Parbendazole

Cat. No.: HY-115364

CAS No.: 14255-87-9

Molecular Formula: $C_{13}H_{17}N_3O_2$

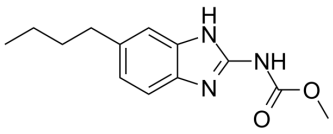
Molecular Weight: 247.29

Target: Microtubule/Tubulin; Parasite

Pathway: Cell Cycle/DNA Damage; Cytoskeleton; Anti-infection

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 : 4 mg/mL (16.18 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	4.0438 mL	20.2192 mL	40.4384 mL
	5 mM	0.8088 mL	4.0438 mL	8.0877 mL
	10 mM	0.4044 mL	2.0219 mL	4.0438 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: 0.4 mg/mL (1.62 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: 0.4 mg/mL (1.62 mM); Suspended solution; Need ultrasonic
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 0.4 mg/mL (1.62 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Parbendazole is a potent inhibitor of microtubule assembly, destabilizes tubulin, with an EC_{50} of 530 nM, and exhibits a broad-spectrum anthelmintic activity.

IC_{50} & Target

EC50: 530 nM (tubulin)[1]

In Vitro

Parbendazole is a tubulin destabilizer, with an EC_{50} of 530 nM, and can induce DNA damage[1]. Parbendazole (2-10 μM) inhibits the assembly of microtubules dose-dependently, with an IC_{50} of 3 μM. Parbendazole (2-20 μM)-treated cells show an

complete absence of microtubules in Vero cells[2]. Parbendazole (up to 10 μM) inhibits the growth of CLd-AXE myxamoebae. Parbendazole (2-5 μM) potently inhibits tubulin purified from the wild-type myxamoebae[3].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Kinase Assay [2]

Pure tubulin is obtained from sheep brain by 2 cycles of assembly and disassembly in vitro. Immediately prior to use the protein is centrifuged at 130000 g for 30 min to remove any aggregates. It is used at a protein concentration of 0-2 mg/mL in 0.025 M Pipes buffer, 0-5 mM EGTA, 0-25 mM $Mg^2SOsup>4$, 0.1 mM GTP. Drug binding is determined by equilibrium dialysis using concentrations of parbendazole between 0.1 μM and 4 μM, and 2% (v/v) DMF (dimethyl formamide) as a carrier. Equilibrium is achieved by constant stirring for 2 h at 26°C, bovine serum albumin being used as a standard. 200 μL aliquots are counted in PCS in a 25-200B liquid scintillation counter[2].

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Cell Assay [2]

Vero cells, an established cell line derived from monkey kidney are seeded in DMEM supplemented with 10% (v/v) foetal calf serum onto glass coverslips in multiwell dishes. They are allowed to settle, and spread for 2-5 h in a humid atmosphere at 37°C. After this time the medium is changed to DMEM containing 2, 10 or 20 μM parbendazole and 1% (v/v) DMSO controls contained 1 % (v/v) DMSO or had no additions[2].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- EBioMedicine. 2021 Mar 10;65:103276.
- Int J Mol Sci. 2023 Jun 30, 24(13), 10972.
- Cancers (Basel). 2022, 14(23), 5854
- RSC Adv. 2021, 11, 18938-18944.
- Heinrich-Heine-Universität Düsseldorf. April 2021.

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REFERENCES

[1]. Lo YC, et al. Computational Cell Cycle Profiling of Cancer Cells for Prioritizing FDA-Approved Drugs with Repurposing Potential. Sci Rep. 2017 Sep 12;7(1):11261.

[2]. Havercroft JC, et al. Binding of parbendazole to tubulin and its influence on microtubules in tissue-culture cells as revealed by immunofluorescence microscopy. J Cell Sci. 1981 Jun;49:195-204.

[3]. Foster KE, et al. A mutant beta-tubulin confers resistance to the action of benzimidazole-carbamate microtubule inhibitors both in vivo and in vitro. Eur J Biochem. 1987 Mar 16;163(3):449-55.

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