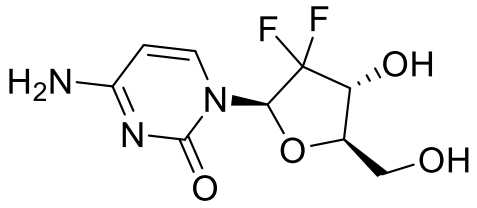
Product data sheet

MedKoo Cat#: 123210 Name: Gemcitabine free base CAS#: 95058-81-4 (free base) Chemical Formula: $C_9H_{11}F_2N_3O_4$ Exact Mass: 263.07176 Molecular Weight: 263.2	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Gemcitabine is an analogue of the antimetabolite nucleoside deoxycytidine with antineoplastic activity. Gemcitabine is converted intracellularly to the active metabolites difluorodeoxycytidine di- and triphosphate (dFdCDP, dFdCTP). dFdCDP inhibits ribonucleotide reductase, thereby decreasing the deoxynucleotide pool available for DNA synthesis; dFdCTP is incorporated into DNA, resulting in DNA strand termination and apoptosis.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	5.0	19.0

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.80 mL	19.00 mL	37.99 mL
5 mM	0.76 mL	3.80 mL	7.60 mL
10 mM	0.38 mL	1.90 mL	3.80 mL
50 mM	0.08 mL	0.38 mL	0.76 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Jang Y, Shin JS, Lee MK, Jung E, An T, Kim UI, Kim K, Kim M. Comparison of Antiviral Activity of Gemcitabine with 2'-Fluoro-2'-Deoxycytidine and Combination Therapy with Remdesivir against SARS-CoV-2. Int J Mol Sci. 2021 Feb 4;22(4):1581. doi: 10.3390/ijms22041581. PMID: 33557278; PMCID: PMC7915419.

In vivo study

1. Hua YQ, Zhang K, Sheng J, Ning ZY, Li Y, Shi WD, Liu LM. NUCB1 Suppresses Growth and Shows Additive Effects With Gemcitabine in Pancreatic Ductal Adenocarcinoma via the Unfolded Protein Response. Front Cell Dev Biol. 2021 Mar 29;9:641836. doi: 10.3389/fcell.2021.641836. PMID: 33855021; PMCID: PMC8041069.

7. Bioactivity
Biological target:

DNA synthesis & repair inhibitor

In vitro activity

Product data sheet

To test the antiviral activity of gemcitabine and 2FdC against SARS-CoV-2, the image-based antiviral assay was carried out by addition of 3-fold serial dilutions (from 300 to 0.02 μM at 10 concentration points) of each compound to Vero cells for 30 min before infection (MOI, 0.02), in which remdesivir was used as a control. The resulting microscopic images from the viral S protein and nuclear condensation represented antiviral efficacy and cytotoxicity, respectively (Figure 2A). Gemcitabine potently suppressed viral infection in a dose-dependent manner with little cytotoxicity at the maximal concentration (300 μM), equating to EC50 of 1.2 ± 1.1 μM, CC50 > 300 μM, and an SI value > 250.0 (Figure 2B). In contrast, 2FdC exhibited weaker antiviral activity with EC50 of 175.2 ± 1.3 μM, CC50 > 300.0 μM, and SI > 1.7. As expected, remdesivir induced a considerable antiviral effect (EC50 of 35.4 ± 1.0 μM, CC50 > 300.0 μM, and SI > 8.5), confirming the reliability of the antiviral assay system. The results suggested that gemcitabine is a highly potent antiviral compound inhibiting SARS-CoV-2 replication in vitro, while deletion of one fluorine from gemcitabine causes drastic reduction of antiviral efficacy, stressing that difluoro substitution on position 2′ of the deoxycytidine nucleoside analogue confers antiviral efficacy.

Reference: Int J Mol Sci. 2021 Feb; 22(4): 1581. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7915419/

In vivo activity

To test the additive effects of NUCB1 with GEM (gemcitabine) in vivo, SW1990 cells overexpressing NUCB1 or control vector were injected subcutaneously into nude mice (n = 6 mice per group) and GEM was injected intraperitoneally (50 mg/kg). Tumor volume was monitored and measured for 24 days. As shown in Figure 3, tumor grafts formed from SW1990 cells overexpressing NUCB1 showed additive effects with GEM treatment, as indicated by decreased tumor volumes (Figure 3A) and decreased tumor weights (Figures 3B,C). Moreover, TUNEL staining confirmed induction of apoptosis upon NUCB1 overexpression, and GEM treatment resulted in further increase in apoptosis (Figure 3D). Collectively, these data reinforce that NUCB1 suppresses proliferation and enhances the anti-tumor effects of GEM in pancreatic cancer cells in vivo.

Reference: Front Cell Dev Biol. 2021; 9: 641836. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8041069/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.