Penfluridol

Cat. No.: HY-B1077

CAS No.: 26864-56-2

Molecular Formula: $C_{28}H_{27}ClF_5NO$

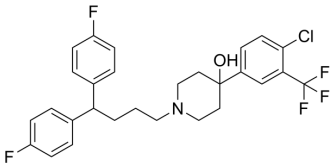
Molecular Weight: 523.97

Target: Calcium Channel; Autophagy; Dopamine Receptor; Apoptosis

Pathway: Membrane Transporter/Ion Channel; Neuronal Signaling; Autophagy; GPCR/G Protein; Apoptosis

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	1 year
	-20°C	6 months



SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 100 mg/mL (190.85 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Concentration \ Solvent \ Mass	1 mg	5 mg	10 mg
1 mM	1.9085 mL	9.5425 mL	19.0851 mL
5 mM	0.3817 mL	1.9085 mL	3.8170 mL
10 mM	0.1909 mL	0.9543 mL	1.9085 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (4.77 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: 2.5 mg/mL (4.77 mM); Suspended solution; Need ultrasonic
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (4.77 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Penfluridol (R-16341) is a potent, long-acting, first-generation, oral diphenylbutylpiperidine antipsychotic agent by targeting D2-like dopamine receptor. Penfluridol effectively inhibits TNFα-induced NF-κB activation and alleviates the severity of arthritis and colitis in vivo. Penfluridol is a Ca^{2+}-calmodulin inhibitor. Penfluridol induces apoptosis and autophagy. Penfluridol is used for chronic schizophrenia, acute psychosis, Tourette syndrome and autoimmune diseases. Penfluridol inhibites the growth of E. faecalis planktonic cells with the MIC of 7.81 μg/ml[1][2][3][4].

IC_{50} & Target	D_2 Receptor

In Vitro

Penfluridol (R-16341; 1.25-40 μM; 24, 48 h) reduces cell viability of human AML cells harboring FLT3-WT or the FLT3-ITD mutation[2].
Penfluridol (7.5 μM; 24 h) results in the apoptosis of AML cells harboring FLT3-WT and FLT3-ITD mutation[2].
Penfluridol (1.25-7.5 μM; 24 h) induces ROS-mediated autophagy via triggering LC3 turnover and acidic vesicular organelle (AVO) formation[2].
Penfluridol (1 μM; for 2 h) obviously inhibits TNFα-induced phosphorylation levels of ERK, JNK, and p38[3].
Penfluridol (1 μM; for 2 h) inhibits TNFα-induced mRNA expressions of IL-1β, IL-6, IL-17, and NOS2[3].
Penfluridol suppresses the differentiation of spleen naive CD4+T cells to TH1 and TH17 and inhibits M1 macrophage polarization[3].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[2]

Cell Line:	Human AML cell lines, HL-60 (FLT3-WT), U937 (FLT3-WT), and MV4–11 (FLT3-ITD)
Concentration:	1.25, 2.5, 5, 10, 20, 40 μM
Incubation Time:	24, 48 h
Result:	Significantly reduced cell viability in a concentration-dependent manner.

Apoptosis Analysis[2]

Cell Line:	HL-60 and U937 cells harboring FLT3-WT
Concentration:	7.5 μM
Incubation Time:	24 h
Result:	Induced concentration-dependent increases in the sub-G1 population. Triggered caspase-3 activation and corresponding PARP-1 cleavage in concentration- and time-dependent manners.

Cell Autophagy Assay[2]

Cell Line:	U937 and HL-60 cells
Concentration:	1.25, 2.5, 5, 7.5 μM
Incubation Time:	24 h
Result:	5 μM and 7.5 μM respectively induced dominant LC3B-II formation and caspase-3 activation in U937 and HL-60 cells.

Western Blot Analysis[3]

Cell Line:	BMDMs
Concentration:	1 μM
Incubation Time:	Pretream for 2 h
Result:	Obviously inhibited the increased phosphorylation levels of ERK, JNK, and p38 by TNFα (10 ng/mL; 15, 30, 60 min).

RT-PCR[3]

Cell Line:	BMDMs
Concentration:	1 μM
Incubation Time:	Pretream for 2 h
Result:	Inhibited TNFα-induced mRNA expressions of IL-1β, IL-6, IL-17, and NOS2.

In Vivo

Penfluridol (10 mg/kg; daily oral gavage; from the 18th day after the first immunization) significantly reduced severity of collagen-induced arthritis[3].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	DBA/1J male mice aged 10–12 weeks with type II chicken collagen-induced arthritis (CIA) model[3]
Dosage:	10 mg/kg
Administration:	Daily oral gavage; from the 18th day after the first immunization
Result:	Inhibited inflammatory cell infiltration, suppressed pannus formation, and protected articular cartilage from damage. obviously decreased mRNA expressions of CXCL10 and MCP-1 in inflamed joints and statistically reduced production levels of inflammatory cytokines IL-1β and IL-6 in sera.

CUSTOMER VALIDATION

- Cell Commun Signal. 2022 Jul 16;20(1):105.
- Arthritis Res Ther. 2022 Jan 19;24(1):27.
- Microbiologyopen. 2020 Dec 20;e1148.
- Mediators Inflamm. 2023 Aug 22.
- Research Square Preprint. 2021 Dec.

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REFERENCES

[1]. Eyal Zur, et al. Penfluridol, a Unique Psychiatric Medicine for the Treatment of Chronic Schizophrenia. Int J Pharm Compd. 2019 Mar-Apr;23(2):113-119.

[2]. Yue-Hong Chen, et al. Penfluridol targets acid sphingomyelinase to inhibit TNF signaling and is therapeutic against inflammatory autoimmune diseases. Arthritis Res Ther. 2022 Jan 19;24(1):27.

[3]. Xianghai Zeng, et al. Drug repurposing: Antimicrobial and antibiofilm effects of penfluridol against Enterococcus faecalis. Microbiologyopen. 2021 Jan;10(1):e1148.

[4]. Szu-Yuan Wu, et al. Penfluridol triggers cytoprotective autophagy and cellular apoptosis through ROS induction and activation of the PP2A-modulated MAPK pathway in acute myeloid leukemia with different FLT3 statuses. J Biomed Sci. 2019 Aug 31;26(1):63.

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

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