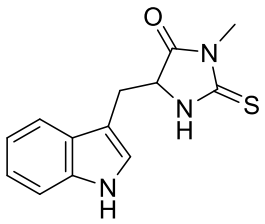
Product data sheet

MedKoo Cat#: 522437 Name: Necrostatin-1 CAS#: 4311-88-0 Chemical Formula: $C_{13}H_{13}N_3OS$ Exact Mass: 259.07793 Molecular Weight: 259.33	
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:

Necrostatin-1 is a potent and selective inhibitor of necroptosis, a mechanism of programmed cell death separate from apoptosis. Necrostatin-1 functions as an allosteric inhibitor of the death domain receptor-associated adaptor kinase RIP (RIP1) in the necroptosis pathway. While affecting this distinct cell death pathway, Necrostatin-1 does not present any perturbation of the Fas/TNFR triggered canonical apoptosis cascade. Necrostatin-1 inhibits RIP1 kinase the key upstream kinase involved in the activation of necroptosis (EC50=180nM).

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	14.0	54.0

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.86 mL	19.28 mL	38.56 mL
5 mM	0.77 mL	3.86 mL	7.71 mL
10 mM	0.39 mL	1.93 mL	3.86 mL
50 mM	0.08 mL	0.39 mL	0.77 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. Shen B, Mei M, Pu Y, Zhang H, Liu H, Tang M, Pan Q, He Y, Wu X, Zhao H. Necrostatin-1 Attenuates Renal Ischemia and Reperfusion Injury via Meditation of HIF-1α/mir-26a/TRPC6/PARP1 Signaling. Mol Ther Nucleic Acids. 2019 Sep 6;17:701-713. doi: 10.1016/j.omtn.2019.06.025. Epub 2019 Jul 12. PMID: 31422287; PMCID: PMC6706591.
2. Han XA, Jie HY, Wang JH, Zhang XM, Wang J, Yu CX, Zhang JL, He J, Chen JQ, Lai KF, Sun EW. Necrostatin-1 Ameliorates Neutrophilic Inflammation in Asthma by Suppressing MLKL Phosphorylation to Inhibiting NETs Release. Front Immunol. 2020 Apr 24;11:666. doi: 10.3389/fimmu.2020.00666. PMID: 32391007; PMCID: PMC7194114.

In vivo study

1. Mou F, Mou C. Necrostatin-1 Alleviates Bleomycin-Induced Pulmonary Fibrosis and Extracellular Matrix Expression in Interstitial Pulmonary Fibrosis. Med Sci Monit. 2020 Feb 5;26:e919739. doi: 10.12659/MSM.919739. PMID: 32019905; PMCID: PMC7020761.
2. Liang S, Lv ZT, Zhang JM, Wang YT, Dong YH, Wang ZG, Chen K, Cheng P, Yang Q, Guo FJ, Lu WW, Zhu WT, Chen AM. Necrostatin-1 Attenuates Trauma-Induced Mouse Osteoarthritis and IL-1β Induced Apoptosis via HMGB1/TLR4/SDF-1 in Primary Mouse Chondrocytes. Front Pharmacol. 2018 Nov 27;9:1378. doi: 10.3389/fphar.2018.01378. PMID: 30542285; PMCID: PMC6277802.

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7. Bioactivity

Biological target:

Necrostatin-1 (Nec-1) is a necroptosis inhibitor that inhibits RIP1 kinase (EC50=182 nM).

In vitro activity

This study further detected the levels of hypoxia-inducible factor-1α (HIF-1α) and miR-26a, and found that the increases in HIF-1α (Figure 2A) and miR-26a expression (Figure 1S, $p < 0.05$) induced by H/R (hypoxia and reoxygenation) injury were inhibited by Nec-1 treatment in a time-dependent manner ($p < 0.05$). The levels of TRPC6 and PARP-1 expression were found to be downregulated following H/R treatment (Figures 2A and S1, $p < 0.05$), and this was consistent with results from a previous study. In contrast, treatment with Nec-1 and H/R increased the levels of TRPC6 and PARP-1 expression, suggesting involvement of the TRPC6/PARP-1 signaling pathway in H/R-induced injuries in HK-2 cells. The levels of RIP1, RIP3, and Sirtuin-2 expression, as key factors in triggering necroptosis, were increased following H/R treatment, and those increases were partially inhibited by Nec-1 (Figures 2A and S1, $p < 0.05$).

Reference: Mol Ther Nucleic Acids. 2019 Sep 6; 17: 701–713. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6706591/

In vivo activity

The role of SDF-1 in the pathogenesis of OA (osteoarthritis) has attracted more attention in recent years. In an in vivo experiment, ELISA indicated serum SDF-1 expression in DMM (destabilized medial meniscus) mice and sham mice. The levels of serum SDF-1α decreased by 30.5% in DMM + Nec-1 group at 8 weeks post-surgery compared with DMM group; this difference was statistically significant (Figure 5C). The tendency is consistent with the results of the cell experiments. The effects of Nec-1 on the expression of HMGB1 and TLR4 in the cartilage were also validated by ICH in the mouse model (Figures 5F,G). The results showed that Nec-1 significantly decreased the expression of HMGB1 and TLR4 in the cartilage of DMM + Nec-1 group compared with DMM group.

Reference: Front Pharmacol. 2018; 9: 1378. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6277802/