**N-Desmethylclozapine**

**Cat. No.**: HY-G0021  
**CAS No.**: 6104-71-8  
**Molecular Formula**: C₁₇H₁₇ClN₄  
**Molecular Weight**: 312.8  

**Target**: mAChR; Opioid Receptor; Drug Metabolite; Virus Protease  
**Pathway**: GPCR/G Protein; Neuronal Signaling; Metabolic Enzyme/Protease; 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**  
DMSO : ≥ 50 mg/mL (159.85 mM)  
* “≥” means soluble, but saturation unknown.*  

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Solvent</th>
<th>Mass</th>
<th>1 mg</th>
<th>5 mg</th>
<th>10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mM</td>
<td></td>
<td></td>
<td>3.1969 mL</td>
<td>15.9847 mL</td>
<td>31.9693 mL</td>
</tr>
<tr>
<td>5 mM</td>
<td></td>
<td></td>
<td>0.6394 mL</td>
<td>3.1969 mL</td>
<td>6.3939 mL</td>
</tr>
<tr>
<td>10 mM</td>
<td></td>
<td></td>
<td>0.3197 mL</td>
<td>1.5985 mL</td>
<td>3.1969 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 (7.99 mM); Clear solution  
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)  
Solubility: ≥ 2.5 mg/mL (7.99 mM); Clear solution

**BIOLOGICAL ACTIVITY**

**Description**  
N-Desmethylclozapine is a major active metabolite of the atypical antipsychotic drug Clozapine. N-Desmethylclozapine is a potent, allosteric and partial M1 receptors agonist (EC₅₀=115 nM) and is able to potentiate hippocampal N-methyl-d-aspartate (NMDA) receptor currents through M1 receptor activation. N-Desmethylclozapine is also a δ-opioid agonist[1][2].

**IC₅₀ & Target**  
EC₅₀: 115 nM (M1 receptors)[1]  
δ-opioid[2]
**In Vitro**

The brain penetrant metabolite N-desmethylclozapine preferentially bound to M1 muscarinic receptors with an IC\textsubscript{50} of 55 nM and was a more potent partial agonist (EC\textsubscript{50}, 115 nM and 50% of acetylcholine response) at this receptor than clozapine\cite{1}.

N-desmethylclozapine exhibits slight agonistic effects on the M1 mAChR, and agonistic properties at the 5-HT1A receptor in the cerebral cortex and hippocampus. This compound also behaves as an agonist at the δ-opioid receptor in the cerebral cortex and striatum\cite{2}.

N-desmethylclozapine (3 μM) greatly decreases the outward current in excitatory neurons, but not in inhibitory neurons. In excitatory neurons, N-desmethylclozapine alone is more effective than either clozapine alone or the combination of clozapine and N-desmethylclozapine. The effect of N-desmethylclozapine in excitatory neurons is significantly suppressed by 0.1 μM pirenzepine and 1 μM atropine. N-desmethylclozapine, but not clozapine, suppressed K⁺ channels via M1 receptors in excitatory cells\cite{3}.

N-desmethylclozapine leads to a decrease in TxB2 levels under unstimulated conditions as well as under TSST-1 stimulation. Clozapine, N-desmethylclozapine and CPZ possibly act on neurotransmitter systems via modulation of TxA2 or TxB2 production\cite{5}.

The IC\textsubscript{50}s of N-desmethylclozapine, fluoxetine hydrochloride, and salmeterol xinafoate in Huh-7 cells infected with DENV-2 are 1 μM, 0.38 μM, and 0.67 μM, respectively. The levels of NS3 are reduced in cells treated with all three inhibitors compared to DMSO treatment, suggesting that the inhibitors act at a stage prior to viral protein translation. N-Desmethylclozapine-treated cells show a >75% reduction in negative-strand RNA levels\cite{6}.

**In Vivo**

N-desmethylclozapine in rat and human at M2 and M4 mAChRs underlying presynaptic modulation of GABA and glutamate release, respectively. In particular, N-desmethylclozapine maybe a M2 mAChR antagonist in the rat but has no activity at this receptor in human neocortex. However, N-desmethylclozapine has an agonistic effect at M4 mAChR in the human but no such effect in the rat neocortex\cite{4}.

**REFERENCES**


\[4\]. Gigout S, et al. Different pharmacology of N-desmethylclozapine at human and rat M2 and M 4 mAChRs in neocortex. Naunyn Schmiedebergs Arch Pharmacol. 2015 May;388(5):487-96
