Technical Data

S1067 SB431542

Molecular Weight (MW)	384.39
Formula	$C_{22}H_{16}N_4O_3$
CAS No.	301836-41-9
Synonyms	N/A
Solubility (25°C) * <1 mg/ml means slightly soluble or insoluble	DMSO 77 mg/mL
	Water <1 mg/mL
	Ethanol 3 mg/mL
Storage	3 years -20℃Powder
	6 months-80℃in DMSO
Chemical Name	4-(4-(benzo[d][1,3]dioxol-5-yl)-5-(pyridin-2-yl)-1H-imidazol-2-yl)benzamide

Preparing Stock Solutions

Stock Solution (1ml DMSO)	1mM	10mM	20mM	30mM
Mass(mg)	0.38439	3.8439	7.6878	11.5317

Biological Activity

Description	SB431542 is a potent and selective inhibitor of **ALK5** with **IC50** of 94 nM, 100-fold more selective for ALK5 than p38 MAPK and other kinases.
Targets	ALK5
IC50	94 nM [1]
In vitro	SB 431542 inhibits the activin type I receptor ALK4 and the nodal type I receptor ALK7, which are responsible for the phosphorylation of Smad2. SB 431542 has little effect on ALK1, ALK2, ALK3, and ALK6, which show phosphorylation of Smad1. SB 431542 is a selective inhibitor of endogenous activin but has no apparent effect on BMP signaling. SB 431542 could induce both Smad2/Smad4- and Smad3/Smad4-dependent transcription.[2] In A498 cells, SB 431542 inhibits both TGF-β1-induced collagen Iα1 and PAI-1 mRNA with IC50 of 60 nM and 50 nM, respectively. In addition, SB 431542 inhibits production of TGF-β1-induced fibronectin mRNA and protein with IC50 of 62 nM and 22 nM, respectively. [3] SB 431542 blocks the TGF-β-mediated growth factors, including PDGF-A, FGF-2 and HB-EGF, leading to an increase in proliferation of MG63 cells. SB 431542 also inhibits TGF-β-induced c-Myc and p21 $^{WAF1/CIP1}$. [4] SB 431542 significantly suppresses TGF-β-induced G1 arrest, leading to accumulation of cells in the S phase of the cell cycle in FET, RIE, and Mv1Lu cells. SB 431542 also inhibits TGF-β-induced epithelial to mesenchymal transition (EMT) in NMuMG and PANC-1 cells. [5] SB 431542 significantly elevates the expression of CD86 in BM-DCs and

	that of CD83 within CD11c+ cells suppressed by TGF-β. SB 431542 is able to induce NK activity through functional maturation and IL-12 production of human DCs. [6]
In vivo	SB 431542 triggers cytotoxic T lymphocyte (CTL) activities in the colon-26 carcinoma models and is most likely to produce antitumor immunological outcomes through alteration of DC function suppressed by TGF-β. [6]
Features	

Protocol (Only for Reference)

Kinase Assay: [1]

Flashplate assay for ALK5	SB 431542 is dissolved in DMSO at a concentration of 10 mM. The kinase domain of TGFβRI, from amino acid 200 to the C-terminus, and the full-length Smad3 protein are expressed as N-terminal glutathion S-transferase (GST) fusion proteins in the baculovirus expression system. Proteins are purified with glutathion Sepharose beads 4B. Basic FlashPlates are coated with 0.1 M sterile filtered sodium bicarbonate, pH 7.6, containing 700 ng of GST-Smad3 per 100 µL. Assay buffer contains 50 mM HEPES (pH 7.4), 5 mM $MgCl_2$, 1 mM $CaCl_2$, 1 mM DTT, 100 mM GTP, 3 µM ATP plus 0.5 µCi/well γ^{33}P-ATP, and 85 ng of GST-ALK5 with or without SB 431542. Plates are incubated at 30 °C for 3 hours. The assay buffer is removed by aspiration, and the plate is counted on a Packard TopCount 96-well scintillation plate reader.

Cell Assay: [4]

Cell lines	MG63 and NIH3T3
Concentrations	0.3 µM
Incubation Time	30 minutes
Method	To explore the effects of ligands, MG63 and NIH3T3 cells are seeded at a density of 8 × 10^4 cells/well in 6-well plates and starved (0.1% FCS for MG63 cells and 0.5% FCS for NIH3T3 cells) for 24 hours before ligand stimulation. Media containing various ligands are exchanged at 48-hours intervals. Cells are trypsinized and counted by a Coulter counter on days 2, 4, and 6 after ligand stimulation. To explore the effects of constitutively active receptors, cells are seeded at a density of 2 × 10^5 cells/well in 6-well plates. The next day, cells are infected with adenoviruses carrying various cDNAs at a multiplicity of infection of 100. Cells are trypsinized and counted on day 3. Cell proliferation assay is performed in the presence of 0.3 µM SB 431542.

Animal Study: [6]

Animal Models	BALB/c mice receive intraperitoneal (i.p.) injections of colon-26 tumor cells.
Formulation	DMSO
Dosages	1 µM solution, 100 µL/mouse
Administration	Directly injected into peritoneal cavity

References

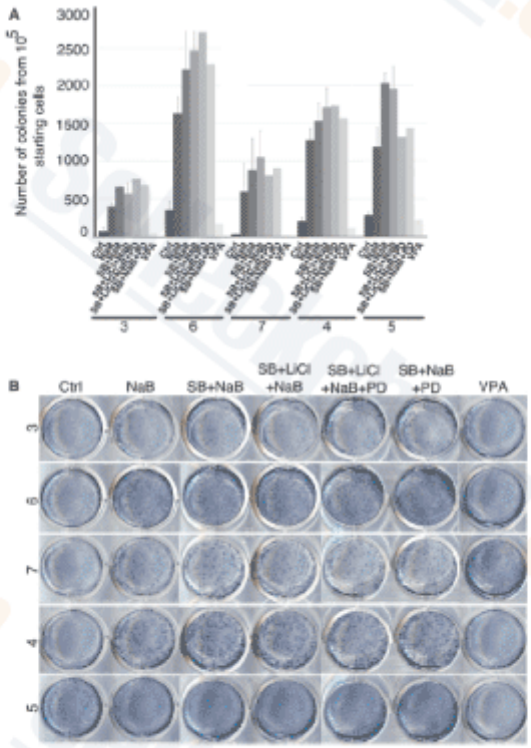
[1] Callahan JF, et al. J Med Chem, 2002, 45(5), 999-1001.

[2] Inman GJ, et al. Mol Pharmacol, 2002, 62(1), 65-74.

[3] Laping NJ, et al. Mol Pharmacol, 2002, 62(1), 58-64.

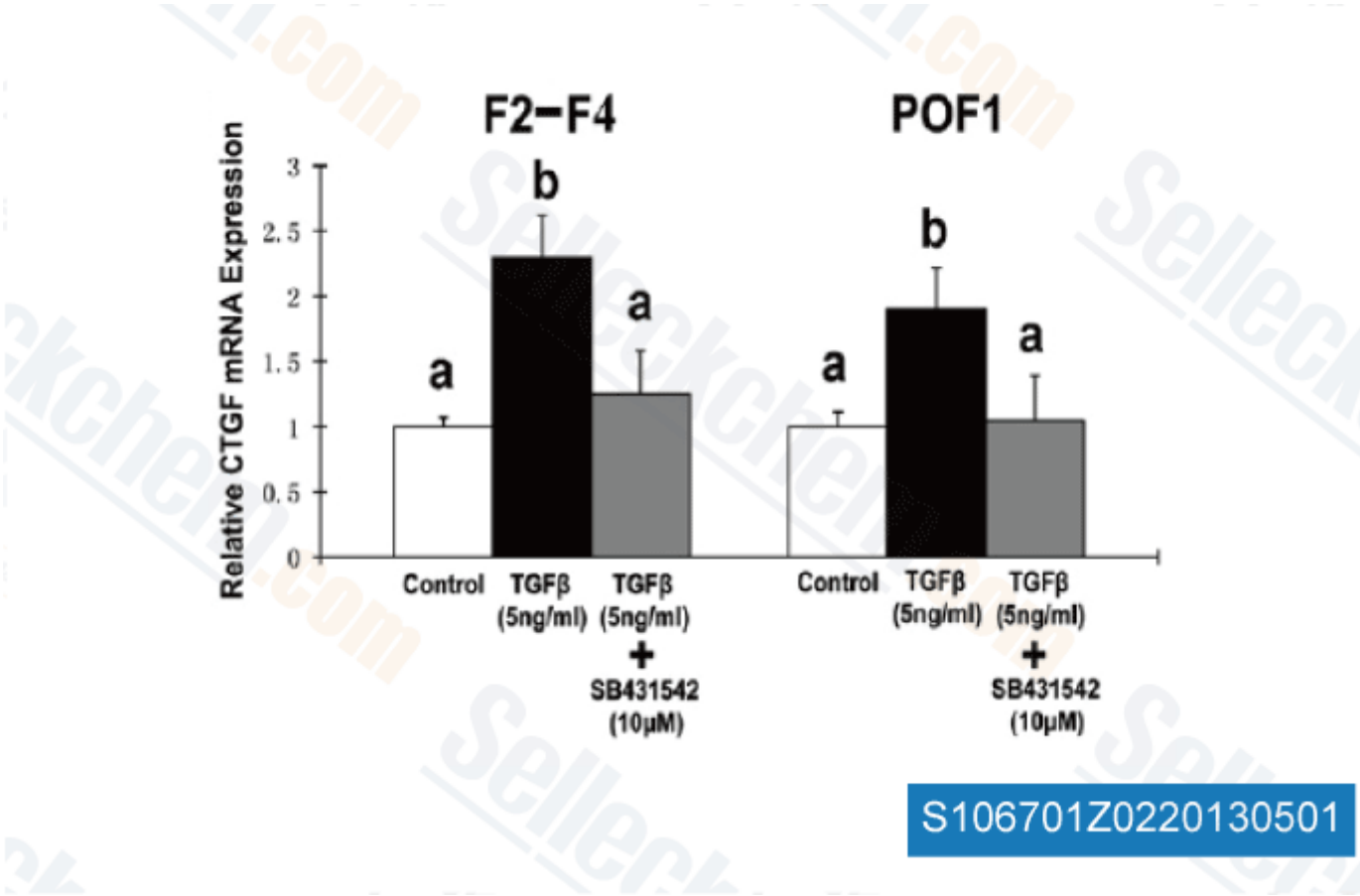
[4] Matsuyama S, et al. Cancer Res, 2003, 63(22), 7791-7798.
[5] Halder SK, et al. Neoplasia, 2005, 7(5), 509-521.
[6] Tanaka H, et al. Oncol Rep, 2010, 24(6), 1637-1643.

Customer Reviews



, , STEM CELLS AND DEVELOPMENT, 2013
SB431542 purchased from **Selleck**

Effect of small molecule inhibitors on reprogramming efficiency of myoblast cell derived from 5 different donors. (A) Reprogramming efficiency is shown as number of colonies from 10^5 starting cells on Y-axes. Ctrl, control condition and addition of small molecule inhibitors are marked. (B) AP staining of reprogrammed myoblast cell lines, from 5 different donors, in wells of 12-well plates at day 18. Ctrl, control condition and additions of small molecule inhibitors are marked.



, , General and Comparative Endocrinology 178 (2012) 314–322
SB431542 purchased from **Selleck**

TGFb1 mRNA expression in different follicles of the 26 weeks old hen ovaries and its effect on CTGF mRNA expression in granulosa cells. Effects of TGFb1 and inhibitor SB431542 on CTGF mRNA expression in granulosa cells from F2 to F4 and POF1 follicles.

SB431542 has been referenced in 6 publications.

- miR-99a/100~125b tricistrons regulate hematopoietic stem and progenitor cell homeostasis by shifting the balance between TGFβ and Wnt signaling. [Emmrich S Genes Dev, 2014, 28(8):858-74]

PubMed: 24736844

- A fully defined and scalable 3D culture system for human pluripotent stem cell expansion and differentiation. [Lei Y, et al. Proc Natl Acad Sci U S A, 2013, 110(52):E5039-48]

PubMed: 24248365

- Ribosomal Protein S6 Kinase (RSK)-2 as a central effector molecule in RON receptor tyrosine kinase mediated epithelial to mesenchymal transition induced by macrophage-stimulating protein. [Ma Q, et al. Mol Cancer, 2011, 10:66]

PubMed: 21619683

- Dioxin receptor expression inhibits basal and TGFβ-induced epithelial-to-mesenchymal transition. [Rico-Leo EM, et al. J Biol Chem, 2013, 288(11):7841-56]

PubMed: 23382382

- Epithelial-mesenchymal transition involved in pulmonary fibrosis induced by multi-walled carbon nanotubes via TGF-beta/Smad signaling pathway. [Chen T Toxicol Lett, 2014, 226(2):150-62]

  PubMed: 24530353

- Transforming growth factor beta receptor I inhibitor sensitizes drug-resistant pancreatic cancer cells to gemcitabine. [Kim YJ, et al. Anticancer Res, 2012, 32(3):799-806]

  PubMed: 22399597

PLEASE KEEP THE PRODUCT UNDER -20°C FOR LONG-TERM STORAGE.

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