### Chemical Properties

<table>
<thead>
<tr>
<th><strong>Product Name:</strong></th>
<th>Topiramate</th>
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</thead>
<tbody>
<tr>
<td><strong>Cas No.:</strong></td>
<td>97240-79-4</td>
</tr>
<tr>
<td><strong>M.Wt:</strong></td>
<td>339.36</td>
</tr>
<tr>
<td><strong>Formula:</strong></td>
<td>C12H21NO8S</td>
</tr>
</tbody>
</table>

**Chemical Name:** 
\[(3aS,5aR,8aR,8bS)-2,2,7,7-tetramethyl-5,5a,8a,8b-tetrahydrodi[1,3]dioxolo[4,5-a:5',3'-d]pyran-3a-yl\]methyl sulfamate

**Canonical SMILES:** 
CC1(OC2COC3(C(C2O1)OC(O3)(C)C)COS(=O)(=O)N)C

**Solubility:** >17mg/mL in DMSO

**Storage:** Store at -20°C

**General tips:** 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.

**Shopping Condition:** Evaluation sample solution: ship with blue ice
All other available size: ship with RT, or blue ice upon request

### Biological Activity

**Targets:** Metabolism

**Pathways:** Carbonic Anhydrase

**Description:**
Topiramate, a novel anticonvulsant drug, is a widely used antiepileptic agent. The drug has been...
reported to interact with various ion channel types, such as AMPA/kainate receptors, voltage-sensitive Na+ channels, NMDA receptors and GABA receptors [1,2].

In vitro: In principal neurons of the rat basolateral amygdala, low concentrations of topiramate selectively inhibited pharmacologically isolated excitatory synaptic currents mediated by kainate receptors with the GluR5 subunit with an IC50 value of 0.5 μM. Topiramate also partially depressed predominantly AMPA-receptor-mediated EPSCs with lower efficacy [1]. In dissociated neocortical slices, low concentrations of TPM (25–30 μM) slightly inhibited the persistent fraction of Na+ current and reduced the Na+-dependent long-lasting action potential shoulders evoked in layer V pyramidal neurons after Ca2+ and K+ current blockade. TPM (100 μM) had no effects on the voltage dependence of activation but induced a leftward shift of the steady-state INa inactivation curve [3].

In vivo: TPM treatment significantly improved the 24-h neurological deficit scores (high dose, 1.17 ± 0.41; low dose, 1.75 ± 0.5; p < 0.05 for both doses). The percentage of infarct volume (low dose, 22.9 ± 8.9%, p = 0.002; high dose 7.6 ± 3.4%, p < 0.001) reduced when compared with the controls (infarct size, 54.2 ± 9.0%; neurobehavior score, 2.67 ± 0.52). Higher dose of TPM induced more neuroprotection than that of lower dose (p < 0.05). In a rat model of focal ischemia, treatment with TPM 2 h after MCA embolization resulted in neuroprotective effect in a dose- and use-dependent manner [2]. Topiramate (25-100 mg/kg, i.p.) dose-dependently elevated the threshold for clonic seizures induced by infusion of a selective agonist of GluR5 kainate receptors ATPA [4]. Topiramate (i.p) effectively suppressed acute seizures induced by perinatal hypoxia in a dose-dependent manner with an ED50 of 2.1 mg/kg [5]. Topiramate (20 and 40 mg/kg i.p.) dose-dependently inhibited both tonic and absence-like seizures. In DBA/2 mice, topiramate inhibited sound-induced seizures with ED50 of 8.6 mg/kg (p.o) [6].

Reference:

Protocol

Cell experiment:

Cell lines Neurons
**Preparation method**

The solubility of this compound in DMSO is > 10 mM. 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**

25 ~ 400 μM

**Applications**

In dissociated neurons, Topiramate inhibited the persistent fraction of Na+ current in a dose-dependent manner.

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**Animal experiment [3]:**

**Animal models**

Male NIH Swiss mice

**Dosage form**

25 ~ 100 mg/kg; i.p.

**Applications**

Topiramate (25 ~ 100 mg/kg, i.p.) produced a dose-dependent elevation in the threshold for clonic seizures induced by intravenous infusion of ATPA, a selective agonist of GluR5 kainate receptors.

**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.

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**Reference:**


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**Caution**

FOR RESEARCH PURPOSES ONLY.

NOT FOR HUMAN, VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

Specific storage and handling information for each product is indicated on the product datasheet. Most ApexBio products are stable under the recommended conditions. Products are sometimes shipped at a temperature that differs from the recommended storage temperature. Shortterm storage of many products are stable in the short-term at temperatures that differ from that
required for long-term storage. We ensure that the product is shipped under conditions that will maintain the quality of the reagents. Upon receipt of the product, follow the storage recommendations on the product data sheet.