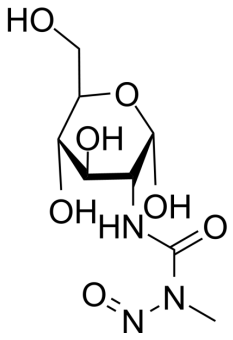
Streptozotocin

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 : 100 mg/mL (377.05 mM; Need ultrasonic)
H_2O : 100 mg/mL (377.05 mM; Need ultrasonic)

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 4.0)
   Solubility: 50 mg/mL (188.52 mM); Clear solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Streptozotocin (Streptozocin; STZ) 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].

IC_{50} & Target

DNA alkylator[2]

In Vitro

The IC_{50} values of Streptozotocin for HL60, K562 and C1498 cells were 11.7, 904 and 1024 μg/ml, respectively[3].
Streptozotocin (0-20 mM, 48 h) (dissolved in citrate buffer, pH 4.4 and diluted in DMEM just before use) induces cytotoxicity, oxidative stress and mitochondrial dysfunction in HepG2 cells[7].
Streptozotocin (10 mM, 0-120 min) (dissolved in 50 mM sodium citrate and 0.45% NaCl, pH 4.5) is specifically transported by GLUT2, which contributes to the cytotoxicity in GLUT2-expressing cells[8].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

Note:
Please do not refer to only one article to determine the experimental conditions. It is recommended to determine the optimal experimental conditions (animal strain, age, dosage, frequency and cycle, detection time and indicators, etc.) through preliminary experiments before the formal experiment.

Streptozotocin is suitable for constructing models of type 1 and type 2 diabetes. Streptozotocin is highly water-soluble, which is often dissolved in cold acidic citric acid buffer (pH 4.0-4.7), commonly used in animal experiments, ready for use. Once absorbed, distributes widely throughout the body, including crossing the blood-brain barrier and placenta, entering various tissues. In the liver, Streptozotocin undergoes chemical modification, converting into an active form that causes DNA methylation and damages pancreatic β-cells, leading to diabetes. The elimination half-life of Streptozotocin varies depending on the species and route of administration.

Induction of Type 1 Diabetes Mellitus (T1DM)[3][4][5]

- Background

  Induces disease by direct destroying the animal's islet β beta cells.

- Specific Modeling Methods

  Mice: C57BL/6 • Male • 8-12 week-old

  Administration: 100 mg/kg-220 mg/kg • i.p. • single high dose, or 40-60 mg/kg for five consecutive days.

  Rat: Sprague-Dawley or Wistar rats • male • 8-10 weeks-old

  Administration: 65 mg/kg • i.p. • single high dose.

  Note

  Tips:

  1) The sensitivity of different species of animals to STZ varies greatly, and it is recommended to use male rats (female mice are more tolerant to STZ) [4];

  2) Fasting without water before administration can increase the sensitivity of pancreatic β 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[4];

  4) After STZ treatment, animals die due to fatal hypoglycemia due to massive necrosis of pancreatic β-cells and sudden release of insulin, usually within 48 hours after injection. To prevent this, 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[5];

  5) preliminary experiments are required, and it is not recommended to directly use the administration methods and dosages in the literature.

- Modeling Indicators

Blood glucose level : Random blood glucose levels are generally used as a guide for diabetes. Animals with blood glucose levels above 300 mg/dL (i.e. 16.7 mmol/L) are considered diabetic. When fasting blood glucose levels are used as an indicator of elevation, values above 150 (8.3 mmoL/L) or 200 mg/dL (11 mmol/L) can be used arbitrarily as a marker of hyperglycemia, depending on the purpose of the study.
Other indicators : generally accompanied by increased water intake, urine volume, and weight loss. Serum biochemical indexes such as total cholesterol, aspartate aminotransferase, triglyceride and low density lipoprotein also increased significantly with the occurrence of diabetes.

- Correlated Product(s): /
- Opposite Product(s): /

Induction of Type 2 Diabetes Mellitus (T2DM)[3][4][5]

- Background

The disease is induced by partially destroying the animals' islet β cells, making the peripheral tissue insensitive to insulin, and by feeding them a high-calorie diet.

- Specific Modeling Methods

Mice: C57BL/6 • Male • 10 week-old
Administration: 4-8 weeks of high-fat diet + low-dose i.p. injection of 30-70 mg/kg STZ for 3-5 days or a single i.p. dose of 90- 100 mg/kg.
Rat: Sprague-Dawley or Wistar rats • male • 8-10 weeks-old
Administration: 4-8 weeks of high-fat diet + i.p. injection of 25-40 mg/kg STZ, a single dose.

Note

Tips:
Same precautions as for "Induction of Type 1 Diabetes Mellitus (T1DM)".

- Modeling Indicators

Blood glucose level : Blood glucose level exceeds 300 mg/dL(16.7 mmoL/L).
Other indicators : generally accompanied by increased water intake, urine volume, and weight loss. Serum biochemical indexes such as total cholesterol, aspartate aminotransferase, triglyceride and low density lipoprotein also increased significantly with the occurrence of diabetes.

- Correlated Product(s): /
- Opposite Product(s): /

CUSTOMER VALIDATION

- Cell Metab. 2025 Sep 2;37(9):1907-1925.e14.
- Nat Biomed Eng. 2021 Jan;5(1):53-63.
- Nat Biomed Eng. 2020 May;4(5):507-517.
- Adv Funct Mater. 2025 May 27.
- ACS Nano. 2025 Oct 21;19(41):36813-36825.

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

[3]. 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.

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

[5]. 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.

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[8]. Schnedl WJ, et al. STZ transport and cytotoxicity. Specific enhancement in GLUT2-expressing cells. Diabetes. 1994 Nov;43(11):1326-33.

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