2-Deoxy-D-glucose

Cat. No.: HY-13966  
CAS No.: 154-17-6  
Molecular Formula: C₆H₁₂O₅  
Molecular Weight: 164.16  
Target: Hexokinase  
Pathway: Metabolic Enzyme/Protease  
Storage: 4°C, protect from light

Solvent & Solubility

<table>
<thead>
<tr>
<th>Solvent</th>
<th>Mass (mg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMSO</td>
<td>≥ 51 mg/mL (310.67 mM)</td>
</tr>
<tr>
<td>H₂O</td>
<td>≥ 24 mg/mL (146.20 mM)</td>
</tr>
</tbody>
</table>

* “≥” means soluble, but saturation unknown.

Preparing Stock Solutions

<table>
<thead>
<tr>
<th>Concentration</th>
<th>1 mg</th>
<th>5 mg</th>
<th>10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mM</td>
<td>6.0916 mL</td>
<td>30.4581 mL</td>
<td>60.9162 mL</td>
</tr>
<tr>
<td>5 mM</td>
<td>1.2183 mL</td>
<td>6.0916 mL</td>
<td>12.1832 mL</td>
</tr>
<tr>
<td>10 mM</td>
<td>0.6092 mL</td>
<td>3.0458 mL</td>
<td>6.0916 mL</td>
</tr>
</tbody>
</table>

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

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.

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 parallels 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].

In Vivo  
2-Deoxy-D-glucose (0.03%, w/w) causes a 7% decrease in final weight that is statistically significant, and delays the appearance of palpable mammary carcinomas[1]. 2-Deoxy-D-glucose (3 mmol/kg, i.v.) is decreased in a dose-dependent manner by insulin in rat muscle[2].
**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 $3 \times 10^4$ 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.

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**REFERENCES**


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

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