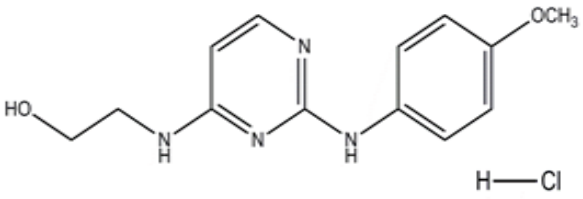
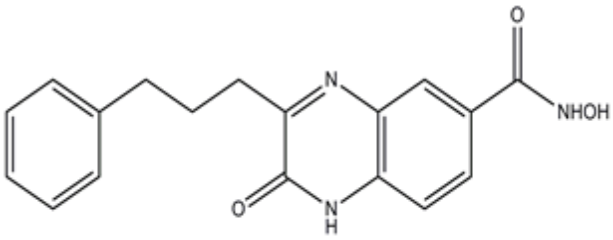
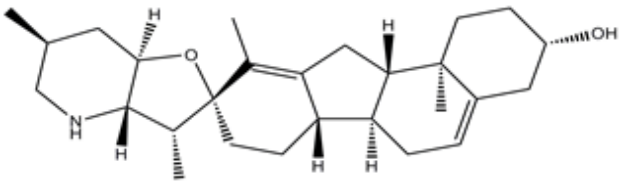
Stem Cell Fate Regulators: Tools for Stem Cell Differentiation, Self-Renewal, Survival and Reprogramming

The tremendous advances achieved recently in the area of Stem Cell Biology have brought renewed interest and hope for potential treatment of several diseases including cancer, cardiovascular disease, diabetes, musculoskeletal disease, and neurodegenerative disease. Natural and synthetic small molecules have been shown to be useful chemical tools for controlling and manipulating the fates of cells. Small molecules can target cell signaling pathways and affect DNA replication, cell differentiation, tumor metastasis and apoptosis. More recently, small molecules have been tested for stem cell self-renewal and differentiation capabilities in potential approaches to regenerative medicine. BioVision is proud to offer a variety of cell-permeable small molecule Stem Cell Fate Regulators (see the table below) to our customers.

Differentiation

Product Name	Cat. No.	Application	Structure
Cardiogenol C hydrochloride New! **CAS #:** 1049741-55-0	1926-5, 25	Cell-permeable. Induces differentiation of mouse embryonic stem cells (ESCs) into cardiomyocytes (EC_{50} = 100 nM).	
Compound 1 **CAS #:** N/A	1688-5	A dihydroquinoxaline derivative that efficiently induces neuronal differentiation from mesenchymal stem cells (MSCs) with excellent efficiency. MSCs treated with Compound 1 display neural electrophysiological and cholinergic neuron properties. **Ref.**: Kim, N.R., et al. (2009). *J. Med. Chem.* **52,** 7931-7933.	
Cyclopamine **CAS #:** 4449-51-8	1578-5	A Hedgehog (Hh) signaling pathway antagonist. Induces stem cell differentiation towards definitive endoderm pancreatic islet cells and modulates cell proliferation. Also depletes stem-like cancer cells in glioblastoma via Hh pathway inhibition. **Ref.:** D'Amour, K.A., et al. (2006). *Nat. Biotechnol.* **24**, 1392-1401; Chen, J.K., et al. (2002). *Genes Dev.* **16**, 2743-2748.	

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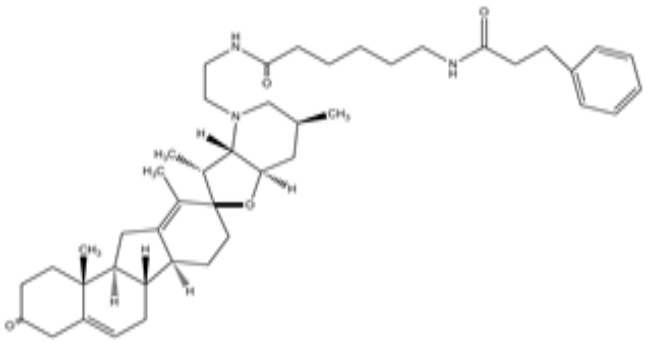
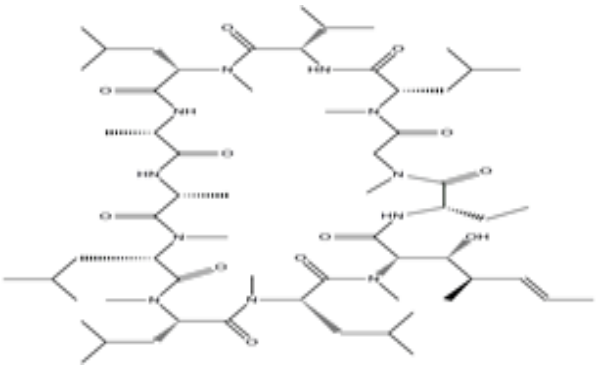
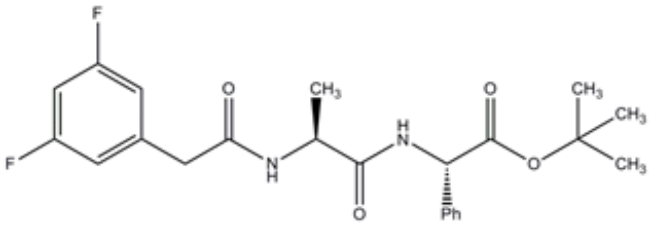
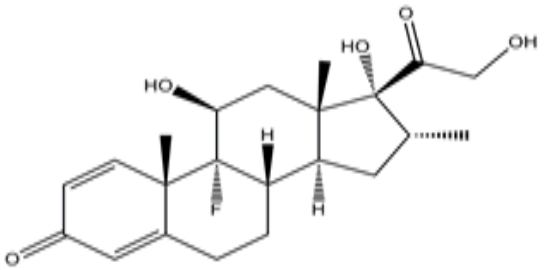
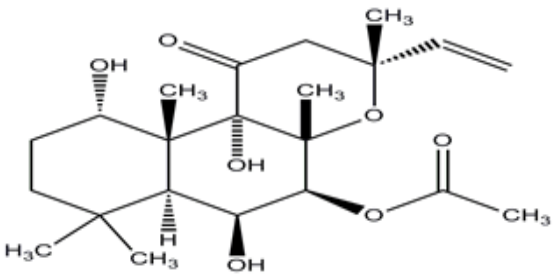
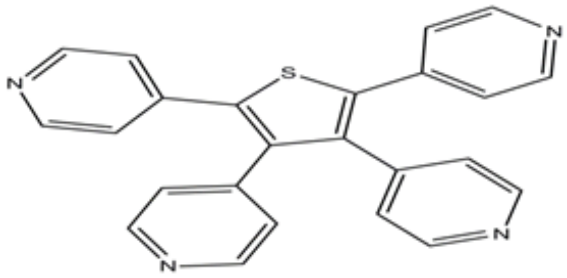
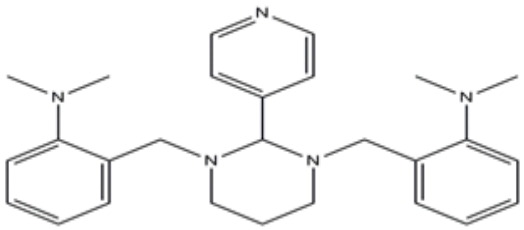
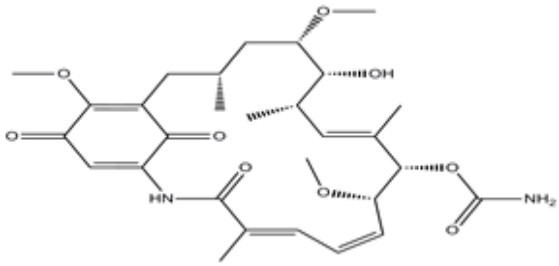
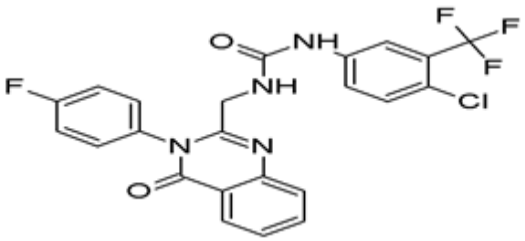
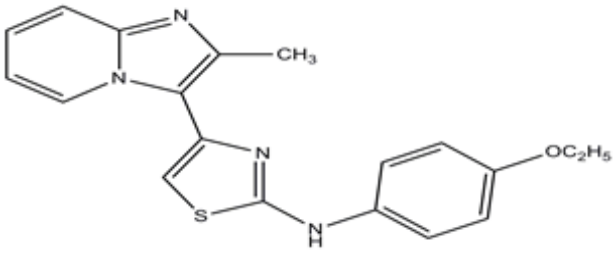
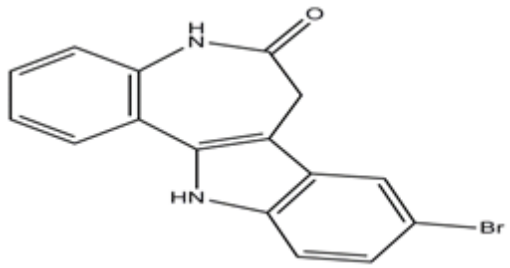
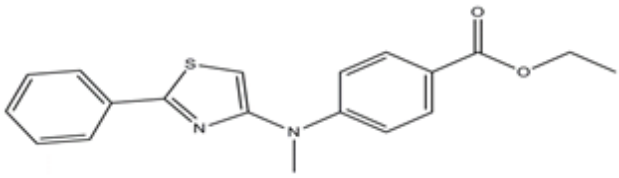
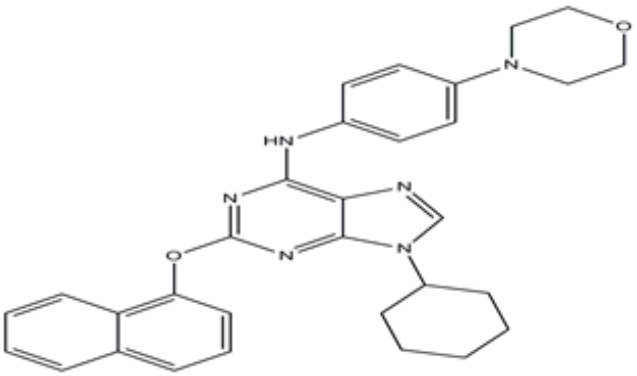
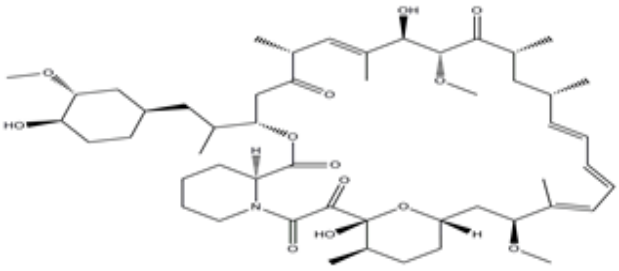
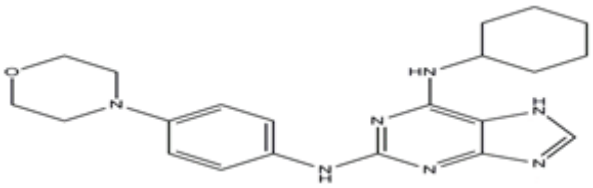
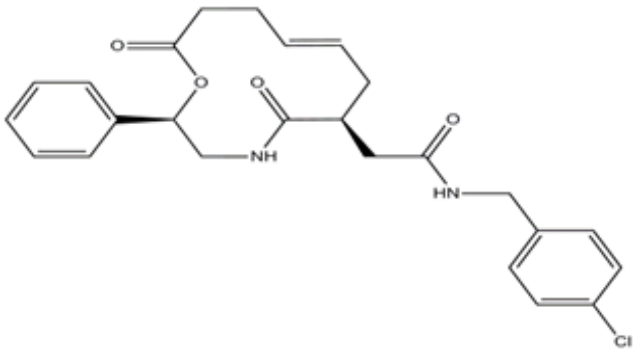
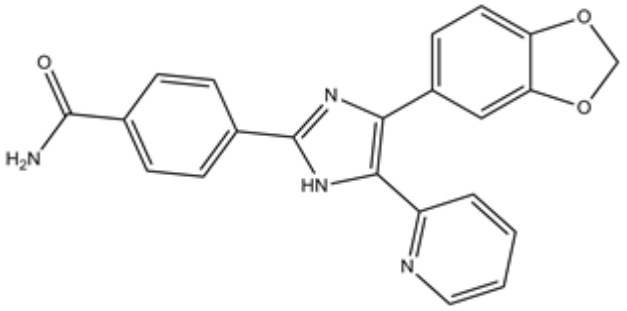
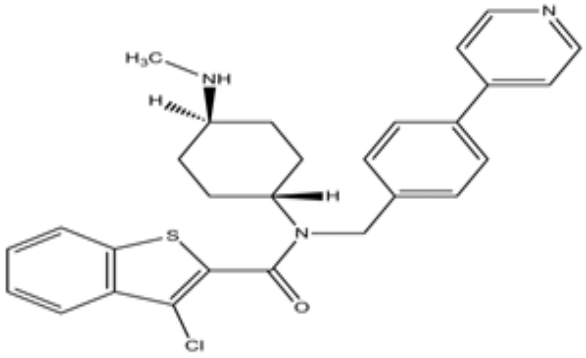
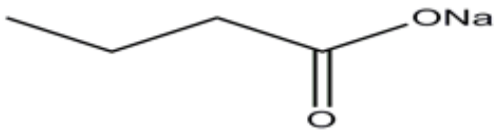
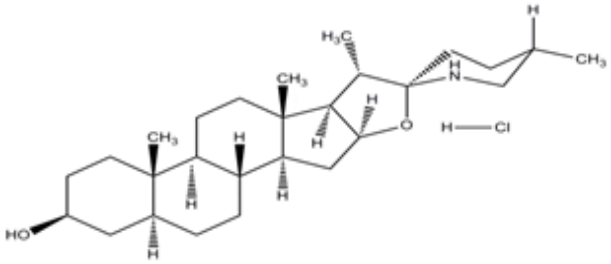
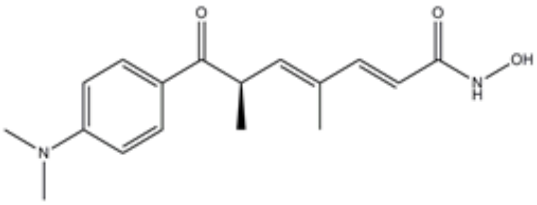
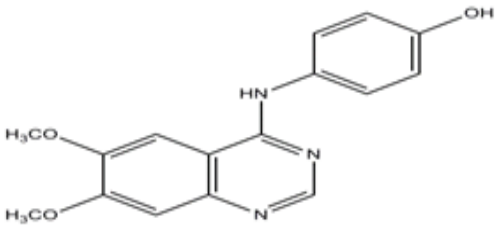
Product Name	Cat. No.	Application	Structure
Cyclopamine-KAAD **CAS #:** 306387-90-6	1910-50	Cell-permeable. A synthetic derivative of the natural product Cyclopamine (Cat. No. 1578-5) that acts as a specific inhibitpr of Smoothened (Smo) and Sonic hedgehog (Shh) intracellular signaling (IC50 = 20 nM in the Shh-LIGHT2 assay).	
Cyclosporine A **CAS #:** 59865-13-3	1522-100, 1G	An immunosuppressant. Potently induces highly cardiogenic progenitors from embryonic stem (ES) cells **Ref.:** Yan, P., et al. (2009). *Biochem. Biophys. Res. Commun.* **379**, 115-120.	
DAPT New! **CAS #:** 208255-80-5	1855-5	Cell permeable. A potent inhibitor of γ-secretase (IC_{50} = 115 nM for total β-amyloid, IC_{50} = 200 nM for β-amyloid 1-42). DAPT treatment can influence hematopoietic cell fate decisions and enhances neuronal differentiation in embryonic stem cell-derived embryoid bodies independent of sonic hedgehog (shh) signaling.	
Dexamethasone **CAS #:** 50-02-2	1042-1G, 10G	A glucocorticoid receptor agonist that regulates T-cell survival, growth and differentiation. **Ref.:** Jaiswal, N., et al. (1997). *J. Cell Biochem.* **106**, 2139-2151; Yamanouchi, K., et al. (1996). *J. Bone Miner. Metab*. **15**, 23-29.	
Forskolin, Coleus Forskohlii **CAS #:** 66575-29-9	1531-5	A diterpene that activates adenylate cyclase and increases intracellular cAMP. Also induces neuronal differentiation. **Ref.:** Hammerschmidt, M., et al. (1996). *Genes Dev.* **10**, 647-658; Son, H., et al. (2001). *Neurosci. Lett.* **308**, 37-40; Palmer, T.D., et al. (1997). *Mol. Cell Neurosci.* **8**, 389-404	

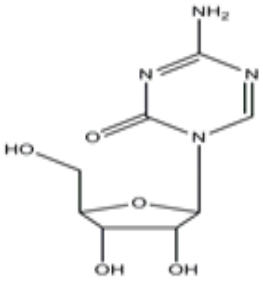
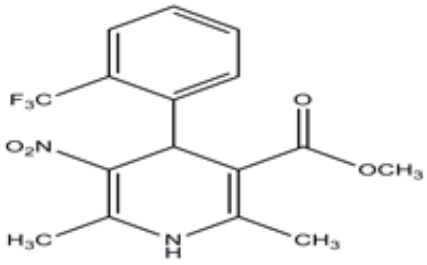
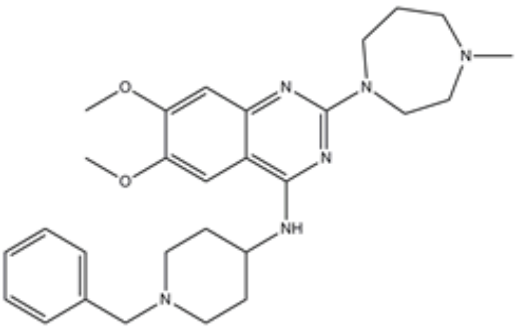
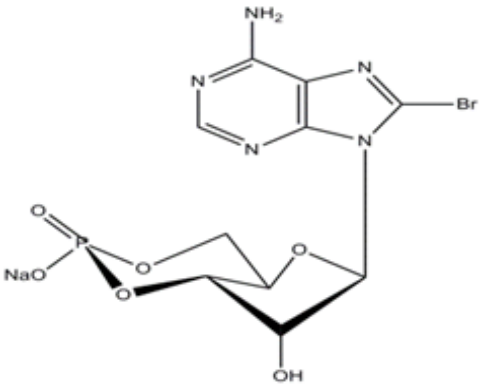
Product Name	Cat. No.	Application	Structure
GANT58 New! **CAS #:** 64048-12-0	1812-5, 25	Cell-permeable. Acts as a blocker of Hedgehog (Hh) pathway downstream of SMO and SUFU causing Gli1 nuclear accumulation. It also targets Gli-mediated gene transactivation (IC_{50} ~ 5 µM in SAG-stimulated Shh-L2 cells) and displays anti-proliferative and antitumor activity in vivo.	
GANT61 New! **CAS #:** 500579-04-4	1892-5	Cell-permeable. A Hedgehog (Hh) signaling pathway antagonist. Inhibits Hh signaling downstream of Smo and Sufu at the level of Gli (IC_{50} = 5 µM). GANT61 has also been shown to inhibit the in vitro proliferation of PANC1 and 22Rv1 cells which have elevated GLi11 levels and prevent the development of 22Rv1 tumors in mice.	
Geldanamycin **CAS #:** 30562-34-6	1564-1,5	A Hsp90 inhibitor. Induces differentiation with neurite outgrowth in the murine neuroblastoma N2A. **Ref.:** Lopez-Maderuelo, M.D., et al. (2001). *FEBS Lett*. **490,** 23-27.	
Hh Signaling Pathway Antagonist **CAS #:** 330796-24-2	1659-1	A potent antagonist of the Hedgehog (Hh) signaling pathway (IC50 = 70 nM). **Ref.:** Brunton, S.A., et al. (2008). *J. Med. Chem.* **51,** 1108.	
JK 184 **CAS #:** 315703-52-7	1726-1	An imidazopyridine derivative that acts as a potent downstream antagonist of Hedgehog(Hh) signaling pathway. JK184 functions by inhibiting class IV alcohol dehydrogenase (Aldh7) (IC50 = 210 nM). **Ref.:** Cupido, T., et al. (2009). *Angew. Chem. Int. Ed.Engl.* **48**, 2321-2324; Lee, J., et al. (2007). *Chembiochem* **8**, 1916-1919.	

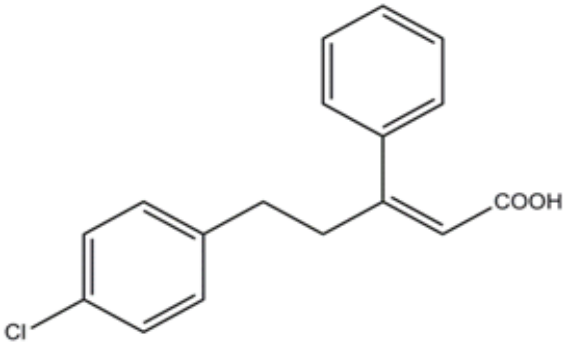
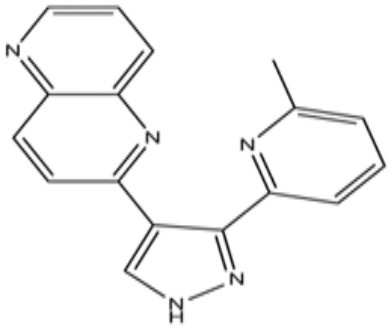
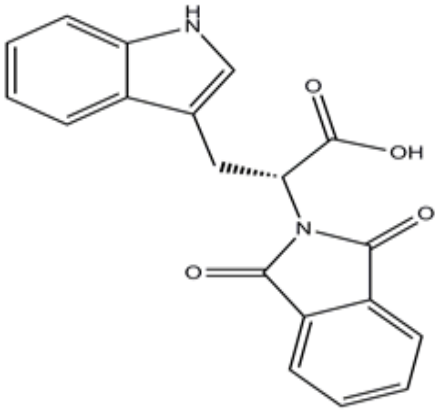
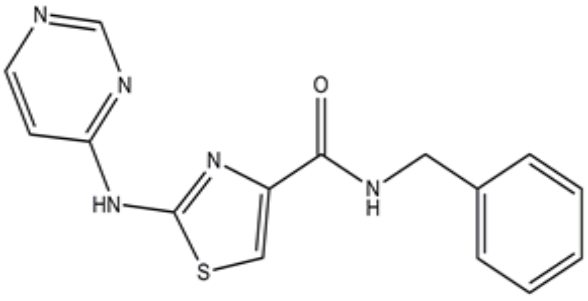
Product Name	Cat. No.	Application	Structure
Kenpaullone New! **CAS #:** 142273-20-9	1904-1	Cell-permeable. A potent inhibitor of CDK1/cyclin B (IC_{50} = 400 nM), CDK2/cyclin A (IC_{50} = 680nM) , CDK5 (IC_{50} = 850nM) and with much less effect other kinases. In addition, it has been found to be a useful GSK-3β inhibitor (IC_{50} = 23nM). More recently, kenpaullone has been shown to increase neurogenesis of human neural progenitor cells through stimulation of Wnt/β-catenin signaling pathway.	
Neuropathiazol New! **CAS #:** 880090-88-0	1903-5, 25	Cell-permeable. Selectively induces neuronal differentiation of primary hippocampal neural progenitor cells. It is more potent and selective compared to retinoic acid. Also suppresses astrocyte differentiation.	
Purmorphamine **CAS #:** 483367-10-8	1672-5	Promotes the differentiation of both human and murine mesenchymal progenitor cells into osteoblasts. It directly binds to and activates7-transmembrane Smo receptor of the Hedgehog (Hh) signaling pathway. **Ref.:** Sinha, S., and Chen, J.K. (2006). *Nat. Chem. Biol.* **2**, 29-30; Wu, X., et al. (2004). *Chem. Biol.* **11,** 1229-1238; Wu, X., et al. (2002). *J. Am. Chem. Soc.* **124**, 14520-14521.	
Rapamycin **CAS #:** 53123-88-9	1568-5, 50	A mTOR inhibitor. Promotes the osteoblastic differentiation of human embryonic stem cells by blocking the mTOR pathway and stimulating the BMP/Smad pathway **Ref.:** Lee, K.-W., et al. (2009). *Stem Cells Dev.* (ahead of print)	

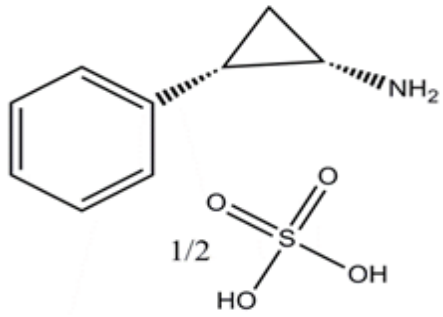
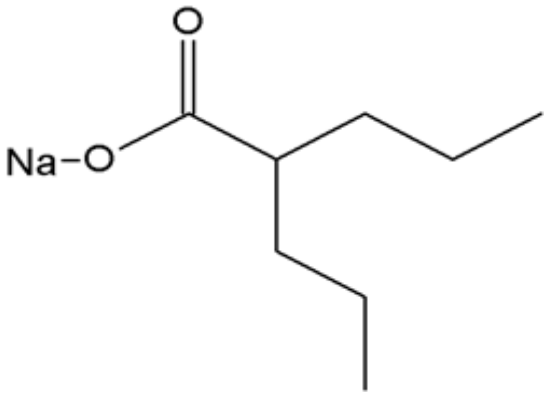
Product Name	Cat. No.	Application	Structure
EZSolution™ Rapamycin New! **CAS #:** 53123-88-9	1746-5	A 5 mM (5 mg in 1093 µl) solution of Rapamycin (Cat. No. 1568-5) in DMSO.	
Reversine New! **CAS #:** 656820-32-5	1851-1,5	A cell-permeable, potent, and selective human A3 adenosine receptor antagonist (Ki = 0.66 µM) and an aurora kinase inhibitor (IC_{50}'s of 30-550 nM for blast colony formation assay). Induces dedifferentiation in murine C2C12 myoblasts. The cells were also shown to regain multipluripotency following removal of the compound.	
Robotnikinin New! **CAS #:** 1132653-79-2	1923-1	A small-molecule chemical inhibitor of Sonic hedgehog (Shh) signaling, that blocks hedgehog signaling through specific binding and blockade of Shh signaling factor. It is the first-characterized hedgehog inhibitor whose molecular mechanism of action is through blockade of Shh protein and not a subsequent factor of the hedgehog signaling cascades. Robotnikinin binds to the Shh-N terminal protein in a concentration-dependent fashion with a Kd of 9 µM.	
SB-431542 **CAS #:** 301836-41-9	1674-1	A potent and selective inhibitor of the TGF-β1 receptor ALK5 (IC50 = 94 nM). It inhibits ALK4 only at higher concentrations (IC50 = 140 nM). Suppresses renewal in embryonic and induced pluripotent stem (iPS) cells and promotes their differentiation through its effect on Smad signaling pathway. **Ref.:** Chambers, S.M., et al. (2009). *Nat. Biotech.* **27**, 275; James, D., et al. (2005). *Development* **132**, 1273; Inman, G.J., et al. (2002). *Mol. Pharmacol.* **62, 65.**	

Product Name	Cat. No.	Application	Structure
EZSolution™ SB-431542 New **CAS #:** 301836-41-9	1872-1	A 10 mM (1 mg in 260 µl) solution of SB-431542 (Cat. No. 1674-1) in anhydrous DMSO	
Smo Agonist, SAG New! **CAS #:** 912545-86-9	1939-500, 1000	Cell-permeable. A Smoothened (Smo) agonist that has shown to induce Hedgehog pathway activation and counteract cyclopamine inhibition of Smo. SAG has been reported to act as an activator at low concentrations, but can inhibit Smo at very high concentrations.	
Sodium butyrate **CAS #:** 156-54-7	1609-1000	A histone deacetylase (HDAC) inhibitor. Induces exocrine pancreatic differentiation of embryonic stem (ES) cells. **Ref.:** Ren, M., et al. (2009). *Acta Pharmacol. Sin.* **30**, 1289-1296; McCue, P.A., et al. (1984). *J. cell. Biol.* **98**, 602-608.	
Tomatidine hydrochloride New! **CAS #:** 6192-62-7	1893-25	Tomatidine is a steroidal alkaloid found in the skins of unripe tomatoes. Structurally Tomatidine resembles cylopamine (Cat. No. 1578-5), but does not inhibit the Hedgehog (Hh) signaling pathway. May be used as a negative control for cyclopamine (Cat. No. 1578-5).	
Trichostatin A **CAS #:** 58880-19-6	1606-1	A histone deacetylase (HDAC) inhibitor. Facilitates myocardial differentiation of monkey embryonic stem (ES) cells Ref.: Kwamura, T., et al. (2005). J. Biol. Chem. 280, 19682-19688.	
WHI-P131 New! **CAS #:** 202475-60-3	1853-5, 25	Cell-permeable. Selectively inhibits the tyrosine kinase activity of Jak3 with an IC_{50} value of 78 µM without affecting the enzymatic activity of JAK1, JAK2, or other protein tyrosine kinases. Also helps to induce rat bone marrow stromal cells (MSCs) to neuronal cells.	

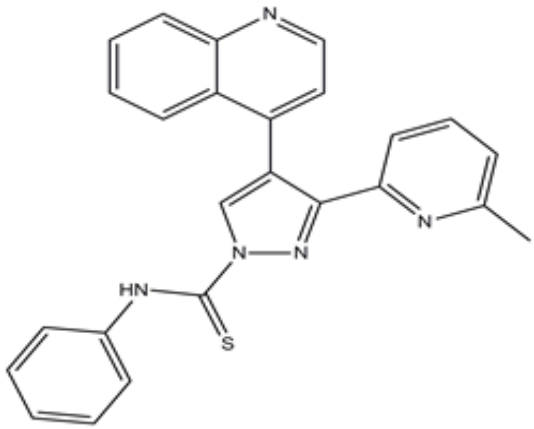
Induced Pluripotent Stem (iPS) Cells and Reprogramming

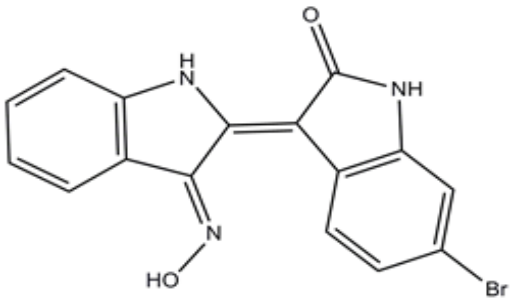
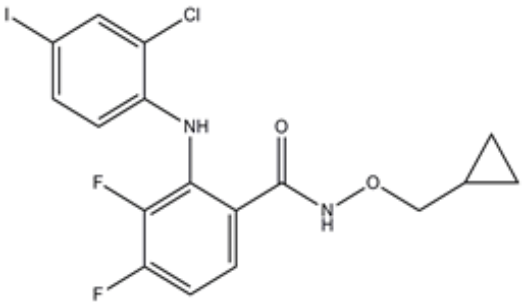
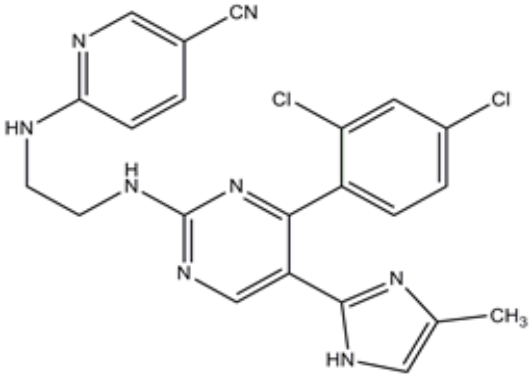
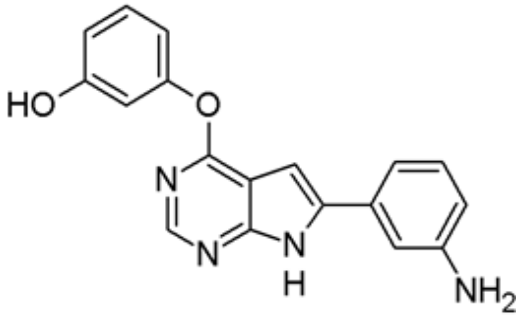
Product Name	Cat. No.	Application	Structure
5-Azacytidine New! **CAS #:** 320-67-2	1854-50, 250	A potent growth inhibitor and cytotoxic agent; a potent DNA methyltransferaseinhibitor. Recently shown to increase re-programming efficiency of stem cells 10-fold.	
(±) –Bay K 8644 **CAS #:** 71145-03-4	1682-5	A L-type Ca2+-channel activator (EC50 = 17.3 nM). In combination with BIX01294 (Cat. No. 1678-5, 25), enables reprogramming of Oct4/Klf4-transduced mouse embryonic fibroblasts. **Ref.:** Shi, Y., et al. (2008). *Cell Stem Cell* **3**, 568-574.	
BIX 01294 **CAS #:** 935693-62-2	1678-5, 25	Selectively impairs the G9a histone lysine methyltransferase (HMTase) and the generation of H3K9me2 in vitro. BIX-01294 enables neural progenitor cells (NPCs) to be reprogrammed in the absence of exogenous Oct4. Ref.: Shi, Y., et al. (2008). Cell Stem Cell 2, 525; Kubicek, S., et al. (2007). Mol. Cell 25, 473.	
8-Br-cAMP New! **CAS #:** 76939-46-3	1837-5, 25	A cell-permeable cAMP analog that is more resistant to hydrolysis by phosphodiesterases than cAMP. Activates protein kinase A, inhibits growth, decreases proliferation, increases differentiation, and induces apoptosis of cultured cells. Also recently shown to improve the reprogramming efficiency of human neonatal foreskin fibroblast (HFF1) cells 2-fold.	

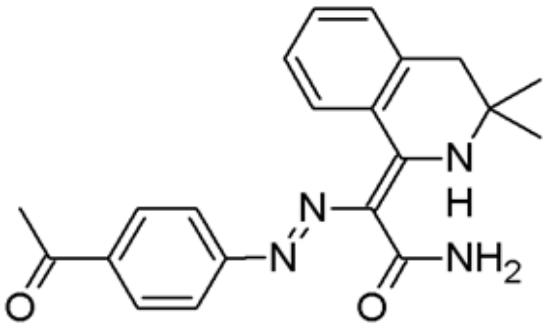
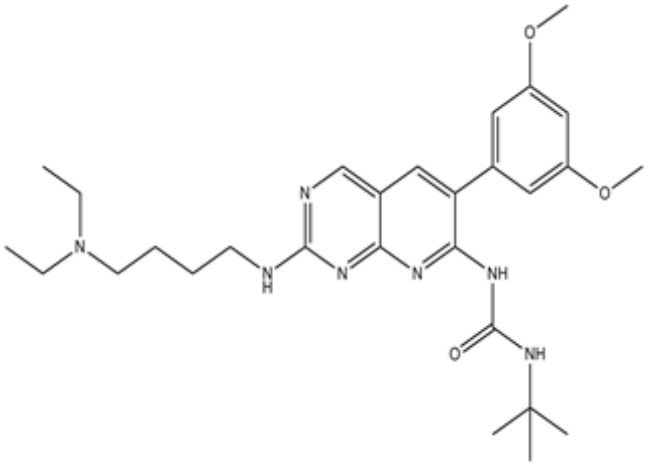
Product Name	Cat. No.	Application	Structure
PS48 New! **CAS #:** 1180676-32-7	1869-5, 25, 100	An allosteric phosphoinositide-dependent protein kinase-1 (PDK1) activator (Kd = 10.3 μM). Binds exclusively to the PIF-binding pocket of PDK1, distinct from the ATP binding site. It has recently been found that a combination of PS48, sodium butyrate (Cat. No. 1609-1000), a histone deacetylase inhibitor and the gene Oct-4, could enhance the reprogramming efficiency of keratinocytes isolated from human skin or hair follicles over 25-fold.	
RepSox New! **CAS#:** 446859-33-2	1894-5, 25	Cell-permeable. A TGF-β type I receptor (ALK5) inhibitor. Inhibits ALK5 autophosphorylation (IC_{50} = 4 nM). Can replace one of the four reprogramming factors Sox-2. RepSox has been successfully used in the direct reprogramming of mouse fibroblasts through induction of Nanog transcription.	
RG 108 **CAS #:** 48208-26-0	1679-10, 30	A DNA methyltransferase (DNMT) inhibitor. RG 108 causes demethylation and reactivation of tumor suppressor genes, but it does not affect the methylation of centromeric satellite sequences. In combination with BIX 01294 (Cat. No. 1678-5), RG108 enhances reprogramming. **Ref.:** Shi, Y., et al. (2008). *Cell Stem Cell* **3**, 568-574; Stresemann, C., et al. (2006). *Cancer Res.* **66**, 2794-2800; Brueckner, B., et al. (2005). *Cancer Res.* **65**, 6305-6311.	
Thiazovivin **CAS #:** 1226056-71-8	1681-1, 5	An effective reagent in enhancing the cell survival pathway. In combination with ALK5 inhibitor SB-431542 (Cat. No. 1674-1) and MEK inhibitor PD-0325901 (Cat. No. 1643-2), Thiazovivin promotes the transformation of fibroblasts into stem cells with a 200-fold efficiency over the classic method. **Ref.:** Lin, T., et al. (2009). *Nat. Methods* **6**, 805-808.	

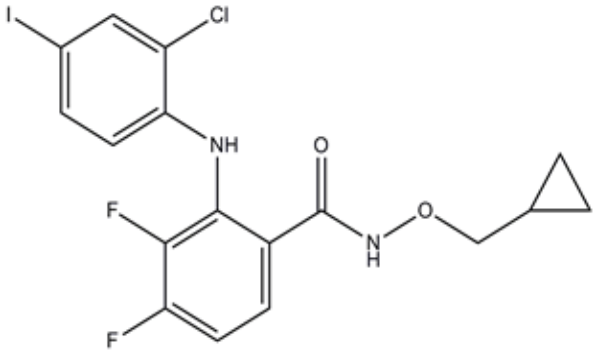
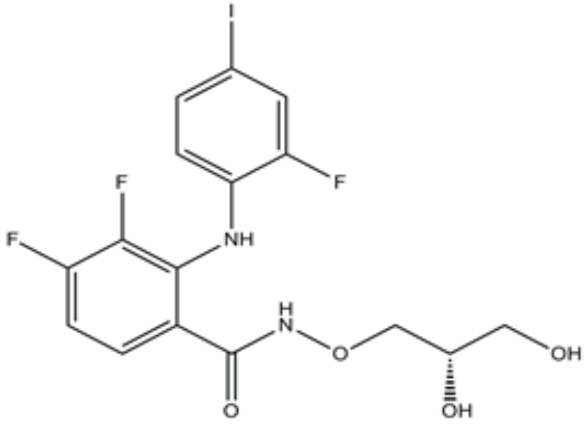
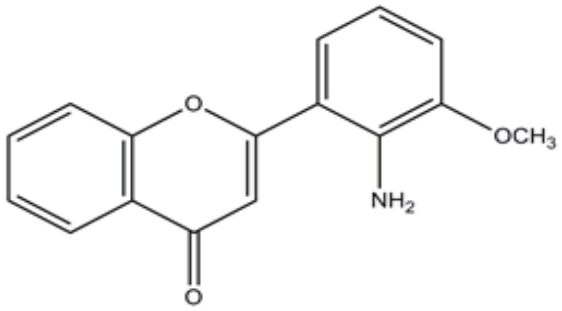
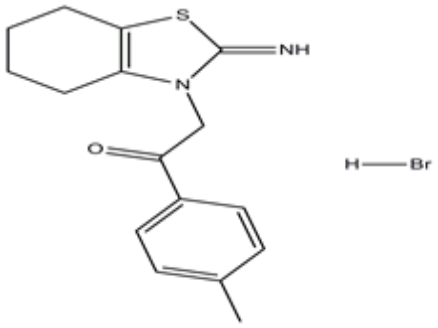
Product Name	Cat. No.	Application	Structure
EZSolution™ Thiazovivin New! **CAS #:** 1226056-71-8	1736-1	A 10 mM (1 mg in 321 µl) solution of Thiazovivin (Cat. No. 1681-1) in anhydrous DMSO.	
Tranylcypromine Hemisulfate (Parnate) New! **CAS #:** 13492-01-8	1816-25, 100	Potently suppresses the enzymatic activity of Lysine-Specific Demethylase 1 (LSD1) (IC50 <2 µM for BHC110/LSD1). When combined with GSK-3 Inhibitor CHIR99021 (Cat. No. 1677-5, 25), causes reprogramming of human primary keratinocyte transduced with two factors, Oct4 and Klf4.	
Valproic Acid, Sodium Salt **CAS #:** 1069-66-5	1647-200	A histone deacetylase 1 (HDAC1) inhibitor. Recently it has been reported that Valproic acid enables reprogramming of primary human fibroblasts with only two factors, Oct4 and Sox2, without the need for the oncogenes c-Myc or Klf4. **Ref.:** Huangfu, D., et al. (2008). *Nat. Biotechnol.* **26**, 1269-1275; Huangfu, D., et al. (2008). Nat. Biotechnol. 26, 795-797.	

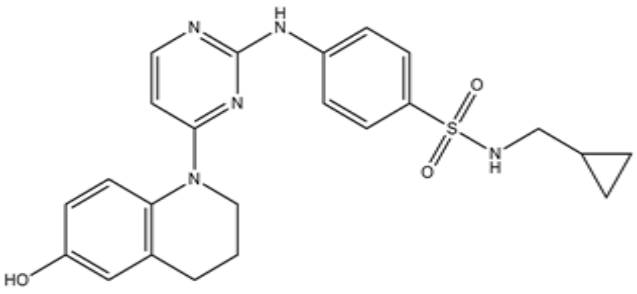
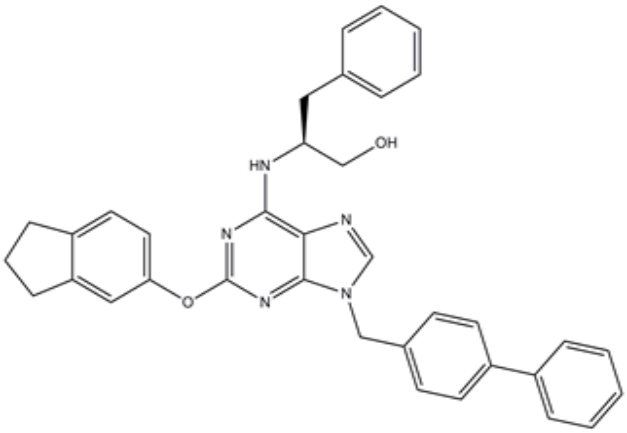
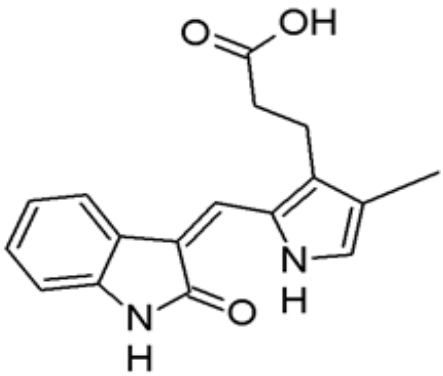
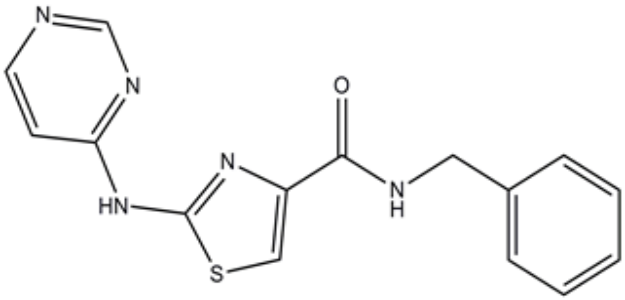
Self-Renewal and Survival

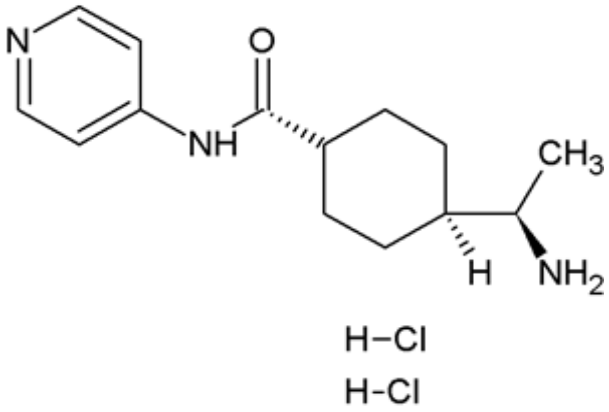
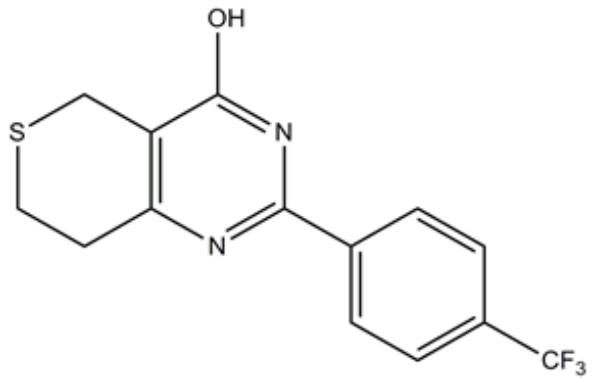
Product Name	Cat. No.	Application	Structure
A 83-01 **CAS #:** 909910-43-6	1725-1	A selective inhibitor of TGF-β type I receptor ALK5 kinase, type I activin/nodal receptor ALK4 and type I nodal receptor ALK7 (IC50 values are 12, 45 and 7.5 nM respectively). Blocks phosphorylation of Smad2 and inhibits TGF-β-induced epithelial-to-mesenchymal transition. Helps maintain homogeneity and long-term in vitro self-renewal of human induced pluripotent stem cells (iPSCs). Ref.: Li, W., et al. (2009). Cell Stem Cell 4, 16-19; Tojo, M., et al. (2005). Cancer Res. 96, 791-800.	

Product Name	Cat. No.	Application	Structure
BIO **CAS #:** 667463-62-9	1673-1	A potent, selective, reversible and ATP-competitive inhibitor of GSK-3α/β (IC50 = 5 nM). Under a feeder-free condition, BIO maintains embryonic stem cells (hESCs) in the undifferentiated state. **Ref.**: Sato, N., et al. (2004). *Nat. Med.* **10**, 55-63.	
CI-1040 (PD184352) **CAS #:** 212631-79-3	1585-1,5, 25	A MEK inhibitor. In combination with the GSK-3 inhibitor CHIR99021 and FGFR inhibitor SU-5402 (Cat. No. 1645-05), helps to sustain self-renewal in human embryonic stem cells (ESC). **Ref.:** Ying, Q.-L; et al. (2008). *Nature* **453**, 519-523.	
CHIR 99021 **CAS #:** 252917-06-9	1677-5, 25	A potent and highly selective inhibitor of glycogen synthase kinase-3β (GSK-3β) (IC_{50} = 6.7 nM). CHIR99021 has been shown to allow for long-term expansion of murine embryonic stem cells in a chemically-defined medium in conjunction with MEK/MAPK inhibitor PD184352 and fibroblast growth factor receptor (FGFR) inhibitor SU5402.	
EZSolution™ CHIR99021 New! **CAS #:** 252917-06-9	1748-5	A 10 mM (5 mg in 1075 µl) solution of CHIR99021 (Cat. No. 1677-5) in anhydrous DMSO.	
GSK-3 Inhibitor, TWS-119 **CAS #:** 601514-19-6	1655-2	A potent GSK-3β inhibitor. At 400 nM, TWS119 induces neurogenesis in murine embryonic stem cells making it a useful tool to regulate stem cell self-renewal and differentiation. **Ref.:** Ding, S., et al. (2003). *Proc. Natl. Acad. Sci. USA* **100**, 7632-7637.	
Heparin-Binding Peptide I New! **CAS #:** N/A	1821-5, 25	A heparin-binding peptide derived from vitronectin. Surfaces displaying this peptide support human embryonic stem (hES) cell adhesion and self-renewal.	H-Gly-Lys-Lys-Gln-Arg-Phe-Arg-His-Arg-Asn-Arg-Lys-Gly-OH

Product Name	Cat. No.	Application	Structure
Heparin-Binding Peptide II New! **CAS #:** N/A	1822-5, 25	A heparin-binding peptide derived from fibronectin. Surfaces displaying this peptide support human embryonic stem (hES) cell adhesion and self-renewal.	H-Gly-Trp-Gln-Pro-Pro-Ala-Arg-Ala-Arg-Ile-OH
Heparin-Binding Peptide III New! **CAS #:** N/A	1823-5, 25	A heparin-binding peptide derived from bone sialoprotein. Surfaces displaying this peptide support human embryonic stem (hES) cell adhesion and self-renewal.	H-Phe-His-Arg-Arg-Ile-Lys-Ala-OH
Integrin Ligand Peptide New! **CAS #:** N/A	1824-5, 25	An integrin ligand peptide derived from fibronectin and vitronectin. Surfaces displaying this peptide supports human embryonic stem (hES) cell adhesion but not self-renewal.	H-Lys-Gly-Arg-Gly-Asp-Ser-OH
IQ-1 **CAS #:** 331001-62-8	1663-1	Maintains the undifferentiated state of embryonic stem cells. By targeting the PR72/130 subunit of the Ser/Thr phosphatase PP2A, it prevents β-catenin from switching coactivator usage from CBP to p300. The increase in β-cateinin/CBP mediated transcription at the expense of β-cateinin/p300-mediated transcription helps to maintain the murine stem cell pluripotency **Ref.:** Miyabashi, T., et al. (2007). *Proc. Natl. Acad. Sci. USA* **104**, 5668.	
PD 173074 **CAS #:** 219580-11-7	1675-1	A potent and selective FGFR1 tyrosine kinase inhibitor (IC50 = 21.5 nM). Blocking of the FGFR signaling pathway by PD 173074 leads to self-renewal of stem cells via ERK1/2 activation. Treatment of FGF2-expressing human multipotent adipose-derived stem cells with PD173074 decreases dramatically their clonogenicity and differentiation potential. **Ref.:** Ying, Q.-L. et al. (2008). *Nature* **53**, 2008; Zaragosi, L.E., et al. (2006). *Stem Cells* **24**, 2412; Mohammadi, M., et al. (1998). *EMBO J.* **17**, 5896.	

Product Name	Cat. No.	Application	Structure
PD184352 (CI-1040) **CAS #:** 212631-79-3	1585-1,5, 25	A MEK inhibitor. In combination with the GSK-3 inhibitor CHIR99021 and FGFR inhibitor SU-5402 (Cat. No. 1645-05), helps to sustain self-renewal in human embryonic stem cells (ESC). **Ref.:** Ying, Q.-L; et al. (2008). *Nature* **453**, 519-523.	
EZSolution™ **PD184352** New! **CAS #:** 212631-79-3	1871-1	A 10 mM (1 mg in 209 µl) solution of PD184352 (Cat. No. 1585-1) in anhydrous DMSO.	
PD0325901 **CAS #:** 391210-10-9	1643-2, 5, 25	A MEK inhibitor. In combination with the GSK-3 inhibitor CHIR99021, prevents cell differentiation and sustains self-renewal of embryonic stem (ES) cells. **Ref.**: Ying, Q.-L; et al. (2008). *Nature* **453**, 519-523.	
PD 98059 **CAS #:** 167869-21-8	1666-5	A MEK inhibitor. Enhances the growth of undifferentiated mouse embryonic stem (ES) cells. **Ref.:** Qi, X., et al. (2004). *Proc. Natl. Acad. Sci. USA* **101**, 6027-6032.	
Pifithrin-α **CAS #:** 63208-82-2	1554-10	An inhibitor of p53-dependent apoptosis. Increases the survival of hemopoietic clonogenic cells. **Ref.:** Kawamura, T., et al. (2009). *Nature* **460**, 1140-1144.	
EZSolution™ **Pyrintegrin** New! **CAS #:** 508-02-1	1731-1	A 10 mM (1 mg in 221 µl) of Pyrintegrin (Cat. No. 1729-1) in anhydrous DMSO.	

Product Name	Cat. No.	Application	Structure
Pyrintegrin **CAS #:** N/A	1729-1, 5	A novel small molecule that helps in promoting human embryonic stem cell (hESC) survival by > 30-fold.The dramatic increase in cell survival has been attributed to the protection of the cell surface protein e-cadherin from damage by Pyrintegrin. **Ref.:** Xu, Y., et al. (2010). *Proc. Natl. Acad. Sci. USA*, April 20.	
QS11 **CAS #:** 944328-88-5	1680-5	Inhibits the GTPase activating protein of ADP-ribosylation factor 1 (ARFGAP1) as well as synergizes the Wnt/β-catenin signaling pathway. The Wnt/β-catenin signaling pathway regulates cell fate and behavior during embryogenesis, adult tissue homeostasis, and regeneration. **Ref.:** Zhang, Q., et al. (2007). *Proc. Natl. Acad. Sci. USA* **104**, 7444-7448.	
SU-5402 **CAS #:** 215543-92-3	1645-05	A potent and selective FGFR inhibitor. Useful tool to determine the role of endogenous FGF signaling in self-renewal or differentiation of human embryonic stem cells **Ref.:** Vatsveen, T.K., et al. (2009). *Eur. J. Haematol.* **83**, 471-476; Dvorak, P., et al. (2005). *Stem Cells* **23**, 1200-1211.	
EZSolution™ Thiazovivin New! **CAS #:** 1226056-71-8	1736-1	A 10 mM (1 mg in 321 µl) solution of Thiazovivin (Cat. No. 1681-1) in anhydrous DMSO.	
Thiazovivin **CAS #:** 1226056-71-8	1681-1,5	A novel small molecule that helps in promoting human embryonic stem cell (hESC) survival by > 30-fold.The dramatic increase in cell survival has been attributed to the protection of the cell surface protein e-cadherin from damage by Pyrintegrin. **Ref.:** Xu, Y., et al. (2010). *Proc. Natl. Acad. Sci. USA,* April 20.	

Product Name	Cat. No.	Application	Structure
Y-27632 **CAS #:** 146986-50-7	1596-1,5, 50	A selective Rho kinase (ROCK) inhibitor. Prevents apoptosis as well as enhance the survival and cloning efficiency of dissociated human embryonic stem cells (hES) without affecting their pluripotency. **Ref.:** Koyanagi, M., et al. (2008). *J. Neurosci. Res.* **86**, 270-280; Watanabe, K., et al. (2007). *Nat. Biotechnol.* **25**, 681-686.	
EZSolution™ **Y-27632** New! **CAS #:** 146986-50-7	1784-5	A 10 mM (5 mg in 1550 µl) solution of Y-27632, Dihydrochloride (Cat. No. 1596-5) in deionized water.	
XAV 939 **CAS #:** 284028-89-3	1727-1	A Tankyrase (TNKS) inhibitor (IC50 = 110 nM for TNKS1 and 4 nM for TNKS2). Antagonizes wnt signaling via stimulation of β-catenin degradation and stabilization of axin. Inhibits proliferation of the µ-catenin-dependent colon carcinoma cell line DLD-1. **Ref.:** DL Huang, S.M., et al. (2009). *Nature* **461**, 614-620.	

DiscoveryPak™ Stem Cell Fate Regulator Sets

DiscoveryPak™ Stem Cell Fate Regulator Set I
Cat. No. K852-3

A set containing three inhibitors useful for sustaining embryonic stem (ES) cell self-renewal. The set contains the following inhibitors: 5 mg of the GSK-3β Inhibitor CHIR 99021 (Cat. No. 1677-5); 5 mg of MEK Inhibitor PD 184352 (Cat. No. 1585-5) and 500 µg of FGFR Inhibitor SU-5402 (Cat. No. 1645-05).

DiscoveryPak™ Stem Cell Fate Regulator Set II
Cat. No. K853-8

A convenient set of eight small molecules useful for stem cell differentiation, self-renewal and reprogramming. The set contains the following products: 5 mg of G9a HMTase Inhibitor BIX01294 (Cat. No. 1678-5); 5 mg of the GSK-3β Inhibitor CHIR 99021 (Cat. No. 1677-5); 5 mg of MEK Inhibitor PD 184352 (Cat. No. 1585-5) ; 2 mg of MEK Inhibitor PD0325901 (Cat. No. 1643-2); 10 mg of DNMT Inhibitor RG-108(Cat. No.1679-10); 1 mg of ALK5 Inhibitor SB-431542 (Cat. No. 1674-1); 500 µg of FGFR Inhibitor SU-5402 (Cat. No. 1645-05) and 200 mg of VPA (Cat. No. 1647-200).

DiscoveryPak™ Stem Cell Fate Regulator Set III
Cat. No. K854-3

A convenient set of three small molecules useful for promoting the transformation of fibroblasts into stem cells. The set contains the following products: 2 mg of MEK Inhibitor PD0325901 (Cat. No. 1643-2); 1 mg of ALK5 Inhibitor SB-431542 (Cat. No. 1674-1) and 1 mg of cell survival enhancing agent Thiazovivin (Cat. No. 1681-1).

DiscoveryPak™ Stem Cell Fate Regulator Set IV
Cat. No. K855-3

A convenient set of three small molecules that help in promoting the survival of embryonic stem cells (ESCs).
The set contains the following products. 1 mg each of ESC survival promoters, Pyrintegrin (Cat. No. 1729-1) and Thiazovivin (Cat. No. 1681-1) and 1 mg of ROCK inhibitor Y-27632, Dihydrochloride.

DiscoveryPak™ Stem Cell Fate Regulator Set V
Cat. No. K865-5
New!

A convenient set of five small molecules useful for generating human induced pluripotent stem cells (iPSC) from primary cells. The five products are: 1 mg of A-83-01 (Cat. No. 1725-1), 2 mg of PD-0325901 (Cat. No. 1643-2), 5 mg of PS48 (Cat. No. 1869-5), 1 g of Sodium Butyrate (Cat. No. 1609-1000) and 25 mg of Tranylcypromine hemisulfate (Parnate) (Cat. No. 1816-25).

DiscoveryPak™ Stem Cell Fate Regulator Set VI
Cat. No. K866-5
New!

A convenient set of five small molecules useful for self-renewal in stem cells and induced pluripotent stem cells (iPSCs). The five products are: 1 mg of A-83-01 (Cat. No. 1725-1), 5 mg of CHIR99021 (Cat. No. 1677-5), 1 mg of IQ-1 (Cat. No. 1663-1), 2 mg of PD-0325901 (Cat. No. 1643-2), and 500 µg of SU-5402.

DiscoveryPak™ Stem Cell Fate Regulator Set VII
Cat. No. K867-10
New!

A convenient set of ten small molecules useful for enhancing the reprogramming efficiency. The ten products are: 5 mg of (±) –Bay K 8644 (Cat. No. 1682-5), 5 mg of BIX01294 (Cat. No. 1678-5), 5 mg of PS-48 (Cat. No. 1869-5), 5 mg of RepSox (Cat. No. 1894-5), 1 mg of Reversine (Cat. No. 1851-1), 10 mg of RG 108 (Cat. No. 1679-10), 1 mg of SB-431542 (Cat. No. 1674-1), 1 g of Sodium Butyrate (Cat. No. 1609-1000), 25 mg of Tranylcypromine hemisulfate (Parnate) (Cat. No. 1816-25), and 200 mg of Valproic Acid, sodium salt (Cat. No. 1647-200).

DiscoveryPak™ Neuronal Cell Induction Small Molecules Set :
Catalog Number: K892-8
New!

A convenient set containing eight small molecules useful for induction of neuronal cells (hciNs) from human fibroblasts. The eight products are: 200 mg of the HDAC inhibitor Valproic Acid Sodium Salt (Cat. No. 1647); 5 mg of GSK-3 inhibitor CHIR99021 (Cat. No. 1677); 5 mg of TGFβ inhibitor RepSox (Cat. No. 1894); 5 mg of cAMP activator Forskolin (Cat. No. 1531); 5 mg of JNK Inhibitor SP600125 (Cat. No. 1669); 1 mg of PKC inhibitor Gö6983 (Cat. No. 9539); 5 mg of ROCK inhibitor Y-27632 HCl (Cat. No. 1596); and 5 mg of AMPK inhibitor Dorsomorphin (Cat. No. 1686).
Ref: Hu, W., et al. (2015). Cell Stem Cell 17, 204-212.

DiscoveryPak™ Stem Cell Fate Regulator Set X
Cat. No. K396-2
New!

A convenient set of two small molecules useful for increasing the cloning efficiency in individualized human pluripotent stem cells (hPSCs). The two modulators are: 5 mg of Pioglitazone (Cat. No. 1877-5) and 5 mg of Y-27632 HCl (Cat. No. 1596-5).
Ref: Kajabadi, N.S., et al. (2015). J. Biol. Chem. 290, 26303- 13

StemBoost™ Neuronal Cell Induction Cocktail Set (100X), Sterile-Filtered
Cat.No. K891-1
New!

A convenient, sterile-filtered cocktail solution (100X, in DMSO) containing the following six small molecules: CHIR99021 (Cat. No. 1677), a GSK-3β inhibitor, 0.3 mM; RepSox (Cat. No. 1894), a TGFβ inhibitor, 0.1 mM; Forskolin (Cat. No. 1531), a cAMP activator, 1.0 mM; SP600125 (Cat. No. 1669), a JNK inhibitor, 1.0 mM; Gö6983 (Cat. No. 9539), a PKC inhibitor, 0.5 mM and Y-27632 HCl (Cat. No. 1596), a ROCK inhibitor. Also provided separately is a sterile-filtered solution (100X, in DI water) of the HDAC inhibitor Valproic Acid Sodium Salt (50 MM).
Ref: Hu, W., et al. (2015). Cell Stem Cell 17, 204-212.

Please visit www.biovision.com for a comprehensive overview on our products!