## Chemical Properties

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Busulfan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cas No.</td>
<td>55-98-1</td>
</tr>
<tr>
<td>M.Wt</td>
<td>246.3</td>
</tr>
<tr>
<td>Formula</td>
<td>C6H14O6S2</td>
</tr>
<tr>
<td>Chemical Name</td>
<td>4-methylsulfonyloxybutyl methanesulfonate</td>
</tr>
<tr>
<td>Canonical SMILES</td>
<td>CS(=O)(=O)OCCCO(CCOS(=O)(=O)C</td>
</tr>
<tr>
<td>Solubility</td>
<td>≥12.3 mg/mL in DMSO</td>
</tr>
<tr>
<td>Storage</td>
<td>Store at -20°C</td>
</tr>
<tr>
<td>General tips</td>
<td>For obtaining a higher solubility, please warm the tube at 37°C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.</td>
</tr>
<tr>
<td>Shopping Condition</td>
<td>Evaluation sample solution: ship with blue ice. All other available size: ship with RT, or blue ice upon request</td>
</tr>
</tbody>
</table>

## Biological Activity

**Targets:** DNA Damage/DNA Repair  
**Pathways:** DNA Alkylating  
**Description:** 
Busulfan is a DNA alkylating agent [1]. DNA alkylating agent is attached to the guanine base of DNA and stops tumor growth by crosslinking guanine nucleobases in DNA double-helix strands and causes DNA damage [1]. In normal human diploid WI38 fibroblasts, busulfan (7.5-120 μM) induced senescence in a dose-dependant way, which was associated with prolonged activation of c-Jun NH2-terminal kinase (JNK), p38 mitogen-activated protein kinase (p38) and extracellular signal-regulated kinase (Erk) [2]. The induction of senescence was initiated by the transient depletion of intracellular glutathione (GSH) and then an increase in reactive oxygen species (ROS) production, which
activated the Erk and p38 MAPK pathway [1]. In the adult mouse testis, busulfan induced apoptosis and decreased testis weight. In the first week, apoptosis mainly occurred to spermatogonia. In the following week, spermatogonia-specific markers Stra 8 and c-kit were reduced but Gli I remained constant, which indicated apoptosis of differentiating type A spermatogonia [3].

Reference:

Protocol

Cell experiment:

Cell lines
WI38 cells (human embryonic lung diploid fibroblasts)

Preparation method
Soluble in DMSO > 12.3mg/mL. General tips for obtaining a higher concentration: Please warm the tube at 37°C for 10 minutes and/or shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Reacting conditions

Applications
Busulfan, an alkylating agent that causes DNA damage by crosslinking DNAs and DNA and proteins, induced senescence in normal human diploid WI38 fibroblasts through the extracellular signal-regulated kinase (Erk) and p38 mitogen-activated protein kinase (p38 MAPK) cascade independent of the p53-DNA damage pathway.

Animal experiment [3]:

Animal models
ICR male mice ranging in age from 8 to 12 weeks

Dosage form
Diluted in sesame oil, 40 mg/kg body weight, intraperitoneal injection

Applications
Busulfan-treated mice exhibited a marked increase in apoptosis and
a decrease in testis weight. The percentage of apoptosis-positive tubules and the apoptotic cell index increased in a time-dependent manner. Increased depletion of male germ cells in the busulfan-treated mouse was mediated by loss of c-kit/SCF(stem cell factor) signaling but not by p53- or Fas/FasL(Fas ligand) -dependent mechanisms.

Other notes
Please test the solubility of all compounds indoor, and the actual solubility may slightly differ with the theoretical value. This is caused by an experimental system error and it is normal.

Reference: