Atenolol

Cat. No.: HY-17498

CAS No.: 29122-68-7

Molecular Formula: $C_{14}H_{22}N_2O_3$

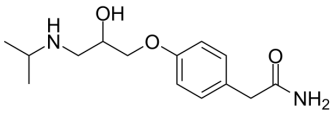
Molecular Weight: 266.34

Target: Adrenergic Receptor

Pathway: GPCR/G Protein; Neuronal Signaling

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	1 year
	-20°C	6 months



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (375.46 mM; Need ultrasonic)

H_2O : 8.33 mg/mL (31.28 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	3.7546 mL	18.7730 mL	37.5460 mL
	5 mM	0.7509 mL	3.7546 mL	7.5092 mL
	10 mM	0.3755 mL	1.8773 mL	3.7546 mL

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

In Vivo

1. Add each solvent one by one: PBS
   Solubility: 36.67 mg/mL (137.68 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (9.39 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (9.39 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (9.39 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Atenolol ((RS)-Atenolol) is a cardioselective β1-adrenergic receptor blocker, with a K_i of 697 nM at β1-adrenoceptor in guine pig left ventricle membrane. Atenolol can be used for the research of hypertension and angina pectoris[1][2].

IC_{50} & Target

Beta-1 adrenergic receptor

	697 nM (Ki)

In Vitro

Atenolol (1-100 μM, 5 h) strengthenes the inhibitory effect on cell migration of rat aortic smooth muscle cells when combinated with Nifedipine (HY-B0284) (1-100μM)[3].
Atenolol (50-150 μM, 24 h) decreases the cell surival of Hem-ECs in a dose-dependent manner[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Proliferation Assay[3]

Cell Line:	Rat aortic smooth muscle cells
Concentration:	1-100 μM
Incubation Time:	48-72 h
Result:	Inhibited cell proliferation (-20%) when incubation lasted 72 h at 100 μM.

Cell Migration Assay [3]

Cell Line:	Rat aortic smooth muscle cells
Concentration:	1-100 μM
Incubation Time:	5 h
Result:	Inhibited myocyte migration induced by fibrinogen in a dose-dependent manner.

Western Blot Analysis[4]

Cell Line:	Hemangioma-derived ECs (Hem-ECs)
Concentration:	100 μM
Incubation Time:	6 h
Result:	Increased LC3-Ⅱ/LC3-Ⅰ ratio and decreased p62.

In Vivo

Atenolol (5-20 mg/kg, i.g., one time) combinated with Amlodipine (HY-B0317) can reduce and stabilize blood oressure (BP) in 2K1C renovascular hypertensive rats[5].
Atenolol (6 mg/kg, p.o., one time) combinated with Nifedipine (HY-B0284) prevents ZD6126-induced cardiac necrosis and increases plasma troponin T levels[6].
Atenolol (40 mg/kg, p.o., daily, 6 weeks) increased plasma membrane β_1- and β_2- adrenoceptors density in rats[7].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	2K1C renovascular hypertensive rats [5]
Dosage:	5-20 mg/kg (single; combination with Amlodipine (HY-B0317) (0.5-2 mg/kg))
Administration:	i.g., one time
Result:	Reduced the average blood oressure (BP) levels within 24 h after administration when treated with Atenolol and Amlodipine (HY-B0317). Decreased the blood pressure variability (BPV) levels when treated with 10 mg/kg Atenolol and 1 mg/kg Amlodipine (HY-B0317), or 20 mg/kg Atenolol and 2 mg/kg Amlodipine (HY-B0317).

Animal Model:	Hras5 tumor xenograft rat model [6]
Dosage:	6 mg/kg (combination with Nifedipine (HY-B0284) (10 mg/kg))
Administration:	Oral gavage (p.o.), one time
Result:	Abolished the hypertensive and tachycaidic effects of ZD6126.

Animal Model:	Male wistar rats[7]
Dosage:	40 mg/kg
Administration:	Oral gavage (p.o.), daily, 6 weeks
Result:	Increased the density of total β-adrenoceptors. Decreased the expression level of β_1- adrenoceptor mRNA.

CUSTOMER VALIDATION

- Protein Cell. 2019 Mar;10(3):178-195.
- Chemosphere. 2019 Jun;225:378-387.
- J Med Chem. 2021 Mar 11;64(5):2725-2738.
- Front Cell Dev Biol. 2022 Apr 20;10:889656.
- Pflugers Arch. 2021 Jul 10.

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REFERENCES

[1]. Corsini A, et al. Effect of the nifedipine-atenolol association on arterial myocyte migration and proliferation. Pharmacol Res. 1993 May-Jun;27(4):299-307.

[2]. Lorusso B, et al. B-blockers activate autophagy on infantile hemangioma-derived endothelial cells in vitro. Vascul Pharmacol. 2022 Oct;146:107110

[3]. Shen FM, et al. Synergistic effects of atenolol and amlodipine for lowering and stabilizing blood pressure in 2K1C renovascular hypertensive rats. Acta Pharmacol Sin. 2005 Nov;26(11):1303-8.

[4]. Gould S, et al. Effect of pretreatment with atenolol and nifedipine on ZD6126-induced cardiac toxicity in rats. J Natl Cancer Inst. 2007 Nov 21;99(22):1724-8.

[5]. Horinouchi T, et al. Different changes of plasma membrane beta-adrenoceptors in rat heart after chronic administration of propranolol, atenolol and bevantolol. Life Sci. 2007 Jul 12;81(5):399-404.

[6]. Heel RC, et al. Atenolol: a review of its pharmacological properties and therapeutic efficacy in angina pectoris and hypertension. Drugs. 1979;17(6):425-460.

[7]. Engel G, et al. (+/-)[125Iodo] cyanopindolol, a new ligand for beta-adrenoceptors: identification and quantitation of subclasses of beta-adrenoceptors in guinea pig. Naunyn Schmiedebergs Arch Pharmacol. 1981;317(4):277-285.

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

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