

Product Data Sheet

Product Name: 2-NP
Cat. No.: GC46503

Chemical Properties

Cas. No. 65182-56-1

SMILES OC1=CC=CC=C1C2=NC(N=CC=C3)=C3C=C2

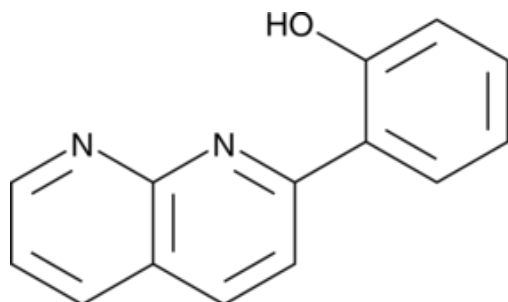
Formula $C_{14}H_{10}N_2O$ M.Wt 222.2

Solubility DMF: 10 mg/ml, DMF:PBS (pH 7.2) (1:1): 0.50 mg/ml Storage Store at -20°C

General tips For obtaining a higher solubility, please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution: ship with blue ice. All other available sizes: ship with RT, or blue ice upon request.

Structure



Protocol

Cell experiment [1]:

Cell lines MSCs transfected with siFSTL1

Preparation Method MSCs transfected with siFSTL1 were treated with 2-NP (15 µg/mL) for 12h (for mRNA analysis) or 24h (for protein analysis). IDO mRNA expression was determined by qRT-PCR, and IDO protein expression was analyzed by western blotting.

Caution: Product has not been fully validated for medical applications. For research use only.

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Reaction
Conditions 15µg/mL; 12h or 24h

Applications Treatment with 2-NP significantly upregulated the mRNA and protein expression levels of IDO.

Animal experiment [2]:

Animal models SAH rats

Preparation Method Rats were pretreated with 2-NP (15µg/kg; i.c.v.) 48h before SAH induction, followed by intranasal administration of PEDF-34 (3µg/kg) 1h after SAH. At 24h post-SAH, brain tissues were collected and levels of TNF-α, IL-1β, and IL-10 were measured using ELISA.

Dosage form 15µg/kg; i.c.v.

Applications Treatment with 2-NP significantly reversed the downregulation of PEDF-34 on pro-inflammatory factors TNF-α and IL-1β, as well as the upregulation of anti-inflammatory factor IL-10.

References:

[1] Zheng X, Zhou X, Ma G, et al. Endogenous Follistatin-like 1 guarantees the immunomodulatory properties of mesenchymal stem cells during liver fibrotic therapy[J]. Stem Cell Research & Therapy, 2022, 13(1): 403.

[2] Wu L, Liu Y, He Q, et al. PEDF-34 attenuates neurological deficit and suppresses astrocyte-dependent neuroinflammation by modulating astrocyte polarization via 67LR/JNK/STAT1 signaling pathway after subarachnoid hemorrhage in rats[J]. Journal of neuroinflammation, 2024, 21(1): 178.

Background

2-NP is a cell-penetrating, selective signal transduction and transcription activator 1 (STAT1)

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transcription enhancer^[1]. 2-NP enhances IFN- γ -induced STAT1 phosphorylation and the expression of its target genes (such as IRF3 and IRF1) without affecting the STAT3 or NF- κ B pathways. 2-NP is commonly used in research areas such as STAT1-dependent antitumor immunity (such as breast cancer, fibrosarcoma, and non-small cell lung cancer) and IFN- γ signal amplification^[2,3,4].

In vitro, pretreatment of human non-small cell lung cancer A549 cells with 2-NP (0.072-45 μ M) for 1h followed by stimulation with IL-27 (50ng/mL) enhanced STAT1 phosphorylation while reducing STAT3 phosphorylation levels, resulting in a significant increase in the STAT1/STAT3 activation ratio compared with IL-27 treatment alone^[5]. Treatment of follistatin-like 1 (FSTL1)-silenced mesenchymal stem cells (MSCs) with 2-NP (15 μ g/mL) for 12h (for mRNA) or 24h (for protein) significantly upregulated the mRNA and protein expression levels of indoleamine 2,3-dioxygenase (IDO)^[6].

In vivo, rats were given 2-NP (15 μ g/kg) via intracerebroventricular (i.c.v.) injection 48h before subarachnoid hemorrhage (SAH) induction, followed by intranasal administration of PEDF-34 (3 μ g/kg) 1h after SAH. At 24h post-SAH, 2-NP significantly reversed the PEDF-34-induced downregulation of the pro-inflammatory cytokines TNF- α and IL-1 β , as well as the upregulation of the anti-inflammatory cytokine IL-10^[7].

References:

- [1] Lynch R A, Etchin J, Battle T E, et al. A small-molecule enhancer of signal transducer and activator of transcription 1 transcriptional activity accentuates the antiproliferative effects of IFN- γ in human cancer cells[J]. Cancer research, 2007, 67(3): 1254-1261.
- [2] Wang W, Lopez McDonald M C, Hariprasad R, et al. Oncogenic STAT transcription factors as targets for cancer therapy: innovative strategies and clinical translation[J]. Cancers, 2024, 16(7): 1387.
- [3] Kachroo P, Lee M, Lee G, et al. IL-27 Mediated Inhibition of Epithelial to Mesenchymal Transition is Augmented by STAT1 Activator, 2-(1, 8-naphthyridin-2-yl) phenol (2-NP) in Human Non-small Cell Lung Cancer[J]. Journal of Surgical Research, 2012, 172(2): 243.
- [4] Mahmood N, Arakelian A, Muller W J, et al. An enhanced chemopreventive effect of methyl donor S-adenosylmethionine in combination with 25-hydroxyvitamin D in blocking m
- [5] Weber C E, Talbot L J, Wai P Y, et al. Transformation of mesenchymal stem cells into cancer associated fibroblasts within the tumor microenvironment[J]. Journal of Surgical Research, 2012, 172(2): 243.

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[6] Zheng X, Zhou X, Ma G, et al. Endogenous Follistatin-like 1 guarantees the immunomodulatory properties of mesenchymal stem cells during liver fibrotic therapy[J]. Stem Cell Research & Therapy, 2022, 13(1): 403.

[7] Wu L, Liu Y, He Q, et al. PEDF-34 attenuates neurological deficit and suppresses astrocyte-dependent neuroinflammation by modulating astrocyte polarization via 67LR/JNK/STAT1 signaling pathway after subarachnoid hemorrhage in rats[J]. Journal of neuroinflammation, 2024, 21(1): 178.

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