

Product data sheet



MedKoo Cat#: 592266 Name: Phenytoin CAS: 57-41-0 Chemical Formula: C ₁₅ H ₁₂ N ₂ O ₂ Exact Mass: 252.0899 Molecular Weight: 252.273		
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:

Phenytoin is an anticonvulsant that is used to treat a wide variety of seizures. It is also an anti-arrhythmic and a muscle relaxant. Phenytoin has been proposed for several other therapeutic uses, but its use has been limited by its many adverse effects and interactions with other drugs.

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
DMF	25.0	99.10
DMSO	41.67	165.16
DMSO:PBS (pH 7.2) (1:1)	0.5	1.98
Ethanol	14.0	55.50

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.96 mL	19.82 mL	39.64 mL
5 mM	0.79 mL	3.96 mL	7.93 mL
10 mM	0.40 mL	1.98 mL	3.96 mL
50 mM	0.08 mL	0.40 mL	0.79 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

- Zhang L, Gao Q, Peng X, Deng S, Zhang L. The effect of phenytoin on the proliferative ability of periodontal and gingival ligament fibroblasts in cell culture medium. *Cell Mol Biol (Noisy-le-grand)*. 2022 May 31;68(5):141-145. doi: 10.14715/cmb/2022.68.5.19. PMID: 36029507.
- Na J, Zheng L, Wang L, Shi Q, Yang Z, Liu N, Guo Y, Fan Y. Phenytoin Regulates Migration and Osteogenic Differentiation by MAPK Pathway in Human Periodontal Ligament Cells. *Cell Mol Bioeng*. 2021 Sep 10;15(1):151-160. doi: 10.1007/s12195-021-00700-0. PMID: 35096190; PMCID: PMC8761188.

In vivo study

- Vega-Riquer JM, Campos-Ordóñez T, Galvez-Contreras AY, Gonzalez-Castañeda RE, Gonzalez-Perez O. Phenytoin promotes the proliferation of oligodendrocytes and enhances the expression of myelin basic protein in the corpus callosum of mice demyelinated by cuprizone. *Exp Brain Res*. 2022 May;240(5):1617-1627. doi: 10.1007/s00221-022-06356-0. Epub 2022 Apr 1. PMID: 35362723.

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2. Nelson M, Yang M, Dowle AA, Thomas JR, Brackenbury WJ. The sodium channel-blocking antiepileptic drug phenytoin inhibits breast tumour growth and metastasis. *Mol Cancer*. 2015 Jan 27;14(1):13. doi: 10.1186/s12943-014-0277-x. PMID: 25623198; PMCID: PMC4320839.

7. Bioactivity

Biological target:

Phenytoin (5,5-Diphenylhydantoin) is a potent Voltage-gated Na⁺ channels (VGSCs) blocker.

In vitro activity

Accordingly, this study aimed to compare the effect of phenytoin on the growth rate of gingival fibroblast cells and PDL in the cell culture medium. In the experimental group, 20 mg/ml phenytoin dissolved in sodium hydroxide was added to Dulbecco's modified Eagle's medium (DMEM). After 48 hours, fibroblast cell proliferation was assessed through a 1-WST cell proliferation kit by ELISA. The proliferation of gingival fibroblast cells and PDL in both test and control groups were statistically analyzed by the independent t-test. The results showed that the effect of phenytoin on the proliferation of gingival fibroblast cells and PDL fibroblast cells is significant. Also, the proliferation of PDL cells was significantly different from gingival cells in the experimental group (P <0.001) and was higher in PDL cells.

Reference: *Cell Mol Biol (Noisy-le-grand)*. 2022 May 31;68(5):141-145. <https://pubmed.ncbi.nlm.nih.gov/36029507/>

In vivo activity

This study aimed to evaluate whether phenytoin promotes myelin recovery of the corpus callosum of demyelinated adult mice. The oligodendroglial lineage (Olig2 + cells, NG2 + cells, and RIP + cells) significantly increases by the phenytoin administration when compared to the control-vehicle group. The phenytoin-treated group also showed an increased expression of MBP in the corpus callosum and better functional scores in the horizontal bar test. These findings suggest that phenytoin stimulates the proliferation of OPCs, re-establishes the oligodendroglial population, promotes myelin recovery in the corpus callosum, and improves motor coordination and muscle strength.

Reference: *Exp Brain Res*. 2022 May;240(5):1617-1627. <https://pubmed.ncbi.nlm.nih.gov/35362723/>

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.