Gemcitabine

Cat. No.: HY-17026

CAS No.: 95058-81-4

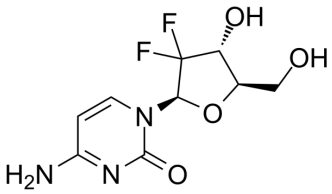
Molecular Formula: $C_9H_{11}F_2N_3O_4$

Molecular Weight: 263.2

Target: Nucleoside Antimetabolite/Analog; DNA/RNA Synthesis; Autophagy; Apoptosis

Pathway: Cell Cycle/DNA Damage; Autophagy; Apoptosis

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



SOLVENT & SOLUBILITY

In Vitro

DMSO : 250 mg/mL (949.85 mM; Need ultrasonic)
Ethanol : 12.5 mg/mL (47.49 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	3.7994 mL	18.9970 mL	37.9939 mL
5 mM	0.7599 mL	3.7994 mL	7.5988 mL
10 mM	0.3799 mL	1.8997 mL	3.7994 mL

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

In Vivo

1. Add each solvent one by one: 0.5%HPMC >> 1%Tween80
   Solubility: 20 mg/mL (75.99 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 5% DMSO >> 40% PEG300 >> 5% Tween-80 >> 50% saline
   Solubility: ≥ 2.62 mg/mL (9.95 mM); Clear solution
3. Add each solvent one by one: 5% DMSO >> 95% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.62 mg/mL (9.95 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.08 mg/mL (7.90 mM); Clear solution
5. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.08 mg/mL (7.90 mM); Clear solution
6. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.08 mg/mL (7.90 mM); Clear solution
7. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.08 mg/mL (7.90 mM); Clear solution
8. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.08 mg/mL (7.90 mM); Clear solution

BIOLOGICAL ACTIVITY

Description	Gemcitabine (LY 188011) is a pyrimidine nucleoside analog antimetabolite and an antineoplastic agent. Gemcitabine inhibits DNA synthesis and repair, resulting in autophagyand apoptosis[1][2].
IC_{50} & Target	DNA synthesis[1]
In Vitro	Gemcitabine (purchased from MedChem Express, 0.003-1 μM; 3 days) kills both mouse and human senescent cells effectively and potently[4]. Gemcitabine inhibits the growth of BxPC-3, Mia Paca-2, PANC-1, PL-45 and AsPC-1 cells with IC_{50}s of 37.6, 42.9, 92.7, 89.3 and 131.4 nM, respectively[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[4]

Cell Line:	Non-senescent and replication-induced senescent new born dermal fibroblasts (NBFs)
Concentration:	0.003, 0.01, 0.03, 0.1, 0.3, 1 μM
Incubation Time:	3 days
Result:	Killed replication-induced senescent NBFs for 3 days with 11.0% cell viability.

In Vivo	Gemcitabine can be administered via endotracheal spray in rats without marked toxicity with a maximum tolerated dose of 4 mg/kg once a week for 9 weeks. The toxicity of Gemcitabine is lower via lung than oral administration at dosages of 2, 4, and 6 mg/kg[2]. Treatment of the LSL-$Kras^{G12D/+}$; LSL-$Trp53^{R172H}$; Pdx-1-Cre mice with either Gemcitabine (50 mg/kg, i.p.) or the combination DMAPT/Gemcitabine significantly increases the median survival time by more than 30 days compared to the placebo group (254.5 or 255 days vs. 217.5 days, respectively)[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Nature. 2019 Oct;574(7777):264-267.
- Adv Mater. 2021 May;33(18):e2100949.
- Cell Res. 2020 Jul;30(7):574-589.
- Gastroenterology. 2021 Nov;161(5):1601-1614.e23.
- Sci Transl Med. 2021 Jan 20;13(577):eaba7401.

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REFERENCES

[1]. Wang H, et al. Enhanced efficacy of Gemcitabine by indole-3-carbinol in pancreatic cell lines: the role of human equilibrativenucleoside transporter 1. Anticancer Res. 2011 Oct;31(10):3171-80.

[2]. Yip-Schneider MT, et al. Dimethylaminoparthenolide and Gemcitabine: a survival study using a genetically engineered mouse model of pancreatic cancer. BMC Cancer. 2013 Apr 17;13:194.

[3]. Gagnadoux F, et al. Safety of pulmonary administration of gemcitabine in rats. J Aerosol Med. 2005 Summer;18(2):198-206

[4]. Yusheng Cai, et al. Elimination of senescent cells by β-galactosidase-targeted prodrug attenuates inflammation and restores physical function in aged mice. Cell Res. 2020 Jul;30(7):574-589.

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