking	<i>IF</i>	Immunofluorescence
<i>ELISA</i>	Enzyme-Linked Immunosorbent Assay	<i>IHC</i>	Immunohistochemistry
<i>FA</i>	Functional Assay	<i>IP</i>	Immunoprecipitation
<i>FC</i>	Flow Cytometry	<i>Neutr.</i>	Neutralization
<i>FM</i>	Fluorescence Microscopy	<i>WB</i>	Western Blot
<i>ICC</i>	Immunocytochemistry		

Catalog No.	Product Name	Description
BPS-72008	BTLA:HVEM[Biotinylated] Inhibitor Screening Assay Kit	Screening and profiling inhibitors of BTLA:HVEM signaling
BPS-72007	CD28:B7-1[Biotinylated] Inhibitor Screening Assay Kit	Screening and profiling inhibitors of CD28:B7-1 signaling
BPS-72044	CD47:SIRP-alpha[Biotinylated] Inhibitor Screening Assay Kit	Screening and profiling inhibitors of CD47:SIRP-alpha interaction
BPS-72051	CD226:CD112 Homogeneous Assay Kit	Measure the inhibition of CD226 binding to CD112 (PVRL2)
BPS-72052	CD226:CD155 Homogeneous Assay Kit	Measure the inhibition of CD226 binding to CD155 (PVR)
BPS-72009	CTLA4:B7-1[Biotinylated] Inhibitor Screening Assay Kit	Screening and profiling inhibitors of CTLA4:B7-1 signaling
BPS-72024	CTLA4[Biotinylated]:B7-2 Inhibitor Screening Assay Kit	Screening and profiling inhibitors of CTLA4:B7-2 interaction
BPS-72031	IDO1 Cell-Based Assay Kit	Monitor the activity of exogenously expressed human IDO1 in cultured cells
BPS-72037	IDO1 Fluorogenic Inhibitor Screening Assay Kit	Measure enzyme inhibition of IDO1
BPS-72021	IDO1 Inhibitor Screening Assay Kit	Designed to measure IDO1 enzyme inhibition
BPS-72041	IDO1 (Mouse) Inhibitor Screening Assay Kit	Measure inhibition of the murine IDO1 enzyme
BPS-72022	IDO2 Inhibitor Screening Assay Kit	Designed to measure IDO2 enzyme inhibition
BPS-72045	OX40[Biotinylated]:OX40L Inhibitor Screening Assay Kit	Screening and profiling inhibitors of OX40:OX40L interaction
BPS-72026	PD-L1:B7-1[Biotinylated] Inhibitor Screening Assay Kit	Screening and profiling inhibitors of the PD-L1:B7-1 interaction
BPS-72014	PD-1:PD-L1 Homogeneous Assay Kit	Measure the inhibition of PD-1 binding to PD-L1
BPS-72003	PD-1:PD-L1[Biotinylated] Inhibitor Screening Assay Kit	Screening and profiling inhibitors of the PD-1:PD-L1 interaction
BPS-72004	PD-1:PD-L2[Biotinylated] Inhibitor Screening Assay Kit	Screening and profiling inhibitors of the PD-1:PD-L2 interaction
BPS-72012	PD-1:PD-L2 TR-FRET Assay Kit	Measure the inhibition of PD-1 binding to PD-L2
BPS-72033	TDO Cell-Based Assay Kit	Monitor the activity of exogenously expressed human TDO in cultured cells
BPS-72023	TDO Inhibitor Screening Assay Kit	Designed to measure TDO enzyme inhibition (96 reactions)
BPS-72036	TDO Inhibitor Screening Assay Kit	Designed to measure TDO enzyme inhibition (384 reactions)
BPS-72039	TDO Fluorogenic Inhibitor Screening Assay Kit	Measure enzyme inhibition of TDO
BPS-72030	TIGIT:CD112 Homogeneous Assay Kit	Measure the inhibition of human TIGIT binding to CD112 (PVRL2/Nectin-2)
BPS-72029	TIGIT:CD155 Homogeneous Assay Kit	Measure the inhibition of TIGIT binding to CD155

Biological Samples

Stable Cell Lines for Immunotherapy Research

Catalog No.	Product Name	Description
BPS-60624	CD27 CHO-K1 Stable Cell Line	CHO-K1 cell line expressing full-length human CD27 (TNFRSF7)
BPS-60532	hIDO1-HEK293 Recombinant Cell Line	Stable recombinant HEK293 cell line expressing tetracycline-inducible human IDO1
BPS-60534	hTDO-HEK293 Recombinant Cell Line	Stable recombinant HEK293 cell line expressing human TDO

Catalog No.	Product Name	Description
BPS-27339	Epacadostat (INCB024360)	Inhibitor of IDO1, with an IC ₅₀ of 10 nM
BPS-27338	INCB024360 Analog	Inhibitor of IDO1, with an IC ₅₀ of 10 nM
BPS-73000	N-formylkynurenine (Kyn)	Standard for measuring IDO1, IDO2, or TDO specific activity
BPS-27337	NLG919	Potently blocks IDO-induced T cell suppression and restored T cell responses with a reported ED ₅₀ of 80 nM <i>in vitro</i>



Catalog No.	Product Name	Description
Cay-16838	CAY10581	Inhibits IDO (IC ₅₀ = 55 nM)
Cay-15618	CAY10680	Adenosine A _{2A} receptor antagonist (K _i = 39.5 nM in human)
Cay-15593	5'-Deoxy-5'-methylthioadenosine	Adenosine A ₁ , A _{2A} , A _{2B} , and A ₃ receptor agonist (K _s = 0.15, 1.13, 13.9, and 0.68 μM, respectively)
Cay-19402	IDO-IN-1	Inhibits IDO (IC ₅₀ = 59 nM); shows activity in HeLa cells (IC ₅₀ = 12 nM)
Cay-19875	INCB024360	Selectively inhibits IDO1 (IC ₅₀ = 7.1 nM in HeLa cells)
Cay-18265	INCB024360 analog	Inhibits IDO1 (IC ₅₀ s = 67 and 19 nM for human IDO in enzyme activity and HeLa cell assays, respectively)
Cay-19914	PD-1/PD-L1 Inhibitor 1	Prevents the interaction of PD-L1 with PD-1 (IC ₅₀ = 0.11-1 μM)
Cay-19132	PD-1/PD-L1 Inhibitor 2	Prevents the interaction of PD-L1 with PD-1 (IC ₅₀ = 18 nM)
Cay-14806	R-848	Mimics CD40-induced B cell activation
Cay-19503	SR 0987	Agonist of the T cell-specific isoform of RORγ; increases IL-17 but decreases PD-1 expression
Cay-16456	1-methyl-D-Tryptophan	Inhibits IDO (IC ₅₀ = 7 μM)



Catalog No.	Product Name	Description
LKT-I7478	Istradefylline	Competitive inhibitor of adenosine A _{2A} receptors that exhibits tremorlytic activity
LKT-R1724	Regadenoson	Adenosine A _{2A} receptor agonist that displays vasodilatory activity; is clinically used in myocardial perfusion imaging

Catalog No.	Product Name	Source	Description
BPS-71125	B7-1 (CD80), Fc fusion (Human)	HEK293 cells	Human secreted B7-1, Fc fusion protein
BPS-71150	B7-2 (CD86), Fc fusion (Human)	HEK293 cells	Human secreted B7-2, Fc fusion protein
BPS-71144	B7-H4, His-tag (Human)	HEK293 cells	Human secreted B7-H4 with C-terminal His-tag
BPS-71148	B7-H5 (VISTA), Fc fusion (Human)	HEK293 cells	Human secreted B7-H5, Fc fusion protein
BPS-71141	BTLA (CD272), Fc fusion (Human)	HEK293 cells	Human BTLA, Fc fusion protein
BPS-71176	CD27, Fc fusion (Human)	HEK293 cells	Human secreted CD27, Fc fusion protein
BPS-71113	CD28, Fc fusion (Human)	HEK293 cells	Human secreted CD28, Fc fusion protein
BPS-71174	CD40, Fc fusion (Human)	HEK293 cells	Human secreted CD40, Fc fusion protein
BPS-71191	CD40L (CD154), His-tag (Human)	HEK293 cells	Human CD40L with an N-terminal His-tag
BPS-71178	CD70, His-tag (Human)	HEK293 cells	Human CD70 with an N-terminal His-tag
BPS-71170	CD137 (4-1BB), Fc fusion (Human)	HEK293 cells	Human secreted CD137, Fc fusion protein
BPS-71181	CD155 (PVR), His-tag (Human)	HEK293 cells	Human CD155 with a C-terminal His-tag
BPS-71167	CD155 (PVR), His-tag (Mouse)	HEK293 cells	Mouse CD155 with a C-terminal His-tag
BPS-71173	CD160, His-tag (Human)	HEK293 cells	Human secreted CD160 with a C-terminal His-tag
BPS-71149	CTLA4 (CD152), Fc fusion (Human)	HEK293 cells	Human secreted CTLA4, Fc fusion protein
BPS-71172	GITR (CD357), Fc fusion (Human)	HEK293 cells	Human secreted GITR, Fc fusion protein
BPS-71190	GITRL, His-tag (Human)	HEK293 cells	Human GITRL with an N-terminal His-tag
BPS-71142	HVEM, Fc fusion (Human)	HEK293 cells	Human HVEM, Fc fusion protein
BPS-71179	ICOS (CD278), Fc fusion (Human)	HEK293 cells	Human ICOS, Fc fusion protein
BPS-71182	IDO1, His-tag (Human)	<i>E. coli</i>	Human IDO1 with an N-terminal His-tag
BPS-71196	IDO1, His-tag (Mouse)	<i>E. coli</i>	Mouse IDO1 with an N-terminal His-tag
BPS-71194-2	IDO2, His-tag (Human)	<i>E. coli</i>	Human IDO2 with an N-terminal His-tag
BPS-71146	LAG3 (CD223), Fc fusion (Human)	HEK293 cells	Human secreted LAG3, Fc fusion protein
BPS-71188	LAT, His-tag (Human)	Sf9 cells	Human LAT with an N-terminal His-tag
BPS-71175	OX40 (CD134), Fc Fusion (Human)	HEK293 cells	Human secreted OX40, Fc fusion protein
BPS-71185	OX40L (CD252), His-tag (Human)	HEK293 cells	Human OX40L with an N-terminal His-tag
BPS-71106	PD-1 (CD279), Fc fusion (Human)	HEK293 cells	Human PD-1, Fc fusion protein
BPS-71116	PD-1 (CD279), Fc fusion (Mouse)	HEK293 cells	Mouse PD-1, Fc fusion protein
BPS-71158	PD-1, Fc fusion [Monkey (<i>M. fascicularis</i>)]	HEK293 cells	Monkey PD-1, Fc fusion protein
BPS-71198	PD-1, FLAG-Avi-His-tag (Human)	HEK293 cells	Human PD-1 with C-terminal FLAG-Avi-His-tags
BPS-71104	PD-L1 (CD274), Fc fusion (Human)	HEK293 cells	Human PD-L1, Fc fusion protein
BPS-71153	PD-L1, Fc fusion [Monkey (<i>M. fascicularis</i>)]	HEK293 cells	Monkey PD-L1, Fc fusion protein
BPS-71117	PD-L1 (CD274), Fc fusion (Mouse)	HEK293 cells	Mouse PD-L1, Fc fusion protein

Catalog No.	Product Name	Source	Description
BPS-71183	PD-L1 (CD274), FLAG-tag (Human)	HEK293 cells	Human PD-L1 with a C-terminal FLAG-tag
BPS-71108	PD-L2 (CD273), Fc fusion, Biotin-labeled (Human)	HEK293 cells	Human PD-L2, Fc fusion protein
BPS-71186	TIGIT, Fc fusion (Human)	HEK293 cells	Human TIGIT, Fc fusion protein
BPS-71151	TIM-3, Fc fusion (Human)	HEK293 cells	Human secreted TIM-3, Fc fusion protein
BPS-71180	TIM-3, FLAG-tag (Human)	HEK293 cells	Human TIM-3 with a C-terminal FLAG-tag
BPS-71195	TDO, His-tag (Human)	<i>E. coli</i>	Human TDO with an N-terminal His-tag
BPS-71192	TPH1, His-tag (Human)	<i>E. coli</i>	Human TPH1 with an N-terminal His-tag
BPS-71193	TPH2, His-tag (Human)	<i>E. coli</i>	Human TPH2 with an N-terminal His-tag



Catalog No.	Product Name	Source	Description
CHI-HF-210B7H4	B7-H4 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human B7-H4 (a.a. 29-258) is fused to the N-terminus of the Fc region of human IgG1
CHI-MF-110B7H4	B7-H4 (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse B7-H4 (a.a. 29-258) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-210CD27	CD27 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD27 (a.a. 21-192) is fused to the N-terminus of the Fc region of human IgG1
CHI-HR-200CD27	CD27 (human) (rec.) (His)	<i>E. coli</i>	Human CD27 (a.a. 21-192) is fused at the C-terminus to a His-tag
CHI-HF-210CD28	CD28 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD28 (a.a. 19-152) is fused to the N-terminus of the Fc region of human IgG1
CHI-MF-110CD28	CD28 (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse CD28 (a.a. 21-149) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-210CD40	CD40 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD40 (a.a. 21-193) is fused to the N-terminus of the Fc region of human IgG1
CHI-HF-210CD40L	CD40L [CD154] (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD40L [CD154] (a.a. 113-261) is fused to the N-terminus of the Fc region of human IgG1
CHI-HF-210CD80	CD80 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD80 (a.a. 35-242) is fused to the N-terminus of the Fc region of human IgG1
CHI-MF-110CD80	CD80 (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse CD80 (a.a. 37-245) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-210CD86	CD86 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD86 (a.a. 20-239) is fused to the N-terminus of the Fc region of human IgG1
CHI-MF-110CD86	CD86 (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse CD86 (a.a. 26-245) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-210CD134	CD134 [OX40] (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD134 (a.a. 29-216) is fused to the N-terminus of the Fc region of human IgG1
CHI-HR-200CD134	CD134 [OX40] (human) (rec.) (His)	<i>E. coli</i>	Human CD134 (a.a. 29-216) is fused at the C-terminus to a His-tag
CHI-HF-210CD137	CD137 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD137 [4-1BB] (a.a. 19-184) is fused to the N-terminus of the Fc region of human IgG1
CHI-HR-200CD137	CD137 (human) (rec.) (His)	<i>E. coli</i>	Human CD137 (a.a. 19-184) is fused at the C-terminus to a His-tag

Catalog No.	Product Name	Source	Description
CHI-HF-220A4	CD152 [CTLA-4] (human):Fc (human) (rec.) (non-lytic)	CHO cells	The extracellular domain of human CD152 [CTLA-4] (a.a. 37-160) is fused to the N-terminus of the Fc region of a mutant human IgG1
CHI-MF-120A4	CD152 [CTLA-4] (mouse):Fc (mouse) (rec.) (non-lytic)	NS1 cells	The extracellular domain of mouse CD152 [CTLA-4] (a.a. 1-160) is fused to the N-terminus of the Fc region of a mutant mouse IgG2a
CHI-HF-210CD272	CD272 [BTLA] (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD272 (a.a. 31-157) is fused to the N-terminus of the Fc region of human IgG1
CHI-HF-220PDL2	CD273 [PD-L2] (human):Fc (human) (rec.) (non-lytic)	CHO cells	The extracellular domain of human CD273 [PD-L2] (a.a. 20-219) is fused to the N-terminus of the Fc region of a mutant human IgG1
CHI-MF-110PDL2	CD273 [PD-L2] (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse CD273 [PD-L2] (a.a. 20-219) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-210PDL1	CD274 [B7-H1/PD-L1] (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD274 [B7-H1] (a.a. 19-238) is fused to the N-terminus of the Fc region of human IgG1
CHI-HF-220PDL1	CD274 [B7-H1/PD-L1] (human):Fc (human) (rec.) (non-lytic)	CHO cells	The extracellular domain of human CD274 [B7-H1] (a.a. 19-238) is fused to the N-terminus of the Fc region of a mutant human IgG1
CHI-MF-120PDL1	CD274 [B7-H1/PD-L1] (mouse):Fc (mouse) (rec.) (non-lytic)	CHO cells	The extracellular domain of mouse CD274 [B7-H1] (a.a. 19-237) is fused to the N-terminus of the Fc region of a mutant mouse IgG2a
CHI-HF-220B7H2	CD275 [B7-H2] (human):Fc (human) (rec.) (non-lytic)	CHO cells	The extracellular domain of human CD275 [B7-H2] (a.a. 1-256) is fused to the N-terminus of the Fc region of a mutant human IgG1
CHI-MF-120B7H2	CD275 [B7-H2] (mouse):Fc (mouse) (rec.) (non-lytic)	CHO cells	The extracellular domain of mouse CD275 [B7-H2] (a.a. 48-279) is fused to the N-terminus of the Fc region of a mutant mouse IgG2a
CHI-HF-210B7H3	CD276 [B7-H3] (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human CD276 [B7-H3] (a.a. 29-245) is fused to the N-terminus of the Fc region of human IgG1
CHI-MF-110B7H3	CD276 [B7-H3] (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse CD276 [B7-H3] (a.a. 30-248) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-220ICOS	CD278 [ICOS] (human):Fc (human) (rec.) (non-lytic)	CHO cells	The extracellular domain of human CD278 [ICOS] (a.a. 21-139) is fused to the N-terminus of the Fc region of a mutant human IgG1
CHI-MF-110ICOS	CD278 [ICOS] (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse CD278 [ICOS] (a.a. 21-142) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-220PD1	CD279 [PD-1] (human):Fc (human) (rec.) (non-lytic)	CHO cells	The extracellular domain of human CD279 [PD-1] (a.a. 25-167) is fused to the N-terminus of the Fc region of a mutant human IgG1
CHI-MF-110PD1	CD279 [PD-1] (mouse):Fc (mouse) (rec.)	CHO cells	The extracellular domain of mouse CD279 [PD-1] (a.a. 26-169) is fused to the N-terminus of the Fc region of mouse IgG2a
CHI-HF-210T3	Tim-3 (human):Fc (human) (rec.)	CHO cells	The extracellular domain of human Tim-3 (a.a. 22-200) is fused to the N-terminus of the Fc region of human IgG1
CHI-MF-111T3	Tim-3 (mouse):Fc (human) (rec.)	CHO cells	The extracellular domain of mouse Tim-3 (a.a. 21-189) is fused to the N-terminus of the Fc region of human IgG1

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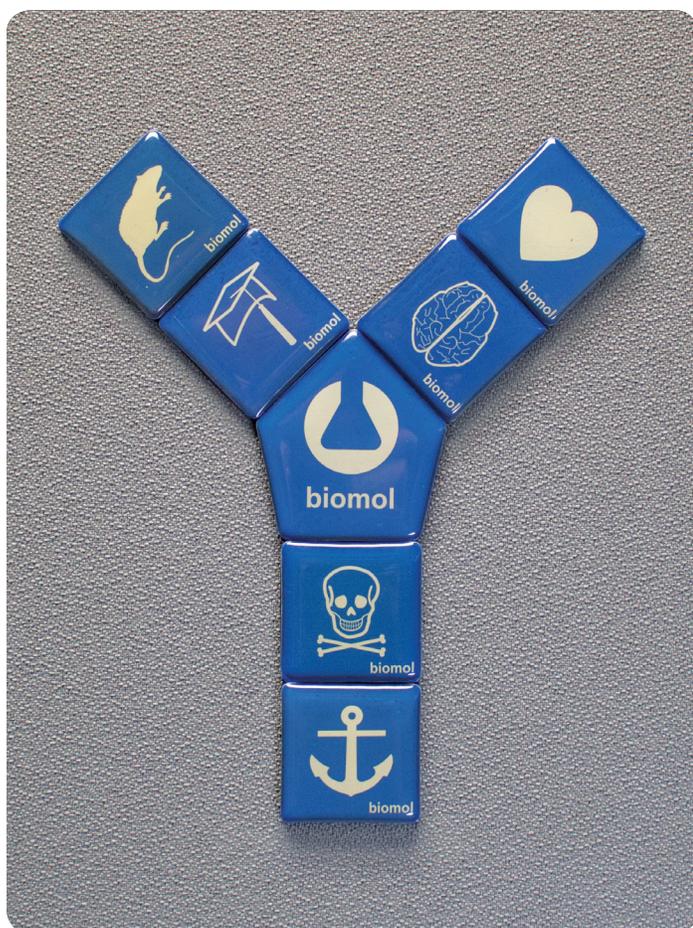
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10009	Biomol BLUEplus-wide Prestained Protein Ladder	Three-color protein standard with 13 prestained proteins covering a wide range from 3.5-245 kDa
10007	Biomol PINK Prestained Protein Ladder	Contains 11 proteins that resolve into sharp, tight bands in the range of 10-175 kDa
01400	Bovine Serum Albumin (BSA), Fraction V	Useful for stabilizing proteins and enzymes against proteolysis and denaturation
03282	Coomassie Brilliant Blue G250	Protein staining dye
04010	Dithiothreitol (DTT)	Reducing agent
06428	Nitroblue Tetrazolium Chloride (NBT)	For sensitive detection of alkaline phosphatase with BCIP
54650	Non-Fat Skimmed Milk Powder	Useful for blocking non-specific binding in Western blots
54662	SDS-Tris-Glycine Buffer, 10x (Laemmli buffer)	For use in SDS-PAGE
04051	Sodium Dodecyl Sulfate (SDS), pure	Anionic detergent
51430	Sodium Dodecyl Sulfate (SDS), ultra pure	Anionic detergent
22166	TMB, pure	Substrate for peroxidase



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Upcoming Meetings

Date	Location	Title	Homepage
09.09. - 11.09.	Erlangen**	5th Intl. GK Symposium: Regulators of Adaptive Immunity	www.gk-symposium.de/symposium2016/
12.09. - 15.09.	Goettingen**	13th Horizons in Molecular Biology	www.horizons.uni-goettingen.de
20.09. - 21.09.	Giessen*	Giessen Graduate Centre for the Life Sciences	www.uni-giessen.de/ggl
25.09. - 28.09.	Erlangen**	Annual Meeting of the German Biophysical Society	www.biophysics2016.org
26.09. - 28.09.	Erlangen**	Meeting of the Society for Biological Radiation Research	www.strahlenlinik.uk-erlangen.de
27.09. - 30.09.	Hamburg*	46th Annual Meeting of the German Society for Immunology	www.immunology-conference.de
27.09. - 30.09.	Frankfurt*	6th European Workshop on Lipid Mediators	www.workshop-lipid.eu
09.11. - 11.11.	Weimar*	20th Signal Transduction Meeting	www.sigtrans.de
02.12. - 03.12.	Guenzburg*	Young Scientists Meeting: Molecular Life Sciences	sg-pharmtox.gbm-online.de

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