Melatonin

Cat. No.: HY-B0075
CAS No.: 73-31-4
Molecular Formula: C₁₃H₁₆N₂O₂
Molecular Weight: 232.28
Target: Melatonin Receptor; Autophagy; Mitophagy; Endogenous Metabolite
Pathway: GPCR/G Protein; Neuronal Signaling; Autophagy; Metabolic Enzyme/Protease
Storage:
- Powder: -20°C 3 years
  - 4°C 2 years
- In solvent: -80°C 6 months
  - -20°C 1 month

SOLVENT & SOLUBILITY

In Vitro

DMSO: 100 mg/mL (430.51 mM; Need ultrasonic)
Ethanol: ≥ 50 mg/mL (215.26 mM)
* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

<table>
<thead>
<tr>
<th>Solvent Concentration</th>
<th>Mass 1 mg</th>
<th>Mass 5 mg</th>
<th>Mass 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mM</td>
<td>4.3051 mL</td>
<td>21.5257 mL</td>
<td>43.0515 mL</td>
</tr>
<tr>
<td>5 mM</td>
<td>0.8610 mL</td>
<td>4.3051 mL</td>
<td>8.6103 mL</td>
</tr>
<tr>
<td>10 mM</td>
<td>0.4305 mL</td>
<td>2.1526 mL</td>
<td>4.3051 mL</td>
</tr>
</tbody>
</table>

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

In Vivo

1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (10.76 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (10.76 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (10.76 mM); Clear solution
4. Add each solvent one by one: 10% EtOH >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (10.76 mM); Clear solution
5. Add each solvent one by one: 10% EtOH >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (10.76 mM); Clear solution
6. Add each solvent one by one: 10% EtOH >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (10.76 mM); Clear solution
**BIOLOGICAL ACTIVITY**

**Description**
Melatonin is a hormone made by the pineal gland that can activate melatonin receptor. Melatonin plays a role in sleep and possesses important antioxidative and anti-inflammatory properties\(^1\)\(^2\)\(^3\). Melatonin is a novel selective ATF-6 inhibitor and induces human hepatoma cell apoptosis through COX-2 downregulation\(^4\).

**IC\(_{50}\) & Target**
Human Endogenous Metabolite

**In Vivo**
Melatonin increases the levels of activated PTEN, RSK-1, mTOR and AMPK\(\alpha\) kinases, mildly inhibits ERK-1/2 phosphorylation and Bad phosphorylation, significantly inhibits phosphorylations of S6 Ribosomal Protein, 4E-BP1, GSK-3\(\alpha\) and GSK-3\(\beta\), and slightly increases PRAS40 phosphorylation in animals\(^1\). Melatonin ameliorates the neurotoxicity and astrocyte activation induced by A\(\beta\)\(_{1-42}\) in the cerebral cortex. Melatonin also blocks the reduction in Reelin and Dab1 expression induced by A\(\beta\)\(_{1-42}\)\(^2\). Melatonin treatment and lack of NLRP3\(^{-/-}\) share similar inhibition of NF-\(\kappa\)B and NLRP3 signaling pathway in mice. Melatonin treatment and lack of NLRP3\(^{-/-}\) share some patterns of clock genes expression, and improve cardiomyocytes morphology in mice\(^3\).

**PROTOCOL**

**Animal Administration**\(^1\)
A total of two sets of adult male C57BL/6j mice weighing 21-26 g are randomly assigned to one of four groups and treated with intraperitoneal (i.p.) delivery of (i) vehicle (50 \(\mu\)L isotonic saline/5% ethanol), (ii) melatonin (4 mg/kg, dissolved in 0.9% isotonic saline/5% ethanol), (iii) Wortmannin, and (iv) melatonin/Wortmannin immediately after reperfusion. In the first set, mice are exposed to 30 min of focal cerebral ischemia (FCI) and 72 h reperfusion for the evaluation of disseminate ischemic injury in the striatum, and signaling pathway analysis (n=7 per group). The second group of mice is exposed to 90 min of FCI and 24 h reperfusion for the analysis of infarct development, brain swelling and IgG extravasation (n=7 per group).

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

**CUSTOMER VALIDATION**

- Redox Biol. 2019 May 20;24:101225

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**REFERENCES**

