

# Product data sheet



MedKoo Cat#: 330141 Name: Sapropterin HCl CAS#: 69056-38-8 (HCl) Chemical Formula: C <sub>9</sub> H <sub>17</sub> Cl <sub>2</sub> N <sub>5</sub> O <sub>3</sub> Molecular Weight: 314.17	
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:

Sapropterin, also known as Tetrahydrobiopterin (BH<sub>4</sub>, THB, trade name Kuvan) or sapropterin (INN) is a naturally occurring essential cofactor of the three aromatic amino acid hydroxylase enzymes, used in the degradation of amino acid phenylalanine and in the biosynthesis of the neurotransmitters serotonin (5-hydroxytryptamine, 5-HT), melatonin, dopamine, norepinephrine (noradrenaline), epinephrine (adrenaline), and is a cofactor for the production of nitric oxide (NO) by the nitric oxide synthases. Chemically, its structure is that of a reduced pteridine derivative.

## 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
Water	100	318.30

## 4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.18 mL	15.91 mL	31.83 mL
5 mM	0.64 mL	3.18 mL	6.37 mL
10 mM	0.32 mL	1.59 mL	3.18 mL
50 mM	0.06 mL	0.32 mL	0.64 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

- Ohashi A, Sugawara Y, Mamada K, Harada Y, Sumi T, Anzai N, Aizawa S, Hasegawa H. Membrane transport of sepiapterin and dihydrobiopterin by equilibrative nucleoside transporters: a plausible gateway for the salvage pathway of tetrahydrobiopterin biosynthesis. *Mol Genet Metab.* 2011 Jan;102(1):18-28. doi: 10.1016/j.ymgme.2010.09.005. Epub 2010 Sep 18. PMID: 20956085.
- Kamada Y, Jenkins GJ, Lau M, Dunbar AY, Lowe ER, Osawa Y. Tetrahydrobiopterin depletion and ubiquitylation of neuronal nitric oxide synthase. *Brain Res Mol Brain Res.* 2005 Dec 7;142(1):19-27. doi: 10.1016/j.molbrainres.2005.09.003. Epub 2005 Oct 10. PMID: 16216381.

### In vivo study

- Schmitz K, Trautmann S, Hahnefeld L, Fischer C, Schreiber Y, Wilken-Schmitz A, Gurke R, Brunkhorst R, Werner ER, Watschinger K, Wicker S, Thomas D, Geisslinger G, Tegeder I. Sapropterin (BH<sub>4</sub>) Aggravates Autoimmune Encephalomyelitis in Mice. *Neurotherapeutics.* 2021 Jul;18(3):1862-1879. doi: 10.1007/s13311-021-01043-4. Epub 2021 Apr 12. PMID: 33844153; PMCID: PMC8609075.

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2. Engineer A, Lim YJ, Lu X, Kim MY, Norozi K, Feng Q. Sapropterin reduces coronary artery malformation in offspring of pregestational diabetes mice. Nitric Oxide. 2020 Jan 1;94:9-18. doi: 10.1016/j.niox.2019.10.002. Epub 2019 Oct 7. PMID: 31600600.

## 7. Bioactivity

### Biological target:

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Sapropterin HCl is a cofactor that facilitates the production of aromatic amino acids, neurotransmitters, and nitric oxide when bound to specific enzymes. Sapropterin HCl acts as a radical-trapping antioxidant, inhibiting phospholipid oxidation in lipid membranes. Sapropterin HCl inhibits ferroptosis in various cell types, such as IKE- or RSL3-induced ferroptosis in HT-1080 cells (EC50 = 21 and 69  $\mu$ M) and ferroptosis induced by the knockout of glutathione peroxidase (Gpx4<sup>-/-</sup>) in immortalized mouse fibroblasts. It reduces RLS3-induced lipid peroxidation in murine fibroblasts and HT-1080 cells when used at a concentration of 50  $\mu$ M.

### In vitro activity

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In vitro, the study investigated the transport of sapropterin across the plasma membrane. Sapropterin supplementation is used to address Sapropterin deficiencies, although its rapid clearance presents challenges. This research identified hENT2 as a key transporter for precursor pterins, such as sepiapterin, BH(2), and sapropterin, impacting intracellular BH(2)/sapropterin ratios.

Reference: Mol Genet Metab. 2011 Jan;102(1):18-28. <https://pubmed.ncbi.nlm.nih.gov/20956085/>

### In vivo activity

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The study suggests that sapropterin may exacerbate autoimmune CNS diseases, with lipid disruptions playing a mechanistic role. Mice with immunization-induced autoimmune encephalomyelitis (EAE), a model of multiple sclerosis, were treated with sapropterin. The results indicated that sapropterin treatment led to higher EAE disease scores and increased T-cell infiltration in the spinal cord. This was associated with changes in lipid profiles known to disrupt the blood-brain barrier in EAE mice.

Reference: Neurotherapeutics. 2021 Jul;18(3):1862-1879. <https://pubmed.ncbi.nlm.nih.gov/33844153/>

*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.*