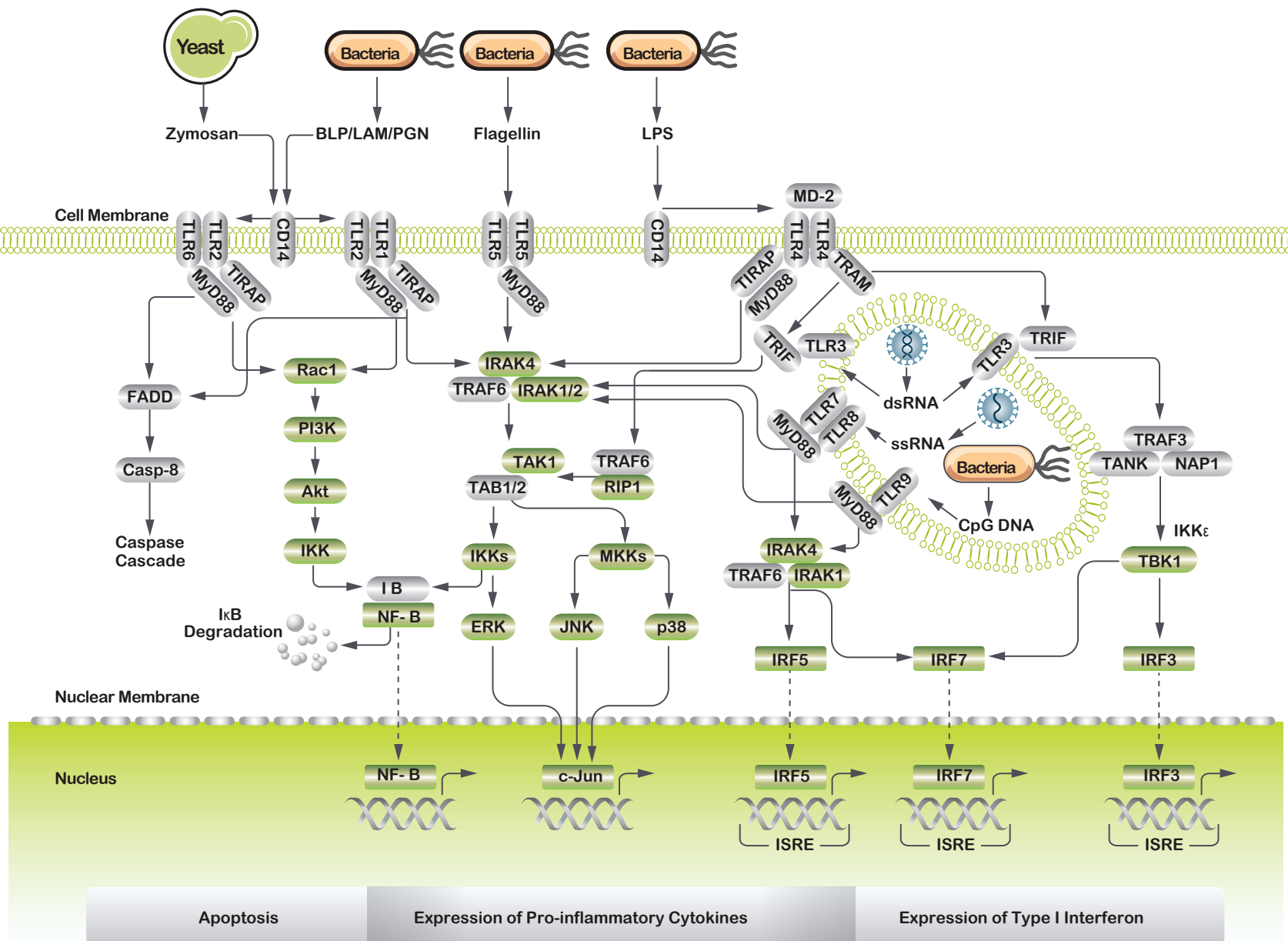


# Toll-like Receptor(TLR) Signaling



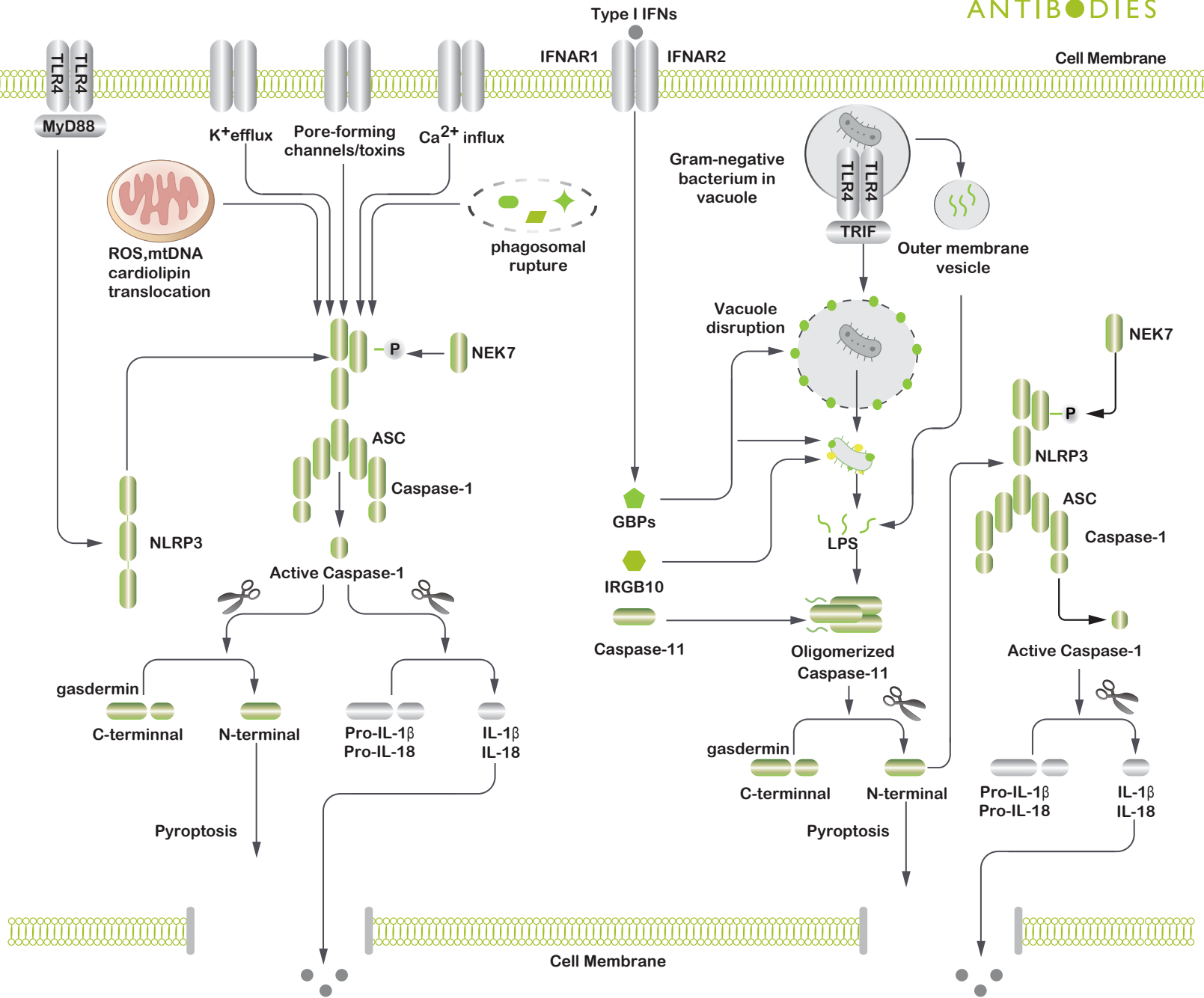
Toll-like receptors (TLRs) are membrane-bound receptors identified as homologs of Toll in *Drosophila*. TLRs play crucial roles in the innate immune system by recognizing various ligands of pathogen-associated molecular patterns (PAMPs, e.g. dsRNA) derived from various microbes or damage-associated molecular patterns (DAMPs) derived from damaged cell contents (not shown). TLRs localize to the cell surface or to intracellular compartments (e.g. endosome). Homo- or heterodimer formation initiates signaling to the two major downstream adaptor proteins, MyD88 and TRIF. TIRAP conducts the signal from TLR4 to MyD88, and TRAM mediates the signal from TLR4 to TRIF. TLR engagement induces formation of the Myddosome, which is based on MyD88 and also contains IRAK1 and IRAK4. IRAK1 activation induces TRAF6 activation following K63-linked polyubiquitination on TRAF6 itself and TAK1. TAK1 activation leads to the activation of IKK complex-NF-κB and MAPKs (e.g. ERK, JNK, p38). MAPK activation leads to AP1 (e.g. c-jun) activation. TLR engagement also induces TRIF activation following TRAF6 and TRAF3 recruitment. TRAF3 recruits TBK1 and IKK $\epsilon$  for IRFs phosphorylation and expression of interferon- $\beta$ . Abbreviations: dsRNA, double-stranded RNA; ssRNA, single-stranded RNA; BLP, Bacteria Lipoprotein; LAM, lipoarabinomannan; PGN, peptidoglycan; ISRE, Interferon-sensitive response

## Key Products for TLR Signaling

Target Name	Cat.No.	Reactivity	Applications	Citations
TLR2	bs-1019R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
TLR4	bs-20595R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
TLR5	bs-1197R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
TLR7	bs-6601R	Human,Mouse,Rat	WB,IF	<a href="#">PubMed</a>
TLR8	bs-8684R	Human,Mouse,Rat	WB,IHC-P	
TLR9	bs-2717R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
IRAK1	bs-28003R	Human,Mouse,Rat	WB,IHC-P	
Phospho-IRAK1 (Ser376)	bs-3192R	Human,Mouse	WB,IHC-P,FCM	
Phospho-IRAK1 (Thr209)	bs-20492R	Human	WB,IHC-P	
Phospho-IRAK1 (Thr387)	bs-3194R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
IRAK4	bs-2440R	Human,Mouse,Rat	FCM	<a href="#">PubMed</a>
Phospho-IRAK4 (Thr345)	bs-10208R	Human,Mouse,Rat	WB,IHC-P	
Phospho-TAK1 (Thr184)	bs-3436R	Human	WB	
Phospho-TAK1 (Thr187)	bs-3438R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Phospho-TAK1(Thr184 + Thr187)	bs-3439R	Human,Mouse	WB	
IKK alpha + IKK beta	bs-10123R	Human,Mouse,Rat	WB,IHC-P	
Phospho-IKK alpha/beta (Ser176 + Ser180)	bs-3237R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
JNK1+JNK2+JNK3	bs-2592R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Phospho-JNK1 + 2 + 3 (Thr183+Tyr185)	bs-1640R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
p38 MAPK	bs-0637R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
Phospho-p38 MAPK (Thr180 + Tyr182)	bs-0636R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
AKT1+2+3	bs-6951R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
AKT	bsm-33278M	Human	WB	
AKT	bsm-33282M	Human	WB	
Phospho-AKT (Ser473)	bs-0876R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
ERK1 + ERK2	bs-2637R	Human,Mouse	WB,IHC-P	<a href="#">PubMed</a>
Phospho-ERK1/2 (Thr202 + Tyr204)	bs-3016R	Human,Mouse,Rat	WB,IHC-P,IF	<a href="#">PubMed</a>
NFkB p65	bs-20355R	Human,Mouse,Rat	WB,IHC-P,FCM	
Phospho-NFkB p65 (Ser536)	bs-0982R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
c-Jun	bs-0670R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Phospho-c-Jun (Thr249)	bs-5462R	Human	FCM	
Phospho-c-Jun (Thr91)	bs-5458R	Human	WB,FCM	
IRF3	bs-2993R	Human,Mouse	WB	<a href="#">PubMed</a>
IRF3	bsm-52116R	Human,Mouse	WB	
Phospho-IRF3 (Ser386)	bs-9278R	Human,Mouse	WB,IHC-P,FCM	
Phospho-IRF3 (Ser396)	bs-3195R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>
IRF7	bs-2994R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Phospho-IRF7 (Ser471 + Ser472)	bs-3196R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>

WB=Western Blot; IHC-P=Immunohistochemistry with Paraffin-Embedded Tissue Slides; IF=Immunofluorescence; FCM=Flow cytometry

# Inflammasome(Pyroptosis) Signaling



## Canonical and non-canonical activation process of inflammasomes.

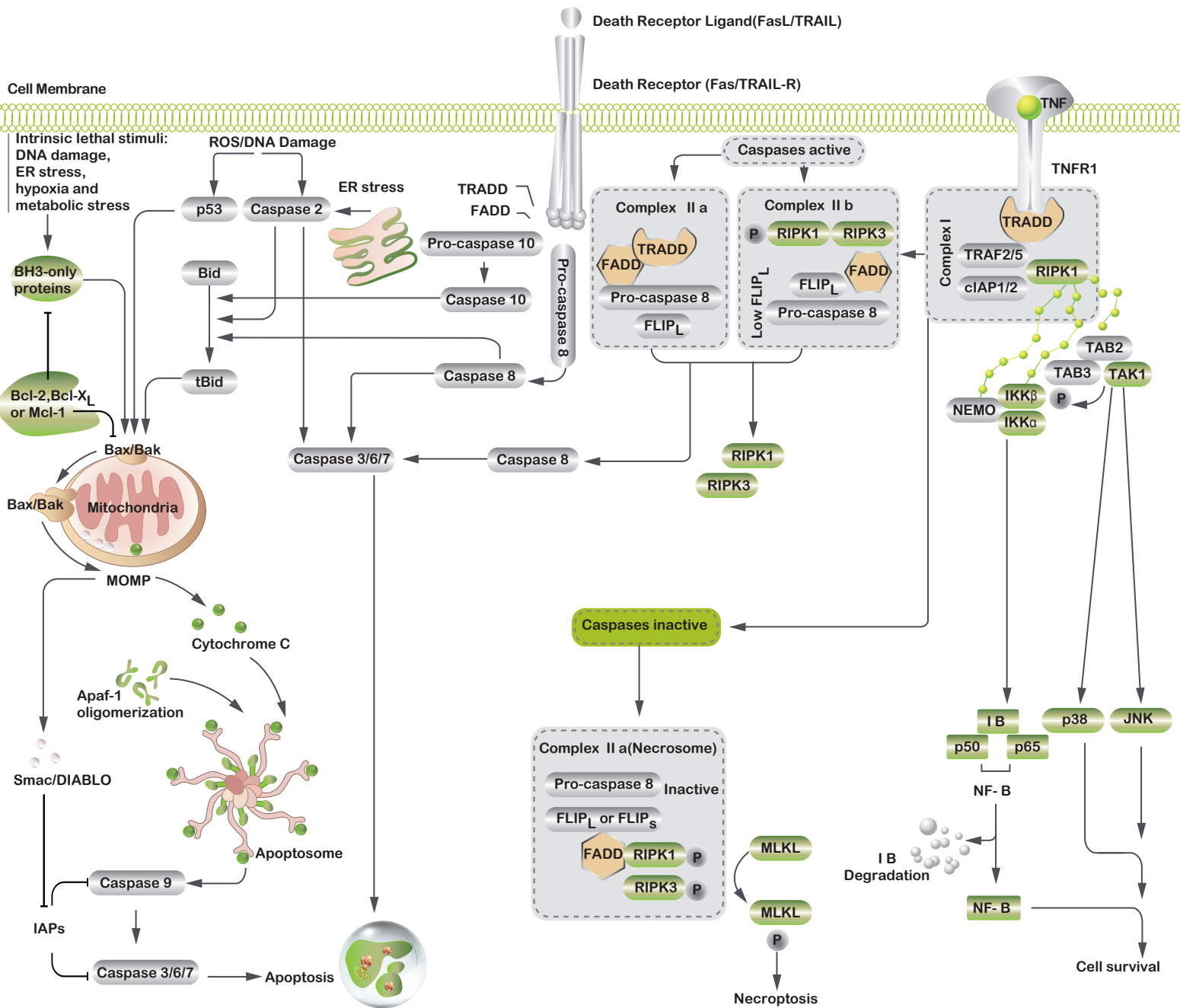
Canonical activation process of NLRP3 inflammasome (left panel) requires a priming signal (also known as Signal 1), often mediated by TLRs and activation of NF- $\kappa$ B, inducing the expression of NLR proteins and IL-1 family members. An activating signal (also known as Signal 2) with various sources (PAMPs/DAMPs, ion efflux or influx, pore-forming channels/toxins, endogenous factors, and mitochondrial damage) leading to assembly of the inflammasome mediated by the kinase NEK7, ASC, and caspase-1. Caspase-1 cleaves gasdermin D, releasing the N-terminal fragment of gasdermin D that assembles into pores on the membrane, resulting in pyroptosis. Active caspase-1 also cleaves pro-IL-1 and pro-IL-18, which are secreted through the pores formed by gasdermin D. Non-canonical activation process of inflammasomes is induced by Gram-negative bacteria. LPS from Gram-negative bacteria is recognized by TLR4 via the adaptor TRIF, resulting in the production of type I IFNs. Type I IFNs induce the expression of IFIs GBPs and IRGB10 and caspase-11. Through GBPs and IRGB10 mediated release and disruption of the bacteria, or via bacterial outer membrane vesicles, LPS can be released into the cytoplasm and results in non-canonical inflammasome activation, which leads to caspase-11-dependent pyroptosis and secretion of IL-1 and IL-18.

## Key Products for Inflammasome/Pyroptosis Signaling

Target Name	Cat.No.	Reactivity	Applications	Citations
NLRP1/NALP1/CARD7	bs-6854R	Human,Mouse,Rat	WB,IHC-P	
NLRP2/NALP2	bs-6717R	Human,Mouse,Rat	WB,IHC-P	
NLRP3/NALP3/CIAS1	bs-10021R	Human,Mouse,Rat	WB,IHC-P,IF	<a href="#">PubMed</a>
NLRP5/NALP5	bs-19006R	Human,Mouse,Rat	WB,IHC-P	
NLRP6/NALP6	bs-10440R	Human,Mouse,Rat	WB,IHC-P	
NLRP8	bs-19287R	Human	WB,IHC-P	
NLRP9	bs-6867R	Human,Mouse,Rat	WB,IHC-P	
NLRP10	bs-6856R	Human	WB,IHC-P	
NLRP11	bs-19283R	Human	WB,IHC-P	
NLRP12/NALP12	bs-6864R	Human,Mouse,Rat	WB,IHC-P	
NLRP13	bs-19285R	Human	WB,IHC-P	
NLRP14	bs-19286R	Human	WB,IHC-P	
NLRC4/CARD 12	bs-20016R	Human,Mouse,Rat	WB,IHC-P	
NLRC1/NOD1/CARD4	bs-7085R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
NOD2/CARD15	bs-7084R	Human,Mouse,Rat	WB,FCM	
NLRC5	bs-19284R	Human	WB,IHC-P	
AIM2	bs-5986R	Human,Mouse,Rat	WB,IHC-P,FCM	
NEK7	bs-7758R	Human,Mouse,Rat	WB,IHC-P	
ASC	bs-6741R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Caspase-1 (p10)	bs-0169R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Caspase-1 (p20)	bs-10743R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Caspase-1 (p20)	bs-10442R	Human,Mouse,Rat	WB,FCM	
Caspase-4	bs-20494R	Mouse,Rat	WB	
Caspase-5 (p20)	bs-6860R	Human,Mouse,Rat	WB	
Gasdermin A	bs-16331R	Human,Mouse,Rat	WB,IHC-P	
Gasdermin C	bs-16332R	Human	WB,IHC-P	
Gasdermin D/DFNA5L	bs-14287R	Human	WB,IHC-P	<a href="#">PubMed</a>
Gasdermin L	bs-13291R	Human	WB,IHC-P	
IL-1 $\beta$	bs-6319R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
IL-1 $\beta$	bs-0812R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
IL-18	bs-0529R	Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
IL-18	bs-4988R	Human,Mouse,Rat	WB,IHC-P	
Human IL-1 beta ELISA Kit	bsk00026	Human	ELISA	
Rat IL-1 beta ELISA Kit	bsk00027	Rat	ELISA	
Mouse IL-1 beta ELISA Kit	bsk00028	Mouse	ELISA	
Human IL-18 ELISA Kit	bsk00371	Human	ELISA	
Rat IL-18 ELISA Kit	bsk00196	Rat	ELISA	

WB=Western Blot; IHC-P=Immunohistochemistry with Paraffin-Embedded Tissue Slides; IF=Immunofluorescence; FCM=Flow cytometry

# TNF and Apoptosis Signaling



TNF (Tumor Necrosis Factor) is a multifunctional proinflammatory cytokine, which has been considered as an anti-cancer agent since its discovery two decades ago. Besides TNF, TNF superfamily proteins consist of other 18 members, acting through 29 receptors that belong to the TNF receptor (TNFR) superfamily. Members of the TNFR super family can send both survival and death signals to cells.

Following the binding of the death ligand to Death Receptors (DRs), including FasL, TNF-, and TRAIL, on the plasma membrane, the DR, adaptor protein (FADD), and associated apoptosis signaling molecule (caspase-8) form the death-inducing signaling complex (DISC), thus leading to the activation of the effector caspase cascade (caspase 3, 6, and 7). This is called extrinsic apoptosis pathway. Following the binding of TNF to TNFR1, TNFR1 binds to TRADD, which recruits RIPK1, TRAF2/5 and cIAP1/2 to form TNFR1 signaling complex I. The Pro-caspase 8 homodimer in complex IIa and complex IIb generates active caspase 8. This active caspase 8 in the cytosol then carries out cleavage reactions to activate downstream executioner caspases and thus induce classical apoptosis. When caspase 8 is inactivated, Necroptosis, an alternative type of regulated cell death, will occur following the formation of Necrosome, which includes RIP1, RIP3, and its substrate, mixed lineage kinase domain like pseudokinase (MLKL). Upon binding to TNFR1 or TNFR2 (not shown), TNF may also activate the NF- $\kappa$ B pathway via IKK. The activation of NF- $\kappa$ B induces the expression of pro-survival genes including Bcl-2 and FLIP, the latter can directly inhibit the activation of caspase-8.

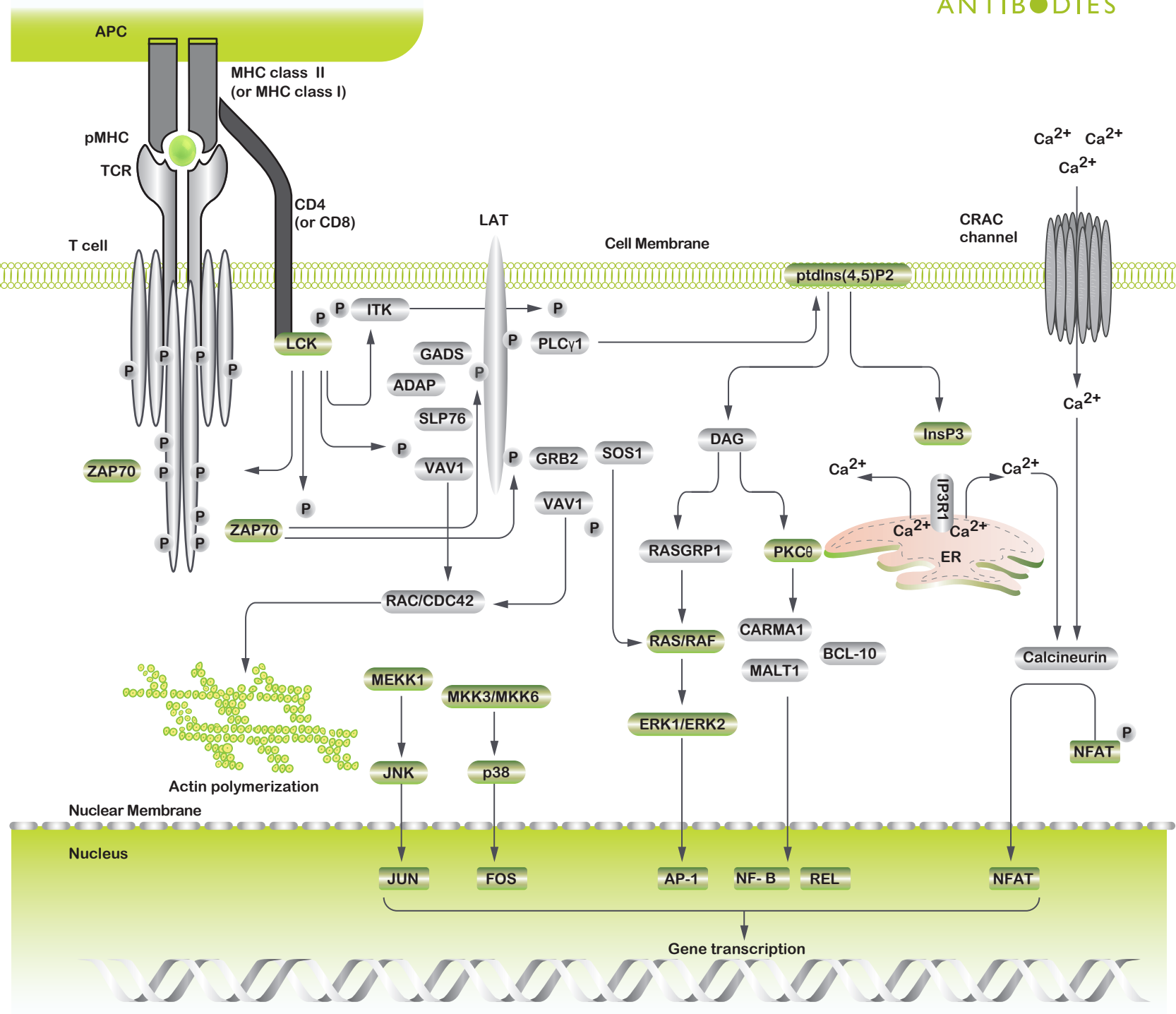
Some intrinsic stimuli (e.g. ROS/DNA damage and ER stress) will also trigger mitochondria-mediated intrinsic apoptosis pathway, which is regulated by Bcl-2 family proteins, including proapoptotic (Bid, Bax, Bak) and antiapoptotic proteins (Bcl-2, Bcl-xL). Caspase 2, 8 and 10 can also cleave Bid, lead to mitochondrial outer membrane permeabilization (MOMP). Following MOMP, mitochondrial intermembrane space proteins such as Smac and Cytochrome C are released into the cytosol. Cytochrome C interacts with Apaf-1, triggering apoptosome assembly, which activates Caspase 9. Active caspase 9, in turn, activates caspase 3, 6 and 7, leading to apoptosis. Mitochondrial release of Smac facilitates apoptosis by blocking the inhibitor of apoptosis (IAP) proteins.

## Key Products for TNF and Apoptosis Signaling

Target Name	Cat.No.	Reactivity	Applications	Citations
TNFR1	bs-2941R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
TNFR2	bs-16610R	Human,Mouse	WB,FCM	
FAS/CD95	bs-0215R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>
Fas Ligand	bs-0216R	Human,Mouse,Rat	WB,IHC-P,FCM,IF	<a href="#">PubMed</a>
TRAIL	bs-1214R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
FADD	bs-0511R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
TRADD	bs-1202R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Bak	bs-1284R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Bax	bs-0127R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Bcl-2	bs-0032R	Human,Mouse,Rat	WB,IHC-P,FCM,IF	<a href="#">PubMed</a>
Bcl-xL	bs-1336R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Bim	bs-1488R	Human,Mouse,Rat	WB,FCM	
Phospho-Bax (Ser184)	bs-3010R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
Phospho-Bcl-2 (Thr129)	bs-5220R	Human,Mouse,Rat	WB,IHC-P,FCM	
Phospho-Bcl-xL (Thr115)	bs-5234R	Human,Mouse,Rat	WB,IHC-P	
Phospho-Bcl-xL (Thr47)	bs-12579R	Human,Mouse,Rat	WB,IHC-P	
Phospho-Bim (Ser55)	bs-3058R	Human,Mouse,Rat	WB,IHC-P	
Phospho-Bim (Ser87)	bs-3012R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
caspase-8 subunit p18	bs-6463R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Caspase-9	bs-0049R	Human,Mouse,Rat	WB,IHC-P,FCM	
Caspase-10	bs-23454R	Human	WB,IHC-P	
Caspase-12	bs-1105R	Mouse,Rat	WB,IHC-P	
Caspase-3	bs-0081R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
caspase-3 p12 subunit	bs-0087R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>
caspase-6 p18 subunit	bs-0084R	Human,Mouse,Rat	WB,IHC-P,IF	
Caspase-7 p20 subunit	bs-3665R	Human,Mouse,Rat	WB,IHC-P	
Cytochrome C	bs-0013R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Survivin	bs-0615R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
FLIP	bs-0119R	Human,Mouse,Rat	WB,IHC-P,FCM	
cIAP	bs-4262R	Human,Mouse,Rat	WB	
XIAP	bs-1281R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
IKK alpha + IKK beta	bs-10123R	Human,Mouse,Rat	WB,IHC-P	
Phospho-IKK alpha/beta (Ser176 + Ser180)	bs-3237R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
JNK1+JNK2+JNK3	bs-2592R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Phospho-JNK1 + 2 + 3 (Thr183+Tyr185)	bs-1640R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
P38 MAPK	bs-0637R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
Phospho-P38 MAPK (Thr180 + Tyr182)	bs-0636R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
NFκB p65	bs-20355R	Human,Mouse,Rat	WB,IHC-P,FCM	
Phospho-NFκB p65 (Ser536)	bs-0982R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
RIPK1	bs-5805R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
RIPK3	bs-3551R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
MLKL	bsm-33339M	Human,Mouse,Rat	WB,IHC-P	
Phospho-MLKL (Ser358)	bsm-33331M	Human,Mouse,Rat	WB,IHC-P	

WB=Western Blot; IHC-P=Immunohistochemistry with Paraffin-Embedded Tissue Slides; IF=Immunofluorescence; FCM=Flow cytometry

# T Cell Receptor(TCR) Signaling



T cells are a subset of lymphocytes that play a crucial role in immune response. T-cell receptor (TCR) is a complex of integral membrane proteins on the surface of T cells, which takes part in the activation of T-cells in response to an antigen. Activation of TCR is triggered by major histocompatibility complex (MHC) molecules and regulated by various co-stimulatory receptors (e.g. CD28). Many transmembrane receptors also modulate specific elements of TCR signaling. Upon engagement of the TCR by antigen presented on MHC molecules, the Src family kinase Lck is activated by the interaction of MHC-II and CD4 or CD8, and proceeds to ITAMs on the  $\alpha$ ,  $\beta$ , and  $\zeta$  subunits of the TCR/CD3 complex. Phosphorylated ITAMs recruit zeta-chain associated protein kinase (ZAP-70) to the TCR/CD3 complex where it becomes activated, promoting recruitment and phosphorylation of downstream adaptor or scaffold proteins. The linker for activation of T cells (LAT) and leukocyte protein SLP-76 are two main substrates of ZAP-70. Phosphorylated LAT and SLP-76 result in recruitment of a number of other proteins involved in activation of the calcium mobilization (Calcineurin, NFAT), RAS/RAF pathway (RAS, RAF, ERK, AP-1), PKC-NF- $\kappa$ B pathway, MAPK pathway (JNK, p38) and cytoskeletal reorganization.

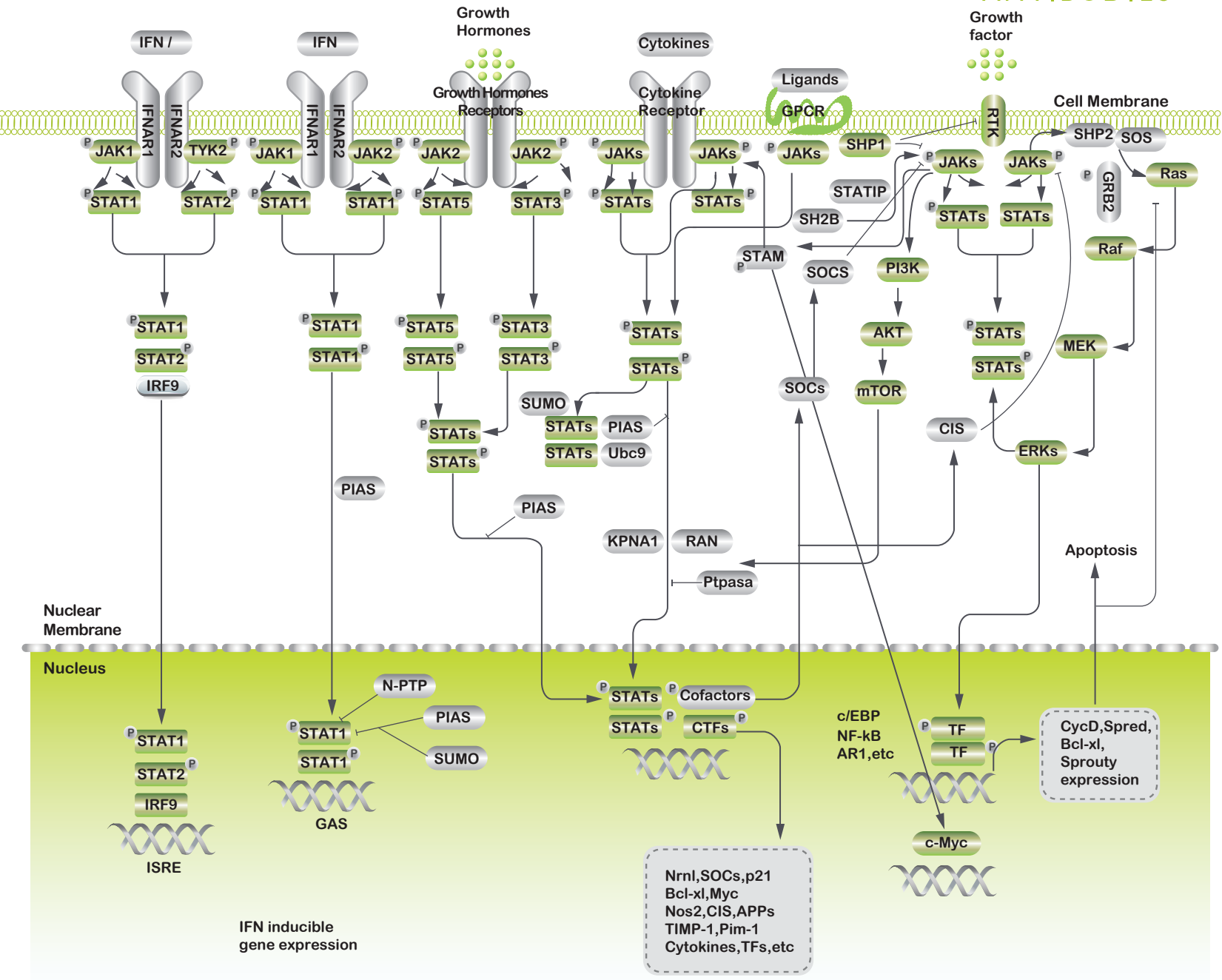
## Key Products for T Cell Receptor Signaling

Target Name	Cat.No.	Reactivity	Applications	Citations
CD3E	bs-0765R	Human,Mouse,Rat	IHC,IF,FCM	<a href="#">PubMed</a>
CD4	bs-0647R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
CD8	bs-0648R	Human,Mouse	WB,IHC-P	<a href="#">PubMed</a>
CD28	bs-1297R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
PD-1	bs-1867R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
CTLA4	bs-10006R	Human,Mouse,Rat	WB FCM	<a href="#">PubMed</a>
Zap-70	bs-1942R	Human,Mouse	WB,FCM	
Phospho-ZAP70 (Tyr315 + Tyr319)	bs-3478R	Human,Mouse	WB,FCM	
phospho-SLP76 (Tyr113)	bs-13663R	Human,Mouse	WB	
phospho-LCK (Tyr394)	bs-5406R	Human	WB	
Phospho-PLC gamma 1 (Tyr783)	bs-3343R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
CDC42	bs-3555R	Human,Mouse,Rat	WB,IHC-P	
PKCθ	bs-4161R	Human,Mouse,Rat	WB,IHC-P	
phospho-PRKCQ (Thr538)	bs-5585R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
IKK alpha + IKK beta	bs-10123R	Human,Mouse,Rat	WB,IHC-P	
Phospho-IKK alpha/beta (Ser176 + Ser180)	bs-3237R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
JNK1+JNK2+JNK3	bs-2592R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Phospho-JNK1 + 2 + 3 (Thr183+Tyr185)	bs-1640R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
P38 MAPK	bs-0637R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
Phospho-P38 MAPK (Thr180 + Tyr182)	bs-0636R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
AKT1+2+3	bs-6951R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
AKT	bsm-33278M	Human	WB	
AKT	bsm-33282M	Human	WB	
Phospho-AKT (Ser473)	bs-0876R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
ERK1 + ERK2	bs-2637R	Human,Mouse	WB,IHC-P	<a href="#">PubMed</a>
Phospho-ERK1/2 (Thr202 + Tyr204)	bs-3016R	Human,Mouse,Rat	WB,IHC-P,IF	<a href="#">PubMed</a>
NFκB p65	bs-20355R	Human,Mouse,Rat	WB,IHC-P,FCM	
Phospho-NFκB p65 (Ser536)	bs-0982R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
c-Jun	bs-0670R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Phospho-c-Jun (Thr249)	bs-5462R	Human	FCM	
Phospho-c-Jun (Thr91)	bs-5458R	Human	WB,FCM	

WB=Western Blot; IHC-P=Immunohistochemistry with Paraffin-Embedded Tissue Slides; IF=Immunofluorescence; FCM=Flow cytometry



# JAK/STAT Signaling



	IFNR	γ family						β family		IL-6R (gp130) family			IL-10R family	
	IFN-α/β IFN-γ	IL-2, IL-4, IL-13, IL-15	IL-7	IL-9	IL-21	TLSP	IL-3, GM-CSF	IL-5	IL-6, IL-11, CNTF, CLF	CT-1, G-CSF, Leptin, LIF, OSM, IL-31			IL-10, IL-22	
JAK1	•	•	•	•	•	•	•	•	•	•			•	
JAK2	•	•	•	•	•	•	•	•	•	•			•	
JAK3		•	•	•	•	•	•	•	•	•			•	
TYK2	•	•		•					•	•			•	
STAT1	•	•	•	•	•	•	•	•	•	•			•	
STAT2	•	•	•	•	•	•	•	•	•	•			•	
STAT3	•	•	•	•	•	•	•	•	•	•			•	
STAT4													•	
STAT5	•	•	•	•	•	•	•	•	•	•			•	
STAT6	•	•	•	•	•	•	•	•	•	•			•	

	Homodimeric Hormone Receptors			IL-10R family											
	Growth Hormone, Prolactin	EPOR	TPOR	AGTR-1	5-HT2A	PAR 1,3,4	PAFR	ADRA	CCR1	CCR2	CCR5	CXCR4			
JAK1	•			•	•	•	•	•	•	•	•	•			
JAK2	•	•	•	•	•	•	•	•	•	•	•	•			
JAK3	•			•	•	•	•	•	•	•	•	•			
TYK2				•	•	•	•	•	•	•	•	•			
STAT1	•	•	•	•	•	•	•	•	•	•	•	•			
STAT2	•	•	•	•	•	•	•	•	•	•	•	•			
STAT3	•	•	•	•	•	•	•	•	•	•	•	•			
STAT4				•	•	•	•	•	•	•	•	•			
STAT5	•	•	•	•	•	•	•	•	•	•	•	•			
STAT6				•	•	•	•	•	•	•	•	•			

IFNR: Interferon Receptor; γ family: Common gamma Chain Receptor Family; β family: Common gamma Chain Receptor Family; IL-6R: IL-6 Receptor; IL-10R: IL-10 Receptor; TLSP: Thymic Stromal Lymphopoietin; GM-CSF: Granulocyte-Macrophage Colony Stimulating Factor; CNTF: Ciliary neurotrophic factor; CLF-1: Cytokine-like factor 1; CLC: Cardiostrophin-like cytokine; G-CSF: granulocyte-colony stimulating factor; CT-1: Cardiostrophin-1; LIF: Leukemia Inhibitory Factor; OSM: Oncostatin M

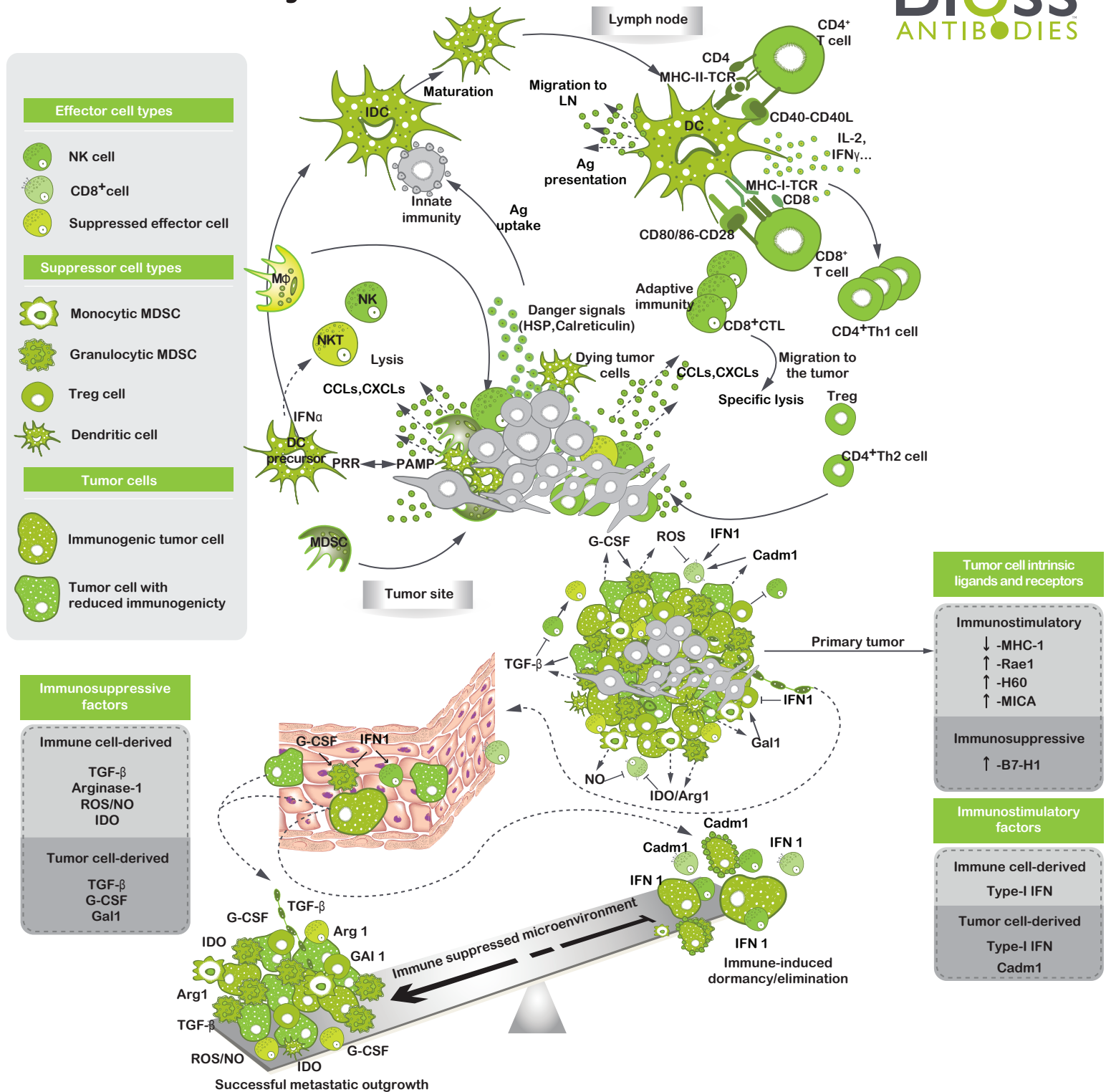
EPOR: Erythropoietin Receptor; Tpo R: Thrombopoietin Receptor; AGTR-1: The Angiotensin II Receptor, Type 1; 5-HT2A: 5-hydroxy-tryptamine(Serotonin) 2A Receptor; PAR: Proteinase-Activated Receptor; PAFR: Platelet-activating Factor Receptor; ADRA: Adrenoceptor Alpha; CCR: chemokine (C-C motif) receptor 5; CXCR: chemokine (C-X-C motif) receptor 4

## Key Products for JAK-STAT Signaling

Target Name	Cat.No.	Reactivity	Applications	Citations
IFNAR1	bs-4116R	Human,Mouse,Rat	WB,IHC-P,FCM	
Phospho-IFNAR1 (Ser535+Ser539)	bs-5457R	Human,Mouse,Rat	WB,FCM	
CD25/IL2 Receptor alpha	bs-0577R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
CD123/IL3 Receptor alpha	bs-2600R	Human,Mouse,Rat	FCM	
CD130/IL6 Receptor beta	bs-1459R	Human,Mouse,Rat	WB,IHC-P,FCM,IF	
Phospho-CD130/gp130 (Ser782)	bs-10122R	Human,Mouse,Rat	WB,IHC-P	
IL15 Receptor alpha	bs-2605R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
IL-17 Receptor alpha	bs-2606R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Leptin Receptor	bs-0961R	Human,Mouse,Rat	WB,IHC-P,FCM	
CNTF Receptor alpha	bs-21991R	Human,Mouse,Rat	WB,IHC-P	
LIF Receptor	bs-1458R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
CCR1/CD191	bs-1169R	Human,Mouse,Rat	WB,IHC-P	
CCR2	bs-0562R	Human,Mouse,Rat	ELISA,IHC-P,FCM	<a href="#">PubMed</a>
CCR5	bs-2514R	Human,Mouse,Rat	WB,IHC-P,FCM,IF	<a href="#">PubMed</a>
CXCR4	bs-1011R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
JAK1	bs-1439R	Human,Mouse,Rat	WB,IHC-P	
JAK1	bsm-33268M	Human,Mouse,Rat	WB,IHC-P	
Phospho-Jak1 (Tyr1034 + Tyr1035)	bs-3238R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
JAK2	bs-23003R	Human,Mouse,Rat	WB,IHC-P	
JAK2	bs-0908R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>
Phospho-JAK2 (Tyr221)	bs-3206R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Phospho-JAK2 (Tyr1007+Tyr1008)	bsm-52171R	Human,Mouse,Rat	WB,IHC-P	
JAK3	bs-2808R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
Phospho-Jak3 (Tyr785)	bs-20168R	Human,Mouse,Rat	WB,IHC-P	
TYK2	bs-6662R	Human,Mouse,Rat	WB	
Phospho-Tyk2 (Tyr1054 + Tyr1055)	bs-3437R	Human,Mouse,Rat	WB,IHC-P	
STAT1	bs-9584R	Human,Mouse,Rat,	WB,IHC-P	
Phospho-STAT1 (Ser727)	bs-5616R	Human,Mouse,Rat	WB,IHC-P,FCM	
Phospho-STAT1 (Tyr701)	bs-1657R	Human,Mouse,Rat	WB,IHC-P	
STAT2	bs-1140R	Human,Mouse,Rat	WB,IHC-P	
Phospho-Stat2 (Tyr690)	bs-3428R	Human,Mouse,Rat	WB,IHC-P	
STAT3	bsm-33223M	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
Phospho-STAT3 (Ser727)	bsm-52210R 外购抗体	Human,Rat	WB,IHC-P,FCM	
Phospho-STAT3 (Tyr705)	bs-22386R	Human,Mouse	WB,IHC-P	
STAT4	bsm-52236R	Human,Mouse,Rat	WB,IHC-P	
Phospho-Stat4 (Tyr693)	bs-3430R	Human,Mouse,Rat	WB,IHC-P	
STAT5	bs-21443R	Human,Mouse	WB,IHC-P	
Phospho-STAT5b (Ser731)	bs-5703R	Human,Mouse,Rat	WB,FCM	
Phospho-STAT5a (Ser726)	bs-5619R	Human,Mouse,Rat	WB,IHC-P	
Phospho-STAT5a (Ser780)	bs-5620R	Human,Mouse,Rat	WB,IHC-P	
Phospho-STAT5a(Tyr694)	bs-1659R	Human,Mouse,Rat	WB	

WB=Western Blot; IHC-P=Immunohistochemistry with Paraffin-Embedded Tissue Slides; IF=Immunofluorescence; FCM=Flow cytometry

# Cancer Immunity



Cancer immunity is an interdisciplinary branch of biology that is concerned with understanding the role of the immune system in the progression and development of cancer. Interactions between cancer and the immune system as a multi-step, multi-tissue, highly-regulated process, immune cells that infiltrate tumors engage in an extensive and dynamic crosstalk with cancer cells. Briefly, cancer immunity can be divided into 2 types: innate immunity and adaptive immunity. In innate immunity, there are direct cancer/innate immune system interactions and a large number of molecules released due to cancer cell death, which may function as DAMP and interact with innate immune cells. Such cancer-derived DAMP include both intracellular molecules and extracellular matrix (ECM) molecules released from apoptotic and necrotic tumor cells. Danger signals and neoantigens of tumor cells are captured by antigen-presenting cells (APCs; eg. dendritic cells, DCs) for processing. In adaptive immunity, APCs present the captured antigens on MHC-I and MHC-II molecules to T cells, resulting in the priming and activation of effector T cell responses against the cancer-specific antigens and subsequent specific lysis of tumor. However, cancer immunity will be dampened by various of factors, which include extrinsic factors (such as T cell exhaustion and phenotype change, immune suppressive cell populations, cytokine and immunosuppressive metabolite release in the tumor microenvironment) and intrinsic factors (such as lack of antigenic mutations, loss of tumor antigen expression, loss of HLA expression, alterations in antigen processing machinery, and constitutive expression of immunosuppressive cell surface molecules).

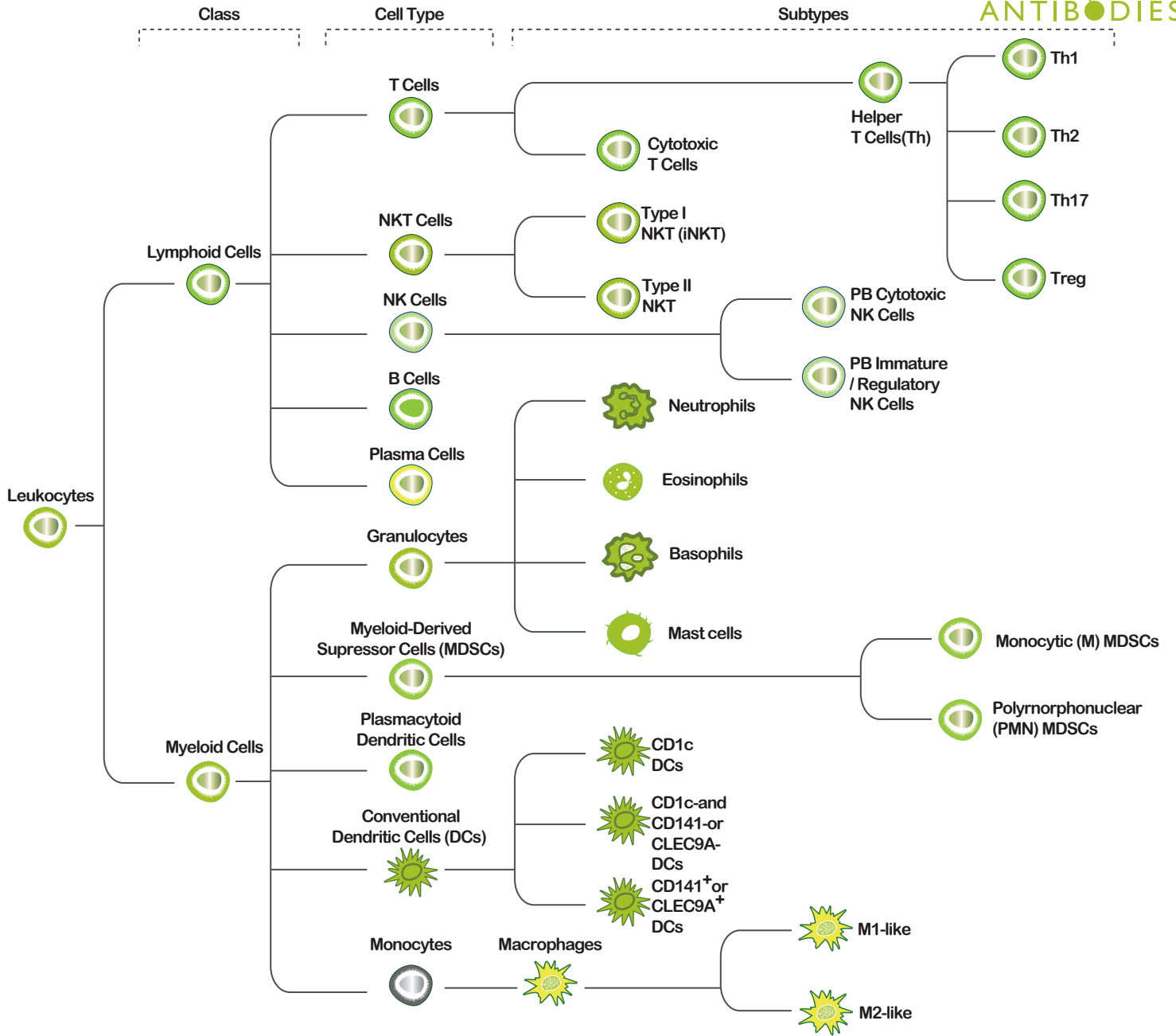
## Key Products for Cancer Immunity

Target Name	Cat.No.	Reactivity	Applications	Citations
CD3E	bs-0765R	Human,Mouse,Rat	IHC-P,IF,FCM	<a href="#">PubMed</a>
CD4	bs-0647R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
CD8	bs-0648R	Human,Mouse	WB,IHC-P	<a href="#">PubMed</a>
CD19	bs-20782R	Human,Mouse	WB,FCM	
CD20	bs-20638R	Human,Mouse	WB,FCM	
CD28	bs-1297R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
CD56	bs-0805R	Human,Mouse,Rat	WB,IHC-P,FCM	
CD68	bs-0649R	Human,Mouse,Rat	WB,IHC-P,IF,FCM	<a href="#">PubMed</a>
CD80	bs-23738R	Human	WB,IHC-P	
CD86	bs-1035R	Human,Mouse,Rat	WB,IF,FCM	<a href="#">PubMed</a>
CD163	bs-23128R	Human,Mouse,Rat	WB,FCM	
CD206	bs-21473R	Human,Mouse,Rat	WB,FCM	
Arginase 1	bs-23837R	Human,Mouse,Rat	WB,IHC-P	
IDO	bs-15493R	Human,Mouse	IF,FCM	<a href="#">PubMed</a>
iNOS	bs-20601R	Human,Rat	WB,IHC-P, FCM	
PD-1	bs-1867R	Human,Mouse,Rat	WB	<a href="#">PubMed</a>
PD-L1	bs-4941R	Human,Mouse,Rat	WB,FCM	
CTLA4	bs-10006R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
TIM3	bs-8766R	Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
LAG-3	bs-2646R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
B7-H3	bs-11019R	Human,Mouse,Rat	WB,IHC-P	
B7-H4	bs-0673R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>
SIGLEC10	bs-2706R	Human,Rat,	WB,IHC-P	
Galectin 1	bs-10376R	Human,Mouse,Rat	WB,IHC-P	
Galectin 3	bs-10377R	Mouse,Rat	WB,IHC-P	
Galectin 3	bs-20700R	Human	WB,IHC-P	<a href="#">PubMed</a>
Cadm1	bs-6026R	Human,Mouse,Rat	WB,IHC-P, FCM	
MCP1	bs-1101R	Human,Mouse,Rat	WB,IHC-P	
CCR1/CD191	bs-1169R	Human,Mouse,Rat	WB,IHC-P	
CCR2	bs-0562R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>
CCR3	bs-1167R	Human,Mouse,Rat	WB,IHC-P	
CCR5	bs-2514R	Human,Mouse,Rat	WB,IHC-P,FCM,IF	<a href="#">PubMed</a>
CCR7	bs-1305R	Human,Mouse,Rat	WB,IHC-P, IF,FCM	
IFNAR1	bs-4116R	Human,Mouse,Rat	WB,IHC-P,FCM	
TGF-β*	bs-0086R	Human,Mouse,Rat	WB,IHC-P,IF	<a href="#">PubMed</a>
IFNγ*	bsm-0388M	Human	WB,IHC-P	<a href="#">PubMed</a>
IFNγ*	bs-0480R	Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
IL-1β*	bs-0812R	Human,Mouse,Rat	ELISA, IHC-P	<a href="#">PubMed</a>
IL-2*	bsm-0389M	Human	ELISA, IHC-P	<a href="#">PubMed</a>
IL-2*	bs-1191R	Mouse,Rat	ELISA, IHC-P	<a href="#">PubMed</a>
IL-4*	bs-0581R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
IL-6*	bs-0781R	Human	ELISA,IHC-P	<a href="#">PubMed</a>
IL-6*	bs-0782R	Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
IL-10*	bs-0698R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>

WB=Western Blot; IHC-P=Immunohistochemistry with Paraffin-Embedded Tissue Slides; IF=Immunofluorescence; FCM=Flow cytometry

\* 如果需要查找相关ELISA试剂盒访问BioSS官方网站<http://bioss.com.cn/search.asp>进行搜索

# Immune Cell Phenotyping Markers



Cell type and subtype		Key Markers in Human	Key Markers in Mouse
Leukocytes		CD45+	CD45+
Lymphoid	T cell	CD3+	CD3+
	Cytotoxic T cell	CD3+ CD8+	CD3+ CD8+
	Helper T (Th) cell	CD3+ CD4+	CD3+ CD4+
	Th1	CD3+ CD4+ T-bet+	CD3+ CD4+ T-bet+
	Th2	CD3+ CD4+ GATA3+	CD3+ CD4+ GATA3+
	Th17	CD3+ CD4+ RORγt+	CD3+ CD4+ RORγt+
	Regulatory T cell	CD3+ CD4+ CD25+ Foxp3+	CD3+ CD4+ CD25+ Foxp3+
	B cell	CD19+ CD20+	CD19+
	Plasma cell	BCMA+ or CD138+	BCMA+ or CD138+
	NK cell	CD56+ CD3-	NK1.1+ Nkp46+ NKG2D+ CD3-
Myeloid	NKT cell	CD56+ Vα24+ CD3+	NK1.1+ CD3+
	Monocyte	CD14+ HLA-DR+ CD206- CD86-	CD14+ F4/80-
	Macrophage	CD68+ HLA-DR+ CD11c-	F4/80+
	M1 Macrophage	CD86+ CD80+ iNOS+	CD86+ CD80+ iNOS+
	M2 Macrophage	CD163+ CD206+	CD163+ CD206+ Arginase-1+
	Conventional DC	CD11c+ HLA-DR+	CD11c+ MHCII+ CD205+
	Plasmacytoid DC	CD123+ BDCA-2+ BDCA-4+	Siglec-H+ CD317+
	Monocytic MDSC	CD15- CD14+ HLA-DR-	Ly6C+ Ly6G- Arginase-1+
	Polymorphonuclear MDSC	CD15+ CD14- HLA-DR-	Ly6C <sup>low</sup> Ly6G+ Arginase-1+
	Neutrophil	CD66b+ CD15/SSEA1+	CD66a+ Ly6G+
	Eosinophil	CD193+ CD125+ CD16-	CD193+ Siglec-F+
	Basophil	FcεR1α+ CD123+ CD117-	FcεR1α+ CD117-
	Mast cell	FcεR1α+ CD117+ Tryptase+	FcεR1α+ CD117+

DC: Dendritic cell; MDSC: Myeloid-derived suppressor cell

## Key Products for Immune Cell Markers

Target Name	Cat.No.	Reactivity	Applications	Citations
CD45	bs-0522R	Human,Mouse,Rat	WB, FCM	<a href="#">PubMed</a>
CD3E	bs-0765R	Human,Mouse,Rat	IHC-P,IF,FCM	<a href="#">PubMed</a>
CD4	bs-0647R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
T-bet	bs-3599R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
ROR gamma T	bs-23110R	Human,Mouse,Rat	WB,IHC-P	
GATA3	bs-1452R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>
CD8	bs-0648R	Human,Mouse	WB,IHC-P	<a href="#">PubMed</a>
CD11c	bs-20690R	Human,Mouse	WB,FCM	
CD14	bsm-30074M-FITC	Human	FCM	
CD15	bs-20726R	Human,Mouse	WB,FCM	
CD16	bsm-30075M-FITC	Human	FCM	
CD19	bs-20782R	Human,Mouse	WB,FCM	
CD20	bs-20638R	Human,Mouse	WB,FCM	
FoxP3	bs-10211R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
CD25/IL2RA	bs-0577R	Human,Mouse	WB,FCM	<a href="#">PubMed</a>
CD28	bs-1297R	Human,Mouse,Rat	WB,IHC-P,FCM	<a href="#">PubMed</a>
CD56	bs-0805R	Human,Mouse,Rat	WB,IHC-P,FCM	
CD68	bs-0649R	Human,Mouse,Rat	WB,IHC-P,IF,FCM	<a href="#">PubMed</a>
CD80	bs-23738R	Human	WB,IHC-P	
CD86	bs-1035R	Human,Mouse,Rat	WB,IF,FCM	<a href="#">PubMed</a>
CD163	bs-23128R	Human,Mouse,Rat	WB,FCM	
CD206	bs-21473R	Human,Mouse,Rat	WB,FCM	
Arginase 1	bs-23837R	Human,Mouse,Rat	WB,IHC-P	
iNOS	bs-20601R	Human,Rat	WB,IHC-P,FCM	
NKG2D	bs-20660R	Mouse,Rat	WB,FCM	
NKG2D	bs-20661R	Mouse,Rat	WB,FCM	
NCR1/Nkp46	bs-10027R	human,Mouse	WB	<a href="#">PubMed</a>
HLA-DR	bs-1198R	Human,Mouse,Rat	WB,FCM	<a href="#">PubMed</a>
CD123/IL3RA	bs-2600R	Human,Mouse	FCM	
BDCA4	bs-0693R	Human,Mouse,Rat	WB,IHC-P	<a href="#">PubMed</a>
CD66a	bs-4896R	Human	WB,FCM	
CCR3	bs-1167R	Human,Mouse,Rat	WB,IHC-P	
c-kit/CD117	bs-0672R	Human,Mouse,Rat	IHC-P,FCM	<a href="#">PubMed</a>

WB=Western Blot; IHC-P=Immunohistochemistry with Paraffin-Embedded Tissue Slides; IF=Immunofluorescence; FCM=Flow cytometry