Nicotinamide

Cat. No.: HY-B0150

CAS No.: 98-92-0

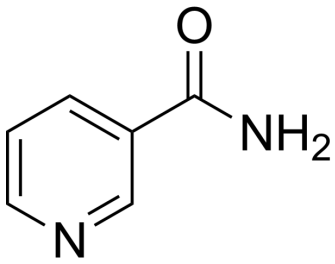
Molecular Formula: $C_6H_6N_2O$

Molecular Weight: 122.12

Target: Endogenous Metabolite; Sirtuin; HBV; Organoid

Pathway: Metabolic Enzyme/Protease; Cell Cycle/DNA Damage; Epigenetics; Anti-infection; Stem Cell/Wnt

Storage: 4°C, protect from light
* In solvent : -80°C, 1 year; -20°C, 6 months (protect from light)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 50 mg/mL (409.43 mM; Need ultrasonic)
H_2O : ≥ 50 mg/mL (409.43 mM)
* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	8.1887 mL	40.9433 mL	81.8867 mL
	5 mM	1.6377 mL	8.1887 mL	16.3773 mL
	10 mM	0.8189 mL	4.0943 mL	8.1887 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 100 mg/mL (818.87 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (20.47 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (20.47 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (20.47 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Nicotinamide is a form of vitamin B3 or niacin. Nicotinamide Hydrochloride inhibits SIRT2 activity (IC_{50}: 2 μM). Nicotinamide also inhibits SIRT1. Nicotinamide increases cellular NAD_+, ATP, ROS levels. Nicotinamide inhibits tumor growth and improves survival. Nicotinamide also has anti-HBV activity[1][2][3][4].

IC_{50} & Target	Human Endogenous Metabolite	SIRT2 2 μM (EC50)	SIRT1 50-180 μM (IC_{50})

In Vitro

Nicotinamide (0-50 mM, 24/48 h) reduces cell number in a time-dependent and dose-dependent manner in A375 and SK-MEL-28 cells[1].
Nicotinamide (10-50 mM, 24 h) makes A375 cells undergo accumulation in G1 phase, reduction in S phase, and increase inthe sub-G1 (apoptosis) phase[1].
Nicotinamide (1-50 mM, 6 h) increases NAD_+, ATP and ROS levels in A375 and SK-MEL-28 cells[1].
Nicotinamide Hydrochloride (0.01-20 mM, 1 h) inhibits purified SIRT2 enzymatic activity in vitro with an EC_{50} of 2 μM[1].
Nicotinamide (0-64 mM) inhibits HBV replication in HepAD38 and HepG2.2.15 cells[3].
Nicotinamide (10 mM, on day 13) promotes pancreatic cell differentiation from human embryonic stem cells (hESCs) through CK1 and ROCK inhibition[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[1]

Cell Line:	A375, SK-MEL-28, mouse B16-F10 cell
Concentration:	0, 1, 20, 50 mM
Incubation Time:	24 h, 48 h
Result:	Reduced cell number in a dose-dependent manner with a strong inhibitory effect at 20mM and an almost complete effect at 50 mM.

Cell Cycle Analysis[1]

Cell Line:	A375, SK-MEL-28
Concentration:	10, 20, 50 mM
Incubation Time:	24 h
Result:	Arrested A375 cells in G1 phase.

In Vivo

Nicotinamide Hydrochloride (Intraperitoneal injection, 1500 and 1800 mg/Kg, 5 days per week) inhibits tumor growth in murine metastatic melanoma model[1].
Nicotinamide Hydrochloride (Intraperitoneal injection, 1800 mg/Kg, once a day, murine metastatic melanoma model) affects IFN-γ (a key mediator of cell-mediated anti-tumor immunity), increases the plasma levels of Eotaxin and IL-5, reduces the plasma levels of IL-3, IL-12, RANTES and IL-10[1].
Nicotinamide Hydrochloride (vein injection, 0-200 mg/kg, 5 days) inhibits HBV replication in HBV-transgenic mice[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	C57BL/6 mice (subcutaneous injected with B16-F10 cells)[1]
Dosage:	1000, 1500, 1800 mg/Kg.
Administration:	Intraperitoneal injection, 5 days per week (followed by 2-day rest) or once a day.
Result:	Inhibited tumor growth at 1500 and 1800 mg/Kg, and had no effect on the body weight. Increased the frequency of IFN-γ producing cells and modulated the protein levels of cytokines and chemokines in the plasma of tumor-bearing mice.

Animal Model:	HBV-transgenic mice[3]

Dosage:	0-200 mg/kg
Administration:	Vein injection, 5 days
Result:	Reduced serum HBV DNA.

CUSTOMER VALIDATION

- Cancer Cell. 2024 Oct 14;42(10):1729-1746.e8.
- Cell Discov. 2024 Sep 17;10(1):96.
- Nat Genet. 2023 Nov 20.
- Cell Stem Cell. 2022 Sep 1;29(9):1366-1381.e9.
- Circ Res. 2022 Aug 19;131(5):456-472.

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REFERENCES

[1]. [1] Francesca Scatozza, et al. Nicotinamide inhibits melanoma in vitro and in vivo. J Exp Clin Cancer Res. 2020 Oct 7;39(1):211.

[2]. Hwang ES, et al. Nicotinamide is an inhibitor of SIRT1 in vitro, but can be a stimulator in cells. Cell Mol Life Sci. 2017 Sep;74(18):3347-3362.

[3]. Li WY, et al. The SIRT1 inhibitor, nicotinamide, inhibits hepatitis B virus replication in vitro and in vivo. Arch Virol. 2016 Mar;161(3):621-30.

[4]. Zhang Y, et al. Nicotinamide promotes pancreatic differentiation through the dual inhibition of CK1 and ROCK kinases in human embryonic stem cells. Stem Cell Res Ther. 2021 Jun 25;12(1):362.

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