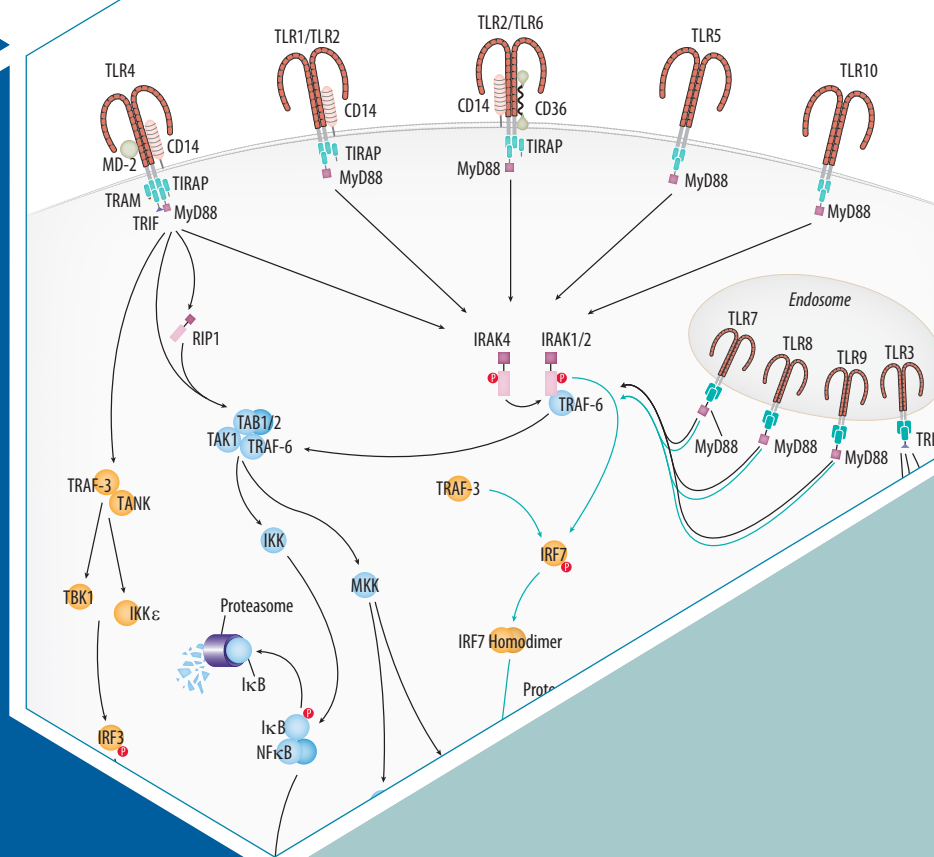
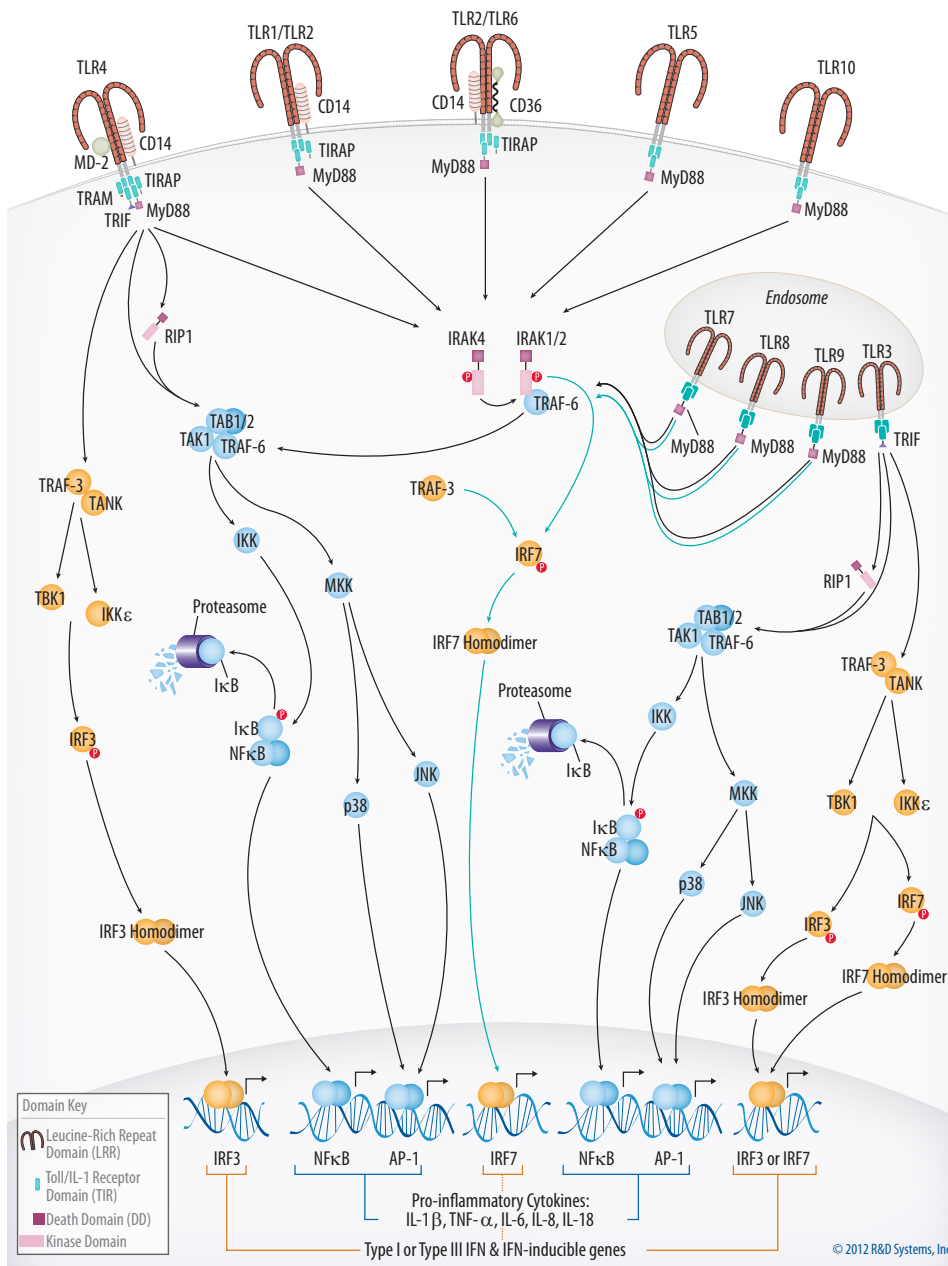


Toll-like Receptors



Toll-like Receptors

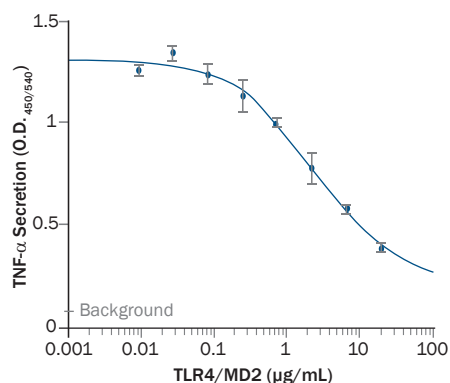
Toll-like receptors are a family of type I transmembrane pattern recognition receptors (PRRs) that sense invading pathogens or endogenous damage signals and initiate the innate and adaptive immune response. There are ten functional TLRs in human (TLR1–10) and twelve in mice (TLR1–9, 11–13). Various combinations of TLRs are expressed by different subsets of immune and non-immune cell types such as monocytes, macrophages, dendritic cells, neutrophils, B cells, T cells, fibroblasts, endothelial cells, and epithelial cells. Of the human TLRs, TLR1, 2, 4, 5, 6, and 10 are expressed on the cell surface and primarily recognize microbial membrane and/or cell wall components, while TLR3, 7, 8, and 9 are expressed in the membranes of endolysosomal compartments and recognize nucleic acids. TLRs have a variable number of ligand-sensing, leucine-rich repeats (LRR) at their N-terminal ends and a cytoplasmic Toll/IL-1 R (TIR) domain. The TIR domain mediates interactions between TLRs and adaptor proteins involved in regulating TLR signaling including MyD88, TRIF, TRAM, and TIRAP/MAL. Signaling pathways activated downstream of these adaptor molecules promote the expression of pro-inflammatory cytokines, chemokines, and type I and type III interferons. Although TLRs provide protection against a wide variety of pathogens, inappropriate or unregulated activation of TLR signaling can lead to chronic inflammatory and autoimmune disorders.



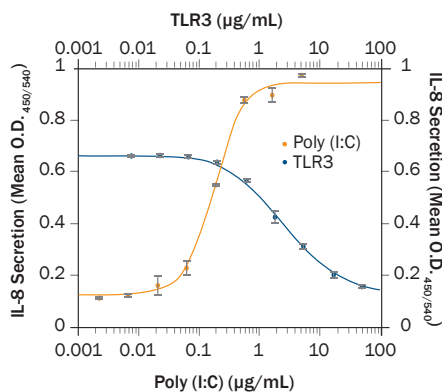
Toll-like Receptors (TLRs)		
TLRs	Agonist(s)	Source
TLR1/TLR2	Triacyl lipopeptides	Bacteria
TLR2	Lipoproteins	Multiple Pathogens
	Peptidoglycan (PGN)	Bacteria
	Porins	Bacteria
	Zymosan	Fungi
	β-Glycan	Fungi
	GPI-mucin	Protozoa
TLR2/TLR6	Envelope glycoproteins	Viruses
	Diacyl lipopeptides	Bacteria
TLR3	Lipoteichoic acid (LTA)	Bacteria
	Double-stranded RNA	Viruses
TLR4	Poly (I:C)	Synthetic analog of double-stranded RNA
	Lipopolysaccharide (LPS)	Bacteria
	Glycoinositol-phospholipids	Protozoa
	Envelope glycoproteins	Viruses
	Host-derived HMGB1 and HSPs	Endogenous
TLR5	Flagellin	Bacteria
TLR7	Single-stranded RNA	Viruses
TLR8	Single-stranded RNA	Viruses
TLR9	Unmethylated CpG DNA	Bacteria
		Protozoa
		Viruses
TLR10	Mitochondrial DNA	Endogenous
	Unknown	Unknown

Recombinant TLR Proteins from R&D Systems

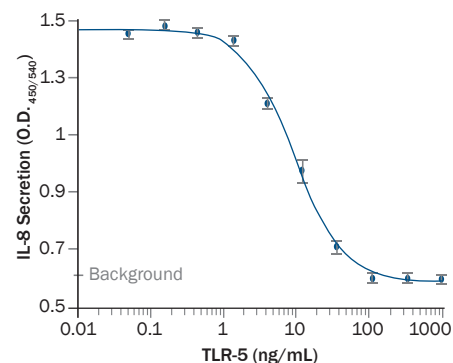
R&D Systems offers the widest selection of recombinant human and mouse TLR proteins for investigating the ligand-binding and biochemical properties of different toll-like receptors. Stringent production and purification standards ensure that R&D Systems® proteins will provide researchers with industry-leading bioactivity and lot-to-lot consistency.



Recombinant Human TLR4/MD-2 Complex Blocks LPS-Induced TNF- α Secretion by PMA-Differentiated U937 Cells. The U937 human histiocytic lymphoma cell line was differentiated with PMA and treated with 10 ng/mL lipopolysaccharide (LPS) that had been pre-incubated for 1 hour with the indicated concentrations of Recombinant Human TLR4/MD-2 Complex (R&D Systems, Catalog # 3146-TM). Following 20 hours of incubation with the LPS-TLR4/MD-2 complex, TNF- α secretion was measured using the Human TNF- α Quantikine® ELISA Kit (R&D Systems, Catalog # DTA00C).



Recombinant Human TLR3 Inhibits Poly (I:C)-Induced IL-8 Secretion by TLR3-transfected HEK293 Cells. The HEK293 human embryonic kidney cell line was transfected with TLR3 and treated with increasing concentrations of Poly (I:C) (Tocris, Catalog # 4287). CXCL8/IL-8 secretion was measured using the Human CXCL8/IL-8 Quantikine® ELISA Kit (R&D Systems, Catalog # D8000C; orange line). The stimulatory effect induced by 10 µg/mL of poly (I:C) was inhibited by treating the cells with increasing concentrations of Recombinant Human TLR3 (R&D Systems, Catalog # 1487-TR; blue line). The ED₅₀ for this effect is typically 5-10 µg/mL.



Recombinant Mouse TLR5 Blocks Flagellin-Induced IL-8 Secretion by HT-29 Cells. The HT-29 human colon adenocarcinoma cell line was treated with Flagellin and the indicated concentrations of Recombinant Mouse TLR5 Fc Chimera (R&D Systems, Catalog # 7915-TR). CXCL8/IL-8 secretion was measured using the Human CXCL8/IL-8 Quantikine® ELISA Kit (R&D Systems, Catalog # D8000C). The ED₅₀ for this effect is typically 4-24 ng/mL.

Recombinant TLR Proteins			
Molecule	Species	Source	Catalog #
TLR1	Human	NSO	1484-TR
	Mouse	NSO	1476-TR
TLR2	Human	NSO	2616-TR
	Mouse	Sf21 (baculovirus)	1530-TR
TLR3	Human	NSO	1487-TR
	Mouse	NSO	3005-TR
TLR4	Human	NSO	1478-TR
TLR4/MD-2	Human	NSO	3146-TM
TLR5	Mouse	CHO	7915-TR
TLR6	Human	CHO	7755-TR
	Mouse	Sf21 (stably transfected)	1533-TR
TLR9	Mouse	CHO	7960-TR
TLR10	Human	CHO	6619-TR
TLR11	Mouse	CHO	7640-TR
TLR12	Mouse	CHO	8086-TR

Tocris® Small Molecules for TLR Research

Tocris is the leading supplier of novel and exclusive tools for life science research. Their portfolio includes a collection of TLR agonists and inhibitors that can be used to characterize the signaling pathways downstream of specific toll-like receptors and determine the effects of TLR signaling on the immune response.

Tocris Small Molecules for TLR Research

Small Molecule	Description	Catalog #
CU-T12-9	Potent TLR1/2 agonist	5414
Pam ₃ CSK ₄	TLR1/2 agonist	4633
Pam ₃ CSK ₄ Biotin	Biotinylated Pam ₃ CSK ₄	4636
CU CPT 22	Selective TLR1/2 inhibitor	4884
Pam ₂ CSK ₄	TLR2/6 agonist	4637
Pam ₂ CSK ₄ Biotin	Biotinylated Pam ₂ CSK ₄	4638
Poly(I:C)	TLR3 agonist	4287
CU CPT 4a	Selective TLR3 inhibitor	4883
C34	TLR4 inhibitor	5373
DSR 6434	Potent TLR7 agonist	4809
Imiquimod	TLR7 agonist	3700
Resiquimod	TLR7 agonist	4536
RWJ 21757	TLR7 agonist	2719
Hydroxychloroquine sulfate	TLR9 inhibitor	5648

For more information, please visit | tocris.com

Immunology Literature from Tocris:

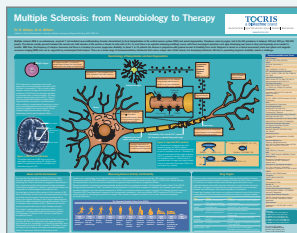
Immunology Product Listing

A collection of over 190 products for immunology research, including research tools for studying chemokine and cytokine signaling, chemotaxis, the complement system, immune cell signaling and inflammation.



Multiple Sclerosis Poster

Multiple sclerosis (MS) is an autoimmune disease characterized by focal demyelination and axon degeneration. Created by Alastair Wilkins and Richard Ibitoye of University of Bristol, this poster summarizes the neurobiology and current therapies of MS.

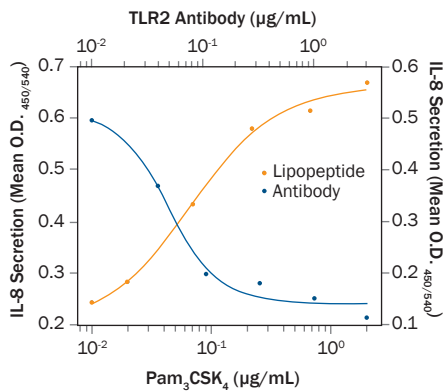


To download or request a copy please visit | tocris.com/requestliterature

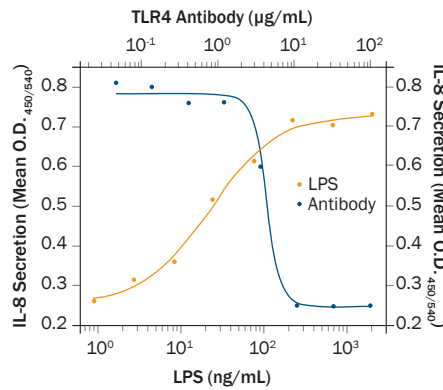
Unconjugated & Fluorochrome-conjugated TLR Antibodies

R&D Systems and Novus Biologicals together offer the most comprehensive selection of unconjugated and fluorochrome-conjugated antibodies for detecting toll-like receptors and related molecules using a variety of different applications. Our catalogs include antibodies that are validated for flow cytometry, immunocytochemistry/immunofluorescence, immunohistochemistry, Western blot, and blocking/neutralization.

Blocking/Neutralization Antibodies for TLRs



TLR2 Ligand-Induced IL-8 Secretion and Neutralization using an Anti-Human TLR2 Antibody. The HEK293 human embryonic kidney cell line transfected with human TLR2 was treated with increasing concentrations of the synthetic tri-palmitoylated lipopeptide Pam₃CSK₄ (Tocris, Catalog # 4633). IL-8 secretion was measured using the Human CXCL8/IL-8 Quantikine® ELISA Kit (R&D Systems, Catalog # D8000C; orange line). The stimulatory effect induced by 0.5 µg/mL Pam₃CSK₄ was neutralized by treating the cells with increasing concentrations of a Mouse Anti-Human TLR2 Monoclonal Antibody (R&D Systems, Catalog # MAB2616; blue line). The ND₅₀ is typically 0.03–0.15 µg/mL.



TLR4/MD2 Ligand-Induced IL-8 Secretion and Neutralization using an Anti-Human TLR4 Antibody. The HEK293 human embryonic kidney cell line co-transfected with human TLR4 and MD-2 was treated with increasing concentrations of lipopolysaccharide (LPS). IL-8 secretion was measured using the Human CXCL8/IL-8 Quantikine® ELISA Kit (R&D Systems, Catalog # D8000C; orange line). The stimulatory effect induced by 75 ng/mL LPS was neutralized by treating the cells with increasing concentrations of a Goat Anti-Human TLR4 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # AF1478; blue line). The ND₅₀ is typically 1.5–7.5 µg/mL.

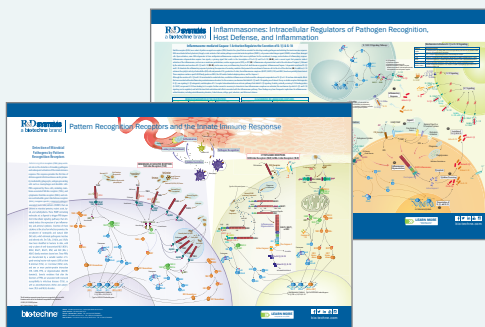
For additional information on TLRs and other pattern recognition receptor families, explore R&D Systems pattern recognition receptor-related signaling pathways at [rndsystems.com/Pathways/Immunology](https://www.rndsystems.com/Pathways/Immunology)

- Nod-like Receptor Signaling Pathways
- Toll-like Receptor Signaling Pathways
- Inflammasome Activation Pathways
- Pathogen or Damage-activated C-Type Lectin Receptor Signaling Pathways
- RIG-I-like Receptor Signaling Pathways



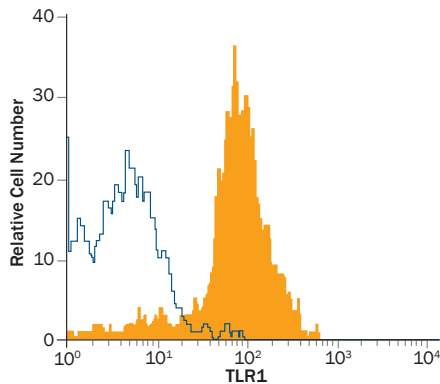
Printed copies of R&D Systems® pathways or our pattern recognition receptor-related miniposters listed below can be requested at [rndsystems.com](https://www.rndsystems.com)

- Pattern Recognition Receptors & the Innate Immune Response
- Inflammasomes: Intracellular Regulators of Pathogen Recognition, Host Defense, and Inflammation

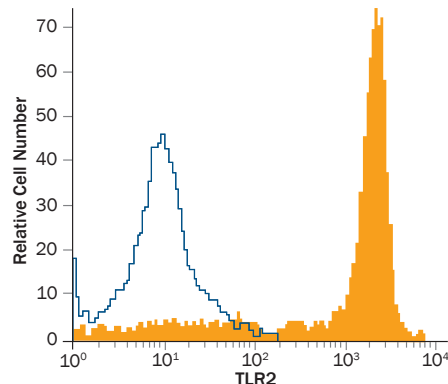


TLR Antibodies for Flow Cytometry, Immunocytochemistry, Immunohistochemistry, or Western Blot

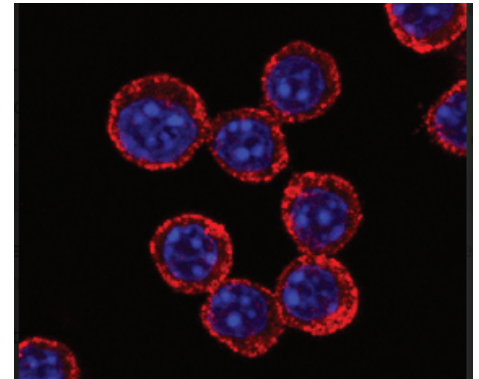
Detection of Plasma Membrane TLRs



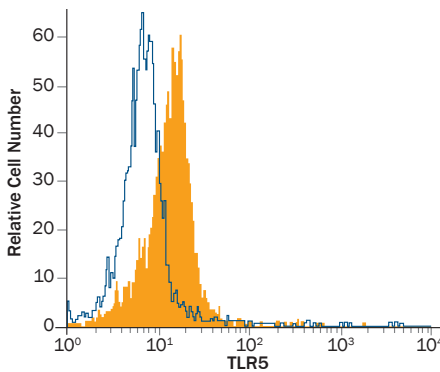
Detection of TLR1 on Human Monocytes by Flow Cytometry. Human peripheral blood monocytes were stained with an APC-conjugated Goat Anti-Human TLR1 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # FAB1484A; filled histogram) or an APC-conjugated Isotype Control (R&D Systems, Catalog # IC108A; open histogram).



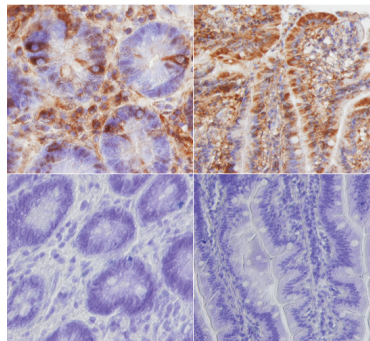
Detection of TLR2 in Human Monocytes by Flow Cytometry. Human peripheral blood monocytes were stained with a PE-conjugated Mouse Anti-Human TLR2 Monoclonal Antibody (R&D Systems, Catalog # FAB2616P; filled histogram) or a PE-conjugated Isotype Control (R&D Systems, Catalog # IC0041P; open histogram).



Detection of TLR4 in RAW264.7 Cells by Immunocytochemistry. TLR4 was detected in the immersion-fixed RAW264.7 mouse monocyte/macrophage cell line using a Rabbit Anti-Mouse TLR4 Monoclonal Antibody (R&D Systems, Catalog # MAB27591) at 1 µg/mL for 3 hours at room temperature. Cells were stained using the NorthernLights™ 557-conjugated Anti-Rabbit IgG Secondary Antibody (R&D Systems, Catalog # NLO04; red) and counterstained with DAPI (blue). Specific staining was localized to cell surfaces and cytoplasm.

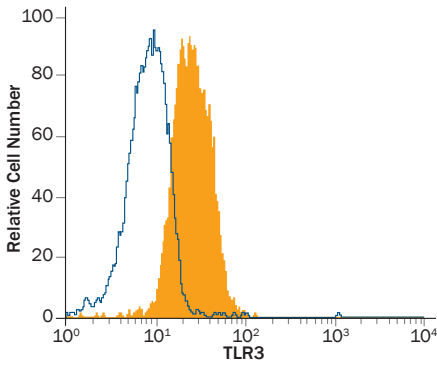


Detection of TLR5 on Human Monocytes by Flow Cytometry. Human peripheral blood monocytes were stained with an Alexa Fluor® 488-conjugated Mouse Anti-Human TLR5 Monoclonal Antibody (R&D Systems, Catalog # FAB6704G; filled histogram) or an Alexa Fluor 488-conjugated Mouse IgG₁ Isotype Control (R&D Systems, Catalog # IC002G; open histogram).

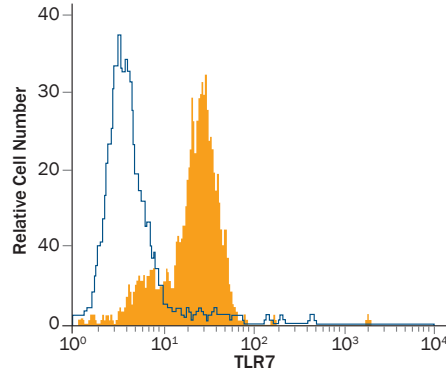


Detection of TLR5 in Human Intestine by Immunohistochemistry. TLR5 was detected in immersion-fixed, paraffin-embedded sections of human intestine using a Mouse Anti-Human TLR5 Monoclonal Antibody (R&D Systems, Catalog # MAB6704) at 15 µg/mL overnight at 4 °C. Tissue was stained using the Anti-Mouse HRP-DAB Cell & Tissue Staining Kit (R&D Systems, Catalog # CTS002; brown) and counterstained with hematoxylin (blue). Lower panels show a lack of labeling when primary antibodies are omitted and the tissue is stained with only secondary antibody followed by incubation with detection reagents.

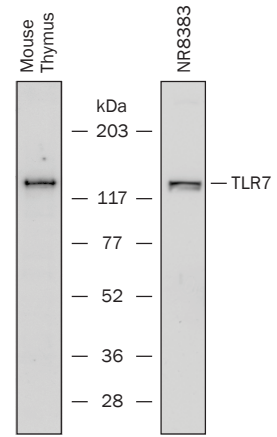
Detection of Endosomal TLRs



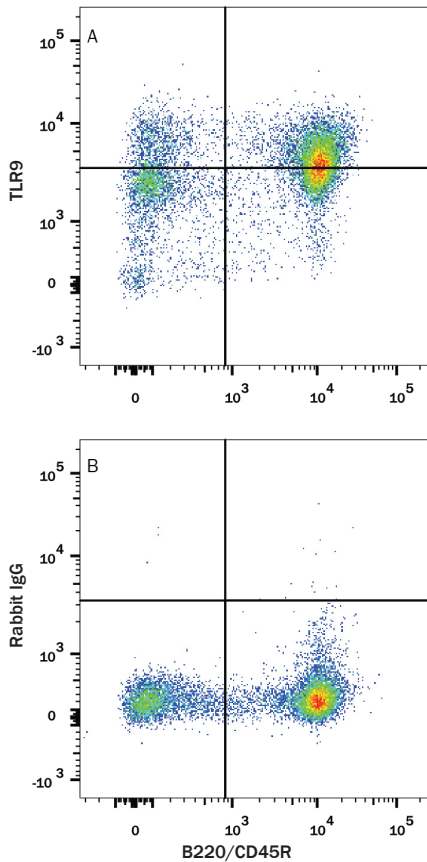
Detection of TLR3 in A549 Cells by Flow Cytometry. The A549 human lung carcinoma cell line was stained with an APC-conjugated Goat Anti-Human TLR3 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # IC1487A; filled histogram) or an APC-conjugated Isotype Control (R&D Systems, Catalog # IC108A; open histogram). To facilitate intracellular staining, cells were fixed with Flow Cytometry Fixation Buffer (R&D Systems, Catalog # FC004) and permeabilized with Flow Cytometry Permeabilization/Wash Buffer I (R&D Systems, Catalog # FC005).



Detection of TLR7 in Ramos Human Burkitt's Lymphoma Cells by Flow Cytometry. The Ramos human Burkitt's lymphoma cell line was stained with a PE-conjugated Mouse Anti-Human TLR7 Monoclonal Antibody (R&D Systems, Catalog # IC5875P; filled histogram) or a PE-conjugated Mouse IgG_{2A} Isotype Control (R&D Systems, Catalog # IC003P; open histogram). To facilitate intracellular staining, cells were fixed with Flow Cytometry Fixation Buffer (R&D Systems, Catalog # FC004) and permeabilized with Flow Cytometry Permeabilization/Wash Buffer I (R&D Systems, Catalog # FC005).



Detection of Mouse and Rat TLR7 by Western Blot. Lysates from mouse thymus tissue or the NR8383 rat alveolar macrophage cell line were separated by SDS-PAGE and immunoblotted using 1 µg/mL of the Rat Anti-Mouse/Rat TLR7 Monoclonal Antibody (R&D Systems, Catalog # MAB7156) followed by an HRP-conjugated Anti-Rat IgG Secondary Antibody. A specific band for TLR7 was detected at approximately 130 to 140 kDa under reducing conditions (as indicated).



Detection of TLR9 in Mouse Splenocytes by Flow Cytometry. Mouse splenocytes were stained with an APC-conjugated Rat Anti-Mouse B220/CD45R Monoclonal Antibody (R&D Systems, Catalog # FAB1217A) and either a (A) Rabbit Anti-Mouse TLR9 Monoclonal Antibody (R&D Systems, Catalog # MAB7960) or (B) Normal Rabbit IgG Control (R&D Systems, Catalog # AB-105-C), followed by a PE-conjugated Anti-Rabbit IgG Secondary Antibody (R&D Systems, Catalog # F0110).

Toll-like Receptor Antibodies from R&D Systems

R&D Systems® antibodies undergo rigorous lot-specific quality control testing for all of the applications listed on our datasheets to ensure superior performance, reliability, and consistency. For more information, please visit rndsystems.com/Antibodies

Unconjugated Antibodies				Fluorochrome-conjugated Antibodies for Flow Cytometry					
Molecule	Species	Clone	Catalog # (Applications)					Alexa Fluor®	
				APC	Fluorescein	PE	PerCP	488	700
TLR1	H	Polyclonal	AF1484 (FC, WB)	✓		✓			
	M	Polyclonal	AF1475 (FC, WB)			✓			
	M	285923	MAB1475 (WB)						
TLR2	H	383936	MAB2616 (B/N, FC)	✓	✓	✓	✓		✓
	H	Polyclonal	AF2616 (E, FC, WB)						
	M	203325	MAB1530 (FC)	✓	✓				
	M	Polyclonal	AF1530 (WB)						
TLR3	H	512505	MAB1487 (WB)						
	H	Polyclonal	AF1487 (WB)	✓					
	M	313129	MAB3005 (WB)	✓		✓			
	M	Polyclonal	AF3005 (WB)						
TLR4	H	285227	MAB1478 (WB)						
	H	610029	MAB14782 (WB)						
	H	610017	MAB14783 (IHC)						
	H	610015	MAB6248 (FC)	✓	✓	✓	✓		✓
	H	Polyclonal	AF1478 (B/N, FC, ICC/IF, IHC, WB)						
	M	267518	MAB2759 (FC, ICC/IF)	✓		✓			
	M	1203B	MAB27591 (FC, ICC/IF)						
TLR5	H	624915	MAB6704 (FC, IHC)					✓	
TLR6	M	418601	MAB1533 (FC)	✓		✓			
	M	Polyclonal	AF1533 (WB)						
TLR7	H	533707	MAB5875 (FC)			✓	✓	✓	
	M/R	726606	MAB7156 (WB)						
TLR8	H	935166	MAB8999 (FC)						
TLR9	H	229106	MAB3658 (FC)						
	H	Polyclonal	AF3658 (FC, IHC)					✓	
	M	1138D	MAB7960 (FC, ICC/IF)						
TLR10	H	670719	MAB6619 (WB)						
TLR11	M	786404	MAB7640 (FC)	✓		✓			
TLR12	M	1229C	MAB8086 (FC, WB)			✓			

Application Key: B/N Block/Neutralize E ELISA FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry WB Western Blot

Additional Select Toll-like Receptor Antibodies from Novus Biologicals

Novus Biologicals offers a wide selection of TLR antibodies including some of the most highly referenced clones on the market. Most of these antibodies are conjugated to multiple different fluorochromes including a series of Alexa Fluor® and DyLight® dyes to provide a full range of options for multicolor experiments. For more information, please visit novusbio.com

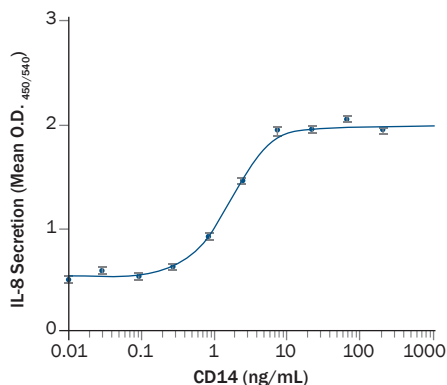
Unconjugated Antibodies				Fluorochrome-conjugated Antibodies for Flow Cytometry								
Molecule	Species	Clone	Catalog # (Applications)	APC	Fluorescein	PE	PerCP	Alexa Fluor®				
								405	488	647	700	
TLR1	H/M/R	Polyclonal	NB100-56563 (FC, IHC, WB)									
TLR2	H	TL2.1	NB100-56722 (B/N, FA, FC, ICC/IF, IHC, IP)		✓	✓	✓	✓	✓	✓	✓	✓
	H/M	T2.5	NBP1-42362 (FC, IHC, IP)		✓							
	M	11G5	NBP2-27165 (FC, WB)*	✓		✓	✓	✓	✓	✓	✓	✓
TLR3	H/M	40C1285.6	NBP2-24875 (FC, ICC/IF, IHC, IP, WB)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
	H/M	TLR3.7			✓	✓						
TLR4	H	HTA125	NB100-56723 (B/N, FA, FC, ICC/IF, IP, IV)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
	H/M	76B357.1	NB100-56566 (FC, ICC/IF, IHC, ChIP, WB)*	✓	✓	✓	✓				✓	
	M	MTS510	NB100-56560 (FC, IP)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
TLR5	H/M	85B152.5	NBP1-97728 (FC, WB)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
	H/M	19D759.2	NBP2-24787 (FC, IHC, WB)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
TLR6	H	86B1153.2	NB100-56536 (FC, IHC)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
	H	hPer6	NBP1-43142 (FC, WB)*	✓		✓	✓	✓	✓	✓	✓	✓
	H	TLR6.127	NBP1-51493 (FC, ICC/IF, IHC, IP)									
TLR7	H/M	4G6	NBP2-27332 (FC, ICC/IF, WB)*	✓		✓	✓	✓	✓	✓	✓	✓
	H/M	Polyclonal	NBP2-24906 (FC, ICC/IF, IHC, WB)									
TLR8	H/M	44C143	NBP2-24917 (FC, IHC, SW, WB)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
	H/M	Polyclonal	NBP1-77203 (E, ICC/IF, WB)									
TLR9	H	eB72-1665	NBP1-43140 (FC, IHC, IP, WB)*	✓		✓	✓	✓	✓	✓	✓	✓
	H/M/R	26C593.2	NBP2-24729 (E, FA, FC, ICC/IF, IHC, IP, IV, SW, WB)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
	M	M9.D6	NBP1-43141 (FC, WB)*	✓	✓	✓	✓	✓	✓	✓	✓	✓
TLR10	H	3C10C5	NBP1-70343 (FC)*	✓		✓	✓	✓	✓	✓	✓	✓
TLR13	M/R	Polyclonal	NBP2-24539 (FC, WB)									

Application Key: B/N Block/Neutralize ChIP Chromatin Immunoprecipitation E ELISA FA Functional Assay FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation IV In vitro WB Western Blot

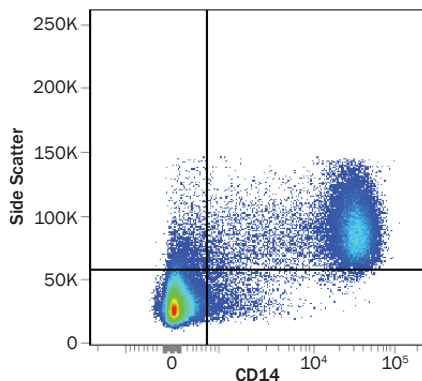
* In addition to the fluorochrome-conjugated forms listed, these antibodies are also available in several DyLight®-conjugated forms. DyLight conjugates include DyLight 350, 405, 405LS, 488, 550, 650, 680, and 755. Please visit novusbio.com for more information.

Proteins & Antibodies for TLR Co-Receptors, Signaling Regulators, and Adaptor Proteins

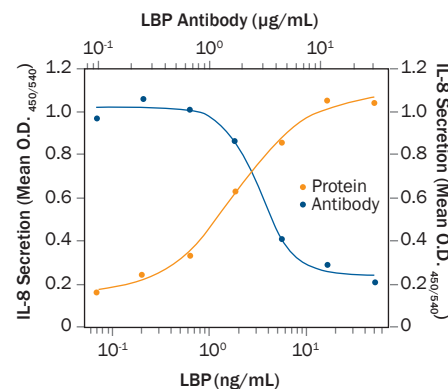
TLR co-receptors such as CD14, CD36, and MD-2 have essential roles in ligand recognition, while intracellular, TIR domain-containing signaling adaptors such as MyD88, TRIF, TRAM, and TIRAP are required for activating signaling pathways downstream of TLRs. Additionally, molecules such as RP105/CD180, SARM1, PRAT4A, and PRAT4B are involved in regulating TLR signaling or TLR localization. R&D Systems and Novus Biologicals provide high quality antibodies to detect these proteins by multiple different methods.



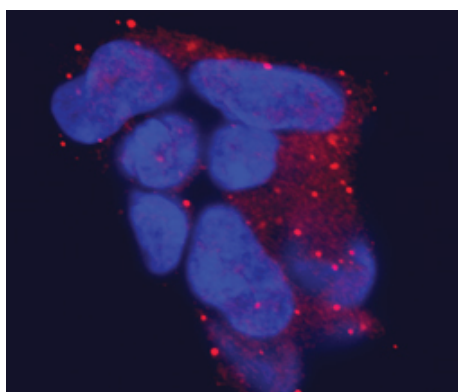
Recombinant Human CD14 Enhances LPS-Stimulated IL-8 Secretion by THP-1 Cells. The THP-1 human acute monocytic leukemia cell line was treated with 15 ng/mL lipopolysaccharide (LPS) and the indicated concentrations of Recombinant Human CD14 (R&D Systems, Catalog # 383-CD). CXCL8/IL-8 secretion was measured using the Human CXCL8/IL-8 Quantikine® ELISA Kit (R&D Systems, Catalog # D8000C). The ED₅₀ for this effect is typically 0.75–4.5 ng/mL.



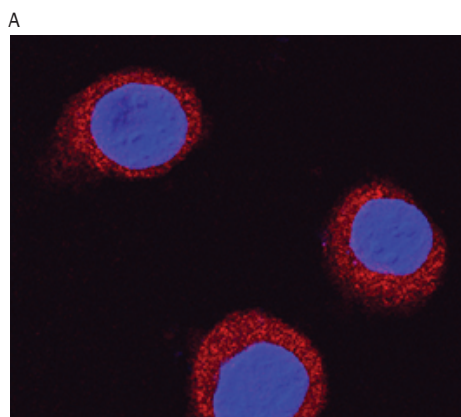
Detection of CD14 in Human Peripheral Blood Mononuclear Cells by Flow Cytometry. Human peripheral blood mononuclear cells were stained with an APC-conjugated Mouse Anti-Human CD14 Monoclonal Antibody (R&D Systems, Catalog # FAB3832A).



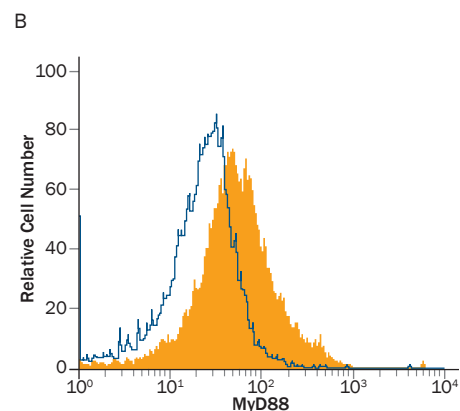
Recombinant Mouse LBP-Induced IL-8 Secretion and Neutralization using an Anti-Mouse LBP Antibody. The THP-1 human acute monocytic leukemia cell line was treated with 5 ng/mL lipopolysaccharide and the indicated concentrations of Recombinant Mouse Lipopolysaccharide-Binding Protein (LBP; R&D Systems, Catalog # 6635-LP). CXCL8/IL-8 secretion was measured using the Human CXCL8/IL-8 Quantikine® ELISA Kit (R&D Systems, Catalog # D8000C). The stimulatory effect induced by 50 ng/mL Recombinant Mouse LBP was neutralized by treating the cells with increasing concentrations of a Rat Anti-Mouse LBP Monoclonal Antibody (R&D Systems, Catalog # MAB6635; blue line). The ND₅₀ is typically 1–5 µg/mL.



Detection of SARM1 in HEK293 Cells by Immunocytochemistry. SARM1 was detected in the immersion-fixed HEK293 human embryonic kidney cell line using a Sheep Anti-Human SARM1 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # AF7037) at 1.7 µg/mL for 3 hours at room temperature. Cells were stained using the NorthernLights™ 557-conjugated Anti-Sheep IgG Secondary Antibody (R&D Systems, Catalog # NLO10; red) and counterstained with DAPI (blue). Specific staining was localized to the cytoplasm.



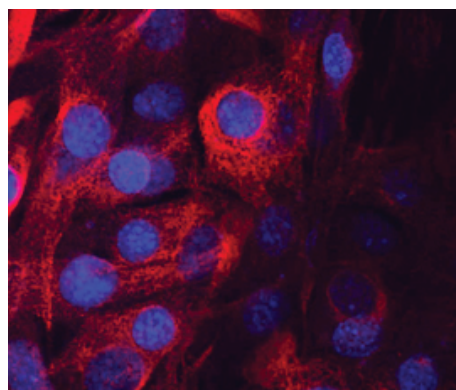
Detection of MyD88 by Immunocytochemistry and Flow Cytometry. (A) MyD88 was detected in immersion-fixed RAW264.7 mouse monocyte/macrophage cell line using a Goat Anti-Mouse/Rat MyD88 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # AF3109) at 1.7 µg/mL for 3 hours at room temperature. Cells were stained using the NorthernLights™ 557-conjugated Anti-Goat IgG Secondary Antibody (R&D Systems, Catalog # NLO01; red) and counterstained with DAPI (blue). Specific staining was localized to the cytoplasm. (B) MyD88 was detected in mouse splenocytes by staining with the Goat Anti-Mouse/Rat MyD88 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # AF3109; filled histogram) followed by staining with an APC-conjugated Anti-Goat IgG Secondary Antibody (R&D Systems, Catalog # F0108). To facilitate intracellular staining, cells were fixed with paraformaldehyde and permeabilized with saponin.



Recombinant Proteins & Antibodies for TLR Co-Receptors, Signaling Regulators, & Adaptor Proteins from R&D Systems

Molecule	Proteins		Unconjugated Antibodies			Fluorochrome-conjugated Antibodies for Flow Cytometry				
	Species	Catalog #	Species	Clone	Catalog # (Applications)	APC	Fluorescein	PE	PerCP	*Alexa Fluor® 405/594/647/700/750
CD14	Human	383-CD	Human	134620	MAB3832 (B/N, FC, WB)	✓	✓	✓	✓	✓
	Mouse	982-CD	Mouse	159010	MAB982 (FC, WB)	✓			✓	✓
CD36	Human	1955-CD	Human	255606	MAB19551 (FC)	✓	✓	✓		
			Human	255619	MAB1955 (WB)					
	Mouse	2519-CD	Mouse	324205	MAB25191 (FC, IHC)	✓				
			Mouse	324216	MAB2519 (WB)					
LBP	Human	870-LP	Human	Polyclonal	AF870 (WB)					
	Human	6445-LP	Mouse	749405	MAB6635 (B/N)					
	Mouse	6635-LP	Mouse	Polyclonal	AF6635 (WB)					
MD-1	Human	925-MD	Human	Polyclonal	AF925 (FC, IHC, WB)					
			Human	153014	MAB925 (WB)					
	Mouse	130-MD	Mouse	142004	MAB130 (WB)					
			Mouse	Polyclonal	AF130 (WB)					
MD-2	Human	1787-MD	Human	288307	MAB1787 (WB)					
			Human	Polyclonal	AF1787 (WB)					
MyD88			Human	316628	MAB29281 (FC)					
			Human	316603	MAB2928 (ICC/IF)					
			Human	Polyclonal	AF2928 (FC, ICC/IF, SW, WB)					
			Mouse	316902	MAB3109 (ICC/IF)					
			Mouse	Polyclonal	AF3109 (FC, ICC/IF, SW, WB)					
PRAT4A	Human	7484-PR								
	Mouse	4429-PR	Mouse	Polyclonal	AF4429 (WB)					
PRAT4B			Mouse	Polyclonal	AF5015 (FC, WB)					
RP105/CD180	Mouse	1378-RP								
SARM1			Human	754711	MAB7037 (ICC/IF)					
			Human	Polyclonal	AF7037 (ICC/IF, IP, WB)					
TRAM/TI-CAM2			Human/ Mouse/ Rat	Polyclonal	AF4348 (FC, ICC/IF, WB)					
			Mouse	757706	MAB4348 (WB)					
			Mouse	757712	MAB43481 (ICC/IF)					
TRIF			Human	567212	MAB6216 (WB)					
			Human	Polyclonal	AF6216 (ICC/IF, WB)					

Application Key: B/N Block/Neutralize FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation SW Simple Western WB Western Blot



Detection of TRAM/TICAM2 in C2C12 Cells by Immunohistochemistry. TRAM/TICAM2 was detected in the immersion-fixed C2C12 mouse myoblast cell line using a Rat Anti-Mouse TRAM/TICAM2 Monoclonal Antibody (R&D Systems, Catalog # MAB43481) at 10 ug/mL for 3 hours at room temperature. Cells were stained using the NorthernLights™ 557-conjugated Anti-Rat IgG Secondary Antibody (R&D Systems, Catalog # NL013; red) and counterstained with DAPI (blue). Specific staining was localized to the cytoplasm.

*Indicates one or more of the following conjugates is available.

Additional Select Antibodies for TLR Co-Receptors, Signaling Regulators, & Adaptor Proteins from Novus Biologicals

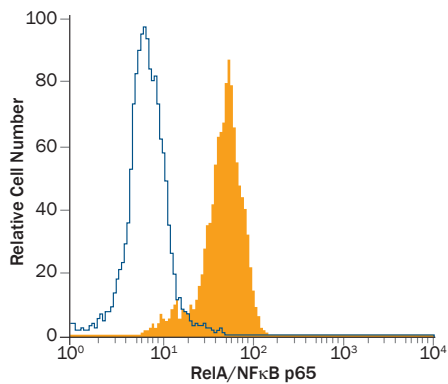
Unconjugated Antibodies				Fluorochrome-conjugated Antibodies for Flow Cytometry							
Molecule	Species	Clone	Catalog # (Applications)	APC	Fluorescein	PE	PerCP	Alexa Fluor®			
								405	488	647	700
CD14	Human	HCD14	NB100-78083 (FC)*	✓	✓	✓	✓	✓	✓	✓	✓
	Human	M5E2	NB100-77758 (FC, ICC/IF, IHC)*	✓	✓	✓	✓	✓	✓	✓	✓
CD36	Human	SM0	NB100-65522 (FC, IHC)*	✓		✓	✓	✓	✓	✓	✓
	Mouse/Rat	D-2712	NB110-59724 (IHC, IP, WB)*		✓			✓	✓	✓	✓
LBP	Human	Polyclonal	NBP1-88371 (IHC)								
MD-1	Human/ Mouse	Polyclonal	NB100-56700 (IHC, WB)								
	Mouse	MD-14	NB100-77635 (FC)								
MD-2	Human/ Mouse/Rat	Polyclonal	NB100-56655 (IHC, WB)								
	Human/ Mouse/Rat	Polyclonal	NBP1-77201 (E, ICC/IF, IHC, WB)								
	Human/ Mouse	9F1B1	NBP1-75512 (E, ICC/IF, IHC, WB)								
MyD88	Human/ Mouse	4D6	NBP2-27369 (FC, ICC/IF, WB)*	✓		✓	✓	✓	✓	✓	✓
PRAT4A	Human/ Mouse/Rat	Polyclonal	NBP1-91153 (ICC/IF, IHC, WB)								
	Human/ Mouse/Rat	Polyclonal	NBP2-23847 (IHC)								
PRAT4B	Human	Polyclonal	NBP1-81085 (ICC/IF, IHC, WB)								
RP105/CD180	Human	MHR73-11	NBP1-49025 (FC, IHC, IP)*	✓		✓	✓	✓	✓	✓	✓
SARM1	Human/ Mouse	Polyclonal	NBP1-77200 (E, ICC/IF, IHC, WB)								
TIRAP/MAL	Human	20D1055.1	NB100-56730 (WB)								
	Human/ Mouse	Polyclonal	NBP2-47605 (ICC/IF, IHC)								
TRIF	Human	Polyclonal	NBP1-89566 (IHC)								
	Human/ Mouse/Rat	Polyclonal	NB120-13810 (ICC/IF, SW, WB)								
UNC93B	Human/ Mouse/Rat	Polyclonal	NBP2-24743 (WB)								

Application Key: E ELISA FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation SW Simple Western WB Western Blot

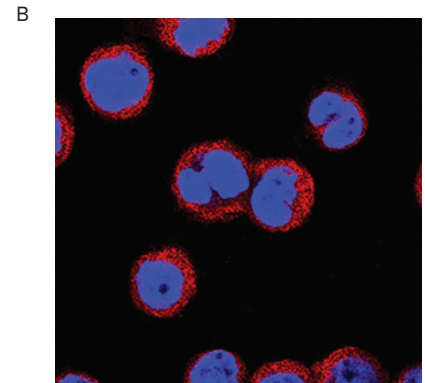
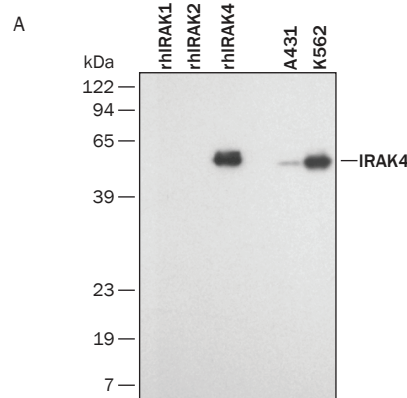
*In addition to the fluorochrome-conjugated forms listed, these antibodies are also available in several DyLight®-conjugated forms. DyLight conjugates include DyLight 350, 405, 405LS, 488, 550, 650, 680, and 755. Please visit novusbio.com for more information.

Antibodies for Detecting TLR Signaling Molecules

Following ligand recognition by TLRs, downstream signal transduction cascades result in the activation of several kinases including IKK, MKK, p38 MAPK, JNK, and TBK1. These kinases activate transcription factors such as AP-1, NF κ B, IRF3, and IRF7, which promote the expression of pro-inflammatory cytokines, chemokines, and type I and type III interferons. R&D Systems and Novus Biologicals offer antibodies to detect the kinases and transcription factors involved in TLR signaling, while Tocris offers inhibitors and activators of these molecules. Together, these reagents can be used to fully characterize TLR signaling pathways.



Intracellular Staining of RelA/NF κ B p65 in HeLa Cells by Flow Cytometry. HeLa human cervical epithelial carcinoma cells were stained with an Alexa Fluor[®] 488-conjugated Mouse Anti-Human/Mouse RelA/NF κ B p65 Monoclonal Antibody (R&D Systems, Catalog # IC5078G; filled histogram) or an Alexa Fluor 488-conjugated Mouse IgG_{2B} Isotype Control (R&D Systems, Catalog # IC0041G; open histogram).



Detection of IRAK4 by Western Blot and Immunocytochemistry. (A) Recombinant Human IRAK1, IRAK2, IRAK4 (2 ng/lane), and lysates from the A431 human epithelial carcinoma cell line or the K562 human chronic myelogenous leukemia cell line were separated by SDS-PAGE and immunoblotted using 1 μ g/mL of the Goat Anti-Human IRAK4 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # AF3919) followed by an HRP-conjugated Anti-Goat IgG Secondary Antibody (R&D Systems, Catalog # HAF109). A specific band for IRAK4 was detected at approximately 55 kDa under reducing conditions (as indicated). (B) IRAK4 was detected in the immersion-fixed THP-1 human acute monocytic leukemia cell line using the Goat Anti-Human IRAK4 Antigen Affinity-purified Polyclonal Antibody (R&D Systems, Catalog # AF3919) at 15 μ g/mL for 3 hours at room temperature. Cells were stained using the NorthernLights™ 557-conjugated Anti-Goat IgG Secondary Antibody (R&D Systems, Catalog # NL001; red) and counterstained with DAPI (blue). Specific staining was localized to the cytoplasm.

Sample-Size Antibodies
Now Available

Choose From Over
10,000 Antibodies



R&D Systems® Antibodies for TLR Signaling Molecules

Molecule	Unconjugated Antibodies		Tocris Small Molecule Activators/Inhibitors Available
	Species	Catalog # (Applications)	
IκB-α	Human	MAB4299 (SW, WB)	X
	Human/Mouse	AF4299 (WB)	
Phospho-IκB-α (S32/S36)	Human	AF4809 (WB)	
IκB-β	Human/Rat	MAB3425 (WB)	
	Human/Mouse	AF5225 (WB)	
IκB-ε	Human	MAB4300 (WB)	
	Human	AF4300 (IHC)	
	Mouse	AF4637 (WB)	
IKK-α	Human/Mouse/Rat	AF3768 (ICC/IF, WB)	X
Phospho-IKK-α (S176/S180)	Human	MAB3768 (WB)	
IKK-β	Human	AF4535 (WB)	X
	Mouse	MAB7155 (WB)	
IKK-γ	Human/Mouse/Rat	AF2684 (ICC/IF, SW, WB)	X
	Human/Mouse/Rat	AF4365 (WB)	
IKK-ε	Human	AF3199 (ICC/IF, WB)	
	Human/Mouse/Rat	MAB3199 (ICC/IF, WB)	
IRAK1	Human	AF4048 (WB)	X
IRAK2	Human	MAB6690 (WB)	
IRAK3	Human	AF6264 (WB)	
IRAK4	Human	AF3919 (ICC/IF, WB)	X
JNK Pan Specific	Human/Mouse/Rat	AF1387 (IHC, WB)	X
	Human/Mouse/Rat	MAB1387 (WB)	
Phospho-JNK (T183/Y185)	Human/Mouse/Rat	AF1205 (IHC, SW, WB)	
	Human/Mouse/Rat	MAB1205 (ICC/IF, SW, WB)	
JNK1	Human/Mouse/Rat	MAB17761 (ICC/IF, WB)	X
	Human/Mouse/Rat	MAB1776 (WB)	
JNK1/2	Human/Mouse/Rat	MAB2076 (ICC/IF, WB)	
JNK2	Human/Mouse/Rat	MAB1846 (ICC/IF, WB)	X
	Human/Mouse/Rat	AF1846 (WB)	
MKK3	Human/Mouse/Rat	MAB2515 (ICC/IF, WB)	
MKK3/MKK6	Human/Mouse/Rat	MAB2514 (WB)	
MKK4	Human	MAB3390 (ICC/IF)	
Phospho-MKK4 (S257/T261)	Human/Mouse/Rat	AF2990 (ICC/IF, WB)	
MKK6	Human/Mouse/Rat	MAB1604 (ICC/IF, WB)	
	Human/Mouse/Rat	AF16041 (WB)	
	Human/Mouse/Rat	AF1604 (WB)	
MKK7	Human	AF3579 (IHC, WB)	
	Human	MAB3579 (IHC)	
p38α	Human/Mouse/Rat	AF8691 (IHC, SW, WB)	X
	Human/Mouse/Rat	MAB869 (WB)	
Phospho-p38α (T180/Y182)	Human	MAB8691 (WB)	
	Human	MAB8692 (ICC/IF)	
p38γ	Human/Mouse/Rat	AF1347 (IHC, SW, WB)	X
	Human/Mouse/Rat	MAB1347 (SW, WB)	
	Human/Mouse/Rat	AF1644 (WB)	
p38δ	Human	AF1519 (IHC, WB)	X
	Human	MAB1519 (WB)	
RIP1/RIPK1	Human/Mouse/Rat	MAB3585 (SW, WB)	X
TAB1	Human/Mouse	AF3578 (ICC/IF, WB)	
TAK1	Human	MAB5307 (WB)	
TANK	Human/Mouse	AF4755 (WB)	
TRAF-3 Isoform 2	Human	AF3278 (WB)	
	Human/Mouse/Rat	MAB3278 (WB)	
TRAF-6	Human	AF3284 (WB)	

Application Key: ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry SW Simple Western WB Western Blot

R&D Systems® Antibodies for TLR-related Transcription Factors

Molecule	Unconjugated Antibodies		Fluorochrome-conjugated Antibodies			Tocris Small Molecule Activators/ Inhibitors Available
	Species	Catalog # (Applications)	APC	Alexa Fluor® 488	PE	
c-Fos	Human	AF7254 (WB)				
FosB/GOS3	Human	AF2214 (IHC, WB)				
	Human/Mouse	MAB2214 (WB)				
FRA-1	Human	AF4935 (IHC, WB)				
	Human	MAB4935 (WB)				
IRF3	Human	AF4019 (FC, ICC/IF, WB)				
	Human	MAB4019 (FC, WB)	✓	✓	✓	
	Mouse	AF4454 (WB)				
c-Jun	Human	MAB2670 (ICC/IF, WB)				X
	Human	AF2670 (WB)				
Phospho-c-Jun (S63)	Human	MAB8930 (ICC/IF, SW, WB)				
JunB	Human	MAB4456 (WB)				
	Human	AF4456 (WB)				
JunD	Human/Mouse	MAB5526 (WB)				
	Human/Mouse	AF5526 (WB)				
NFκB1	Human	MAB2697 (WB)				X
	Human/Mouse	AF2697 (ChIP, WB)				
NFκB2	Human	MAB28881 (ChIP, ICC/ IF, WB)				X
c-Rel	Human	MAB4606 (ICC/IF, WB)				
	Human/Mouse	AF2699 (ChIP, ICC/IF, SW, WB)				
	Mouse	MAB2699 (WB)				
RelA/NFκB p65	Human	MAB50781 (FC)				
	Human/Mouse	MAB5078 (FC, ICC/IF, WB)	✓	✓	✓	
	Human/Mouse	AF5078 (ChIP, SW, WB)				
Phospho-RelA/NFκB p65 (S529)	Human	MAB7624 (WB)				
Phospho-RelA/NFκB p65 (S536)	Human	MAB7226 (ICC/IF, WB)				
	Human	MAB72261 (ICC/IF, SW, WB)				
RelB	Human	MAB2698 (ICC/IF, IHC, WB)				

Application Key: FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry ChIP Chromatin Immunoprecipitation
SW Simple Western WB Western Blot

Additional Select Antibodies for TLR Signaling Molecules from Novus Biologicals

Molecule	Unconjugated Antibodies		Fluorochrome-conjugated Antibodies						
	Species	Catalog # (Applications)	APC	PE	PerCP	Alexa Fluor®			
						405	488	647	700
IκB-α	Human/Mouse/Rat	NB100-56507 (FC, ICC/IF, IHC, IP, SW, WB)*	✓	✓	✓	✓	✓	✓	✓
IKK-α	Human/Mouse	NB100-56704 (FC, ICC/IF, IHC, IP, SW, WB)*	✓	✓	✓	✓	✓	✓	✓
IKK-β	Human/Mouse	NB100-56509 (FC, ICC/IF, IHC, IP, SW, WB)*	✓	✓	✓	✓	✓	✓	✓
IRAK4	Human/Mouse/Rat	NB500-597 (FC, IP, WB)							
RIP1	Human/Mouse/Rat	NBP1-77077 (E, ICC/IF, IHC, WB)							
TRAF-3	Human/Mouse/Rat	NB100-56176 (IHC, IP, WB)							
TRAF-6	Human/Mouse	NB100-56436 (FC, WB)							
	Human/Mouse/Rat	NB100-56179 (IHC, IP, WB)							

Application Key: E ELISA FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation SW Simple Western WB Western Blot

*In addition to the fluorochrome-conjugated forms listed, these antibodies are also available in several DyLight®-conjugated forms. DyLight conjugates include DyLight 350, 405, 405LS, 488, 550, 650, 680, and 755. Please visit novusbio.com for more information.

Additional Select Antibodies for TLR-related Transcription Factors from Novus Biologicals

Molecule	Unconjugated Antibodies		Fluorochrome-conjugated Antibodies			
	Species	Catalog # (Applications)	Alexa Fluor®			
			405	488	647	700
c-Fos	Human/Mouse/Rat	NBP1-89065 (ICC/IF, IHC, WB)				
IRF7	Human/Mouse/Rat	NBP1-77263 (E, ICC/IF, IHC, WB)				
c-Jun	Human/Mouse/Rat	NB110-55569 (FC, ICC/IF, IHC, IP, WB)				
NFκB1	Human/Mouse	NBP1-77395 (ICC/IF, IHC, SW, WB)	✓	✓	✓	✓
NFκB2	Human/Mouse/Rat	NBP1-87760 (ICC/IF, IHC, SW, WB)				

Application Key: E ELISA FC Flow Cytometry ICC/IF Immunocytochemistry/Immunofluorescence IHC Immunohistochemistry IP Immunoprecipitation SW Simple Western WB Western Blot

ELISA Kits for Select Cytokines Induced by TLRs

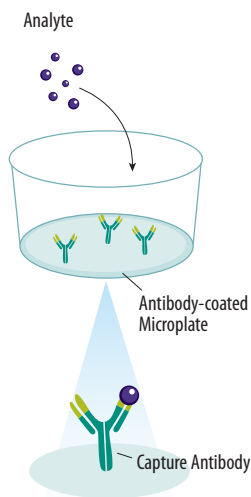
For detecting cytokines and chemokines that are induced by TLR signaling, R&D Systems offers complete, ready-to-run Quantikine® ELISA Kits and the more flexible DuoSet® ELISA Development Systems.

Quantikine® ELISA Kit Features

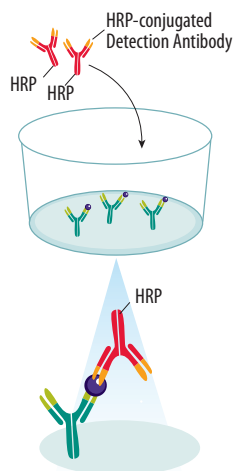
- Complete, ready-to-use kits
- Exhaustively tested for superior quality and reproducibility
- Detailed protocol booklets
- Colorimetric detection

Assay Principle

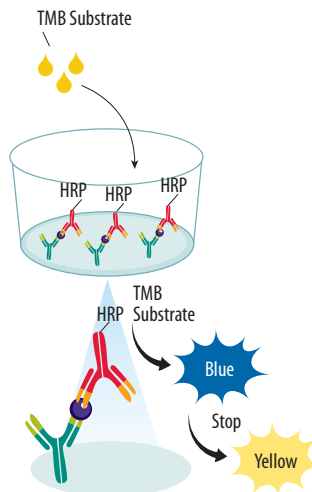
Step 1



Step 2



Step 3



A microplate pre-coated with capture antibody is provided. Samples or standards are added and any analyte present is bound by the immobilized antibody. Unbound materials are washed away (Step 1). A second HRP-labeled detection antibody is added and binds to the captured analyte. Unbound detection antibody is washed away (Step 2). Tetramethylbenzidine (TMB) substrate solution is added to the wells and a blue color develops in proportion to the amount of analyte present in the sample. Color development is stopped turning the color in the wells to yellow. The absorbance of the color at 450 nm is measured (Step 3).

DuoSet® ELISA Development System Features

When complete kits are not an option, DuoSet® ELISA Development Systems offer an economical alternative. DuoSet® Kits contain the essential components required to develop an immunoassay, but unlike Quantikine® ELISA Kits, they require the user to set up the assay by coating a microplate with the provided capture antibody. DuoSet® Kits also provide a biotinylated detection antibody and streptavidin-HRP, enabling chemiluminescent or colorimetric detection, a mass-calibrated standard, and detailed protocol.

- Contains all of the essential components required to develop an immunoassay for a specific target
- Contains carefully selected and validated antibodies, reducing development time
- Provides sufficient reagents for five or fifteen 96-well plates
- Includes mass-calibrated recombinant standard, reducing assay variability
- Can be adapted for use across multiple platforms

Molecule	Species	Quantikine® ELISA Kits Catalog #	Quantikine® High Sensitivity ELISA Kits Catalog #	DuoSet® ELISA Development Systems Catalog #
IFN- γ	Human	DIF50		DY285
	Mouse	MIF00		DY485
IL-1 β /IL-1F2	Human	DLB50	HSLB00C	DY201
	Mouse	MLB00C		DY401
IL-6	Human	D6050	HS600B	DY206
	Mouse	M6000B		DY406
IL-8/CXCL8	Human	D8000C	HS800	DY208
TNF- α	Human	DTA00C	HSTA00D	DY210
	Mouse	MTA00		DY410

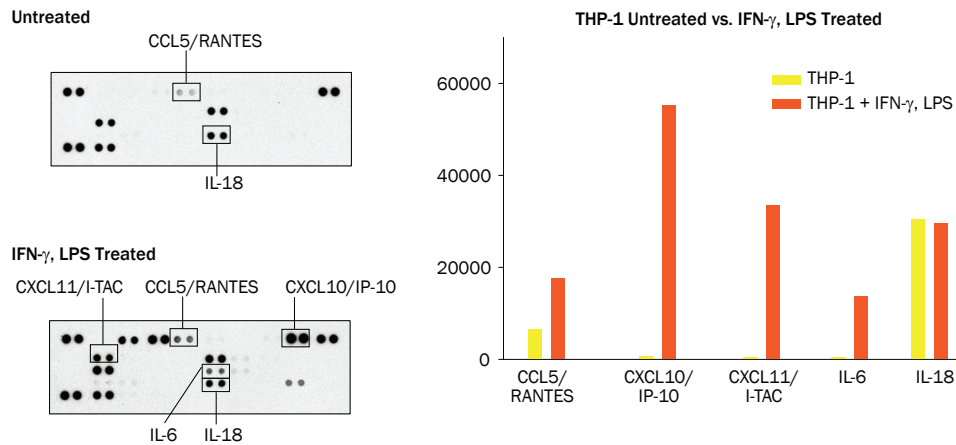
For more information, please visit | rndsystems.com/ELISAs

Multiplex Assays from R&D Systems

R&D Systems also offers Proteome Profiler™ Antibody Arrays and Luminex® Bead-Based Assays for simultaneously profiling the levels of multiple analytes in a single sample. Multiplexing allows researchers to maximize data collection from small sample volumes, minimize experimental variability, and optimize productivity.

Proteome Profiler™ Antibody Arrays

Proteome Profiler Antibody Arrays are available for determining the relative levels of phosphorylated MAPKs, NFκB-related analytes, chemokines, or cytokines in a single sample.



Simultaneous Detection of Multiple Analytes in IFN-γ, LPS-treated THP-1 Cell Lysates using the Proteome Profiler™ Human Cytokine Array. The THP-1 human acute monocytic leukemia cell line was untreated or treated with 1 μg/mL Recombinant Human IFN-γ (R&D Systems, Catalog # 285-IF) for 8 hours and 1 μg/mL lipopolysaccharide (LPS) for 16 hours. Cytokine expression in 200 μg of cell lysate was analyzed using the Proteome Profiler Human Cytokine Array (R&D Systems, Catalog # ARY005B).

Select Proteome Profiler™ Antibody Arrays from R&D Systems

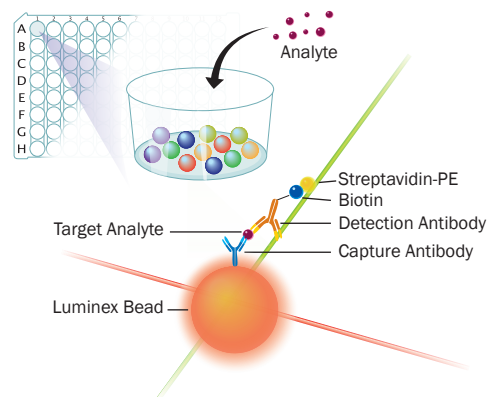
Kit	Catalog #
Proteome Profiler Human Phospho-MAPK Array Kit	ARY002B
Proteome Profiler Human NFκB Pathway Array Kit	ARY029
Proteome Profiler Human Cytokine Array Kit	ARY005B
Proteome Profiler Human XL Cytokine Array Kit	ARY022
Proteome Profiler Human Chemokine Array Kit	ARY017
Proteome Profiler Mouse Cytokine Array Kit, Panel A	ARY006
Proteome Profiler Mouse XL Cytokine Array Kit	ARY028
Proteome Profiler Mouse Chemokine Array Kit	ARY020

Please visit randsystems.com/ProteomeProfiler for a list of analytes detected by each array and the qualified sample types.

Luminex® Assays

R&D Systems offers two versions of our Luminex® bead-based assays. Our standard Luminex Assays offer the largest, customizable menu of analytes for bead-based multianalyte profiling using cell culture supernatants, serum, or plasma samples. These assays allow up to 100 analytes to be simultaneously profiled using polystyrene microparticles or 50 analytes using magnetic particles. Please visit rndsystems.com/LuminexAssay to see our industry-leading selection of analyte combinations.

Luminex High Performance Assays offer defined analyte panels for bead-based multianalyte profiling. These assays rely on panel-optimized diluents that provide maximum performance for a smaller group of analytes than our standard Luminex Assays. Each assay is fully validated for all sample types indicated for a given panel. In-house testing demonstrates that analyte concentrations determined using our Luminex High Performance Assays correlate closely with those obtained using our single analyte Quantikine® ELISA Kits. Please visit rndsystems.com/LuminexPerformance to view a list of available kits.



Custom Services from Bio-technie

When your work demands unique reagents or scientific support, turn to the decades of product development legacy behind Bio-technie's trusted brands. Together with a dedicated project manager, our expert scientists, quality assurance team, and world-class technical support, we will deliver custom solutions tailored to bring you success faster and more economically.

Benefits of Custom Services from Bio-Techne

- Scientific expertise
- Consistency
- Supply
- Large-scale production
- Regulatory support
- Quality results
- Timeliness
- ISO-certified Quality Management System and FDA registered
- Long-term cost savings
- Confidentiality
- Dedicated project managers

What You Can Expect

- Identify the need
- Consult with our experts
- Refine the project specifics, milestones, and deliverables
- Review a statement of work
- Receive regular project updates
- Accept delivery of custom product or service

Custom Services

- Protein Services
- Assay Services
- Antibody Services
- Recombinant Antibody Conversion
- Sister Clone Availability
- Luminex® Custom Services
- Biomarker Testing Service
- Chemistry Services
- Custom Compound Libraries from Tocris
- Bioactivity Testing Services
- Ubiquitin/Proteasome Custom Services



Learn more | rndsystems.com/services

R&D SYSTEMS

 **NOVUS**
BIOLOGICALS

TOCRIS

protein  simple

bio-techne[®]

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

bio-techne.com

