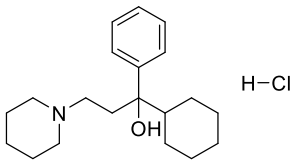
Product data sheet

MedKoo Cat#: 318909 Name: Benzhexol HCl CAS#: 52-49-3 (HCl) Chemical Formula: $C_{20}H_{32}ClNO$ Exact Mass: 301.2406 Molecular Weight: 337.932	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Benzhexol, also known as Trihexyphenidyl, is an antiparkinsonian agent of the antimuscarinic class. It has been in clinical usage for decades.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	20	59.18
Ethanol	20	59.18

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	2.96 mL	14.80 mL	29.59 mL
5 mM	0.59 mL	2.96 mL	5.92 mL
10 mM	0.30 mL	1.48 mL	2.96 mL
50 mM	0.06 mL	0.30 mL	0.59 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Liu ZZ, Ji BS. The protective effect of trihexyphenidyl on the beta-amyloid peptide (25-35)-induced cytotoxicity in PC12 cells. Clin Exp Med. 2010 Dec;10(4):237-43. doi: 10.1007/s10238-010-0090-9. Epub 2010 Jan 26. PMID: 20101432.

In vivo study

1. Downs AM, Fan X, Donsante C, Jinnah HA, Hess EJ. Trihexyphenidyl rescues the deficit in dopamine neurotransmission in a mouse model of DYT1 dystonia. Neurobiol Dis. 2019 May;125:115-122. doi: 10.1016/j.nbd.2019.01.012. Epub 2019 Jan 30. PMID: 30707939; PMCID: PMC6863078.

7. Bioactivity
Biological target:

Trihexyphenidyl hydrochloride is an antiparkinsonian agent of the antimuscarinic class, binds to the M1 muscarinic receptor.

In vitro activity

The protective effect of Trihexyphenidyl (THY) on Aβ(25-35)-induced cytotoxicity in cultured rat pheochromocytoma (PC12) cells was investigatecd. In this report, the cell survival was measured by MTT assay, the enzyme activity of superoxide dismutase (SOD) and glutathione peroxidase (GSH-PX), the contents of lipid peroxidation products malondialdehyde (MDA) and ROS in the cells were

determined. Acridine orange (AO) was used to observe the morphological characteristic of apoptotic cells. Mitochondrial membrane potential in PC12 cells were monitored by fluorospectrophotometer combining with Rh123. As a cell permeable fluorescent probe, Fura-2/AM was employed to detect intracellular [Ca(2+)]. The results showed that after incubation with Aβ(25-35) (10 μM) for 24 h, there were decreased changes in cell viability, SOD, and GSH-PX activity as well as mitochondrial membrane potential, in contrast, the levels of [Ca(2+)](i), ROS, and MDA were increased, THY significantly attenuated all the changes induced by Aβ(25-35), indicating that THY exhibited protective effect against Aβ(25-35)-induced cytotoxicity, which may represent the cellular mechanisms of the action.

Reference: Clin Exp Med. 2010 Dec;10(4):237-43. https://dx.doi.org/10.1007/s10238-010-0090-9

In vivo activity

To test the DA-enhancing effects of Benzhexol (Trihexyphenidyl, THP) in vivo, microdialysis was conducted in awake, behaving mice. THP was reverse dialyzed and extracellular DA was measured both pre- and post- treatment (Fig 3A). Extracellular DA was significantly reduced at baseline in Dyt1 mice relative to controls (Tor1a+/+, 3.07 ± 0.434 ng/mL, Tor1a+/ΔE, 1.88 ± 0.205 ng/mL; Student's t test, $p<0.05$), consistent with previous results. THP significantly increased extracellular DA in both control and Dyt1 mice (two-way repeated measures ANOVA, main effect of treatment, $F1,14 = 38.02$, $p<0.0001$). In fact, THP increased extracellular DA in Dyt1 mice to normal WT concentrations (Tukey's post-hoc, $p>0.05$). Additionally, extracellular DA was measured using microdialysis after a single peripheral administration of THP (20 mg/kg i.p.). Previous studies demonstrated that this dose reduces the severity of the dystonia in a mouse model of DOPA-responsive dystonia, but does not reduce locomotor activity. Peripherally administered THP significantly increased extracellular DA (Fig 3B); (two-way repeated measures ANOVA, main effect of treatment, $F1,16 = 7.003$, $p<0.05$).

Reference: Neurobiol Dis. 2019 May;125:115-122. doi: 10.1016/j.nbd.2019.01.012.
https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/30707939/