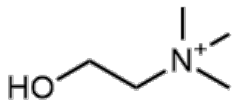
Product Data Sheet

Product Name: Choline
Cat. No.: GB57726

Chemical Properties

Cas. No.	62-49-7		
Formula	$C_5H_{14}NO^+$	M.Wt	104.17
Solubility	≥50mg/ml in DMSO; ≥50mg/ml in water	Storage	Store at 2-8°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 PC12 cells

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Preparation Method	PC12 cells were plated on 100mm dishes at a density of 2×10^5 cells/cm^2 in choline-free DMEM/F12 (1:1) growth media containing 5% (v/v) dialyzed horse serum and 10% (v/v) delipidated fetal calf serum for 3 days. PC12 cells were maintained, at 37°C in a humidified atmosphere, containing 5% CO_2/95% air, for 2 days in serum-free DMEM/F12 media-containing 70μM Choline. The cell viability was evaluated.
Reaction Conditions	70μM; 2 days
Applications	Choline treatment significantly enhanced cell viability of PC12 cells.

Animal experiment [2]:

Animal models	APP/PS1 transgenic mice
Preparation Method	APP/PS1 transgenic mice (2 months old) were housed singly in a standard environment with water ad libitum. From 2 months to 11 months of age, mice were randomly divided into two groups: a control AIN76A diet group and a Choline-supplemented diet group (4.95g/kg/day). Then, the mouse brain tissues were collected for analysis.
Dosage form	4.95g/kg/day for 10 months; p.o.
Applications	Choline supplementation decreased Aβ deposition and inhibited microgliosis in APP/PS1 mice.

References:
[1] Holmes-McNary M Q, Loy R, Mar M H, et al. Apoptosis is induced by choline deficiency in fetal brain and in PC12 cells[J]. Developmental Brain Research, 1997, 101(1-2): 9-16.
[2] Wang Y, Guan X, Chen X, et al. Choline supplementation ameliorates behavioral deficits and Alzheimer's disease-like pathology in transgenic APP/PS1 mice[J]. Molecular nutrition & food research, 2019, 63(18): 1801407.

Background

Choline is an essential nutrient for neurotransmitter synthesis, cell-membrane signaling, lipid transport, and methyl-group metabolism [1]. Choline can affect DNA methylation, leading to impaired DNA repair function, and regulate cell signaling mediated by phospholipid metabolic intermediates to support the synthesis of cell membranes, thereby promoting cell proliferation [2]. Choline has been widely used to promote brain development and the function of the nervous system [3].

In vitro, Choline (70μM) treatment for 2 days significantly increased the viability of PC12 cells and reduced DNA fragmentation [4]. Treatment with 13.2μM Choline for 2 hours significantly inhibited the phagocytic and killing capacity of bovine neutrophils, and increased the mRNA abundance of muscarinic and nicotinic cholinergic receptors [5]. Treatment with 70μM Choline for 72 hours significantly inhibited the accumulation of triglycerides in C3A cells, protected mitochondrial membrane potential from decrease, and increased the activity of GSH-Px in the cells [6].

In vivo, Choline treatment via oral administration at a dose of 1mg/kg/day for 14 days significantly reduced oxidative stress and inhibited inflammatory responses in a mouse model of allergic airway disease[7]. Oral administration of 4.95g/kg of Choline daily for 10 months significantly improved the cognitive deficits and anxiety symptoms in APP/PS1 mice, and inhibited the deposition of β-amyloid protein[8].

References:
[1] Zeisel S H, Da Costa K A. Choline: an essential nutrient for public health[J]. Nutrition reviews, 2009, 67(11): 615-623.
[2] Awwad H M, Geisel J, Obeid R. The role of choline in prostate cancer[J]. Clinical biochemistry,

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2012, 45(18): 1548-1553.
[3] Zeisel S H. Choline: an essential nutrient for humans[J]. Nutrition, 2000, 16(7-8): 669-671.
[4] Holmes-McNary M Q, Loy R, Mar M H, et al. Apoptosis is induced by choline deficiency in fetal brain and in PC12 cells[J]. Developmental Brain Research, 1997, 101(1-2): 9-16.
[5] Garcia M, Mamedova L K, Barton B, et al. Choline regulates the function of bovine immune cells and alters the mRNA abundance of enzymes and receptors involved in its metabolism in vitro[J]. Frontiers in immunology, 2018, 9: 2448.
[6] Zhu J, Wu Y, Tang Q, et al. The effects of choline on hepatic lipid metabolism, mitochondrial function and antioxidative status in human hepatic C3A cells exposed to excessive energy substrates[J]. Nutrients, 2014, 6(7): 2552-2571.
[7] Mehta A K, Arora N, Gaur S N, et al. Choline supplementation reduces oxidative stress in mouse model of allergic airway disease[J]. European journal of clinical investigation, 2009, 39(10): 934-941.
[8] Wang Y, Guan X, Chen X, et al. Choline supplementation ameliorates behavioral deficits and Alzheimer's disease-like pathology in transgenic APP/PS1 mice[J]. Molecular nutrition & food research, 2019, 63(18): 1801407.

Caution: Product has not been fully validated for medical applications. For research use only.
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