2-Deoxy-D-glucose

Cat. No.: HY-13966

CAS No.: 154-17-6

Molecular Formula: $C_6H_{12}O_5$

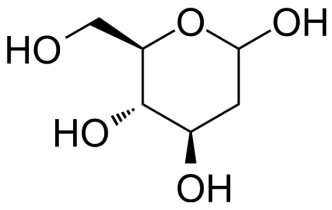
Molecular Weight: 164.16

Target: Hexokinase; Apoptosis; HSV

Pathway: Metabolic Enzyme/Protease; Apoptosis; Anti-infection

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	6 months
	-20°C	1 month



SOLVENT & SOLUBILITY

In Vitro

H_2O : ≥ 24 mg/mL (146.20 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	6.0916 mL	30.4581 mL	60.9162 mL
5 mM	1.2183 mL	6.0916 mL	12.1832 mL
10 mM	0.6092 mL	3.0458 mL	6.0916 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 130 mg/mL (791.91 mM); Clear solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

2-Deoxy-D-glucose is a glucose analog that acts as a competitive inhibitor of glucose metabolism, inhibiting glycolysis via its actions on hexokinase[1].

IC_{50} & Target

HSV-1

In Vitro

2-Deoxy-D-glucose (2-DG, 4, 8, or 16 mM) significantly reduces the level of ATP in MCF-7 cells in a dose- and time-dependent manner that paralleles the effects of 2-DG on cell growth. The levels of phosphorylated Akt are significantly decreased, whereas the levels of phosphorylated AMPK and Sirt-1 are significantly increased in MCF-7 cells exposed to 2-Deoxy-D-glucose at 4, 8, or 16 mM for 1, 3, or 5 days in a dose- and time-dependent manner[1]. 2-DG treatment increases the levels of pentose phosphate pathway (PPP) metabolites and augments the generation of NADPH by glucose-6-phosphate dehydrogenase. An increase in NADPH and upregulation of glutathione synthetase expression resultes in the increase in the

	reduced form of glutathione by 2-DG in NB4 cells[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	2-Deoxy-D-glucose (0.03%, w/w) causes a 7% decrease in final weight that is statistically significant, and delayes the appearance of palpable mammary carcinomas[1]. 2-Deoxy-D-glucose (3 mmol/kg, i.v.) is decreased in a dose-dependent manner in rat muscle[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [1]	The effect of 2-DG on cell growth is determined by evaluating the number of adherent cells. Briefly, MCF-7 cells are plated at 3×10^4 cells per well in flat-bottomed 96-well plates in 100 µL of culture medium under the culture conditions. After 24 hours, cells are fed with fresh medium including 2-Deoxy-D-glucose at doses of 0, 4, 8, or 16 mM. At days 1, 3, and 5 after 2-Deoxy-D-glucose exposure, cells are fixed with 1% glutaraldehyde, replaced with PBS, and stored at 4°C. At the end of an experiment, all of the plates are stained with 0.02% aqueous crystal violet for 30 minutes and rinsed with deionized water. After redissolving the bound crystal violet in 70% ethanol, the absorbance is determined at 590 nm using a SPECTRA MAX PLUS Microplate Spectrophotometer System. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [1]	At 21 days of age, rats are injected with 50 mg 1-methyl-1-nitrosourea per kilogram of body weight (i.p.). Rats are housed two per cage in solid-bottomed polycarbonate cages equipped with a food cup. Six days following carcinogen injection, all rats are randomized into one of three groups, 30 rats per group, and are fed ad libitum AIN-93G diet containing 0.0%, 0.02%, or 0.03% (w/w) 2-Deoxy-D-glucose (2-DG) for 5 weeks. Animal rooms are maintained at 22±1°C with 50% relative humidity and a 12-hour light/12-hour dark cycle. Rats are weighed thrice per week and are palpated for detection of mammary tumors twice per week starting from 19 days postcarcinogen. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Cancer Cell. 2020 Sep 14;38(3):350-365.e7.
- Cell Res. 2021 Mar;31(3):291-311.
- Signal Transduct Target Ther. 2023 Feb 15;8(1):65.
- Gastroenterology. 2024 Jan 24:S0016-5085(24)00064-7.
- Cell Metab. 2022 Nov 11;S1550-4131(22)00490-9.

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REFERENCES

[1]. Zhu Z, et al. 2-Deoxyglucose as an energy restriction mimetic agent: effects on mammary carcinogenesis and on mammary tumor cell growth in vitro. Cancer Res. 2005 Aug 1;65(15):7023-30.

[2]. Ueyama A, et al. Nonradioisotope assay of glucose uptake activity in rat skeletal muscle using enzymatic measurement of 2-deoxyglucose 6-phosphate in vitro and in vivo. Biol Signals Recept. 2000 Sep-Oct;9(5):267-74.

[3]. Miwa H, et al. Leukemia cells demonstrate a different metabolic perturbation provoked by 2-deoxyglucose. Oncol Rep. 2013 May;29(5):2053-7.

Caution: Product has not been fully validated for medical applications. For research use only.

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