Ibuprofen

Cat. No.: HY-78131

CAS No.: 15687-27-1

Molecular Formula: $C_{13}H_{18}O_2$

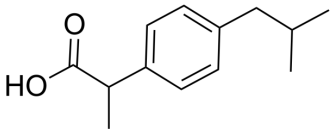
Molecular Weight: 206.28

Target: COX; Apoptosis; Parasite

Pathway: Immunology/Inflammation; Apoptosis; Anti-infection

Storage:

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



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (484.78 mM; Need ultrasonic)

H_2O : < 0.1 mg/mL (insoluble)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	4.8478 mL	24.2389 mL	48.4778 mL
5 mM	0.9696 mL	4.8478 mL	9.6956 mL
10 mM	0.4848 mL	2.4239 mL	4.8478 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 (12.12 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (12.12 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (12.12 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Ibuprofen ((±)-Ibuprofen) is a potent, orally active, selective COX-1 inhibitor with an IC_{50} value of 13 μM. Ibuprofen inhibits cell proliferation, angiogenesis, and induces cell apoptosis. Ibuprofen is a nonsteroidal anti-inflammatory agent and a nitric oxide (NO) donor. Ibuprofen ((±)-Ibuprofen) can be used in the research of pain, swelling, inflammation, infection, immunology, cancers[1][2][5][8].

IC_{50} & Target	COX-1	COX-2

	13 μM (IC_{50})	370 μM (IC_{50})

In Vitro

Ibuprofen (24 h) inhibits COX-1 and COX-2 activity with IC_{50} values of 13 μM and 370 μM[1].
Ibuprofen (500 μM, 48 h) inhibits cell proliferation and angiogenesis, and induces apoptosis in AGS cells (Adenocarcinoma gastric cell line)[2].
Ibuprofen (500 μM, 48 h) downregulates transcription of Akt, VEGF-A, PCNA, Bcl2, OCT3/4 and CD44 genes, but upregulates RNA levels of wild type P53 and Bax genes in AGS cell[2].
Ibuprofen (500 μM, 24 h) restores microtubule reformation, microtubule-dependent intracellular cholesterol transport, and induces extension of microtubules to the cell periphery in both cystic fibrosis (CF) cell models and primary CF nasal epithelial cells[3].
Ibuprofen (500 μM, 24 h) enhances UV-induced cell death in MCF-7 cells and MDA-MB-231 cells by a photosensitization process[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[2]

Cell Line:	AGS cells
Concentration:	100-1000 μM
Incubation Time:	24 h, 48 h
Result:	Inhibited AGS cell viability with IC_{50} values of 630 μM (trypan blue staining, 24 h), 456 μM (neutral red assay, 24 h), 549 μM (trypan blue staining, 48 h) and 408 μM (neutral red assay, 48 h).

In Vivo

Ibuprofen (300 mg/kg; p.o.; daily, for 14 days) reduces overall tumor growth and enhances anti-tumor immune characteristics without adverse autoimmune reactions in a model of postpartum breast cancer[5].
Ibuprofen (60 mg/kg; i.h.; every second day for 15 days) reduces the risk of neuropathy in a rat model of chronic Oxaliplatin‐induced peripheral neuropathy[6].
Ibuprofen (20 mg/kg; p.o.; every 12 hours, 5 doses total) decreases muscle growth (average muscle fiber cross-sectional area) without affecting regulation of supraspinatus tendon adaptions to exercise[7].
Ibuprofen (35 mg/kg; p.o.; twice daily) attenuates the Inflammatory response to pseudomonas aeruginosa in a rat model of chronic pulmonary infection[8].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Syngeneic (D2A1) orthotopic Balb/c mouse model of PPBC (postpartum)[5]
Dosage:	300 mg/kg, daily for 14 days
Administration:	Fed in animal feedings (added to pulverized standard chow and mixed dry, then mixed with water, made into chow pellets and dried thoroughly)
Result:	Suppresed tumor growth, reduced presence of immature monocytes and increased numbers of T cells. Enhanced Th1 associated cytokines as well as promoted tumor border accumulation of T cells.

Animal Model:	Oxaliplatin‐induced peripheral neuropathy[6]
Dosage:	60 mg/kg, every second day for 15 days
Administration:	Subcutaneous injection
Result:	Lowered sensory nerve conduction velocity (SNCV).

CUSTOMER VALIDATION

- Cell Rep. 2019 Dec 17;29(12):3847-3858.e5.
- Chemosphere. 2019 Jun;225:378-387.
- Phytomedicine. 1 September 2022, 154427.
- EMBO Rep. 2022 Apr 11;e53932.
- Cells. 2022, 11(12), 1870.

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REFERENCES

[1]. Noreen Y, et al. Development of a radiochemical cyclooxygenase-1 and -2 in vitro assay for identification of natural products as inhibitors of prostaglandin biosynthesis. J Nat Prod. 1998 Jan;61(1):2-7.

[2]. Hassan Akrami, et al. Inhibitory effect of ibuprofen on tumor survival and angiogenesis in gastric cancer cell. Tumour Biol. 2015 May;36(5):3237-43.

[3]. Sharon M Rymut, et al. Ibuprofen regulation of microtubule dynamics in cystic fibrosis epithelial cells. Am J Physiol Lung Cell Mol Physiol. 2016 Aug 1;311(2):L317-27.

[4]. Emmanuelle Bignon, et al. Ibuprofen and ketoprofen potentiate UVA-induced cell death by a photosensitization process. Sci Rep. 2017 Aug 21;7(1):8885.

[5]. Nathan D Pennock, et al. Ibuprofen supports macrophage differentiation, T cell recruitment, and tumor suppression in a model of postpartum breast cancer. J Immunother Cancer. 2018 Oct 1;6(1):98.

[6]. Thomas Krøigård, et al. Protective effect of ibuprofen in a rat model of chronic oxaliplatin-induced peripheral neuropathy. Exp Brain Res. 2019 Oct;237(10):2645-2651.

[7]. Sarah Ilkhanipour Rooney, et al. Ibuprofen Differentially Affects Supraspinatus Muscle and Tendon Adaptations to Exercise in a Rat Model. Am J Sports Med. 2016 Sep;44(9):2237-45.

[8]. M W Konstan, et al. Ibuprofen attenuates the inflammatory response to Pseudomonas aeruginosa in a rat model of chronic pulmonary infection. Implications for antiinflammatory therapy in cystic fibrosis. Am Rev Respir Dis. 1990 Jan;141(1):186-92.

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