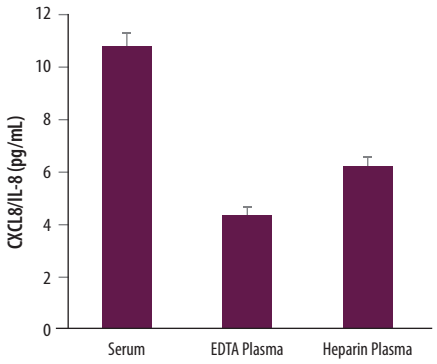
# New Products OCTOBER 2012

## New High Sensitivity Human CXCL8/IL-8 Quantikine® ELISA

Now with 18-fold Greater Sensitivity

CXCL8, alternatively known as Interleukin-8 (IL-8), is a proinflammatory cytokine belonging to the alpha (C-X-C) family of chemokines. CXCL8/IL-8, which signals through the G protein-coupled receptors CXCR1 and CXCR2, is a key mediator of the inflammatory response.[1] It is expressed by numerous cell types, such as monocytes/macrophages, T cells, neutrophils, fibroblasts, endothelial cells, keratinocytes, chondrocytes, and various tumor cells. Inducers of CXCL8/IL-8 secretion include inflammatory signals, environmental stresses, and microbes.[1,2] CXCL8/IL-8 promotes the recruitment of neutrophils to sites of inflammation and initiates the degranulation of neutrophil specific granules and azurophilic granules.[2, 3] It also influences the migration of basophils, T cells, and eosinophils, and stimulates angiogenesis.[1] Aberrant CXCL8/IL-8 secretion can contribute to chronic inflammatory conditions including rheumatoid arthritis, psoriasis, and inflammatory bowel disease.[2-5] Additionally, CXCL8/IL-8 has been reported to play a role in tumor progression and metastasis.[6]

*R&D Systems now offers a Human CXCL8/IL-8 Quantikine High Sensitivity (HS) ELISA Kit (Catalog # HS800) that is designed to measure low concentrations of CXCL8/IL-8 in serum and plasma. Quantikine HS ELISA Kits utilize an alkaline phosphatase-based amplification system to detect proteins with expression levels that may be below the limits for conventional ELISAs. This high sensitivity kit is approximately 18-fold more sensitive than the standard Human CXCL8/IL-8 Quantikine ELISA (Catalog # D8000C). For more information, please see our website at* ***www.RnDSystems.com/QuantikineHS****.*




**Measurement of Human CXCL8/IL-8 in Biological Fluids.** Human serum (N=35) and plasma with EDTA (N=35) or heparin (N=35) were assayed for CXCL8/IL-8 levels using the Human CXCL8/IL-8 Quantikine HS ELISA Kit (Catalog # HS800). Samples were obtained from apparently healthy volunteers.

### References


1. Rollins, B.J. (1997) Blood **90**:909.
2. Baggiolini, M. & I. Clark-Lewis (1992) FEBS Lett. **307**:97.
3. Taub, D. D. *et al*. (1996) J. Clin. Invest. **97**:1931.
4. Skov, L. *et al.* (2008) J. Immunol. **181**:669.
5. Grimm, M.C. *et al.* (1996) Gut **38**:90.
6. Waugh, D.J. & C. Wilson (2008) Clin. Cancer Res. **14**:6735.


## Quantikine® High Sensitivity ELISA Kits

| ANALYTE | SPECIES | SENSITIVITY | RANGE | CATALOG # | SIZE |
|---|---|---|---|---|---|
| CXCL8/IL-8 | Human | 0.4 pg/mL | 1-64 pg/mL | HS800 | 1 Kit |

## Quantikine® ELISA Kits

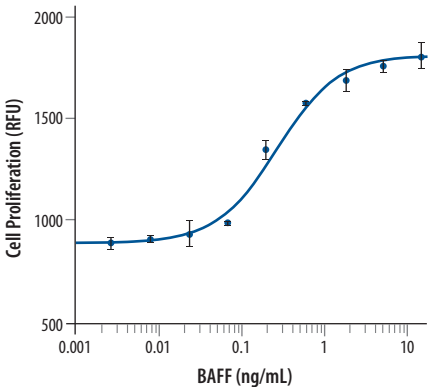
| ANALYTE | SPECIES | SENSITIVITY | RANGE | CATALOG # | SIZE |
|---|---|---|---|---|---|
| C1q R1/CD93 | Human | 0.028 ng/mL | 0.078-5 ng/mL | DCD930 | 1 Kit |
| IL-13 Rα2 | Mouse | 5.6 pg/mL | 39-2,500 pg/mL | M13RA2 | 1 Kit |
| PSG-1 | Human | 0.48 ng/mL | 3.13-200 ng/mL | DPSG10 | 1 Kit |
| SOST/Sclerostin | Mouse/Rat | 4.17 pg/mL | 15.6-1,000 pg/mL | MSST00 | 1 Kit |

## Contents

## B Cell-activating Factor

B Cell-activating Factor (BAFF), also known as BLyS or TNFSF13B, is a type II transmembrane glycoprotein in the tumor necrosis factor ligand superfamily (TNFSF). BAFF is produced by monocytes, neutrophils, dendritic cells, T cells, and adipocytes and can be expressed as a homotrimer or a heterotrimer with APRIL, a related TNFSF member. Membrane-localized BAFF can be proteolytically cleaved into a soluble form and stored by neutrophils until inflammation-induced release. BAFF binds and activates three cell surface-localized TNF superfamily receptors, BCMA, TACI, and BAFF R. While BAFF is critical for B cell differentiation and survival, it also co-stimulates T cells, promotes a Th1-associated immune response, and induces the expansion of regulatory T cell populations.[1-4] Additionally, BAFF promotes monocyte survival, cytokine secretion, and macrophage differentiation.[5] Aberrant expression of BAFF is associated with lymphoid cancers, as well as autoimmune diseases such as lupus, multiple sclerosis, and rheumatoid arthritis, where it is thought that high levels of BAFF may lead to the survival of low-affinity, self-reactive B cells.[6-8]

*R&D Systems now offers a CHO cell-expressed Recombinant Human BAFF/BLyS/TNFSF13B (Catalog # 7537-BF) with no tag. For more information on other BAFF-related products, please visit our website at* ***www.RnDSystems.com/TNFSF****.*




**BAFF Induces B Cell Proliferation.** Mouse B cells were treated with increasing concentrations of Recombinant Human BAFF/BLys/TNFSF13B (Catalog # 7537-BF) and an anti-IgM antibody. B cell proliferation was measured using the redox-sensitive dye Resazurin (Catalog # AR002).

### References


1. Mackay, F. *et al.* (2010) Immunol. Rev. **237**:205.
2. Huard, B. *et al.* (2001) J. Immunol. **167**:6225.
3. Sutherland, A.P. *et al.* (2005) J. Immunol. **174**:5537.
4. Walters, S. *et al.* (2009) J. Immunol. **182**:793.
5. Chang, S.K. *et al.* (2006) Blood **108**:2687.
6. Eibel, H. *et al.* (2010) Curr. Opin. Allergy Clin. Immunol. **10**:526.
7. Mackay, F. & P. Schneider (2009) Nat. Rev. Immunol. **9**:491.
8. Tangye, S.G. *et al.* (2006) Semin. Immunol. **18**:305.


## Recombinant Proteins

| PROTEIN | SPECIES | SOURCE | CATALOG # | SIZE |
|---|---|---|---|---|
| Acetylcholinesterase/ACHE | Human | CHO | 7574-CE-010 | 10 µg |
| Adenosine Deaminase 2/CECR1 | Human | CHO | 7518-AD-010 | 10 µg |
| Aldo-keto Reductase 1B10/AKR1B10 | Human | *Sf* 21 | 7529-DH-020 | 20 µg |
| Axl Fc Chimera* | Mouse | CHO | 7477-AX-050 | 50 µg |
| β-1,4-Galactosyltransferase 2/B4GalT2 | Human | NS0 | 7530-GT-020 | 20 µg |
| BAFF/BLyS/TNFSF13B* | Human | CHO | 7537-BF-025 | 25 µg |
| BMP-8a | Mouse | CHO | 7540-BP-025 | 25 µg |
| Calsyntenin-1 | Human | NS0 | 5346-CL-050 | 50 µg |
| Calsyntenin-2 | Human | NS0 | 5480-CL-050 | 50 µg |
| CD5 | Mouse | NS0 | 115-CD-050 | 50 µg |
| CD7 | Human | HEK293 | 7579-CD-050 | 50 µg |
| CD74 | Mouse | CHO | 7478-CD-050 | 50 µg |
| Pro Collagen II | Human | CHO | 7589-CL-020 | 20 µg |
| COMT | Human | *E. coli* | 7386-MT-010 | 10 µg |
| CRISP-2 | Mouse | NS0 | 4576-CR-050 | 50 µg |
| Cytosolic Sulfotransferase 1C2/SULT1C2 | Human | *E. coli* | 7458-ST-020 | 20 µg |
| DDR2 Fc Chimera | Mouse | NS0 | 7479-DR-050 | 50 µg |
| EDA2R/TNFRSF27/XEDAR Fc Chimera* | Mouse | NS0 | 7554-XD-050 | 50 µg |
| EphA8 Fc Chimera | Human | NS0 | 6828-A8-050 | 50 µg |
| FGF R4 Fc Chimera | Mouse | NS0 | 2265-FR-050 | 50 µg |
| Galectin-9 | Mouse | *E. coli* | 3535-GA-050 | 50 µg |
| Polypeptide GalNac Transferase 2/GALNT2 | Human | NS0 | 7507-GT-020 | 20 µg |
| Polypeptide GalNac Transferase 4/GALNT4 | Human | NS0 | 7528-GT-020 | 20 µg |
| Polypeptide GalNac Transferase 10/GALNT10 | Human | NS0 | 7575-GT-020 | 20 µg |
| Active Heparanase/HPSE | Human | CHO | 7570-GH-005 | 5 µg |
| HGF Propeptide | Human | *Sf* 21 | 7057-HG-010 | 10 µg |
| Histamine N-Methyltransferase/HNMT | Human | *E. coli* | 7637-MT-010 | 10 µg |
| IFN-β (Mammalian) | Mouse | CHO | 12405-1 | 100000 U |
| Insulin R/CD220 | Mouse | CHO | 7544-MR-050 | 50 µg |
| Lymphotoxin βR/TNFRSF3 Fc Chimera | Human | CHO | 7538-LR-100 | 100 µg |
| MARCO | Human | CHO | 7586-MA-050 | 50 µg |
| MDGA1 | Mouse | NS0 | 7587-MD-050 | 50 µg |
| NQO-1 | Human | *E. coli* | 7567-DH-010 | 10 µg |
| PRAT4A | Human | NS0 | 7484-PR-050 | 50 µg |
| PRAT4A | Mouse | NS0 | 4429-PR-050 | 50 µg |
| Pref-1/DLK-1/FA1 | Human | NS0 | 1144-PR-025 | 25 µg |
| Reg2 | Mouse | CHO | 2098-RG-050 | 50 µg |
| Reg3A* | Mouse | CHO | 7539-RG-050 | 50 µg |
| SECTM1 Fc Chimera | Human | CHO | 7559-ST-050 | 50 µg |
| Semaphorin 4F Fc Chimera | Mouse | NS0 | 7200-S4-050 | 50 µg |
| sFRP-3* | Human | NS0 | 7584-SF-025 | 25 µg |
| SLAM/CD150 | Human | NS0 | 164-SL-050 | 50 µg |
| TIGIT Fc Chimera | Mouse | NS0 | 7267-TG-050 | 50 µg |
| TNFRH3/TNFRSF26 Fc Chimera | Mouse | CHO | 5330-RH-050 | 50 µg |
| WIF-1 | Mouse | NS0 | 135-WF-050 | 50 µg |

* New and improved version

# Animal Component-Free Recombinant Proteins

R&D Systems offers animal-free and animal component-free recombinant proteins manufactured in a facility exclusively dedicated to their production and purification. They are expressed in an animal-free certified *Sf* 9 insect cell line using animal-free raw materials and labware.

For a complete product listing, please visit our website at **www.RnDSystems.com/AnimalFree**.

| PROTEIN | SPECIES | SOURCE | CATALOG # | SIZE |
|---|---|---|---|---|
| Animal Component-Free IL-11 | Human | *Sf* 9 | ACFP218 | 50 µg |
| Animal Component-Free Thrombopoietin/TPO | Human | *Sf* 9 | ACFP288 | 50 µg |

# Polyclonal Antibodies

| ANTIBODY | SPECIES | APPLICATION | CATALOG # | SIZE |
|---|---|---|---|---|
| Calcium Activated Nucleotidase 1/CANT1 | Human | IHC, WB | AF6720 | 100 µg |
| Cytokeratin 5 | Human | WB | AF7564 | 100 µg |
| Cytokeratin 18 | Human | WB | AF7619 | 100 µg |
| Dopamine β-Hydroxylase | Human | WB | AF7376 | 100 µg |
| eIF5A | Human/Mouse/Rat | WB | AF7558 | 100 µg |
| FGF acidic | Mouse | B/N, WB | AF4686 | 100 µg |
| gp96/HSP90B1 | Human/Mouse/Rat | WB | AF7606 | 100 µg |
| Hemopexin | Mouse | IHC, WB | AF7007 | 100 µg |
| HMGB1/HMG-1 | Human/Mouse | WB | AF1690 | 100 µg |
| Heparan Sulfate Glucosamine 3-O-Sulfotransferase 3 | Human | WB | AF7276 | 100 µg |
| KLF5 | Human/Mouse | IHC, WB | AF3758 | 100 µg |
| LEF1 | Human | WB | AF7647 | 100 µg |
| MIF | Human/Mouse/Rat | WB | AF1978 | 100 µg |
| MMP-12 | Human | IHC, IP, WB | AF917 | 100 µg |
| NAIP | Mouse | WB | AF7608 | 100 µg |
| Neurocan | Human | IHC | AF6508 | 100 µg |
| PD-ECGF/Thymidine Phosphorylase | Mouse | WB | AF7568 | 100 µg |
| PEAR1 | Mouse | FC, WB | AF7607 | 100 µg |
| PLA2G4A | Human/Mouse | WB | AF6659 | 100 µg |
| PRMT1 | Human/Mouse | WB | AF6016 | 100 µg |
| Protein O-Glucosyltransferase 1/POGLUT1 | Human | WB | AF6437 | 100 µg |
| Prostaglandin E Synthase 2/PTGES2 | Human | WB | AF7627 | 100 µg |
| Inorganic Pyrophosphatase/PPA1 | Human/Mouse/Rat | WB | AF6557 | 100 µg |
| Relaxin-1 | Mouse | IHC, WB | AF6637 | 100 µg |
| Pro Relaxin-3 | Human | IHC, WB | AF3107 | 100 µg |
| Renin R | Human/Mouse | WB | AF5716 | 100 µg |
| SCD-1 | Human | WB | AF7550 | 100 µg |
| Semaphorin 3E | Human/Mouse | IHC, WB | AF3239 | 100 µg |
| TCF-3/E2A | Mouse | WB | AF7650 | 100 µg |
| TGIF1 | Human | WB | AF7555 | 100 µg |
| TIGAR/C12orf5 | Human | WB | AF7629 | 100 µg |

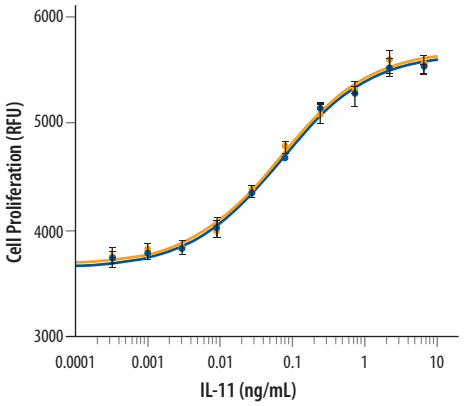
*Continued on page 4.*

## Animal Component-Free Interleukin-11

Interleukin-11 (IL-11), also known as adipogenesis inhibitory factor, is a pleiotropic IL-6 cytokine family member.[1, 2] It signals through IL-11 receptor α and, similar to other IL-6 family cytokines, the gp130 co-receptor.[2, 3] IL-11 is secreted by multiple cell types including chondrocytes, fibroblasts, osteoblasts, synoviocytes, and trophoblasts.[2] Its production is normally induced by pathological stimuli, such as viral-induced inflammation, arthritis, and cancer and is thus rarely found in the serum of healthy individuals.[2] IL-11 synergizes with other cytokines to exert diverse biological activities on multiple cell types including lymphocytes, macrophages, hematopoietic cells, epithelial cells, endothelial cells, and osteoclasts.[2]

Recombinant IL-11 is now available as an Animal Component-Free (ACF) protein. ACF proteins are essential for researchers concerned with experimental variability caused by trace animal components or mammalian pathogens. R&D Systems ACF recombinant proteins are expressed in an animal-free certified *Sf* 9 insect cell line that has undergone screening for viruses, *Mycoplasma* and *Spiroplasma*, and the production and purification of these proteins use dedicated animal-free raw materials and labware. ACF proteins share the same biological activities as those produced by our standard techniques.

*R&D Systems now offers Animal Component-Free Recombinant Human IL-11 (Catalog # ACFP218). For more information, or to read R&D Systems complete ACF statement, please visit our website at* ***www.RnDSystems.com/AnimalFree.***




**Animal Component-Free (ACF) and Conventionally Manufactured IL-11 Exhibit the Same Bioactivity.** Both ACF Recombinant Human IL-11 (Catalog # ACFP218; blue line) and conventionally manufactured Recombinant Human IL-11 (Catalog # 218-IL; orange line) stimulate concentration-dependent proliferation of the T11 mouse plasmacytoma cell line as measured using Resazurin (Catalog # AR002).

### References

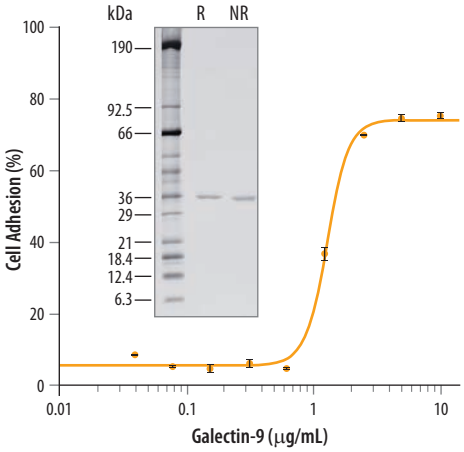
1. Kawashima, I. *et al.* (1991) FEBS Lett. **283**:199.
2. Putoczki, T. & M. Ernst (2010) J. Leukoc. Biol. **88**:1109.
3. Barton, V.A. *et al.* (2000) J. Biol. Chem. **275**:36197.

## Galectin-9

The Galectin family of lectins is characterized by their affinity for N-acetyl-lactosamine-containing glycoproteins. Galectin-9 is a widely expressed tandem-repeat Galectin that contains two carbohydrate-recognition domains connected by a linker region. Different isoforms of Galectin-9 are generated by deletion or insertion within the linker region.

The carbohydrate-binding activity of Galectin-9 is required for its various effects on immune responses. Galectin-9 functions as an eosinophil chemo-attractant and inhibits IgE-based immune complex formation, mast cell degranulation, and anaphylaxis.[1,2] It binds to TIM-3, triggering apoptosis and inhibiting Th1 cell responses.[3,4] Additionally, Galectin-9 may also interact with Th1 and Th2 cells, independently of TIM-3, to promote both apoptosis and cytokine secretion.[5] Galectin-9 also interferes with the associations between hyaluronic acid and CD44, and between VCAM-1 and Integrin $\alpha4\beta1$.[6] This regulates cellular adhesion to the vascular endothelium and suppresses tumor cell metastasis. Furthermore, a Galectin-9 isoform, known as Ecalectin or UAT (urate transporter), can be expressed as an integral membrane protein that mediates the cellular efflux of urate.[7]

*R&D Systems now offers Recombinant Mouse Galectin-9 (Catalog # 3535-GA) and a Rat Anti-Mouse Galectin-9 Monoclonal Antibody (Catalog # MAB3535). Please see pages 2 and 4, respectively, for details. For more information on our products for Galectin-related research, please visit our website at* ***www.RnDSystems.com/Galectins****.*




**Dose-dependent Galectin-9-induced Cell Adhesion.** Recombinant Mouse Galectin-9 (Catalog # 3535-GA) was immobilized on a 96-well microplate at the indicated concentrations. Galectin-9 stimulated the adhesion of the D10.G4.1 mouse helper T cell line in a dose-dependent manner. To highlight purity, Galectin-9 was visualized on a silver stained 4-20% SDS polyacrylamide gel under reducing (R) and non-reducing (NR) conditions (inset).

### References


1. Sato, M. *et al.* (2002) Glycobiology **12**:191.
2. Niki, T. *et al.* (2009) J. Biol. Chem. **284**:32344.
3. Seki, M. *et al.* (2007) Arthritis Rheum. **56**:3968.
4. Zhu, C. *et al.* (2005) Nat. Immunol. **6**:1245.
5. Su, E.W. *et al.* (2011) Glycobiology **21**:1258.
6. Nobumoto, A. *et al.* (2008) Glycobiology **18**:735.
7. Leal-Pinto, E. *et al.* (2002) Am. J. Physiol. Renal Physiol. **283**:F150.


## Polyclonal Antibodies

| ANTIBODY | SPECIES | APPLICATION | CATALOG # | SIZE |
|---|---|---|---|---|
| *Continued from page 3.* | | | | |
| TM4SF1 | Mouse | IHC, WB | AF7514 | 100 µg |
| TMEM219 | Human | WB | AF7556 | 100 µg |
| Tmp21/p23 | Human/Mouse | WB | AF7630 | 100 µg |
| Twist-1 | Human | WB | AF62301 | 100 µg |
| Tyrosine Hydroxylase | Human/Mouse/Rat | IHC, WB | AF7566 | 100 µg |

## Monoclonal Antibodies

| ANTIBODY | SPECIES | APPLICATION | CATALOG # | SIZE |
|---|---|---|---|---|
| A20/TNFAIP3 | Human | WB | MAB7598 | 100 µg |
| ABCA1 | Human | FC, IHC | MAB7207 | 100 µg |
| AG-3 | Human | IHC, WB | MAB6307 | 100 µg |
| Phospho-Akt1 (T308) | Human | IHC, WB | MAB7419 | 100 µg |
| APRIL/TNFSF13 | Human | B/N | MAB5860 | 500 µg |
| β2-Microglobulin | Rat | FC | MAB3864 | 100 µg |
| BLMH/Bleomycin Hydrolase | Human | IHC, WB | MAB6200 | 100 µg |
| Caldesmon/CALD1 | Human | IHC, WB | MAB7569 | 100 µg |
| Caspr1 | Human | IHC | MAB7548 | 100 µg |
| CCL3/MIP-1α | Mouse | IHC, WB | MAB4501 | 100 µg |
| CD19 | Rat | IHC, WB | MAB7489 | 100 µg |
| CD161 | Mouse | FC | MAB7614 | 100 µg |
| CHD7 | Human | IHC | MAB7350 | 100 µg |
| COMMD1 | Human | WB | MAB7526 | 100 µg |
| CRTAC1 | Human | IHC | MAB5234 | 100 µg |
| Cystatin C | Rat | IHC, IP | MAB6154 | 100 µg |
| Cytosolic Sulfotransferase 1B1/SULT1B1 | Human | IHC | MAB5959 | 100 µg |
| DISP1 | Human | IHC | MAB3549 | 100 µg |
| DPP9 | Human | IHC, WB | MAB5419 | 100 µg |
| DPPA5/ESG1 | Mouse | IHC, WB | MAB3984 | 100 µg |
| Endosialin/CD248 | Mouse | IHC | MAB7535 | 100 µg |
| Phospho-ERK1/ERK2 (T202/Y204, T185/Y187) | Human | WB | MAB1825 | 100 µg |
| ERMAP | Human | WB | MAB4928 | 100 µg |
| ERMAP | Human | FC | MAB49281 | 100 µg |
| EVI-1 | Human | WB | MAB7506 | 100 µg |
| F-box protein 15/FBXO15 | Human | FC, IHC | MAB6035 | 100 µg |
| FHL1 | Human | IHC, WB | MAB5938 | 100 µg |
| Galectin-2 | Mouse | IHC, WB | MAB6667 | 100 µg |
| Galectin-9 | Mouse | FC, IHC | MAB3535 | 100 µg |
| Gastrokine 1 | Mouse | IHC, WB | MAB7287 | 100 µg |
| G-CSF R/CD114 | Mouse | FC | MAB60391 | 100 µg |
| GDF-11/BMP-11 | Human | IHC | MAB19581 | 100 µg |
| gp130 | Rat | FC, WB | MAB5029 | 100 µg |
| Hemopexin | Mouse | WB | MAB7007 | 100 µg |

# Monoclonal Antibodies

| ANTIBODY | SPECIES | APPLICATION | CATALOG # | SIZE |
|---|---|---|---|---|
| IL-17 | Canine | B/N | MAB5848 | 500 µg |
| IL-36Ra/IL-1F5 | Mouse | WB | MAB2714 | 100 µg |
| Klotho | Human | B/N | MAB5334 | 500 µg |
| LAMP2/CD107b | Human | FC, IHC, WB | MAB6228 | 100 µg |
| LCoR | Human | IHC | MAB7534 | 100 µg |
| LGI2 | Human | IHC, WB | MAB7334 | 100 µg |
| LRRC4 | Human | IHC | MAB49951 | 100 µg |
| LYAR | Human | IHC, WB | MAB6748 | 100 µg |
| Metadherin | Mouse | WB | MAB7180 | 100 µg |
| NALP3 | Mouse | FC, IHC, WB | MAB7578 | 100 µg |
| Neuropilin-1 | Mouse | FC | MAB5994 | 100 µg |
| Ninjurin-1 | Human | FC, IHC | MAB51051 | 100 µg |
| Nucleoporin NUP85 | Human | WB | MAB5976 | 100 µg |
| Osterix/Sp7 | Human | IHC, WB | MAB7547 | 100 µg |
| Pepsinogen A | Human | IHC, WB | MAB7525 | 100 µg |
| Perilipin-2 | Human | WB | MAB7634 | 100 µg |
| Peroxiredoxin 3 | Human | WB | MAB7504 | 100 µg |
| PI 3-Kinase p55γ | Human/Mouse/Rat | WB | MAB6638 | 100 µg |
| Phospho-PLC-γ2 (Y753) | Human | WB | MAB37161 | 100 µg |
| Phospho-PLC-γ2 (Y759) | Human | IHC, WB | MAB7377 | 100 µg |
| Plexin B2 | Mouse | FC, IHC | MAB6836 | 100 µg |
| Phospho-PRAS40 (T246) | Human/Mouse | IHC, WB | MAB6890 | 100 µg |
| PRELP | Human | IHC | MAB6447 | 100 µg |
| PSMB7 | Human/Mouse | WB | MAB7590 | 100 µg |
| Purine Nucleoside Phosphorylase/PNP | Human | IHC, WB | MAB6486 | 100 µg |
| Phospho-RelA/NFκB p65 (S529) | Human | WB | MAB7624 | 100 µg |
| RIP3 | Human | IHC, WB | MAB7604 | 100 µg |
| ROBO1 | Human | WB | MAB7118 | 100 µg |
| RORγ/RORC/NR1F3 | Human | WB | MAB61091 | 100 µg |
| RORγ/RORC/NR1F3 | Human | WB | MAB61092 | 100 µg |
| S100A8 | Human | IHC, WB | MAB4570 | 100 µg |
| S1P3/EDG-3 | Human | FC | MAB7524 | 100 µg |
| S1P3/EDG-3 | Human | IHC | MAB75241 | 100 µg |
| Semaphorin 3C | Human/Mouse | IHC, WB | MAB1728 | 500 µg |
| Semaphorin 4D/CD100 | Human | IHC | MAB7470 | 100 µg |
| SH2D1A | Human | WB | MAB7440 | 100 µg |
| Siglec-E | Mouse | FC | MAB5806 | 100 µg |
| Phospho-SLP-76/LCP2 (Y145) | Human | IHC, WB | MAB7474 | 100 µg |
| SOCS-5 | Human | WB | MAB4796 | 100 µg |
| Spi-B | Human | WB | MAB7576 | 100 µg |
| ST6 GalNAc α-2,6-sialyltransferase V/ ST6GALNAC5 | Human | IHC | MAB67151 | 100 µg |
| Phospho-STAT3 (S727) | Human | WB | MAB4934 | 100 µg |
| Syntaxin 1A | Human | IHC, WB | MAB7237 | 100 µg |

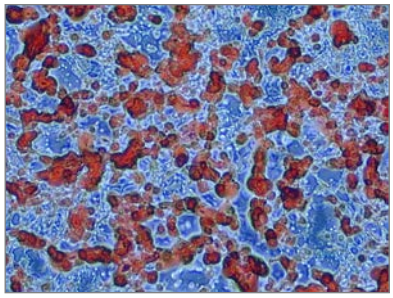
*Continued on page 6.*

## Pref-1

Preadipocyte Factor 1 (Pref-1), also known as Delta-like 1 (DLK-1) and Fetal Antigen 1 (FA1), is a member of the Notch/Delta/Serrate protein family.[1] It is a transmembrane protein that can be proteolytically cleaved to generate soluble forms. Pref-1 is believed to be a co-ligand for Notch signaling, enhancing or inhibiting Notch activation following ligand binding.[2] It is expressed in numerous endocrine cells and is highly expressed in preadipocytes but not in mature adipocytes.[1-5] In adipose tissue, Pref-1 inhibits adipogenesis, and it is often used as a preadipocyte marker.[1-4]

*R&D Systems is now offering Recombinant Human Pref-1/DLK-1/FA1 (Catalog # 1144-PR). Please see page 2 for details. For more information on Pref-1 and additional adipogenesis markers, please visit our website at* ***www.RnDSystems.com/AdipogenesisMarkers****.*

**A.**



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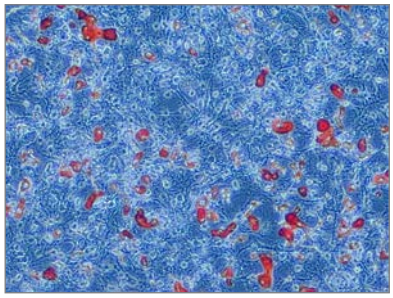

**Pref-1 Inhibits Adipocyte Differentiation.** The 3T3-L1 mouse embryonic fibroblast adipose-like cell line was induced to differentiate into adipocytes either in the absence **(A)** or presence **(B)** of Recombinant Human Pref-1 (Catalog # 1144-PR), an inhibitor of adipogenesis. Adipocytes were then visualized with the lipid staining compound Oil Red O.

### References


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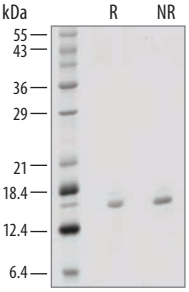
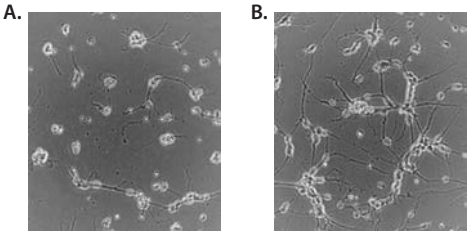
## Reg2 & Reg3A

Mouse Regenerating Islet-derived Protein 2 (Reg2) and Reg3A are members of the Reg family of secreted C-type lectin domain-containing pancreatic proteins.[1] Reg2 is expressed primarily by acinar cells in the normal exocrine pancreas and is upregulated in response to pancreatic injury or pancreatitis.[2,3] A Reg2 ortholog has yet to be discovered in humans or rats.[1] Reg3A, also known as Reg-IIIα, Pancreatitis-associated Protein 2 (PAP2) in rats, and Human Islet Peptide/PAP (HIP/PAP) in humans, is a pancreatic secretory protein that is thought to be involved in cell proliferation and differentiation.[4,5] It is mainly expressed in the intestinal tract and acinar cells, and in islet α cells of the exocrine pancreas.[2,6,7] Increased expression of Reg3A is observed during pancreatic inflammation and liver carcinogenesis.[8,9] Additionally, Reg3A expression in rat dorsal root ganglion neurons can be increased by nerve injury and inflammation.[10]

*R&D Systems now offers Recombinant Mouse Reg2 (Catalog # 2098-RG) and Recombinant Mouse Reg3A (Catalog # 7539-RG). Please see page 2 for details. For more information on our products for lectin related research, please visit our website at* ***www.RnDSystems.com/Lectin.***




**Recombinant Mouse Reg3A Purity.** Recombinant Mouse Reg3A (Catalog # 7539-RG) is visualized on a silver stained 15% SDS polyacrylamide gel under reducing (R) and non-reducing (NR) conditions.




**Reg3A Stimulates Cortical Neurite Outgrowth.** E16-E18 rat cortical neurons were grown on a nitrocellulose-coated plate either in the absence **(A)** or presence **(B)** of Recombinant Mouse Reg3A (Catalog # 7539-RG; 10 µg/mL). Neurite outgrowth is significantly enhanced in the presence of Reg3A.

### References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## Monoclonal Antibodies

| ANTIBODY | SPECIES | APPLICATION | CATALOG # | SIZE |
|---|---|---|---|---|
| *Continued from page 5.* | | | | |
| TEX19.1 | Mouse | IHC, WB | MAB66451 | 100 µg |
| TGF-β2 | Mouse | B/N | MAB7346 | 500 µg |
| TRAM/TICAM2 | Mouse | IHC | MAB43481 | 100 µg |
| Transthyretin/Prealbumin | Human | IHC, WB | MAB7505 | 100 µg |
| Tumstatin | Human | WB | MAB7546 | 100 µg |
| Tyrosine Hydroxylase | Human | IHC, WB | MAB7566 | 100 µg |
| Uromodulin | Mouse | IHC, WB | MAB5175 | 100 µg |
| VIAAT/SLC32A1 | Human | IHC | MAB6847 | 100 µg |

## Fluorochrome-labeled Antibodies

| ANTIBODY | SPECIES | LABEL | CATALOG # | SIZE |
|---|---|---|---|---|
| β2-Microglobulin | Rat | Alexa Fluor® 488 | FAB7438G | 100 Tests |
| BTLA | Mouse | Allophycocyanin | FAB7600A | 100 Tests |
| BTLA | Mouse | Alexa Fluor 488 | FAB7600G | 100 Tests |
| CD1b | Human | Allophycocyanin | FAB7446A | 100 Tests |
| CD1b | Human | Alexa Fluor 488 | FAB7446G | 100 Tests |
| CD1b | Human | Phycoerythrin | FAB7446P | 100 Tests |
| CD34 | Human | Alexa Fluor 488 | FAB72271G | 100 Tests |
| CD34 | Human | Phycoerythrin | FAB72271P | 100 Tests |
| CD44 | Rat | Allophycocyanin | FAB6577A | 100 Tests |
| CD44 | Rat | Alexa Fluor 488 | FAB6577G | 100 Tests |
| CD44 | Rat | Phycoerythrin | FAB6577P | 100 Tests |
| CD161 | Human | Allophycocyanin | FAB7448A | 100 Tests |
| CD161 | Human | Alexa Fluor 488 | FAB7448G | 100 Tests |
| CD161 | Human | Phycoerythrin | FAB7448P | 100 Tests |
| CD161 | Mouse | Allophycocyanin | FAB7614A | 100 Tests |
| CD161 | Mouse | Alexa Fluor 488 | FAB7614G | 100 Tests |
| CD161 | Mouse | Phycoerythrin | FAB7614P | 100 Tests |
| CLEC10A/CD301 | Human | Phycoerythrin | FAB48881P | 100 Tests |
| CLEC14A | Human | Allophycocyanin | FAB7436A | 100 Tests |
| CLEC14A | Human | Alexa Fluor 488 | FAB7436G | 100 Tests |
| CLEC14A | Human | Phycoerythrin | FAB7436P | 100 Tests |
| DLL4 | Mouse | Allophycocyanin | FAB1389A | 100 Tests |
| DLL4 | Mouse | Alexa Fluor 488 | FAB1389G | 100 Tests |
| EOMES | Human | Allophycocyanin | IC6166A | 100 Tests |
| EOMES | Human | Alexa Fluor 488 | IC6166G | 100 Tests |
| FCRL1/FcRH1 | Mouse | Allophycocyanin | FAB7286A | 100 Tests |
| FCRL1/FcRH1 | Mouse | Phycoerythrin | FAB7286P | 100 Tests |
| FCRL3/FcRH3 | Human | Allophycocyanin | FAB3126A | 100 Tests |
| FCRL3/FcRH3 | Human | Alexa Fluor 488 | FAB3126G | 100 Tests |
| FCRL3/FcRH3 | Human | Phycoerythrin | FAB3126P | 100 Tests |
| Gi24/Dies1/VISTA | Mouse | Allophycocyanin | FAB7005A | 100 Tests |
| Gi24/Dies1/VISTA | Mouse | Alexa Fluor 488 | FAB7005G | 100 Tests |

# Fluorochrome-labeled Antibodies

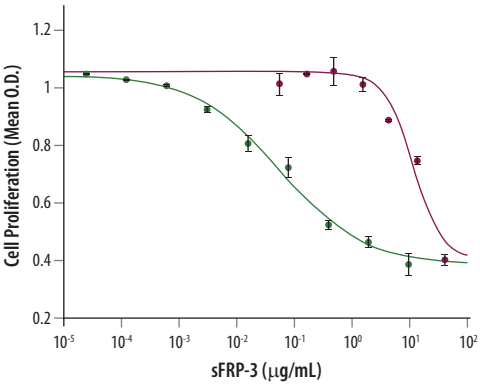
| ANTIBODY | SPECIES | LABEL | CATALOG # | SIZE |
|---|---|---|---|---|
| Glut2 | Mouse | Allophycocyanin | FAB1440A | 100 Tests |
| Glut2 | Mouse | Phycoerythrin | FAB1440P | 100 Tests |
| gp130 | Rat | Allophycocyanin | FAB5029A | 100 Tests |
| IL-2 Rα | Rat | Allophycocyanin | FAB5156A | 100 Tests |
| IL-27/IL-35 EBI3 Subunit | Mouse | Phycoerythrin | IC18341P | 100 Tests |
| Indoleamine 2,3-dioxygenase/IDO | Human | Phycoerythrin | IC6030P | 100 Tests |
| Integrin αX/CD11c | Mouse | Allophycocyanin | FAB69501A | 100 Tests |
| Jagged 2 | Mouse | Allophycocyanin | FAB4748A | 100 Tests |
| Jagged 2 | Mouse | Phycoerythrin | FAB4748P | 100 Tests |
| LAMP2/CD107b | Human | Allophycocyanin | IC6228A | 100 Tests |
| LAMP2/CD107b | Human | Alexa Fluor 488 | IC6228G | 100 Tests |
| LAMP2/CD107b | Human | Phycoerythrin | IC6228P | 100 Tests |
| LIF Rα | Mouse | Allophycocyanin | FAB5990A | 100 Tests |
| LIF Rα | Mouse | Phycoerythrin | FAB5990P | 100 Tests |
| MINA | Human | Allophycocyanin | IC7476A | 100 Tests |
| MINA | Human | Alexa Fluor 488 | IC7476G | 100 Tests |
| MINA | Human | Phycoerythrin | IC7476P | 100 Tests |
| MMP-24/MT5-MMP | Human/Mouse | Allophycocyanin | FAB924A | 100 Tests |
| MMP-24/MT5-MMP | Human/Mouse | Alexa Fluor 488 | FAB924G | 100 Tests |
| MMP-24/MT5-MMP | Human/Mouse | Phycoerythrin | FAB924P | 100 Tests |
| Neuropilin-1 | Mouse | Allophycocyanin | FAB5994A | 100 Tests |
| Neuropilin-1 | Mouse | Phycoerythrin | FAB5994P | 100 Tests |
| Ninjurin-1 | Human | Allophycocyanin | FAB51051A | 100 Tests |
| NKG2C/CD159c | Human | Alexa Fluor 700 | FAB138N | 100 Tests |
| OSM Rβ | Mouse | Phycoerythrin | FAB662P | 100 Tests |
| Plexin B2 | Mouse | Allophycocyanin | FAB6836A | 100 Tests |
| Plexin B2 | Mouse | Alexa Fluor 488 | FAB6836G | 100 Tests |
| Plexin B2 | Mouse | Phycoerythrin | FAB6836P | 100 Tests |
| Plexin D1 | Human | Allophycocyanin | FAB7536A | 100 Tests |
| Plexin D1 | Human | Phycoerythrin | FAB7536P | 100 Tests |
| S1P1/EDG-1 | Mouse | Biotin | FAB7089B | 100 Tests |
| Semaphorin 4A | Human | Allophycocyanin | FAB4694A | 100 Tests |
| Semaphorin 4D/CD100 | Human | Allophycocyanin | FAB74701A | 100 Tests |
| Semaphorin 4D/CD100 | Human | Alexa Fluor 488 | FAB74701G | 100 Tests |
| Semaphorin 4D/CD100 | Human | Phycoerythrin | FAB74701P | 100 Tests |
| Siglec-H | Mouse | Allophycocyanin | FAB7319A | 100 Tests |
| Siglec-H | Mouse | Alexa Fluor 488 | FAB7319G | 100 Tests |
| Siglec-H | Mouse | Phycoerythrin | FAB7319P | 100 Tests |
| STING/TMEM173 | Human | Alexa Fluor 488 | FAB7169G | 100 Tests |
| STING/TMEM173 | Human | Phycoerythrin | FAB7169P | 100 Tests |
| TCR γ/δ | Mouse | Allophycocyanin | FAB7297A | 100 Tests |
| TCR γ/δ | Mouse | Alexa Fluor 488 | FAB7297G | 100 Tests |
| TCR γ/δ | Mouse | Phycoerythrin | FAB7297P | 100 Tests |
| TLR9 | Human | Alexa Fluor 488 | IC7108G | 100 Tests |
| TRANCE/TNFSF11/RANK L | Human | Allophycocyanin | FAB6264A | 100 Tests |
| TRANCE/TNFSF11/RANK L | Human | Phycoerythrin | FAB6264P | 100 Tests |

## Wnt Inhibitors: WIF-1 and sFRP-3

The Wnt signaling pathway is a highly conserved signal transduction cascade that has a central role in a myriad of biological processes including embryonic development and tissue regeneration. Wnt signaling is tightly regulated and can be inhibited by several antagonists that bind either to the Wnt ligand itself or to Wnt receptors. Wnt Inhibitory Factor-1 (WIF-1) is a secreted protein that binds directly to Wnt proteins via its WIF domain and blocks receptor binding.[1,2] It fine-tunes Wnt signaling by time- and location-specific expression, especially during joint development and cardiomyogenesis.[3-5] WIF-1 has been shown to bind to Wnt-3a, -4a, -5, -7a, -9a, and -11 with little or no binding to Wnt-5b, -7b, and -9b.[3]

Secreted Frizzled-related Proteins (sFRP) bind to Wnt proteins through their N-terminal cysteine-rich domains (CRDs), which are homologous to the CRDs found in the Frizzled family of Wnt receptors. sFRP-3 neutralizes the bioactivity of Wnt-1, -5a, -9a, and Xwnt-8. It has been shown to regulate somitic myogenesis and osteoblast differentiation, as well as morphogenesis of the cochlear epithelium, hair follicle, and cardiac atrioventricular cushion.[6-10]

*R&D Systems now offers Recombinant Mouse WIF-1 (Catalog # 135-WF) and a new Recombinant Human sFRP-3 (Catalog # 7584-SF), which was developed without the histidine tag for increased bioactivity. Please see page 2 for details. For more information on our products for Wnt-related research, please visit our website at* ***www.RnDSystems.com/Wnt****.*




**Comparison of the Activity of Tagged and Untagged sFRP-3.** The HeLa human cervical epithelial carcinoma cell line was treated with a histidine-tagged Recombinant Human sFRP-3 (Catalog # 192-SF; purple line) or Recombinant Human sFRP-3 without the histidine tag (Catalog # 7584-SF; green line) for 72 hours. Cell proliferation was determined using the MTT Cell Proliferation/Viability Assay (Catalog # 4890-025-K). The sFRP-3 protein developed without the histidine tag exhibits greater activity in this assay.

### References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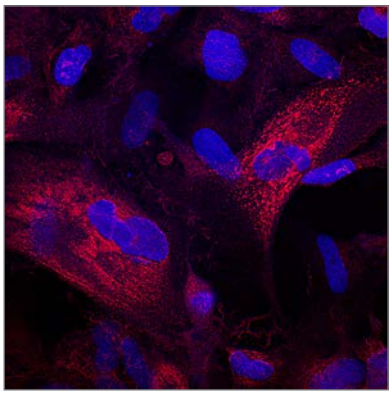
## Phospho-Akt1 (T308)

The Akt family of serine/threonine protein kinases, also known as protein kinase B (PKB), is comprised of three highly homologous members: Akt1 (PKBα), Akt2 (PKBβ), and Akt3 (PKBγ). These kinases are central to many cellular processes including glucose uptake, cell proliferation, and apoptosis. In addition, their activity is often dysregulated in many cancer types.[1] Akt1 is a key protein in growth and proliferation signaling pathways. Full activation of Akt by growth factors is dependent on phosphorylation on T308 by PDK-1 and PDK-2, and on S473 by mTORC.[2-4] Akt can also be phosphorylated on T308 and S473 by IKKε.[4] Although phosphorylation on both T308 and S473 is required for maximal activation of Akt, phosphorylation on T308 appears to be a more reliable marker for Akt function. For example, only phosphorylation on T308 is required for Akt activity in human platelets.[5] Furthermore, Akt phosphorylation on T308, but not S473, correlates with poor prognosis in acute myeloid leukemia and with Akt activity in human non-small cell lung cancer.[6,7]

*R&D Systems now offers a Mouse Anti-Human Phospho-Akt1 (T308) Monoclonal Antibody (Catalog # MAB7419). This antibody also recognizes mouse phospho-Akt1 (T308) by Western blot. Please see page 4 for more details. For more information, please visit our website at* ***www.RnDSystems.com/IntracellularKinases****.*



**Phospho-Akt1 (T308) in CCD-1070Sk Cells.** The CCD-1070Sk human foreskin fibroblast cell line was stimulated with Recombinant Human PDGF-BB (Catalog # 220-BB). Phosphorylated Akt1 (T308) was subsequently detected in immersion-fixed cells using a Mouse Anti-Human Phospho-Akt1 (T308) Monoclonal Antibody (Catalog # MAB7419). Cells were stained using the NorthernLights™ 557-conjugated Donkey Anti-Mouse IgG Secondary Antibody (Catalog # NL007; red) and nuclei were counterstained with DAPI (blue). Specific staining was localized to the cytoplasm.

### References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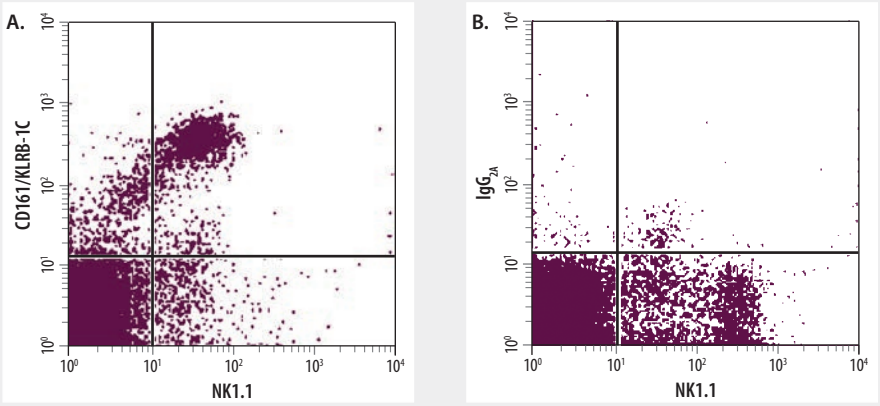
## CD161/KLRB-1C

Mouse CD161/KLRB-1C, also known as NK1.1, is a member of the killer cell lectin-like family of receptors. It is used as a standard marker for mouse natural killer (NK) cells and subpopulations of natural killer T (NKT) cells, $CD4^+$, $CD8^+$, and γδ T cells in select laboratory mouse strains.[1] Similarly, human CD161 is a marker for NK cells and Th17 cells, as well as subsets of monocytes and dendritic cells. Upon binding its ligand, OCIL/CLEC2d, CD161 acts to inhibit NK cell-mediated cytotoxicity.[2,3] Alternatively, CD161 can enhance TCR activation by CD1d ligation.[4] $CD161^+$ cell populations are depleted in ulcerative colitis, Graves' disease, and AIDS.[5-7]

*R&D Systems now offers an unconjugated (Catalog # MAB7614) and an APC-, PE-, or Alexa Fluor® 488-conjugated Rat Anti-Mouse CD161/KLRB-1C Monoclonal Antibody (Catalog # FAB7614A, FAB7614P, FAB7614G, respectively). These antibodies stain the same population of cells as the commonly used NK1.1 (PK136) antibody. R&D Systems also offers an APC-, PE-, or Alexa Fluor 488-conjugated Mouse Anti-Human CD161 Monoclonal Antibody (Catalog # FAB7448A, FAB7448P, FAB7448G, respectively). Please see pages 4 and 6 for details. For more information, please visit our website at* ***www.RnDSystems.com/NKCells****.*




**Detection of CD161/KLRB-1C by Flow Cytometry.** C57/B6 mouse splenocytes were stained with a PE-conjugated anti-mouse NK1.1 monoclonal antibody (Clone PK136) and either an **(A)** APC-conjugated Rat Anti-Mouse CD161/KLRB-1C Monoclonal Antibody (Catalog # FAB7614A) or an **(B)** APC-conjugated Rat $IgG_{2A}$ Isotype Control (Catalog # IC006A).

### References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## DuoSet® ELISA Development Systems

| ANALYTE | SPECIES | CATALOG # | *REAGENTS FOR |
|---|---|---|---|
| α2-Macroglobulin | Human | DY1938 | 15 Plates |
| Albumin | Human | DY1455 | 15 Plates |
| CCL3/MIP-1α | Canine | DY7370 | 15 Plates |
| FGF-21 | Human | DY2539 | 15 Plates |
| Galectin-3BP/MAC-2BP | Human | DY2226 | 15 Plates |
| Glypican 3 | Human | DY2119 | 15 Plates |
| IL-13 Rα2 | Mouse | DY539 | 15 Plates |
| IL-17F | Rat | DY4437 | 15 Plates |
| IL-29/IFN-λ1 | Human | DY7246 | 15 Plates |
| Myeloperoxidase/MPO | Mouse | DY3667 | 15 Plates |
| Periostin/OSF-2 | Human | DY3548 | 15 Plates |
| Serpin A12 | Human | DY4410 | 15 Plates |

**Also available in 45 plate Economy Packs for $1390.*

## DuoSet® IC (Intracellular) ELISA Development Systems

| ANALYTE | SPECIES | CATALOG # | *REAGENTS FOR |
|---|---|---|---|
| GAPDH/G3PDH | Human/Mouse/Rat | DYC5718-2 | 2 Plates |

**Also available in 5 plate packs for $645 and 15 plate Economy Packs for $1390.*

# Cell-Based ELISA Assay Kits

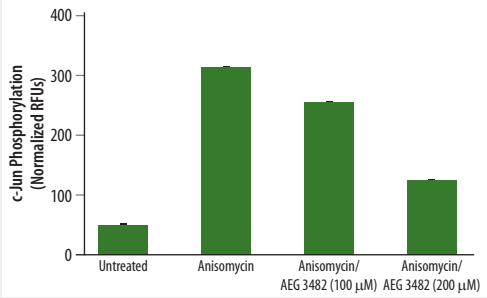
| ANALYTE | SPECIES | CATALOG # | SIZE |
|---|---|---|---|
| Total β-Catenin Cell-Based ELISA | Human/Mouse | KCB1329 | 1 Kit |
| Phospho-c-Jun (S63), Cell-Based ELISA | Human/Mouse/Rat | KCB7499 | 1 Kit |

## Human/Mouse/Rat Phospho-c-Jun (S63) Cell-Based ELISA

R&D Systems now offers a Human/Mouse/Rat Phospho-c-Jun (S63) Cell-Based ELISA (Catalog # KCB7499). c-Jun, an AP-1 transcription factor, regulates cell proliferation and can induce oncogenic transformation. The Phospho-c-Jun Cell-Based ELISA is a fluorescence-based assay that measures phosphorylated c-Jun (S63) and total c-Jun in whole, fixed, adherent or non-adherent cells, eliminating the need for lysate preparation. Additionally, the two proteins are measured simultaneously in the same microplate well permitting normalization of the signals and correcting for well-to-well variations in cell numbers. For more information on Cell-Based ELISAs, please visit our website at **www.RnDSystems.com/CellBasedELISA**.

## Features

- ✓ No lysate preparation required
- ✓ Results with as few as 10,000 cells per well
- ✓ Measure phospho and total proteins simultaneously in the same well
- ✓ Design allows for normalization of well-to-well variations
- ✓ No specialized equipment needed
- ✓ Excellent alternative to Western blot




**Simultaneous Measurement of Phosphorylated and Total c-Jun in HeLa Cells.** The HeLa human epithelial cervical carcinoma cell line was untreated or treated with Anisomycin (Catalog # 1290), an inducer of stress-activated kinases. After fixation and permeabilization of the cells, phospho-c-Jun (S63) levels were determined and normalized to total c-Jun in the same wells using the Human/Mouse/Rat Phospho-c-Jun (S63) Cell-Based ELISA Kit (Catalog # KCB7499). Pretreatment of the cells with AEG 3482 (Catalog # 2651), a suppressor of JNK signaling pathways, inhibited c-Jun (S63) phosphorylation in a dose-dependent manner. Values represent mean ± range of duplicate determinations.

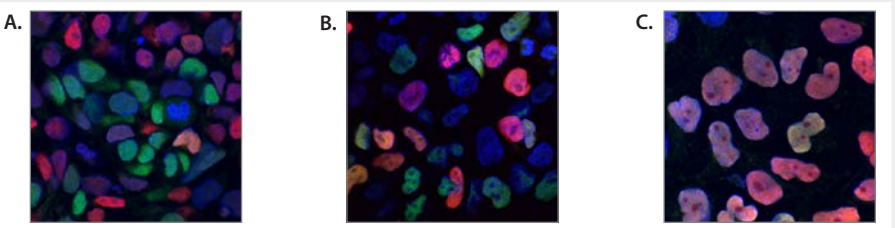
# Stem Cell Kits & Reagents

| MEDIA | SPECIES | CATALOG # | SIZE |
|---|---|---|---|
| Three Germ Layer 3-color Immunocytochemistry Kit | Human | SC022 | 1 Kit |

*Fluorochrome-conjugated antibodies for the single-step immunocytochemical staining of human pluripotent stem cells differentiated into each of the three germ layers. Antibodies conjugated to NorthernLights™ (NL) Fluorochromes included in the kit: Anti-human SOX1-NL493, Otx-2-NL557, Brachyury-NL557, HAND1-NL637, GATA-4-NL493, and SOX17-NL637.*

## Human Three Germ Layer 3-Color Immunocytochemistry Kit

Pluripotent stem cells are characterized by their ability to self-renew and to differentiate into cells of the three germ layers. Verification of pluripotency *in vitro* is critical to reduce variability and improve data consistency. R&D Systems now offers a Human Three Germ Layer 3-Color Immunocytochemistry Kit (Catalog # SC022) for the verification of human stem cell pluripotency. This kit contains six fluorochrome-conjugated antibodies that can be used for single-step immunocytochemical staining of human pluripotent stem cells that have differentiated into cell of each of the three germ layers. For additional stem cell products, please visit our website at **www.RnDSystems.com/StemCells**.

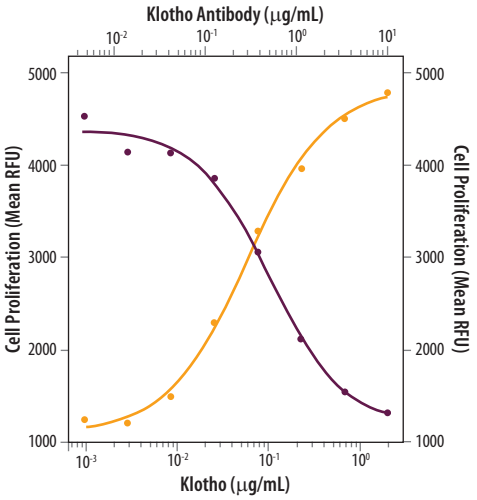



**Expression of Germ Layer Markers in Differentiated Pluripotent Stem Cells.** iPS2 human induced pluripotent stem cells were differentiated into each of the three germ layers using materials provided in the Human Pluripotent Stem Cell Functional Identification Kit (Catalog # SC027). Germ layer differentiation was verified using antibodies provided in the Human Three Germ Layer 3-Color Immunocytochemistry Kit (Catalog # SC022). **A.** Ectoderm differentiated cells were simultaneously stained with NL557-conjugated Otx-2 (red) and NL493-conjugated SOX1 (green). **B.** Mesoderm differentiated cells were simultaneously stained with NL557-conjugated Brachyury (red) and NL637-conjugated HAND1 (green). **C.** Endoderm differentiated cells were simultaneously stained with NL637-conjugated SOX17 (red) and NL493-conjugated GATA-4 (green). All nuclei were counterstained with DAPI (blue).

## Klotho

Klotho is a type I transmembrane protein that exists in both a membrane bound (mKL) and secreted (sKL) form.[1,2] mKL is primarily expressed in the kidney, although it has also been detected in other tissues such as the brain and parathyroid.[3] mKL mediates phosphate homeostasis through its interactions with FGF receptors (FGF R). By binding to FGF R, mKL increases the affinity of the mKL-FGF R complex for the bone-derived factor FGF-23.[4,5] In response to elevated serum phosphate levels, FGF-23 binds to the Klotho-FGF R complex and reduces phosphate levels by increasing phosphate excretion and decreasing Vitamin D synthesis. Mice expressing disrupted Klotho have been shown to display hyperphosphatemia, elevated Vitamin D levels, and unexpected phenotypes such as hypoglycemia and accelerated aging.[3] It has been reported that all phenotypes associated with the disruption of Klotho expression can be resolved by restoring phosphate and Vitamin D levels.[6] In humans, renal Klotho levels are decreased in chronic renal failure and other conditions that affect phosphate homeostasis.[7]

*R&D Systems now offers a Rat Anti-Human Klotho Monoclonal Antibody for neutralization (Catalog # MAB5334). Please see page 5 for details. For additional FGF- and Klotho-related products, please visit our website at* ***www.RnDSystems.com/FGFFamily****.*




**Neutralization of Klotho-induced Proliferation of BaF3 Pro-B Cells.** The BaF3 mouse pro-B cell line, transfected with human FGF R IIIc, was grown in the presence of increasing concentrations of Recombinant Human Klotho (Catalog # 5334-KL). Cell proliferation was assessed in a fluorometric assay using the redox sensitive dye Resazurin (Catalog # AR002; orange line). Proliferation elicited by 0.3 µg/mL Recombinant Human Klotho was neutralized in a dose-dependent manner using a Rat Anti-Human Klotho Monoclonal Antibody (Catalog # MAB5334; purple line).

### References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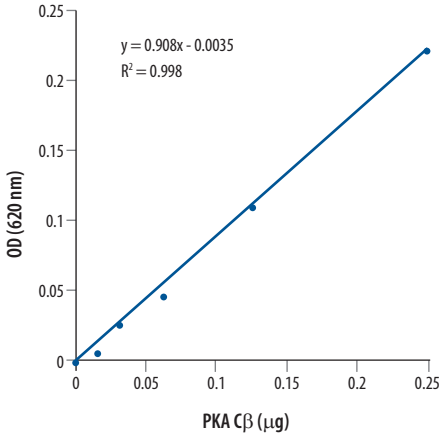
## Universal Kinase Activity Kit

More than 500 kinases are found in the human genome.[1] These enzymes regulate almost all cellular processes by adding phosphate groups to target molecules, thereby modifying the activity, localization, and overall function of their targets. Consequently, abnormal activity of kinases underlies many diseases including cancer. To aid in assessing kinase activity *in vitro*, R&D Systems now offers a Universal Kinase Activity Kit (Catalog # EA004).[2] The majority of kinases use ATP as the phosphate donor, transferring the terminal phosphate group of ATP to the substrate protein and producing ADP as a by-product. The Universal Kinase Activity Kit is an ADP-based phosphatase-coupled kinase assay that utilizes CD39L2/ENTPD6 as a coupling phosphatase. CD39L2 releases the β-phosphate from ADP, and the released inorganic phosphate is detected using malachite green reagents. The amount of inorganic phosphate released is proportional to the amount of ADP generated during the kinase reaction and thus, reflects the kinetics of the reaction. For more information, please visit our website at **www.RnDSystems.com/KinaseAssay.**

### Features

- ✓ Applicable for all kinase reactions that produce ADP
- ✓ Non-radioactive
- ✓ No labeling, conjugation, or antibody is used
- ✓ Quantitative
- ✓ Amenable to high-throughput analysis




**Measuring PKA Cβ Specific Activity.** The activity of Recombinant Human PKA Cβ (Catalog # 4596-KS) was assayed using the Universal Kinase Activity Kit (Catalog # EA004). PKA Cβ catalyzed the transfer of phosphate from ATP to a PKA peptide substrate. Inorganic phosphate was generated from ADP with the phosphatase CD39L2 (0.1 µg/50 µL) and the levels were measured using malachite green detection reagents. The specific activity (SA) of PKA Cβ was 670 pmol/min/µg. This was calculated using the slope (0.908 OD/µg), the phosphate conversion factor (*CF*, 3505 pmol/OD), the reaction time (*t*, 10 minutes), and the coupling rate (*r*, 0.475), according to the equation:

$$SA = \frac{slope \times CF}{r \times t}$$

### References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2. Wu, Z.L. (2011) PLoS One **6**:e23172.


## ELISpot Kits

For the detection and quantitation of analyte-specific secreting cells.

| ANALYTE | SPECIES | CATALOG # | REAGENTS FOR |
|---|---|---|---|
| IFN-γ/IL-5 Dual-Color Kit | Mouse | ELD7420 | 1 Kit |

## Glycobiology Assay Reagents

| ANALYTE | SPECIES | CATALOG # | SIZE |
|---|---|---|---|
| PAPS | Multi-species | ES019 | 500 µg |

## Kinase Activity Assays

| ASSAY | SPECIES | CATALOG # | SIZE |
|---|---|---|---|
| Universal Kinase Activity Kit | Multi-species | EA004 | 1 Kit |
| *Non-radioactive, plate-based kit to assess the activity of most kinases in vitro.* | | | |

## PlusCellect™ Cell Selection & Identification Kits

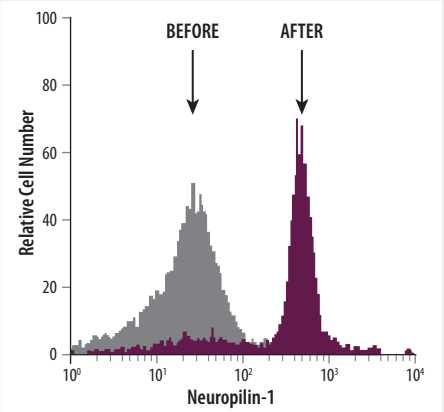
For the isolation and identification of rare cell populations using a positive selection method.

| CELL TYPE | SPECIES | CATALOG # | CELLS PROCESSED |
|---|---|---|---|
| CD34⁺ Hematopoietic Progenitor Cells | Human | PLS7227 | 1x10⁹ cells |
| Neuropilin-1⁺ Cells | Human | PLS3870 | 1x10⁹ cells |

### Neuropilin-1⁺ Cell Enrichment

Neuropilin-1, a type I transmembrane glycoprotein, first gained attention as a co-receptor for Semaphorin axon guidance cues.[1,2] It was also described as a co-receptor for VEGF with a putative role in angiogenesis in both pathological and physiological conditions.[3,4] Neuropilin-1 activities have since been expanded to include the ability to promote osteoblastic bone formation, regulate thymocyte migration, and direct dendritic cell entry into the lymphatics.[5-7] In contrast to mice where it is found on several peripheral blood cell types, Neuropilin-1 expression in humans appears to be restricted primarily to cells with a phenotype consistent with plasmacytoid dendritic cells.[8-11] Due to this limited expression pattern, Neuropilin-1 may be used to isolate this dendritic cell subset.

R&D Systems is now offering a PlusCellect Human Neuropilin-1⁺ Cell Isolation Kit (Catalog # PLS3870). This kit contains a biotinylated anti-human Neuropilin-1 selection antibody that is used in conjunction with streptavidin-conjugated microparticles and a suitable magnet system to enrich for the cells of interest. A PE-conjugated anti-Neuropilin-1 antibody is also included in the kit to assess enrichment efficiency, which typically falls between 80 and 95%. For more information on R&D Systems cell selection and detection kits, please visit our website at **www.RnDSystems.com/CellSelection**.




**Enrichment of Neuropilin-1⁺ Cells from PBMCs.** Neuropilin-1⁺ cells were isolated from human peripheral blood mononuclear cells (PBMCs) using the PlusCellect Human Neuropilin-1⁺ Cell Isolation Kit (Catalog # PLS3870). The cells were labeled both before and after enrichment with the PE-conjugated anti-Neuropilin-1 antibody included in the kit.

### References


1. He, Z. & M. Tessier-Lavigne (1997) Cell **90**:739.
2. Kolodkin, A.L. *et al.* (1997) Cell **90**:753.
3. Soker, S. *et al.* (1998) Cell **92**:735.
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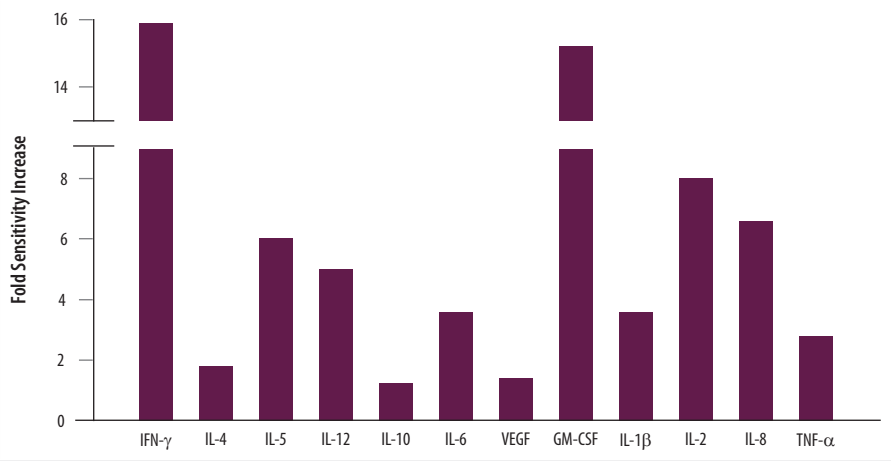
# Fluorokine® Multianalyte Profiling (MAP) Kits for the Luminex® Platform

## Human *High Sensitivity* Cytokine Fluorokine MAP Kit

A combination of increased sensitivity and custom multianalyte profiling. Design your own multiplex immunoassay for the simultaneous detection of up to 12 human cytokines in a single sample of serum or plasma.




**Cytokine Multiplexing with Increased Sensitivity.** The Fluorokine MAP Human High Sensitivity Cytokine Kit offers custom multianalyte profiling with up to 16 times the sensitivity of currently available bead sets.

**Kit can be purchased 2 ways to fit the needs of the individual researcher.**

### 1. BASE KIT AND BEAD SETS

Fluorokine MAP Kits can be purchased as a Base Kit and individual Bead Sets. Each Bead Set contains analyte-specific, antibody-coated beads and biotinylated detection antibodies for the molecule of interest. Beads and antibody cocktails are mixed by the end user.

| ANALYTE | CATALOG # | SIZE |
|---|---|---|
| Base Kit, HS Cytokine | LHSC000 | 1 Kit |
| CXCL8 | LHSC208 | 1 Kit |
| GM-CSF | LHSC215 | 1 Kit |
| IFN-γ | LHSC285 | 1 Kit |
| IL-1β | LHSC201 | 1 Kit |
| IL-2 | LHSC202 | 1 Kit |
| IL-4 | LHSC204 | 1 Kit |
| IL-5 | LHSC205 | 1 Kit |
| IL-6 | LHSC206 | 1 Kit |
| IL-10 | LHSC217 | 1 Kit |
| IL-12 p70 | LHSC219 | 1 Kit |
| TNF-α | LHSC210 | 1 Kit |
| VEGF | LHSC293 | 1 Kit |

*Fluorokine MAP Base Kits and Bead Sets are shipped the next business day.*

### 2. CUSTOM PREMIX KITS

Fluorokine MAP Kits can be purchased using our specialized online ordering tool to select up to 10 cytokines to multiplex. By ordering kits in this manner, the capture and detection reagents for the user-defined analytes are provided as premixed cocktails.

| KIT | CATALOG # | SIZE |
|---|---|---|
| HS Cytokine Kit | FCST09 | 1 Kit |
| CXCL8/IL-8, GM-CSF, IFN-γ, IL-1β, IL-2, IL-4, IL-5, IL-6, IL-10, IL-12 p70, TNF-α, VEGF | | |

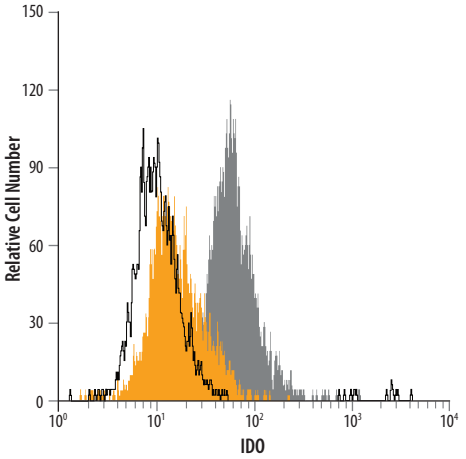
*Custom Premix Kits require a 2-4 day turn-around time when orders are placed directly with R&D Systems. Please allow additional time when placing orders through a distributor.*

For more information on Fluorokine MAP Kits, please visit our website at **www.RnDSystems.com/MultiplexAssays**

## Indoleamine 2,3-dioxygenase

Indoleamine 2,3-dioxygenase (IDO), a heme-containing intracellular oxidoreductase, is the first and rate-limiting enzyme in the degradation of the essential amino acid L-tryptophan (L-Trp).[1] It catalyzes the oxidative cleavage of the pyrrole ring in L-Trp to generate N-formyl-kynurenine.[1] IDO is widely expressed in many cells types including dendritic cells, macrophages, placental trophoblasts, and most tumor cells.[2-4] Its expression is induced by proinflammatory cytokines, such as IFN-γ, IFN-α, IFN-β, TNF-α, and IL-1, as well as by ligation of CD80/CD86 or CD40 by CTLA-4 or CD40L, respectively.[1,4,5] IDO activity has been shown to modulate immune system functions. Depletion of L-Trp stores via IDO-catalyzed degradation inhibits microbial replication.[4] Decreased L-Trp availability, as well as the generation of cytotoxic metabolites, also negatively effects proliferation and induces apoptosis of activated T cells.[3,4,6] Additionally, IDO activity promotes differentiation of $CD4^+$ T cells into regulatory T cells.[3] IDO-mediated immunosuppression is believed to be critical for several processes including protection of fetal tissues from maternal T lymphocytes, suppression of tissue graft rejection, and immune evasion by tumor cells.[3,4,7]

*R&D Systems now offers a PE-conjugated Mouse Anti-Human Indoleamine 2,3-dioxygenase Monoclonal Antibody (Catalog # IC6030P). Please see page 7 for details. For a complete listing of IDO-related products, please visit our website at* ***www.RnDSystems.com/IDO.***




**Detection of IDO by Flow Cytometry.** Human Mesenchymal Stem Cells (Catalog # CCM004) were unstimulated (orange filled histogram) or stimulated with IFN-γ + TNF-α (grey filled histogram). Cells were then stained with a PE-conjugated Mouse Anti-Human Indoleamine 2,3-dioxygenase (IDO) Monoclonal Antibody (Catalog # IC6030P; filled histograms) or a PE-conjugated Mouse $IgG_1$ Isotype Control (Catalog # IC002P; open histogram).

### References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| TARGET | COMPOUND NAME | DESCRIPTION | CATALOG # | SIZE |
|---|---|---|---|---|
| Actin | Phalloidin | Promoter of actin polymerization | 4535/1 | 1 mg |
| Activin/SMAD3 | Alantolactone | Induces activin/SMAD3 signaling; antiproliferative | 4490/10 | 10 mg |
| Activin/SMAD3 | Alantolactone | Induces activin/SMAD3 signaling; antiproliferative | 4490/50 | 50 mg |
| Adenosine A2B Receptor | BAY 60-6583 | Potent adenosine A2B receptor agonist; cardioprotective | 4472/10 | 10 mg |
| Adenosine A2B Receptor | BAY 60-6583 | Potent adenosine A2B receptor agonist; cardioprotective | 4472/50 | 50 mg |
| Amyloid Fibril | EGCG | Inhibitor of amyloid fibril formation | 4524/50 | 50 mg |
| Angiotensin II Type-1 (AT1) Receptor | Azilsartan | Potent AT1 receptor inverse agonist; antihypertensive | 4553/10 | 10 mg |
| Angiotensin II Type-1 (AT1) Receptor | Azilsartan | Potent AT1 receptor inverse agonist; antihypertensive | 4553/50 | 50 mg |
| BCR-ABL Tyrosine Kinase | GNF 2 | Selective allosteric BCR-ABL inhibitor | 4399/10 | 10 mg |
| BCR-ABL Tyrosine Kinase | GNF 2 | Selective allosteric BCR-ABL inhibitor | 4399/50 | 50 mg |
| C5a Receptor | NDT 9513727 | Potent and selective human C5a receptor antagonist | 3333/10 | 10 mg |
| C5a Receptor | NDT 9513727 | Potent and selective human C5a receptor antagonist | 3333/50 | 50 mg |
| $Ca^{2+}$-Activated $Cl^-$ Channel Transmembrane Protein 16A (TMEM16A) | T16Ainh - A01 | TMEM16A inhibitor | 4538/10 | 10 mg |
| $Ca^{2+}$-Activated $Cl^-$ Channel Transmembrane Protein 16A (TMEM16A) | T16Ainh - A01 | TMEM16A inhibitor | 4538/50 | 50 mg |
| Carbonic Anhydrase IX and XII | U 104 | Potent carbonic anhydrase IX and XII inhibitor | 4540/10 | 10 mg |
| Carbonic Anhydrase IX and XII | U 104 | Potent carbonic anhydrase IX and XII inhibitor | 4540/50 | 50 mg |
| Cathepsin | E 64d | Cathepsin inhibitor; interferes with autolysosomal digestion | 4545/1 | 1 mg |
| Ceramidase | Ceranib 1 | Ceramidase inhibitor; antiproliferative | 4448/10 | 10 mg |
| Ceramidase | Ceranib 1 | Ceramidase inhibitor; antiproliferative | 4448/50 | 50 mg |
| Chk2 | DIM | Activates Chk2; induces G2/M cell cycle arrest | 4502/50 | 50 mg |
| Cholecystokinin (CCK) | Proglumide sodium salt | Non-selective CCK antagonist; orally active | 1478/50 | 50 mg |
| CIC-Ka chloride channel/Transient Potential Vanilloid 1 (TRPV1) Receptor/RAD51 Recombinase | DIDS | CIC-Ka chloride channel blocker; TRPV1 receptor modulator; RAD51 recombinase inhibitor | 4523/50 | 50 mg |
| Cyclooxygenase (COX)/Transient Receptor Potential Canonical 6 (TRPC6) | Flufenamic acid | A non-steroidal anti-inflammatory drug (NSAID); inhibits COX; activates TRPC6 | 4522/50 | 50 mg |
| Cytochrome P450 3A4 (CYP3A4) | PF 4981517 | Selective CYP3A4 inhibitor | 4252/10 | 10 mg |
| Cytochrome P450 3A4 (CYP3A4) | PF 4981517 | Selective CYP3A4 inhibitor | 4252/50 | 50 mg |
| DNA | Cytarabine | Nucleoside analog; inhibits DNA replication | 4520/50 | 50 mg |
| DNA Topoisomerase I | β-Lapachone | DNA topoisomerase I inhibitor | 1293/10 | 10 mg |
| DNA Topoisomerase I | β-Lapachone | DNA topoisomerase I inhibitor | 1293/50 | 50 mg |
| Dopamine D4 Receptor | A 412997 dihydrochloride | Selective D4 receptor agonist | 4552/10 | 10 mg |
| Dopamine D4 Receptor | A 412997 dihydrochloride | Selective D4 receptor agonist | 4552/50 | 50 mg |
| Embryonic Stem Cells | IDE 2 | Induces definitive endoderm formation in mouse and human embryonic stem cells | 4016/10 | 10 mg |
| Embryonic Stem Cells | IDE 2 | Induces definitive endoderm formation in mouse and human embryonic stem cells | 4016/50 | 50 mg |
| Eukaryotic Elongation Factor-2 (eEF-2) Kinase | A 484954 | eEF-2 kinase inhibitor | 4483/10 | 10 mg |
| Eukaryotic Elongation Factor-2 (eEF-2) Kinase | A 484954 | eEF-2 kinase inhibitor | 4483/50 | 50 mg |
| Eukaryotic Initiation Factor 4E (eIF4E) | Ribavirin | Antiviral guanosine analog; blocks eIF4E activity | 4501/50 | 50 mg |
| Fatty Acid Amide Hydrolase (FAAH) Inhibitor | TC-F 2 | Potent, reversible, and selective FAAH inhibitor | 4355/10 | 10 mg |
| Fatty Acid Amide Hydrolase (FAAH) Inhibitor | TC-F 2 | Potent, reversible, and selective FAAH inhibitor | 4355/50 | 50 mg |
| Focal Adhesion Kinase (FAK) | Y 11 | Potent and selective FAK inhibitor | 4498/10 | 10 mg |
| Focal Adhesion Kinase (FAK) | Y 11 | Potent and selective FAK inhibitor | 4498/50 | 50 mg |
| G9a/GLP Methyltransferase | UNC 0646 | Potent and selective inhibitor of G9a/GLP methyltransferase heteromeric complex | 4342/10 | 10 mg |
| G9a/GLP Methyltransferase | UNC 0646 | Potent and selective inhibitor of G9a/GLP methyltransferase heteromeric complex | 4342/50 | 50 mg |
| GABAA Receptor | MK 0343 | GABAA receptor subtype-selective partial agonist | 4415/10 | 10 mg |

| TARGET | COMPOUND NAME | DESCRIPTION | CATALOG # | SIZE |
|---|---|---|---|---|
| GABAA Receptor | MK 0343 | GABAA receptor subtype-selective partial agonist | 4415/50 | 50 mg |
| GABAA Receptor | PHP 501 trifluoroacetate | Potent GABAA receptor antagonist | 4466/10 | 10 mg |
| GABAA Receptor | PHP 501 trifluoroacetate | Potent GABAA receptor antagonist | 4466/50 | 50 mg |
| Glucose Transporter 1 (GLUT1) | STF 31 | GLUT1 inhibitor | 4484/10 | 10 mg |
| Glucose Transporter 1 (GLUT1) | STF 31 | GLUT1 inhibitor | 4484/50 | 50 mg |
| Glycogen Synthase Kinase -3 (GSK-3) | A 1070722 | Highly potent and selective GSK-3 inhibitor | 4431/10 | 10 mg |
| Glycogen Synthase Kinase -3 (GSK-3) | A 1070722 | Highly potent and selective GSK-3 inhibitor | 4431/50 | 50 mg |
| Glycogen Synthase Kinase -3β (GSK-3β) | TC-G 24 | Potent and selective GSK-3β inhibitor | 4353/10 | 10 mg |
| Glycogen Synthase Kinase -3β (GSK-3β) | TC-G 24 | Potent and selective GSK-3β inhibitor | 4353/50 | 50 mg |
| γ-Secretase | Flurizan | γ-Secretase inhibitor; lowers Aβ42 levels *in vitro* | 4495/50 | 50 mg |
| Heat Shock Protein 90 (Hsp90) | PU H71 | Potent Hsp90 inhibitor | 3104/10 | 10 mg |
| hERG (human Ether-a-go-go Related Gene) $K^+$ Channel | NS 3623 | Activator of hERG $K^+$ channel; exhibits antiarrhythmic activity | 4462/10 | 10 mg |
| hERG (human Ether-a-go-go Related Gene) $K^+$ Channel | NS 3623 | Activator of hERG $K^+$ channel; exhibits antiarrhythmic activity | 4462/50 | 50 mg |
| Hexokinase | 2-Deoxy-D-glucose | Non-metabolizable glucose analog; hexokinase substrate | 4515/50 | 50 mg |
| HIF1α ProlylHydroxylase-2 (PHD2) | IOX 2 | Potent and selective PHD2 inhibitor | 4451/10 | 10 mg |
| HIF1α Prolyl Hydroxylase-2 (PHD2) | IOX 2 | Potent and selective PHD2 inhibitor | 4451/50 | 50 mg |
| Histone Deacetylase | SBHA | Histone deacetylase inhibitor | 3810/50 | 50 mg |
| Inositol-Requiring Enzyme 1α (IRE1α) Endoribonuclease | 4mu8C | IRE1α endoribonuclease inhibitor | 4479/10 | 10 mg |
| Inositol-Requiring Enzyme 1α (IRE1α) Endoribonuclease | 4mu8C | IRE1α endoribonuclease inhibitor | 4479/50 | 50 mg |
| Inositol-Requiring Enzyme 1α (IRE1α) Endoribonuclease | STF 083010 | IRE1α endoribonuclease inhibitor | 4509/10 | 10 mg |
| Inositol-Requiring Enzyme 1α (IRE1α) Endoribonuclease | STF 083010 | IRE1α endoribonuclease inhibitor | 4509/50 | 50 mg |
| Kv1.3 $K^+$ Channel | Psora 4 | Potent Kv1.3 $K^+$ channel blocker | 4367/10 | 10 mg |
| Kv1.3 $K^+$ Channel | Psora 4 | Potent Kv1.3 $K^+$ channel blocker | 4367/50 | 50 mg |
| Leucine-Rich Repeat Kinase 2 (LRRK2) | LRRK2-IN-1 | Potent and selective LRRK2 inhibitor | 4273/10 | 10 mg |
| Leucine-Rich Repeat Kinase 2 (LRRK2) | LRRK2-IN-1 | Potent and selective LRRK2 inhibitor | 4273/50 | 50 mg |
| LpxC | PF 5081090 | Potent LpxC inhibitor | 4362/10 | 10 mg |
| μ OpioidReceptor | Clocinnamox mesylate | Irreversible μ opioid receptor antagonist | 0898/2 | 2 mg |
| μ Opioid Receptor | PL 017 | Selective μ opioid receptor agonist | 2024/1 | 1 mg |
| Metabotropic Glutamate Receptor 5 (mGluR5) | VU 0357121 | Positive allosteric modulator of mGluR5 | 4437/10 | 10 mg |
| Metabotropic Glutamate Receptor 5 (mGluR5) | VU 0357121 | Positive allosteric modulator of mGluR5 | 4437/50 | 50 mg |
| Metabotropic Glutamate Receptor 5 (mGluR5) | MFZ 10-7 | Negative allosteric modulator of mGluR5 | 4438/10 | 10 mg |
| Metabotropic Glutamate Receptor 5 (mGluR5) | MFZ 10-7 | Negative allosteric modulator of mGluR5 | 4438/50 | 50 mg |
| Microtubules | UA 62784 | Inhibitor of microtubule polymerization | 4286/10 | 10 mg |
| Microtubules | UA 62784 | Inhibitor of microtubule polymerization | 4286/50 | 50 mg |
| Nav1.7 $Na^+$ Channels | TC-N 1752 | Selective Nav1.7 $Na^+$ channel blocker | 4435/10 | 10 mg |
| Nav1.7 $Na^+$ Channels | TC-N 1752 | Selective Nav1.7 $Na^+$ channel blocker | 4435/50 | 50 mg |
| Neurotensin/Neuromedin N Degrading Enzymes | JMV 390-1 | Inhibitor of multiple neurotensin and neuromedin N degrading enzymes | 2575/1 | 1 mg |
| Nicotonic Acetylcholine Receptors (nAChR) | RuBi-Nicotine | Caged nicotine; rapidly excitable by visible light | 3855/10 | 10 mg |
| α7 Nicotinic Acetylcholine Receptor (α7 nAChR)/ Histamine H3 Receptor | SEN 12333 | α7 nAChR agonist; histamine H3 receptor antagonist | 4441/10 | 10 mg |

*Continued on page 14.*

| TARGET | COMPOUND NAME | DESCRIPTION | CATALOG # | SIZE |
|---|---|---|---|---|
| *Continued from page 13.* | | | | |
| α7 Nicotinic Acetylcholine Receptor (α7 nAChR)/ Histamine H3 Rece ptor | SEN 12333 | α7 nAChR agonist; histamine H3 receptor antagonist | 4441/50 | 50 mg |
| NOD1 (Nucleotide-Binding Oligomerization Domain 1) | ML 130 | Inhibitor of NOD1-induced NF-κB activation | 4354/10 | 10 mg |
| NOD1 (Nucleotide-Binding Oligomerization Domain 1) | ML 130 | Inhibitor of NOD1-induced NF-κB activation | 4354/50 | 50 mg |
| NR2C/NR2D-Containing NMDA Receptors | DQP 1105 | Selective antagonist for NR2C/NR2D-containing NMDA receptors | 4491/10 | 10 mg |
| NR2C/NR2D-Containing NMDA Receptors | DQP 1105 | Selective antagonist for NR2C/NR2D-containing NMDA receptors | 4491/50 | 50 mg |
| Nuclear Factor (Erythroid-Derived)-Like 2 (Nrf2) Pathway | MMF | Nrf2 pathway activator; primary metabolite of dimethyl fumarate (DMF) | 4511/50 | 50 mg |
| Nuclear Factor (Erythroid-Derived)-Like 2 (Nrf2) Pathway | DMF | Nrf2 pathway activator; primary metabolite of dimethyl fumarate (DMF) | 4512/50 | 50 mg |
| $P2X_3/P2X_{2/3}$ Purinergic Receptors | Ro 51 | Potent $P2X_3$ and $P2X_{2/3}$ receptors antagonist | 4391/10 | 10 mg |
| $P2X_3/P2X_{2/3}$ Purinergic Receptors | Ro 51 | Potent $P2X_3$ and $P2X_{2/3}$ receptors antagonist | 4391/50 | 50 mg |
| $P2X_7$ Purinergic Receptor | A 804598 | Potent and selective $P2X_7$ receptor antagonist | 4473/10 | 10 mg |
| $P2X_7$ Purinergic Receptor | A 804598 | Potent and selective $P2X_7$ receptor antagonist | 4473/50 | 50 mg |
| $P2Y_{12}$ Purinergic Receptor | PSB 0739 | Highly potent $P2Y_{12}$ receptor antagonist | 3983/10 | 10 mg |
| $P2Y_{12}$ Purinergic Receptor | PSB 0739 | Highly potent $P2Y_{12}$ receptor antagonist | 3983/50 | 50 mg |
| $P2Y_4$ Purinergic Receptor | MRS 4062 triethylammonium salt | Selective $P2Y_4$ receptor agonist | 4261/1 | 1 mg |
| $P2Y_6$ Purinergic Receptor | MRS 2957 triethylammonium salt | Potent and selective $P2Y_6$ receptor agonist | 4260/1 | 1 mg |
| $P2Y_6$ Purinergic Receptor | MRS 2957 triethylammonium salt | Potent and selective $P2Y_6$ receptor agonist | 4260/10 | 10 mg |
| $p56^{lck}$ Tyrosine Kinase | Damnacanthal | Potent and selective inhibitor of $p56^{lck}$ activity | 1936/1 | 1 mg |
| Phosphodiesterase 11 (PDE11) | BC 11-38 | Selective PDE11 inhibitor | 4496/10 | 10 mg |
| Phosphodiesterase 11 (PDE11) | BC 11-38 | Selective PDE11 inhibitor | 4496/50 | 50 mg |
| Serotonin 5-HT3 receptor | VUF 10166 | High affinity 5-HT3 receptor antagonist | 4532/10 | 10 mg |
| Serotonin 5-HT3 receptor | VUF 10166 | High affinity 5-HT3 receptor antagonist | 4532/50 | 50 mg |
| Somatostatin Receptor (sst1) | CH 275 | Potent and selective sst1 agonist | 2454/1 | 1 mg |
| Sphingosine 1-Phosphate Receptor-1 ($S1P_1$) | TC-SP 14 | Potent $S1P_1$ agonist | 4363/10 | 10 mg |
| Sphingosine 1-Phosphate Receptor-1 ($S1P_1$) | TC-SP 14 | Potent $S1P_1$ agonist | 4363/50 | 50 mg |
| Sterol-Regulatory Element Binding Protein (SREBP) | Fatostatin A | Cell permeable inhibitor of SREBP activation | 4444/10 | 10 mg |
| Sterol-Regulatory Element Binding Protein (SREBP) | Fatostatin A | Cell permeable inhibitor of SREBP activation | 4444/50 | 50 mg |
| Subtilisin/Kex2p-Like Proprotein Convertase | Decanoyl-RVKR-CMK | Subtilisin/Kex2p-like proprotein convertase inhibitor | 3501/1 | 1 mg |
| TCF/β-Catenin | ICG 001 | Inhibitor of TCF/β-Catenin-mediated transcription | 4505/10 | 10 mg |
| TCF/β-Catenin | ICG 001 | Inhibitor of TCF/β-Catenin-mediated transcription | 4505/50 | 50 mg |
| Toll-Like Receptor 7 (TLR7) | Resiquimod | TLR7 agonist | 4536/10 | 10 mg |
| Toll-Like Receptor 7 (TLR7) | Resiquimod | TLR7 agonist | 4536/50 | 50 mg |
| Ubiquitin Ligase APC/C | TAME hydrochloride | Ubiquitin ligase APC/C inhibitor; induces mitotic arrest | 4506/50 | 50 mg |
| Ubiquitin-Specific-Processing Protease 7 (USP7) | P 22077 | USP7 inhibitor | 4485/10 | 10 mg |
| Ubiquitin-Specific-Processing Protease 7 (USP7) | P 22077 | USP7 inhibitor | 4485/50 | 50 mg |
| | NCX 4040 | A nitric oxide-donating aspirin; exhibits anti-inflammatory and antitumor activities | 4531/10 | 10 mg |
| | NCX 4040 | A nitric oxide-donating aspirin; exhibits anti-inflammatory and antitumor activities | 4531/50 | 50 mg |

BostonBiochem®

## Ubiquitin Chains

| UBIQUITIN CHAINS | SPECIES | SOURCE | CATALOG # | SIZE |
|---|---|---|---|---|
| Di-Ubiquitin Non-hydrolyzable (K48-linked) | Human | *E. coli* | UCN-200-100 | 100 µg |
| Di-Ubiquitin Non-hydrolyzable (K48-linked) Agarose | Human | *E. coli* | UCN-202-250 | 250 µL |
| Di-Ubiquitin Non-hydrolyzable (K63-linked) | Human | *E. coli* | UCN-300-100 | 100 µg |
| Di-Ubiquitin Non-hydrolyzable (K63-linked) Agarose | Human | *E. coli* | UCN-302-250 | 250 µL |
| Tri-Ubiquitin Non-hydrolyzable (K48-linked) | Human | *E. coli* | UCN-215-025 | 25 µg |
| Tri-Ubiquitin Non-hydrolyzable (K48-linked) Agarose | Human | *E. coli* | UCN-217-100 | 100 µL |
| Tri-Ubiquitin Non-hydrolyzable (K63-linked) | Human | *E. coli* | UCN-315-025 | 25 µg |
| Tri-Ubiquitin Non-hydrolyzable (K63-linked) Agarose | Human | *E. coli* | UCN-317-100 | 100 µL |
| Tetra-Ubiquitin Non-hydrolyzable (K48-linked) | Human | *E. coli* | UCN-210-025 | 25 µg |
| Tetra-Ubiquitin Non-hydrolyzable (K48-linked) Agarose | Human | *E. coli* | UCN-212-100 | 100 µL |
| Tetra-Ubiquitin Non-hydrolyzable (K63-linked) | Human | *E. coli* | UCN-310-025 | 25 µg |
| Tetra-Ubiquitin Non-hydrolyzable (K63-linked) Agarose | Human | *E. coli* | UCN-312-100 | 100 µL |
| Tetra-Ubiquitin Non-hydrolyzable (Linear) | Human | *E. coli* | UCN-710-100 | 100 µg |
| Tetra-Ubiquitin Non-hydrolyzable (Linear) Agarose | Human | *E. coli* | UCN-712-250 | 250 µL |

## Ubiquitin-Like Molecules

| MOLECULE | SPECIES | SOURCE | CATALOG # | SIZE |
|---|---|---|---|---|
| $His_6$-ISG $^{13}C/^{15}N$-labeled | Human | *E. coli* | UL-645-050 | 50 µg |

## E2 Conjugating Enzymes

| PROTEIN | SPECIES | SOURCE | CATALOG # | SIZE |
|---|---|---|---|---|
| $His_6$-UBE2G1 | Human | *E. coli* | E2-700-050 | 50 µg |
| $His_6$-UBE2G1 | Human | *E. coli* | E2-700-100 | 100 µg |
| $His_6$-UBE2J2, Isoform 1 | Human | *E. coli* | E2-710-050 | 50 µg |
| $His_6$-UBE2J2, Isoform 1 | Human | *E. coli* | E2-710-100 | 100 µg |
| $His_6$-UBE2Q1, Isoform 2 | Human | *E. coli* | E2-720-050 | 50 µg |
| $His_6$-UBE2Q1, Isoform 2 | Human | *E. coli* | E2-720-100 | 100 µg |
| $His_6$-UBE2Q2, Isoform 1 | Human | *E. coli* | E2-745-050 | 50 µg |
| $His_6$-UBE2Q2, Isoform 1 | Human | *E. coli* | E2-745-100 | 100 µg |
| $His_6$-UBE2R2 | Human | *E. coli* | E2-715-050 | 50 µg |
| $His_6$-UBE2R2 | Human | *E. coli* | E2-715-100 | 100 µg |
| $His_6$-UBE2V2 | Human | *E. coli* | E2-730-050 | 50 µg |
| $His_6$-UBE2V2 | Human | *E. coli* | E2-730-100 | 100 µg |

## Proteasome Inhibitors

| TARGET | COMPOUND | CATALOG # | SIZE |
|---|---|---|---|
| 19S Regulatory Particle-Associated Deubiquitinases | b-AP15/VLX1500 | I-197-200 | 200 µg |
| 19S Regulatory Particle-Associated Deubiquitinases | b-AP15/VLX1500 | I-197-01M | 1 mg |

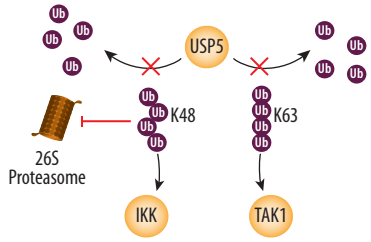
## E3 Ligase Inhibitors

| TARGET | COMPOUND | CATALOG # | SIZE |
|---|---|---|---|
| Anaphase-Promoting Complex/Cyclosome (APC/C) | proTAME | I-440-01M | 1 mg |

## Non-Hydrolyzable Ubiquitin Chains

Ubiquitin is a highly conserved 76 amino acid protein involved in a myriad of cellular processes.[1] Ubiquitin or Ubiquitin chains are conjugated to target proteins through the coordinated actions of Ubiquitin-activating (E1), Ubiquitin-conjugating (E2), and Ubiquitin ligase (E3) enzymes. Ubiquitin chains are also generated in a free, unanchored form either by chain removal from poly-ubiquitinated proteins or by *de novo* synthesis.[2,3] It is becoming increasingly evident that unanchored Ubiquitin chains (UUCs) are physiologically relevant. For example, K48- and/or K63-linked UUCs have been shown to directly activate protein kinases involved in immune cell signaling.[3,4] Additionally, K48-linked UUCs antagonize proteasomal degradation, presumably by competing with poly-ubiquitinated proteasome substrates for binding sites.[5] Their accumulation has been linked to Alzheimer's disease and polyglutamine diseases.[6,7] The study of UUCs is challenging because they are readily hydrolyzed by deubiquitinating enzymes (DUBs) such as Isopeptidase T/USP5.[8]

*Boston Biochem now offers non-hydrolyzable Ubiquitin chains with a variety of linkages (K48-linked, K63-linked, and linear) and lengths (di-, tri-, and tetra-ubiquitin). For additional information about Ubiquitin-related products, please visit the Boston Biochem website at* ***www.BostonBiochem.com****.*




**Function of Unanchored Ubiquitin Chains.** Unanchored K48- and K63-linked Ubiquitin chains directly activate the protein kinases IKK and TAK1, respectively. Unanchored K48-linked Ubiquitin chains also antagonize proteasome function. Non-hydrolyzable Ubiquitin chains are resistant to disassembly by deubiquitinating enzymes (DUBs) such as Isopeptidase T/USP5.

### References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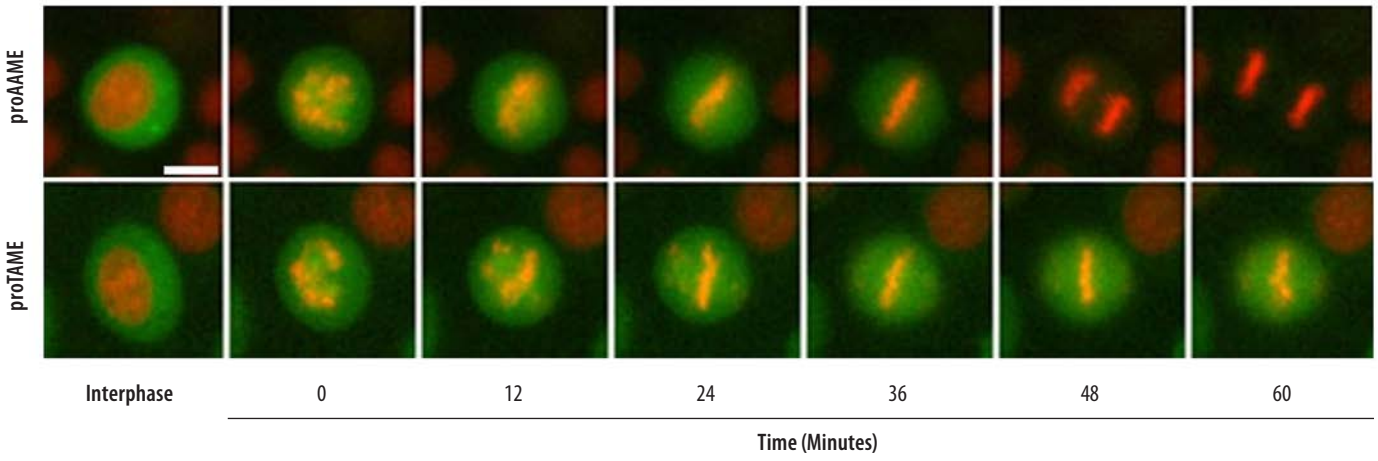
# proTAME: A Cell Permeable APC/Cell Cycle Inhibitor

The anaphase promoting complex (APC) is a multisubunit Ubiquitin ligase (E3) that is best known for its role in the spindle assembly checkpoint of the cell cycle. This checkpoint suppresses APC activity and suspends the cell in metaphase until all chromosomes are properly attached to the mitotic spindle. Once the checkpoint is satisfied, the APC is freed and subsequently catalyzes the ubiquitination of mitotic regulatory proteins, including Cyclin B1 and Securin, targeting them for proteasomal degradation. Sister chromatids can then separate and mitosis is allowed to progress. TAME (tosyl arginine methyl ester) and proTAME (a cell permeable derivative) were recently described by Zeng and colleagues as pharmacological inhibitors of the APC.[1,2] Boston Biochem now offers proTAME (Catalog # I-440) for the study of the APC-related activities in live cells. proTAME is available from both the R&D Systems and Boston Biochem websites.




**proTAME Arrests Cells in Metaphase.** HeLa H2B-RFP cells (red) were transfected with Cyclin-B1-GFP (green) and synchronized using a double thymidine block. Eight hours after release from the block, the cells were treated with 20 µM of either proAAME (top images) or proTAME (Catalog # I-440; bottom images) for 45 minutes before time-lapse imaging. Those treated with the control compound proAAME progress from metaphase to anaphase, while cells treated with proTAME remain arrested in metaphase. Scale Bar = 12 µm. Images were adapted with permission.[1]

## References

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