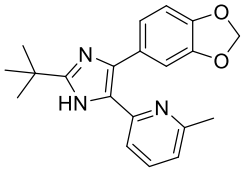
Product data sheet

MedKoo Cat#: 406135 Name: SB505124 CAS#: 694433-59-5 Chemical Formula: $C_{20}H_{21}N_3O_2$ Exact Mass: 335.16338 Molecular Weight: 335.4	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
SB505124 is a selective inhibitor of transforming growth factor-β type I receptor (ALK5, ALK4 and ALK7) with potential anticancer activity. SB505124 selectively inhibits signaling from TGF-β and activin; does not inhibit other ALK family members. SB-505124 selectively and concentration-dependently inhibits ALK4-, ALK5-, and ALK 7-dependent activation of downstream cytoplasmic signal transducers, Smad2 and Smad3, and of TGF-beta-induced mitogen-activated protein kinase pathway components but does not alter ALK1, ALK2, ALK3 or ALK6-induced Smad signaling.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	57.72	172.09
DMF	20.0	59.63
Ethanol	43.5	129.70
Ethanol:PBS (pH 7.2) (1:1)	0.5	1.49

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	2.98 mL	14.91 mL	29.82 mL
5 mM	0.60 mL	2.98 mL	5.96 mL
10 mM	0.30 mL	1.49 mL	2.98 mL
50 mM	0.06 mL	0.30 mL	0.60 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Asnaghi L, White DT, Key N, Choi J, Mahale A, Alkatan H, Edward DP, Elkhamary SM, Al-Mesfer S, Maktabi A, Hurtado CG, Lee GY, Carcaboso AM, Mumm JS, Safieh LA, Eberhart CG. ACVR1C/SMAD2 signaling promotes invasion and growth in retinoblastoma. Oncogene. 2019 Mar;38(12):2056-2075. doi: 10.1038/s41388-018-0543-2. Epub 2018 Nov 6. PMID: 30401983; PMCID: PMC6430693.
2. Liu Y, Sharma T, Chen IP, Reichenberger E, Ueki Y, Arif Y, Parisi D, Maye P. Rescue of a cherubism bone marrow stromal culture phenotype by reducing TGFβ signaling. Bone. 2018 Jun;111:28-35. doi: 10.1016/j.bone.2018.03.009. Epub 2018 Mar 9. PMID: 29530719; PMCID: PMC5924722.

In vivo study

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1. Wang B, Wang Y, Chen H, Yao S, Lai X, Qiu Y, Cai J, Huang Y, Wei X, Guan Y, Wang T, Wang J, Xiang AP. Inhibition of TGFβ improves hematopoietic stem cell niche and ameliorates cancer-related anemia. Stem Cell Res Ther. 2021 Jan 18;12(1):65. doi: 10.1186/s13287-020-02120-9. PMID: 33461597; PMCID: PMC7814632.
2. Zhang H, Chen S, Shang C, Wu X, Wang Y, Li G. Interplay between Lefty and Nodal signaling is essential for the organizer and axial formation in amphioxus embryos. Dev Biol. 2019 Dec 1;456(1):63-73. doi: 10.1016/j.ydbio.2019.08.006. Epub 2019 Aug 13. PMID: 31419410.

7. Bioactivity

Biological target:

SB-505124 is a selective inhibitor of TGF-β Receptor type I receptors (ALK4, ALK5, ALK7), with IC50s of 129 nM and 47 nM for ALK4, ALK5, respectively, but it does not inhibit ALK1, 2, 3, or 6.

In vitro activity

Pharmacological inhibition of the ACVR1C receptor using SB505124, a selective inhibitor of ALK4/5/7 receptors, significantly reduced growth (Figure 3a, c, e) and invasion (Figure 3b, d, f) of cultured retinoblastoma cells in a dose-dependent manner. In WERI Rb1 cells, growth was potently suppressed, starting at 2 μM after 3, 5, and 7 days of treatment (Figure 3a). Y79 growth was almost completely suppressed at concentrations ≥ 1 μM (Figure 3c), while HSJD-RBVS-10 cells were somewhat less responsive to SB505124-mediated growth inhibition (Figure 3e). Nevertheless, SB505124 potently suppressed invasion of all three lines in a dose-dependent manner, as found by transwell invasion assay, with more than 70% inhibition in the ability of the cells to invade through a Matrigel-coated filter at concentrations ≥ 3 μM (Figure 3b, d, f).

Reference: Oncogene. 2019 Mar; 38(12): 2056–2075. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6430693/

In vivo activity

In this study, SB505124 was found to be effective in rescuing symptoms during CRA (cancer-related anemia). SB505124 is a small molecule inhibitor of the TGFβ type I receptor serine/threonine kinase known as activin receptor-like kinase (ALK). Indeed, this study observed that SB505124 significantly rescued erythrocyte reduction, ameliorated the hindered hematopoiesis, and improved the HSC niche in the bone marrow. Results suggest that the TGFβ signaling pathway could be targeted to restore the HSC niche and rescue CRA. Several TGFβ pathway inhibitors are currently under clinical trials and have shown acceptable safety, tolerability, and efficacy for slowing the progression of solid tumors and myelodysplastic syndrome. These details, combined with present novel findings in the LLC-bearing mouse model, suggest that SB505124 is a safe and effective treatment that could be developed for CRA and potentially other cancer-related disorders.

Reference: Stem Cell Res Ther. 2021; 12: 65. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7814632/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.