Thiamine monochloride

Cat. No.: HY-A0100

CAS No.: 59-43-8

Molecular Formula: $C_{12}H_{17}ClN_4OS$

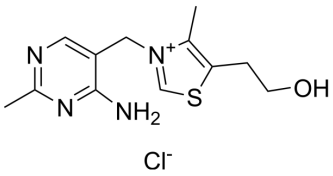
Molecular Weight: 300.81

Target: Endogenous Metabolite; Bacterial

Pathway: Metabolic Enzyme/Protease; Anti-infection

Storage: 4°C, sealed storage, away from moisture

* In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

H_2O : ≥ 100 mg/mL (332.44 mM)

DMSO : 1 mg/mL (3.32 mM; Need ultrasonic)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	3.3244 mL	16.6218 mL	33.2436 mL
5 mM	0.6649 mL	3.3244 mL	6.6487 mL
10 mM	0.3324 mL	1.6622 mL	3.3244 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: PBS
   Solubility: ≥ 100 mg/mL (332.44 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Thiamine monochloride (Vitamin B1) is an essential vitamin that plays an important role in cellular production of energy from ingested food and enhances normal neuronal actives.

IC_{50} & Target	Microbial Metabolite	Human Endogenous Metabolite

In Vitro

Thiamine levels in the blood of homozygous KO and KI mice feed a conventional diet are decreased to 0.058±0.051 and 0.126±0.092 μM, respectively, at 7 weeks compared to WT mice (0.796±0.259 μM). When WT and homozygous KO and KI mice are fed a thiamine-restricted diet (thiamine: 0.60 mg/100 g food), blood thiamine concentration at 5 and 14 days is markedly decreased to 0.010±0.009 and 0.010±0.006 μM, respectively, compared to WT mice (0.609±0.288 μM). Thiamine concentration in brain homogenate of WT mice fed a conventional diet is 3.81±2.18 nmol/g wet weight, and that of KO and KI is 1.33±0.96 and 2.16±1.55 nmol/g wet weight, respectively. Notably, thiamine concentration in brain homogenate decreased steadily in KO and KI mice fed a thiamine-restricted diet (thiamine: 0.60 mg/100 g food) for 5 days (0.95±0.72

	nmol/g wet weight) and 14 days (1.11±0.24 nmol/g wet weight), respectively, compared to WT (3.65±1.02 nmol/g wet weight), before the mice presented an phenotype of disease[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	WT, homozygous, and heterozygous KO and KI mice feed a conventional diet (thiamine: 1.71 mg/100 g) survive for over 6 months without any phenotype of disease. Homozygous KO and KI mice feed a thiamine-restricted diet (thiamine: 0.60 mg/100 g food) showe paralysis, weight loss, and immobility, and die within 12 and 30 days, respectively. Similarly, homozygous KO and KI mice feed a thiamine-restricted diet with an even lower percentage of thiamine (thiamine: 0.27 mg/100 g food) die within 14 and 18 days, respectively. However, WT and heterozygous KO and KI mice feed a thiamine-restricted diet (thiamine: 0.60 mg or 0.27 mg/100g food) survive for over 6 months without any phenotype of disease[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Animal Administration [2]	Slc19a3 E314Q KI mice are maintained routinely with conventional diet, which has a thiamine concentration (thiamine hydrochloride, MW=337.3) of 1.71 mg/100 g food. two types of thiamine-restricted food based on “purified diets for laboratory rodents” are prepared, in which thiamine concentration is 0.60 mg/100 g food (35% thiamine of conventional food) or 0.27 mg/100 g food (16% thiamine of conventional food). A high-thiamine-containing food is also prepared from AIN-93M, in which thiamine concentration is five times that of CE-2 (thiamine: 8.50 mg/100 g food). Thiamine concentration is determined at Japan Food Research Laboratories[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

REFERENCES

[1]. Kenneth Osiezagha, et al.Thiamine Deficiency and Delirium. Innov Clin Neurosci. 2013 Apr; 10(4): 26-32.

[2]. Kaoru Suzuki, et al. High-dose thiamine prevents brain lesions and prolongs survival ofSlc19a3-deficient mice. PLoS One. 2017; 12(6): e0180279.

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