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DATASHEET

Deschloroclozapine (DCZ)

Product overview

Name	Deschloroclozapine (DCZ)
Cat No	HB8555
Description	Potent, selective and metabolically stable hM3Dq and hM4Di muscarinic DREADD actuator.
Alternative names	DCZ
Biological action	Agonist
Purity	>98%

Biological Data

Biological description

Overview

Deschloroclozapine (DCZ) is reported to be a potent, selective and highly brain-penetrable muscarinic hM3Dq and hM4Di DREADD actuator with minimal off-target actions (K_i = 6.3 and 4.2 nM at hM3Dq and hM4Di respectively) and (EC_{50} values are 0.13 and 0.081 nM at hM3Dq and hM4Di respectively in a BRET-based assay.

It represents a potent, selective, metabolically stable and fast acting DREADD agonist with utility in both mice and non-human primates for a variety of applications.

It shows 100-fold improved affinity and greater agonist potency for hM3Dq and hM4Di compared to Clozapine n-Oxide (CNO) or DREADD agonist 21 (C21) with reduced off-target binding compared with clozapine in vitro.It has lower affinity at D_1, D_2 and 5-HT_{2A} and 5-HT_{2C} receptors compared with clozapine.

PET studies demonstrate the compound is rapidly brain penetrable, is apparently selective and doses for DREADD occupancy are 20-fold and 60-fold lower than CNO or DREADD agonist 21 (C21) respectively.

Uses and applications

Systemic delivery of low doses of DCZ (1 or 3 µg/kg) were shown to enhance neuronal activity via hM3Dq in mice and monkeys within minutes.

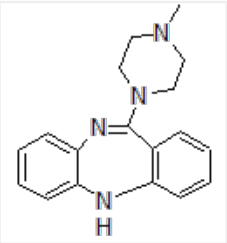
Intramuscular doses of 100 µg/kg reversibly induced spatial working memory deficits in hM4Di expressing monkeys.

Deschloroclozapine dihydrochloride (water soluble) also available.

Solubility & Handling

Storage instructions	Room temperature
Solubility overview	Soluble in DMSO (100 mM), and in ethanol (50 mM with warming)
Important	This product is for RESEARCH USE ONLY and is not intended for therapeutic or diagnostic use. Not for human or veterinary use

Chemical Data

Chemical name	6-(4-methylpiperazin-1-yl)-11H-benzo[b][1,4]benzodiazepine
Molecular Weight	292.38
Chemical structure	
Molecular Formula	$C_{18}H_{20}N_4$
CAS Number	1977-07-7
PubChem identifier	16103
SMILES	CN1CCN(CC1)C2=NC3=CC=CC=C3NC4=CC=CC=C42
Source	Synthetic
InChi	InChI=1S/C18H20N4/c1-21-10-12-22(13-11-21)18-14-6-2-3-7-15(14)19-16-8-4-5-9-17(16)20-18/h2-9,19H,10-13H2,1H3
InChiKey	VQHITFFJBFOMBG-UHFFFAOYSA-N
Appearance	Yellow solid

References

Deschloroclozapine, a potent and selective chemogenetic actuator enables rapid neuronal and behavioral modulations in mice and monkeys

Nagai et al (2020) Nature Neuroscience 1157-1167

PubMedID 32632286

Chemogenetic actuator drugs impair prefrontal cortex-dependent working memory in rhesus monkeys

Upright and Baxter (2019) bioRxiv https://doi.org/10.1101/864140

Binding of 5H-dibenzo[b,e][1,4]diazepine and chiral 5H-dibenzo[a,d]cycloheptene analogues of clozapine to dopamine and serotonin receptors.

Phillips et al (1994) J Med Chem 37(17)

PubMedID 8064797