Streptozotocin

Cat. No.: HY-13753

CAS No.: 18883-66-4

Molecular Formula: $C_8H_{15}N_3O_7$

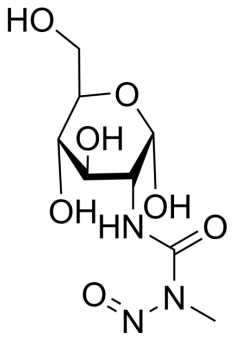
Molecular Weight: 265.22

Target: DNA/RNA Synthesis; DNA Alkylator/Crosslinker; Autophagy; Bacterial; Antibiotic

Pathway: Cell Cycle/DNA Damage; Autophagy; Anti-infection

Storage: -20°C, sealed storage, away from moisture and light

* The compound is unstable in solutions, freshly prepared is recommended.



SOLVENT & SOLUBILITY

In Vitro

DMSO : 250 mg/mL (942.61 mM; Need ultrasonic)

H_2O : 113.3 mg/mL (427.19 mM; Need ultrasonic and warming)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	3.7705 mL	18.8523 mL	37.7045 mL
5 mM	0.7541 mL	3.7705 mL	7.5409 mL
10 mM	0.3770 mL	1.8852 mL	3.7705 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 (377.05 mM); Clear solution; Need ultrasonic and warming and heat to 60°C
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.08 mg/mL (7.84 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.08 mg/mL (7.84 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.08 mg/mL (7.84 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Streptozotocin (Streptozocin) is a potent DNA-methylating antibiotic. Streptozotocin causes methylation of liver and kidney and pancreatic DNA, but no methylation in brain DNA.

IC_{50} & Target

DNA alkylator[1]

In Vitro

Streptozotocin (STZ) shows higher cytotoxic effect in vitro on hematological cell lines compared to Alloxan (ALX). ALX

	appears not to be toxic for the studied cell lines with estimated IC_{50} values of 2809, 3679 or over 4000 μg/mL for HL60, K562 and C1498 cells, respectively. Streptozotocinn is more toxic, especially for the human myeloid leukemia cell line, HL60. The IC_{50} values of Streptozotocin are 11.7, 904 and 1024 μg/mL for HL60, K562 and C1498 cells, respectively. Results also show that the murine leukemic cells are more resistant to Streptozotocin and ALX cytotoxicity than human leukemic cells[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	Streptozotocin can be used in animal modeling to establish rat and mouse models of diabetes. Streptozotocin (STZ)-injected mice show tendency to have lower body weight than that observed in animals injected with ALX. Streptozotocin -injected mice have significantly fewer splenocytes ($22.2\pm3.2\times10^6$; n=10) compared to mice injected with ALX ($60.7\pm4.3\times10^6$; n=15; p=0.01)[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [2]	Human and murine cell lines are cultured in triplicate in 96-well plates at a density of 2×10^4 cells/well in the absence (untreated control) or presence of various concentrations of ALX (20-3000 μg/mL) or STZ (1-3000 μg/mL) for 48 h at 37°C under a humidified atmosphere containing 5% CO_2. Cells incubated in complete media including dH_2O in a final concentration of 0.1% served as control for solvent toxicity and cells incubated in complete medium are used as a control for the experiments. The effects of the tested drugs on tumor cell growth or viability are determined employing the MTT assay in accordance with the manufacturer's instructions. The IC_{50}values (drug concentration that induces 50% inhibition of the cell growth) are calculated using the GraphPad Prism 4 program[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [2][3]	Mice[2] Male C57BL/6 mice (10-16 weeks) are used.The age group distribution in the mouse group treated with Streptozocin and ALX as well as controls is as follows: Streptozocin xenograft (n=7, median age 14 weeks), ALX xenograft (n=11, median age 15 weeks), Streptozocin non-transplanted (n=7, median age 14 weeks), ALX non-transplanted (n=15, median age 15 weeks).Male C57BL/6 mice are under inhalation anesthesia injected via the penile vein with ALX (75 mg/mL) or Streptozocin (180 mg/kg). Control group contain male C57BL/6 mice. Blood glucose levels and body weight are measured before injection, after 6 h, then daily after drug injection. Rats[3] Thirty rats underwent oophorectomy to induce menopausal status. Rats receive intraperitoneal administration of Streptozocin (50 mg/kg) to induce diabetes mellitus (DM) 1 week after the oophorectomy. Blood glucose level is checked 3 days after Streptozocin administration, and values >250 mg/dL are considered as positive for DM. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Nat Biomed Eng. 2021 Jan;5(1):53-63.
- Nat Biomed Eng. 2020 May;4(5):507-517.
- Sci Transl Med. 2020 Jul 1;12(550):eaba6676.
- Cell Rep. 2023 May 23;42(6):112550.
- Clin Transl Med. 2021 Apr;11(4):e387.

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REFERENCES

[1]. Bennett RA, et al. Alkylation of DNA in rat tissues following administration of streptozotocin. Cancer Res. 1981 Jul;41(7):2786-90

[2]. Diab RA, et al. Immunotoxicological effects of streptozotocin and alloxan: in vitro and in vivo studies. Immunol Lett. 2015 Feb;163(2):193-8

[3]. Acer S, et al. Oxidative stress of crystalline lens in rat menopausal model. Arq Bras Oftalmol. 2016 Jul-Aug;79(4):222-5.

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