# Product Data Sheet

Product Name: Pyridoxine HCl
Cat. No.: GC17393

## Chemical Properties

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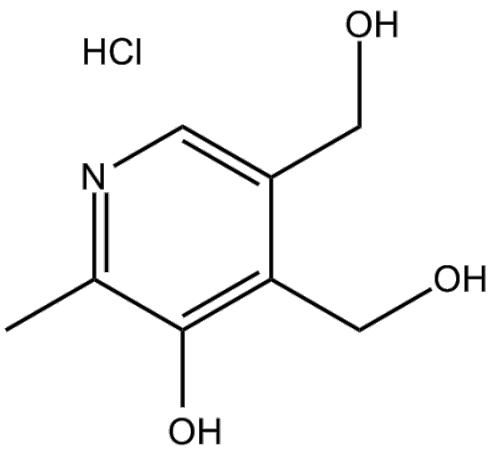
| Cas. No. | 58-56-0 | | |
| Chemical Name | 4,5-bis(hydroxymethyl)-2-methylpyridin-3-ol;hydrochloride | | |
| SMILES | CC1=NC=C(C(=C1O)CO)CO.Cl | | |
| Formula | $C_8H_{11}NO_3$ .HCl | M.Wt | 205.64 |
| Solubility | ≥ 9.3mg/mL in DMSO | Storage | Store at -20°C |
| General tips | For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months. | | |
| Shipping Condition | Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request. | | |

Structure




## Protocol

**Cell experiment [1]:**

Cell lines HepG2 cells

# Product Data Sheet

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| Preparation Method | HepG2 cells were cultured in EMEM medium supplemented with 10% fetal bovine serum, penicillin (50U/ml), and streptomycin (50mg/ml). The cells were seeded in 96-well culture plates at a concentration of $5\times10^4$ cells/ml. After 24 hours of adherent culture, Pyridoxine HCl was added to the medium at concentrations of 0, 2, 4, 6, 8, and 10mM. The cells were further cultured for 24 hours, and then the dye MTT was added to the culture medium and analyzed at 570nm. |
| Reaction Conditions | 0, 2, 4, 6, 8, and 10mM; 24h |
| Applications | Pyridoxine HCl treatment inhibited the cell viability of HepG2 cells in a dose-dependent manner. |

**Animal experiment [2]:**

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| Animal models | Male C57BL/6 mice |
| Preparation Method | Male C57BL/6J mice (7 weeks old) were raised under standard conditions, with a suitable temperature (22°C) and humidity (55%), a 12-hour light/12-hour dark cycle, and free access to food and water. The mice were divided into two groups (12 mice in each group): the control group (with normal saline) and the Pyridoxine HCl treatment group. The mice were intraperitoneally injected with the vehicle or Pyridoxine HCl (350mg/kg) twice a day for 2 weeks. After the last treatment with Pyridoxine HCl, the mice were sacrificed 2 hours later and their brain tissues were collected for analysis. |
| Dosage form | 350mg/kg; twice a day for 2 weeks; i.p. |
| Applications | Pyridoxine HCl treatment led to cytoplasmic hypertrophy of GFAP-positive astrocytes in mice and promoted neuroblast differentiation. |

***Caution: Product has not been fully validated for medical applications. For research use only.***
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References:
[1] Balakina A, Prikhodchenko T, Amozova V, et al. Preparation, antioxidant properties and ability to increase intracellular no of a new pyridoxine derivative B6NO[J]. Antioxidants, 2021, 10(9): 1451.
[2] Yoo D Y, Kim W, Kim D W, et al. Pyridoxine enhances cell proliferation and neuroblast differentiation by upregulating the GABAergic system in the mouse dentate gyrus[J]. Neurochemical research, 2011, 36(5): 713-721.

## Background

Pyridoxine HCl is the hydrochloride form of vitamin B6 that functions as an antioxidant [1]. Pyridoxine HCl can inhibit the α-glucosidase on the brush border of the small intestine, delaying the digestion of oligosaccharides and disaccharides into monosaccharides, thereby reducing the absorption rate of glucose[2]. Pyridoxine HCl acts as a co-factor to improve the conversion of glyoxylic acid into glycine in ethylene glycol poisoning[3]. Pyridoxine HCl can be used as a model compound to design new drugs and develop related derivatives[4].

In vitro, Pyridoxine HCl treatment for 24 hours significantly inhibited the cell viability of HepG2 cells, with an $IC_{50}$ value of 6.32±0.98mM[5]. Treatment with 250μg/ml Pyridoxine HCl for 24 hours significantly altered the expression of cell surface markers in lipopolysaccharides (LPS)-stimulated U937 cells, and reduced the secretion of IL-1β, IL-6, IL-10 and TNF-α in the cells[6]. Treatment with 100mg/l Pyridoxine HCl for 24 hours can fully restore the migration ability and response to shear stress of human aortic endothelial cells cultured in 30.5mM glucose[7].

In vivo, Pyridoxine HCl treatment through intraperitoneal injection (350mg/kg; twice a day) for 2 weeks led to the increase in glial fibrillary acidic protein (GFAP)-positive cells in the subgranular zone of the dentate gyrus of C57BL/6 mice and promoted neuroblast differentiation[8]. A single intraperitoneal injection of 180mg/kg dose of Pyridoxine HCl for 30 minutes increased the GABA level in the mouse brain and reduced the levels of glutamate and nitrite, and decreased the anxiety-related behaviors of the mice[9].

References:
[1] Bilski P, Li M Y, Ehrenshaft M, et al. Vitamin B6 (pyridoxine) and its derivatives are efficient singlet

oxygen quenchers and potential fungal antioxidants[J]. Photochemistry and photobiology, 2000, 71(2): 129-134.
[2] Kim H H, Kang Y R, Choi H Y, et al. Postprandial anti-hyperglycemic effect of vitamin B6 (pyridoxine) administration in healthy individuals[J]. Food science and biotechnology, 2019, 28(3): 907-911.
[3] Lheureux P, Penaloza A, Gris M. Pyridoxine in clinical toxicology: a review[J]. European Journal of Emergency Medicine, 2005, 12(2): 78-85.
[4] Shtyrlin Y G, Petukhov A S, Strelnik A D, et al. Chemistry of pyridoxine in drug design[J]. Russian Chemical Bulletin, 2019, 68(5): 911-945.
[5] Balakina A, Prikhodchenko T, Amozova V, et al. Preparation, antioxidant properties and ability to increase intracellular no of a new pyridoxine derivative B6NO[J]. Antioxidants, 2021, 10(9): 1451.
[6] Mikkelsen K, Dargahi N, Fraser S, et al. High-dose vitamin B6 (pyridoxine) displays strong anti-inflammatory properties in lipopolysaccharide-stimulated monocytes[J]. Biomedicines, 2023, 11(9): 2578.
[7] Kelso B G, Brower J B, Targovnik J H, et al. Pyridoxine restores endothelial cell function in high glucose[J]. Metabolic Syndrome and Related Disorders, 2011, 9(1): 63-68.
[8] Yoo D Y, Kim W, Kim D W, et al. Pyridoxine enhances cell proliferation and neuroblast differentiation by upregulating the GABAergic system in the mouse dentate gyrus[J]. Neurochemical research, 2011, 36(5): 713-721.
[9] Walia V, Garg C, Garg M. Anxiolytic-like effect of pyridoxine in mice by elevated plus maze and light and dark box: Evidence for the involvement of GABAergic and NO-sGC-cGMP pathway[J]. Pharmacology Biochemistry and Behavior, 2018, 173: 96-106.