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DATASHEET

Deschloroclozapine dihydrochloride (DCZ) (water soluble)

Product overview

Name	Deschloroclozapine dihydrochloride (DCZ) (water soluble)
Cat No	HB9126
Alternative names	DCZ
Biological action	Agonist
Purity	>99%
Description	Potent, selective and metabolically stable hM3Dq and hM4Di muscarinic DREADD actuator. Water soluble.

Images

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 freebase also available.

Solubility & Handling

Storage instructions	-20°C
Solubility overview	Soluble in water (100 mM). Always store solutions at -20°C.
Handling	Storage of solid

- Store at -20°C.
- Please note that the compound is a hydroscopic solid and contact with air may cause material to become sticky. Product performance should not be affected but we recommend storing the material in a sealed jar.

Storage of solutions

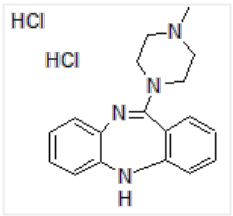
- Make up solutions and use immediately.
- If storage of solutions is required, you should aliquot out the solution into tightly sealed vials and store at -20°C and store these for up to one month.
- Allow the product to equilibrate to RT for at least one hour before opening and using.

Storage of solutions at room temperature

- We recommend only keeping solutions at room temperature (25°C) for a few days as our studies have shown that after 96 hours the purity of the compound in solution drops to ~97% and will continue to drop over time.

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 dihydrochloride
Molecular Weight	365.3
Chemical structure	
Molecular Formula	$C_{18}H_{20}N_4.2HCl$
CAS Number	1977-07-7 (free base)
SMILES	Cl.Cl.CN1CCN(CC1)C2=Nc4ccccc4Nc3ccccc23
Source	Synthetic
InChi	InChI=1S/C18H20N4.2ClH/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;2*1H
InChiKey	ZMDCCOPUWCVMFM-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

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

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

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