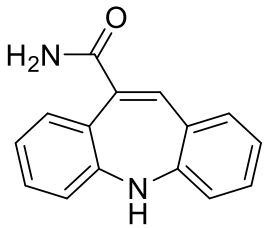
Product data sheet

MedKoo Cat#: 317368 Name: Carbamazepine CAS#: 298-46-4 Chemical Formula: $C_{15}H_{12}N_2O$ Exact Mass: 236.09496 Molecular Weight: 236.27	
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:
Carbamazepine is a medication used primarily in the treatment of epilepsy and neuropathic pain. For seizures it works as well as phenytoin and valproate. It is not effective for absence seizures or myoclonic seizures. It may be used in schizophrenia along with other medications and as a second line agent in bipolar disorder. It is taken two to four times per day. A controlled release formulation is available for which there is tentative evidence showing less side effects.

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	47	198.92
Ethanol	18	76.18

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	4.23 mL	21.16 mL	42.32 mL
5 mM	0.85 mL	4.23 mL	8.46 mL
10 mM	0.42 mL	2.12 mL	4.23 mL
50 mM	0.08 mL	0.42 mL	0.85 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. Ruiz CE, Manuguerra S, Curcuraci E, Santulli A, Messina CM. Carbamazepine, cadmium chloride and polybrominated diphenyl ether-47, synergistically modulate the expression of antioxidants and cell cycle biomarkers, in the marine fish cell line SAF-1. Mar Environ Res. 2020 Feb;154:104844. doi: 10.1016/j.marenvres.2019.104844. Epub 2019 Nov 21. PMID: 31784109.

2. Zhou Q, Chen PC, Devaraneni PK, Martin GM, Olson EM, Shyng SL. Carbamazepine inhibits ATP-sensitive potassium channel activity by disrupting channel response to MgADP. Channels (Austin). 2014;8(4):376-82. doi: 10.4161/chan.29117. PMID: 24849284; PMCID: PMC4203739.

In vivo study

1. Lee JTC, Shanina I, Chu YN, Horwitz MS, Johnson JD. Carbamazepine, a beta-cell protecting drug, reduces type 1 diabetes incidence in NOD mice. Sci Rep. 2018 Mar 15;8(1):4588. doi: 10.1038/s41598-018-23026-w. PMID: 29545618; PMCID: PMC5854601.

2. Okada M, Hirano T, Mizuno K, Chiba T, Kawata Y, Kiryu K, Wada K, Tasaki H, Kaneko S. Biphasic effects of carbamazepine on the dopaminergic system in rat striatum and hippocampus. Epilepsy Res. 1997 Sep;28(2):143-53. doi: 10.1016/s0920-1211(97)00042-9. PMID: 9267779.

7. Bioactivity

Biological target:

Carbamazepine (Carbatrol, NSC 169864) is a sodium channel blocker with IC50 of 131 μM in rat brain synaptosomes.

In vitro activity

Carbamazepine, an anticonvulsant known to inhibit voltage-gated sodium channels, has profound effects on K(ATP) channels. Like sulfonylureas, carbamazepine corrects trafficking defects in channels bearing mutations in the first transmembrane domain of SUR1. Moreover, carbamazepine inhibits the activity of K(ATP) channels such that rescued mutant channels are unable to open when the intracellular ATP/ADP ratio is lowered by metabolic inhibition. Here, we investigated the mechanism by which carbamazepine inhibits K(ATP) channel activity. We show that carbamazepine specifically blocks channel response to MgADP. This gating effect resembles that of sulfonylureas. Our results reveal striking similarities between carbamazepine and sulfonylureas in their effects on K(ATP) channel biogenesis and gating and suggest that the 2 classes of drugs may act via a converging mechanism.

Reference: Channels (Austin). 2014;8(4):376-82. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/24849284/

In vivo activity

The effects of carbamazepine treatment was treated in female non-obese diabetic (NOD) mice by supplementing LabDiet 5053 with 0.5% w/w carbamazepine to achieve serum carbamazepine levels of 14.98 ± 3.19 μM. Remarkably, diabetes incidence over 25 weeks, as determined by fasting blood glucose, was ~50% lower in carbamazepine treated animals. Partial protection from diabetes in carbamazepine-fed NOD mice was also associated with improved glucose tolerance at 6 weeks of age, prior to the onset of diabetes in our colony. Less insulitis was detected in carbamazepine treated NOD mice at 6 weeks of age, but we did not observe differences in CD4+ and CD8+ T cell composition in the pancreatic lymph node, as well as circulating markers of inflammation. Taken together, our results demonstrate that carbamazepine reduces the development of type 1 diabetes in NOD mice by maintaining functional beta-cell mass.

Reference: Sci Rep. 2018 Mar 15;8(1):4588. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/29545618/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.