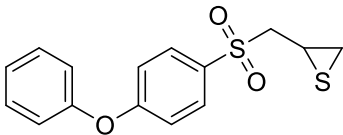


Product data sheet



MedKoo Cat#: 406563 Name: SB-3CT CAS#: 292605-14-2 Chemical Formula: C ₁₅ H ₁₄ O ₃ S ₂ Exact Mass: 306.0384 Molecular Weight: 306.4	
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:

SB-3CT is a potent matrix metalloproteinase MMP-2 and MMP-9 inhibitor. SB-3CT is a 2-[(arylsulfonyl)methyl]thiirane that achieves potent inhibition, by a thiirane-opening mechanism, of the MMP2 and MMP9 zinc metalloproteases. SB-3CT attenuates behavioral impairments and hippocampal loss after traumatic brain injury in rat. Matrix metalloproteinases (MMPs) are involved in a number of activities including angiogenesis and embryogenesis. In particular, gelatinases A (MMP-2) and B (MMP-9), are thought to facilitate tumor metastasis.

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	39.16	127.81
DMF	25.0	81.59
DMF:PBS (pH 7.2) (1:5)	0.1	0.33
Ethanol	6.04	19.71

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.26 mL	16.32 mL	32.64 mL
5 mM	0.65 mL	3.26 mL	6.53 mL
10 mM	0.33 mL	1.63 mL	3.26 mL
50 mM	0.07 mL	0.33 mL	0.65 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

- Shackleton B, Ringland C, Abdullah L, Mullan M, Crawford F, Bachmeier C. Influence of Matrix Metalloproteinase 9 on Beta-Amyloid Elimination Across the Blood-Brain Barrier. *Mol Neurobiol.* 2019 Dec;56(12):8296-8305. doi: 10.1007/s12035-019-01672-z. Epub 2019 Jun 18. PMID: 31209784; PMCID: PMC6842100.
- Liu X, Su P, Meng S, Aschner M, Cao Y, Luo W, Zheng G, Liu M. Role of matrix metalloproteinase-2/9 (MMP2/9) in lead-induced changes in an in vitro blood-brain barrier model. *Int J Biol Sci.* 2017 Oct 31;13(11):1351-1360. doi: 10.7150/ijbs.20670. PMID: 29209140; PMCID: PMC5715519.

In vivo study

Product data sheet



1. Ringland C, Schweig JE, Eisenbaum M, Paris D, Ait-Ghezala G, Mullan M, Crawford F, Abdullah L, Bachmeier C. MMP9 modulation improves specific neurobehavioral deficits in a mouse model of Alzheimer's disease. *BMC Neurosci.* 2021 May 25;22(1):39. doi: 10.1186/s12868-021-00643-2. PMID: 34034683; PMCID: PMC8152085.

2. Pirbhoy PS, Rais M, Lovelace JW, Woodard W, Razak KA, Binder DK, Ethell IM. Acute pharmacological inhibition of matrix metalloproteinase-9 activity during development restores perineuronal net formation and normalizes auditory processing in *Fmr1* KO mice. *J Neurochem.* 2020 Dec;155(5):538-558. doi: 10.1111/jnc.15037. Epub 2020 Jun 8. PMID: 32374912; PMCID: PMC7644613.

7. Bioactivity

Biological target:

SB-3CT is a matrix metalloproteinase MMP-2 and MMP-9 inhibitor with K_i values of 13.9 and 600 nM, respectively.

In vitro activity

MMP9 inhibition with SB-3CT dose-dependently enhanced the (basolateral-to-apical) transit of monomeric $A\beta(1-42)$ across an in vitro model of the BBB (Figure 4). $A\beta$ BBB clearance was increased by >50% at 100nM SB-3CT compared to control, and statistically significant increases were observed at SB-3CT concentrations 5 μ M and higher (2.5-fold). Moreover, to assess the potential impact of SB-3CT on BBB monolayer integrity, this study evaluated the movement of a paracellular marker (10kDa lucifer yellow dextran) across the in vitro BBB model and observed no difference between each SB-3CT group and control conditions, indicating the barrier properties of the BBB model are maintained in the presence of SB-3CT exposure (data not shown).

Reference: *Mol Neurobiol.* 2019 Dec; 56(12): 8296–8305. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6842100/>

In vivo activity

The altered anxiety in the E4FAD mice indicates that treatment with SB-3CT may be efficacious, however, due to limitations in detection, the proteolytic activity of MMP9 in the brain could not be measured and this study could not confirm target engagement. This finding is consistent with other reports owing to the rapid degradation of the activated MMP9 enzyme in vivo. The mechanism of action of SB-3CT is to modulate MMP9 activity, not MMP9 expression. As expected, total MMP9 levels in the E4FAD brains remained unaltered, emphasizing that MMP9 expression is not a good indicator of target engagement when assessing SB-3CT. Owing to this limitation, it is not certain whether the observed effect on anxiety in the current studies was caused by the inhibition of MMP9 activity or another effect of the drug. In prior reporting, the same dose of SB-3CT used in these studies showed significant reductions in MMP9 activity in the brain using a treatment paradigm more acute than that used in the present study. Thus, it seems likely MMP9 activity was inhibited in the current studies, but a more chronic treatment paradigm may be necessary to overcome the AD phenotype.

Reference: *BMC Neurosci.* 2021; 22: 39. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8152085/>

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.