

Product Data Sheet

Product Name: Candesartan

Cat. No.: GC16978

Chemical Properties

Cas. No. 139481-59-7

Chemical Name 2-ethoxy-3-[[4-[2-(2H-tetrazol-5-yl)phenyl]phenyl]methyl]benzimidazole-4-carboxylic acid

SMILES CCOC1=NC2=CC=CC(=C2N1CC3=CC=C(C=C3)C4=CC=CC=C4C5=NNN=N5)C(=O)O

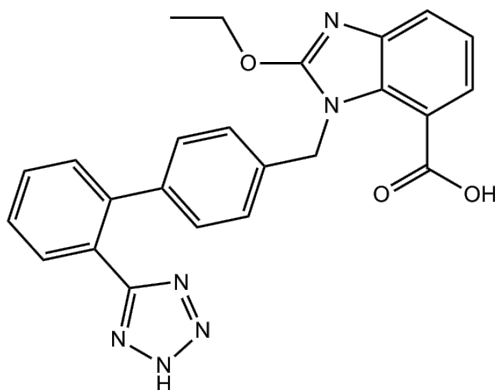
Formula $C_{24}H_{20}N_6O_3$ M.Wt 440.45

Solubility $\geq 14.65\text{mg/mL}$ in DMSO, $\geq 3.45\text{mg/mL}$ in EtOH with ultrasonic 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 CT-26 cells

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CT-26 cells were cultured in RPMI 1640 medium supplemented with 10% fetal bovine serum and 1% penicillin/streptomycin at 37.0°C and 5% CO₂ humidity.

CT-26 cells (1×10^3) were seeded in 96-well plates and treated with various concentrations of Candesartan (100, 200, 400, 600, 800, and 1000μM) for 24 hours. After cell treatment, 20μl of MTT solution (5mg/ml) was transferred to each well, and the culture plates were incubated at 37°C for 4h to investigate the production of formazan crystals by living cells. Subsequently, the medium was replaced with DMSO (100μl), and the optical density was then measured at 545-630nm.

Reaction Conditions 100, 200, 400, 600, 800, and 1000μM; 24h

Applications Candesartan significantly inhibited the viability of CT-26 cells in a dose-dependent manner.

Animal experiment [2]:

Animal models Nude athymic BALB/c mice

Nude athymic BALB/c mice of 6 weeks of age with an average weight of 20g were maintained under standard conditions. KU-19-19 cells (2×10^6 cells) suspended in 50μl Matrigel were subcutaneously implanted into the flank of each nude mouse. The mice were divided into 2 groups, with about 20 mice in each group. Starting on the day of cell implantation, mice were injected with 2mg/kg Candesartan daily via gavage, and tumors were measured twice weekly. The tumor volume (V) was calculated according to the formula $V = \frac{AB^2}{2}$, where A is the maximum diameter and B is the diameter perpendicular to A. Mice were sacrificed on day 28, and subcutaneous tumors were harvested for analysis.

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Dosage form 2mg/kg/day for 28 days; p.o.

Applications Candesartan treatment significantly reduced tumor volume and inhibited tumor angiogenesis in mice.

References:

- [1] Tabatabai E, Khazaei M, Asgharzadeh F, et al. Inhibition of angiotensin II type 1 receptor by candesartan reduces tumor growth and ameliorates fibrosis in colorectal cancer[J]. Excli Journal, 2021, 20: 863.
- [2] Kosugi M, Miyajima A, Kikuchi E, et al. Angiotensin II type 1 receptor antagonist candesartan as an angiogenic inhibitor in a xenograft model of bladder cancer[J]. Clinical cancer research, 2006, 12(9): 2888-2893.

Background

Candesartan is an oral blocker of AngII type-1 receptors (AT1R), with an IC₅₀ value of 0.26nM^[1]. Candesartan can inhibit the viral activity of SARS-CoV-2 with an IC₅₀ value of 5.944μM^[2]. Candesartan has been widely used to inhibit renal vasoconstriction in rodents, blocking AT1A and AT1B receptors in rodent renal resistance vessels^[3].

In vitro, Candesartan treatment at 20μM for 24h significantly induced apoptosis and inhibited cell migration in CT-26 and SW-480 cells^[4]. Treatment of human embryonic kidney epithelial cells with 100μM Candesartan for 24h significantly reduced TNF-α-induced TGF-β and IL-6 expression and blocked TNF-α-induced ROS activation^[5]. Treatment with 1μM Candesartan for 48h specifically reversed the AngII-induced decrease in miR-301b levels in rat aortic smooth muscle cells (RASMCs) and significantly reduced the AngII-induced increase in STAT3 expression^[6].

In vivo, Candesartan treatment via oral administration at a dose of 2mg/kg/day for 28 days significantly reduced tumor volume and inhibited tumor angiogenesis in the murine xenograft model of bladder cancer^[7]. Intraperitoneal administration of Candesartan (10mg/kg/day) for 7 days significantly reduced pathological neovascularization and improved capillary perfusion in a mouse

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model of ischemic retinopathy^[8]. Oral administration of Candesartan at a dose of 1mg/kg/day for 21 days significantly improved insulin resistance, hepatic steatosis, and dyslipidemia in the high-fat diet (HFD)-fed mice^[9].

References:

- [1] Abreu Diaz A M, Drumeva G O, Petrenyov D R, et al. Synthesis of the novel AT1 receptor tracer [18F] fluoropyridine–candesartan via click chemistry[J]. Acs Omega, 2020, 5(32): 20353-20362.
- [2] Alnajjar R, Mostafa A, Kandeil A, et al. Molecular docking, molecular dynamics, and in vitro studies reveal the potential of angiotensin II receptor blockers to inhibit the COVID-19 main protease[J]. Heliyon, 2020, 6(12).
- [3] Ruan X, Purdy K E, Oliverio M I, et al. Effects of candesartan on angiotensin II-induced renal vasoconstriction in rats and mice[J]. Journal of the American Society of Nephrology: JASN, 1999, 10: S202-7.
- [4] Tabatabai E, Khazaei M, Asgharzadeh F, et al. Inhibition of angiotensin II type 1 receptor by candesartan reduces tumor growth and ameliorates fibrosis in colorectal cancer[J]. Excli Journal, 2021, 20: 863.
- [5] Yu Y, Jiang H, Niu Y, et al. Candesartan inhibits inflammation through an angiotensin II type 1 receptor independent way in human embryonic kidney epithelial cells[J]. Anais da Academia Brasileira de Ciências, 2019, 91(02): e20180699.
- [6] Zhang L, Yang F, Yan Q. Candesartan ameliorates vascular smooth muscle cell proliferation via regulating miR-301b/STAT3 axis[J]. Human Cell, 2020, 33(3): 528-536.
- [7] Kosugi M, Miyajima A, Kikuchi E, et al. Angiotensin II type 1 receptor antagonist candesartan as an angiogenic inhibitor in a xenograft model of bladder cancer[J]. Clinical cancer research, 2006, 12(9): 2888-2893.
- [8] Shanab A Y, Elshaer S L, El-Azab M F, et al. Candesartan stimulates reparative angiogenesis in ischemic retinopathy model: role of hemeoxygenase-1 (HO-1)[J]. Angiogenesis, 2015, 18(2): 137-150.
- [9] Lee J W, Gu H O, Jung Y, et al. Candesartan, an angiotensin-II receptor blocker, ameliorates insulin resistance and hepatosteatosis by reducing intracellular calcium overload and lipid accumulation[J]. Experimental & molecular medicine, 2023, 55(5): 910-925.

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