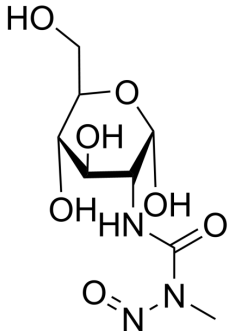
Streptozotocin



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; Apoptosis
Pathway:	Cell Cycle/DNA Damage; Autophagy; Anti-infection; Apoptosis
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: 0.1 M Sodium citrate buffer (pH 4.5)
   Solubility: 200 mg/mL (754.09 mM); Clear solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Streptozotocin (Streptozocin) is an antibiotic widely used in experimental animal models of induced diabetes. Streptozotocin enters B cells via the glucose transporter (GLUT2) and causes the alkylation of DNA (DNA-methylating). Streptozotocin can induce the apoptosis of β cells[1][2][3][4][5][6][7].

IC_{50} & Target

DNA alkylator[1]

In Vitro

The IC_{50} values of Streptozotocin for HL60, K562 and C1498 cells were 11.7, 904 and 1024 μg/ml, respectively[2].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

Streptozotocin (180 mg/kg, intravenous injection, killed 4 days later) can induce diabetes mellitus and lymphocytopenia in mice[2].

Streptozotocin (STZ) is a classic diabetes modeling agent that induces disease by destroying pancreatic beta cells in

animals. And rats and mice are generally used as animal models. Different injection doses of STZ induce different diabetes models (T1DM, T2DM)[3][4][5].

1 Streptozotocin-induced diabetes model in experimental animals[3][4]
(1) T1DM
Male Wistar rats: Single high-dose injection of 50 mg/kg STZ
Female C57BL/6J mice: Single high-dose injection of 200 mg/kg STZ
(2) T2DM
Male Wistar rats: 8 weeks of high-fat diet + low-dose injection of 25 mg/kg STZ for 5 days
Female C57BL/6J mice: high-fat diet + low-dose injection of 40 mg/kg STZ for 4 days

Dissolution method of Streptozotocin, just for reference[5]:
(1) Solvent preparation: 0.1 mM citrate buffer
Liquid A: Weigh 2.1 g of citric acid (HY-N1428) (MW: 210.14), add double distilled water to 100 mL, and dissolve
Liquid B: Sodium citrate (HY-B2201) (MW: 294.10) 2.94 g. Add double distilled water to 100 mL and dissolve
Citrate buffer: Mix solution A and solution B in a ratio of 1.32:1. Determine pH and adjust to 4.2-4.5. Finally, use a 0.22 μm or 0.45 μm filter to remove impurities.
(2) Streptozotocin working solution preparation
Use the above buffer solution to prepare Streptozotocin injection (prepare in ice bath). The injection solution should be prepared for immediate use or stored at 4°C, and the injection should be completed within 30 minutes.

Tips:
1) Different species of animals have great differences in sensitivity to STZ. It is recommended to use male rats (female mice are more tolerant to STZ)[8];
2) Fasting without water before administration can increase the sensitivity of pancreatic beta cells to STZ. STZ injection in model animals generally requires rapid injection;
3) Different strains of mice have different sensitivities to STZ. Studies have reported that the DBA/2 strain is the most sensitive, followed by C57BL6. Balb/cJ mice are resistant to multiple low-dose STZ-induced diabetes[9];
4) After STZ treatment, animals die due to fatal hypoglycemia caused by massive necrosis of pancreatic β-cells and sudden release of insulin, usually within 48 hours after injection. To prevent this from occurring, it is best to provide animals with 10% sucrose water regularly after STZ treatment. If animal mortality exceeds 20% when using a single high-dose STZ diabetic mouse protocol, treat animals with an intraperitoneal injection of 5% glucose solution within 6 hours of STZ injection[10].
5) Preliminary experiments are required, and it is not recommended to directly use the administration methods and dosages in the literature. Choose the appropriate dose carefully to avoid excessive doses that may cause hypoglycemia or even death of the experimental animals.

Animal Model:	C57BL/6 male mice[2]
Dosage:	180 mg/kg
Administration:	i.v.
Result:	Elevated blood glucose levels after 48 h and reduced body weight. Inhibited splenocyte proliferation in mixed lymphocyte cultures. Increased the level of INF-γ.

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.
- Exp Mol Med. 2023 May 1
- 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]. Szkudelski T. The mechanism of alloxan and streptozotocin action in B cells of the rat pancreas. Physiol Res. 2001;50(6):537-46.

[3]. Akinlade OM, et al. Streptozotocin-induced type 1 and 2 diabetes in rodents: a model for studying diabetic cardiac autonomic neuropathy. Afr Health Sci. 2021 Jun;21(2):719-727.

[4]. Marino F, et al. Streptozotocin-induced type 1 and 2 diabetes mellitus mouse models show different functional, cellular and molecular patterns of diabetic cardiomyopathy[J]. International Journal of Molecular Sciences, 2023, 24(2): 1132.

[5]. Lu Yanrong, et al. Establishment of autoimmune type 1 diabetes model in rhesus monkeys. China CN101804211B.2012-12-05.

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

[7]. Liu Y, et al. Tangeretin inhibits streptozotocin-induced cell apoptosis via regulating NF-κB pathway in INS-1 cells. J Cell Biochem. 2019 Mar;120(3):3286-3293.

[8]. Kim B, et al. Outbred Mice with Streptozotocin-Induced Diabetes Show Sex Differences in Glucose Metabolism. Int J Mol Sci. 2023 Mar 8;24(6):5210.

[9]. Gurley SB, et al. Impact of genetic background on nephropathy in diabetic mice. Am J Physiol Renal Physiol. 2006 Jan;290(1):F214-22.

[10]. Huang F, et al. Antidiabetic effect of a new peptide from Squalus mitsukurii liver (S-8300) in streptozocin-induced diabetic mice. J Pharm Pharmacol. 2005 Dec;57(12):1575-80.

[11]. Furman BL. Streptozotocin-Induced Diabetic Models in Mice and Rats. Curr Protoc Pharmacol. 2015 Sep 1;70:5.47.1-5.47.20.

[12]. Evan AP, et al. The effect of streptozotocin and streptozotocin-induced diabetes on the kidney. Ren Physiol. 1984;7(2):78-89.

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