

Product Data Sheet

Product Name: Carbidopa (hydrate)

Cat. No.: GC47037

Chemical Properties

Cas. No. 38821-49-7

SMILES OC1=C(O)C=CC(C[C@](C)(NN)C(O)=O)=C1.O

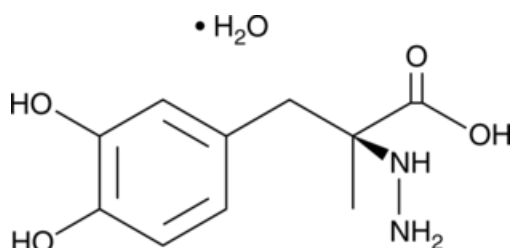
Formula C₁₀H₁₄N₂O₄.H₂O M.Wt 244.2

Solubility DMSO: Slightly Soluble, Methanol: Slightly Soluble 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 NCI-H146 cells

Preparation Method NCI-H146 cells (50,000) were seeded in 60mm plates in 3ml growth medium supplemented with 10% qualified, heat-inactivated FBS and 50units/ml of penicillin and streptomycin. Following incubation overnight, different concentrations of Carbidopa (0, 0.1, 1, 10, and 100μM) were added to the plate of a suspension cell line or to 3ml of fresh media for a monolayer cell for 72h and cell viability was measured.

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

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Reaction Conditions	0, 0.1, 1, 10, and 100μM; 72h
Applications	Carbidopa treatment significantly inhibited the cell viability of NCI-H146 cells in a concentration-dependent manner.
Animal experiment [2]:	
Animal models	BALB/c nude mice
Preparation Method	BALB/c nude mice were housed in temperature (23±2°C) and light-controlled (12:12-hour light-dark cycle) animal care facility with food and tap water ad libitum. The rats were provided with standard rat chow and water. MCF7 cells were subcutaneously injected into the right flank of each mouse (0.1ml; 1×10⁶ cells per mouse). When tumors reached a volume of 100mm³, mice were randomized into control and treatment groups (6 mice per group); no specific criteria or method was used for randomization. The treatment group received intraperitoneal (i.p.) injection of Carbidopa (7.5mg/kg) and the control group the same amount of vehicle twice a day, every 12h. The treatment continued for 14 days continuously. The body weight and tumor volume were recorded every two days throughout the procedure.
Dosage form	7.5mg/kg; twice a day for 14 days; i.p.
Applications	Carbidopa treatment inhibited tumor growth in a MCF7 cell-xenograft mouse model without affecting body weight.

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References:

- [1] Gilbert J A, Frederick L M, Pobst L J, et al. Hydrogen peroxide degradation and selective carbidopa-induced cytotoxicity against human tumor lines[J]. Biochemical pharmacology, 2005, 69(8): 1159-1166.
- [2] Chen Z, Xia X, Chen H, et al. Carbidoopa suppresses estrogen receptor-positive breast cancer via AhR-mediated proteasomal degradation of ER α [J]. Investigational New Drugs, 2022, 40(6): 1216-1230.

Background

Carbidopa (hydrate) is an aryl hydrocarbon receptor (AhR) agonist that inhibits pancreatic cancer cell and tumor growth [1]. Carbidoopa can block the conversion of levodopa to dopamine in the periphery, enabling greater availability of dopamine to the central nervous system as well as minimizing the peripheral side effects of dopamine [2]. Carbidoopa has been widely used to improve neurodegenerative diseases and promote the proteasomal degradation of androgen receptor (AR) protein[3].

In vitro, Carbidoopa treatment for 72 hours significantly reduced the viability of NCI-H146, NCI-H209 and NCI-H727 cells, with IC₅₀ values of 12, 22 and 29 μ M, respectively [4]. Treatment with 1mM Carbidoopa for 24 hours significantly reduced the expression of IDO1 mRNA and IDO1 protein in BxPC-3 cells[5]. Treatment with 300 μ M Carbidoopa for 24 hours significantly reduced the mitochondrial membrane potential of MDA-MB-231 cells, leading to mitochondrial dysfunction and cell damage[6].

In vivo, Carbidoopa treatment via intraperitoneal injection at a dose of 7.5mg/kg), twice a day for 14 days, significantly inhibited tumor growth in a MCF7 cell-xenograft mouse model, and led to an increase in CYP1A1 protein and a decrease in ER α protein in the tumor tissue[7]. Daily intraperitoneal injection of Carbidoopa (25mg/kg) was administered for 11 weeks, which significantly inhibited tumor growth in a xenograft mouse model of LNCaP cells and suppressed the production of serum prostate-specific antigen (PSA)[8].

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- [1] Safe S. Carbidopa: a selective Ah receptor modulator (SAhRM)[J]. Biochemical Journal, 2017, 474(22): 3763-3765.
- [2] Lenka A, Vernino S. Carbidopa: beyond Parkinson's disease[J]. Clinical Autonomic Research, 2025, 35(3): 347-352.
- [3] Chen Z, Cai A, Zheng H, et al. Carbidopa suppresses prostate cancer via aryl hydrocarbon receptor-mediated ubiquitination and degradation of androgen receptor[J]. Oncogenesis, 2020, 9(5): 49.
- [4] Gilbert J A, Frederick L M, Pobst L J, et al. Hydrogen peroxide degradation and selective carbidopa-induced cytotoxicity against human tumor lines[J]. Biochemical pharmacology, 2005, 69(8): 1159-1166.
- [5] Korac K, Rajasekaran D, Sniegowski T, et al. Carbidopa, an activator of aryl hydrocarbon receptor, suppresses IDO1 expression in pancreatic cancer and decreases tumor growth[J]. Biochemical Journal, 2022, 479(17): 1807-1824.
- [6] Actis Dato A B, Naso L G, Martínez V R, et al. Carbidopa and ZnCarbidopa Induce Reductive Stress in MDA-MB-231 Cells[J]. ChemPlusChem, 2025, 90(3): e202400596.
- [7] Chen Z, Xia X, Chen H, et al. Carbidopa suppresses estrogen receptor-positive breast cancer via AhR-mediated proteasomal degradation of ER α [J]. Investigational New Drugs, 2022, 40(6): 1216-1230.
- [8] Wafa L A, Cheng H, Plaa N, et al. Carbidopa abrogates L-dopa decarboxylase coactivation of the androgen receptor and delays prostate tumor progression[J]. International journal of cancer, 2012, 130(12): 2835-2844.

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