Thiabendazole

Cat. No.: HY-B0263

CAS No.: 148-79-8

Molecular Formula: $C_{10}H_7N_3S$

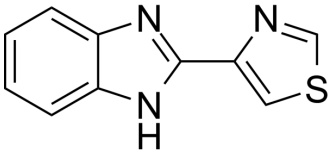
Molecular Weight: 201.25

Target: Mitochondrial Metabolism; Parasite; CDK; MDM-2/p53; Others; Caspase; VEGFR; Interleukin Related

Pathway: Metabolic Enzyme/Protease; Anti-infection; Cell Cycle/DNA Damage; Apoptosis; Others; Protein Tyrosine Kinase/RTK; Immunology/Inflammation

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	2 years
	-20°C	1 year



SOLVENT & SOLUBILITY

In Vitro

DMSO : 50 mg/mL (248.45 mM; Need ultrasonic)

H_2O : < 0.1 mg/mL (ultrasonic) (insoluble)

Preparing Stock Solutions

Concentration \ Solvent \ Mass	1 mg	5 mg	10 mg
1 mM	4.9689 mL	24.8447 mL	49.6894 mL
5 mM	0.9938 mL	4.9689 mL	9.9379 mL
10 mM	0.4969 mL	2.4845 mL	4.9689 mL

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

In Vivo

1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (12.42 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (12.42 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Thiabendazole is an orally available benzimidazole fungicide with repellent and anticancer activities. Thiabendazole can result in developmental malformations. Thiabendazole can be used for modeling[1][2][3][4][5].

IC_{50} & Target

CDK2	CCNE1	bax	Caspase-9
Caspase 3	IL-1β	IL-10	IL-6

	IL-13	IFN-gamma	IFN-gamma

In Vitro

Thiabendazole (0/50/100/200/300/400/500 μM, 24/48/72 h) time- and dose-dependently inhibits B16F10 and B16 cells proliferation[2].
Thiabendazole (250 μM, 16 h) inhibits angiogenesis in Xenopus embryos and disrupts newly established vasculature[3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[2]

Cell Line:	B16F10, B16
Concentration:	0/50/100/200/300/400/500 μM
Incubation Time:	24/48/72 h
Result:	Suggested that thiabendazole exhibited inhibitory effects to murine melanoma cell lines in vitro. The IC_{50} values of B16 cells were 540.8, 410.7, 280.4 μM at 24, 48, and 72 h, respectively. And the IC_{50} values of B16F10 cells were 532.4, 322.9, 238.5 μM at 24, 48, and 72 h, respectively.

In Vivo

Thiabendazole (50 mg/kg, 27 days) slows tumor growth in a mouse Xenopus model[3].
Thiabendazole (0/0.5/1/2/4/5/10/20/ mg/L, 0-96 hpf) induces developmental defects in zebrafish through apoptosis, oxidative stress, and changes of PI3K/Akt and MAPK pathwayssup>[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Wistar rats (adult male, 173±4 g average weight)[6]
Dosage:	90 mg/L, daily oral exposure for 90 days
Administration:	p.o.
Result:	Significantly changed the blood parameters in the sample. (1) Significantly altered blood parameters in the samples. (2) Red blood cells count and hemoglobin content were significantly reduced. (3) Platelet count dropped significantly. (4) The mean values of MCV (mean corpuscular volume) and MCH (mean corpuscular hemoglobin) were significantly increased. (5) Eosinophil content was significantly reduced. Significantly reduced the expression levels of immunoglobulins IgG and IgM. Significantly up-regulated the inflammatory factors (TNF-α, INF-γ, IL-1β, IL-6, L-10 and IL-13) in spleen tissue.and the cytokines CD4 increased and CD8 decreased.

Animal Model:	Wild-type zebrafish (AB strain) and transgenic zebrafish models, including flk1:eGFP, olig2:dsRed, and L-fabp:dsRed;elastase:GFP)[4]
Dosage:	0/0.5/1/2/4/5/10/20 mg/L
Administration:	Soak drug administration
Result:	None of the embryos exposed to 20 and 50 mg/L of thiamendam survived. Induced apoptosis and cell cycle arrest in zebrafish larvae. Reduced the expression levels of antioxidant enzymes inducing ROS production and inflammatory response. Induced cardiovascular defects in zebrafish larvae.

	Caused motor neuron toxicity in zebrafish larvae. Caused hepatotoxicity and pancreatic toxicity.

CUSTOMER VALIDATION

- ACS Omega. 2020 Oct 12;5(41):26551-26561.

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REFERENCES

[1]. Budetić M, et al. Review of Characteristics and Analytical Methods for Determination of Thiabendazole. Molecules. 2023 May 6;28(9):3926.

[2]. Park J, et al. Developmental defects induced by thiabendazole are mediated via apoptosis, oxidative stress and alteration in PI3K/Akt and MAPK pathways in zebrafish. Environ Int. 2023 Jun;176:107973.

[3]. Elgebaly SA, et al. Thiabendazole-induced suppression of renal damage in a murine model of autoimmune disease. Am J Pathol. 1984 May;115(2):204-11.

[4]. Motwadie ME, et al. Modulation of immune functions, inflammatory response, and cytokine production following long-term oral exposure to three food additives; thiabendazole, monosodium glutamate, and brilliant blue in rats. Int Immunopharmacol. 2021 Sep;98:107902.

[5]. Cha, H.J., et al., Evolutionarily repurposed networks reveal the well-known antifungal drug thiabendazole to be a novel vascular disrupting agent. PLoS Biol, 2012. 10(8): p. e1001379.

[6]. Zhang, J., et al., Thiabendazole, a well-known antifungal drug, exhibits anti-metastatic melanoma B16F10 activity via inhibiting VEGF expression and inducing apoptosis. Pharmazie, 2013. 68(12): p. 962-8.

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