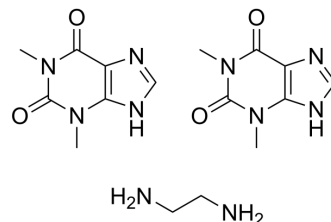


Aminophylline

Cat. No.:	HY-B0140
CAS No.:	317-34-0
Molecular Formula:	C ₁₆ H ₂₄ N ₁₀ O ₄
Molecular Weight:	420.43
Target:	Phosphodiesterase (PDE); Adenosine Receptor
Pathway:	Metabolic Enzyme/Protease; GPCR/G Protein
Storage:	4°C, sealed storage, away from moisture and light * In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture and light)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 14.29 mg/mL (33.99 mM; Need ultrasonic)
H₂O : 6.25 mg/mL (14.87 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent Concentration	Mass		
		1 mg	5 mg	10 mg
	1 mM	2.3785 mL	11.8926 mL	23.7852 mL
	5 mM	0.4757 mL	2.3785 mL	4.7570 mL
	10 mM	0.2379 mL	1.1893 mL	2.3785 mL

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

In Vivo

- Add each solvent one by one: PBS
Solubility: 22 mg/mL (52.33 mM); Clear solution; Need ultrasonic
- Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
Solubility: 1.43 mg/mL (3.40 mM); Clear solution; Need ultrasonic
- Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
Solubility: ≥ 1.43 mg/mL (3.40 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% corn oil
Solubility: ≥ 1.43 mg/mL (3.40 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Aminophylline is a competitive and non-selective phosphodiesterase (PDE) inhibitor. Aminophylline is a competitive adenosine receptor antagonist. Aminophylline has apulmonary vasodilator action as well as a bronchodilator action and has the potential for asthma research^{[1][2]}.

In Vitro

Aminophylline is a compound of the bronchodilator theophylline with ethylenediamine in 2:1 ratio. The ethylenediamine

improves solubility, and the aminophylline is usually found as a dihydrate. Aminophylline is less potent and shorter-acting than theophylline. Its most common use is in the treatment of airway obstruction from asthma or COPD. It is used off-label as a reversal agent during nuclear stress testing. Aminophylline is a nonselective adenosine receptor antagonist and phosphodiesterase inhibitor. Adenosine is an endogenous extracellular messenger that can regulate myocardial oxygen needs. It acts through cellular surface receptors which effect intracellular signalling pathways to increase coronary artery blood flow, slow heart rate, block atrioventricular node conduction, suppress cardiac automaticity, and decrease β -adrenergic effects on contractility. Adenosine also antagonizes chronotropic and inotropic effects of circulating catecholamines. Overall, adenosine decreases the heart's rate and force of contraction, which increases blood supply to the cardiac muscle. Given specific circumstances this mechanism (which is intended to protect the heart) may cause atropine-resistant refractory bradycardia. Adenosine's effects are concentration-dependent. Adenosine's receptors are competitively antagonized by methylxanthines such as aminophylline. Aminophylline competitively antagonizes the cardiac actions of adenosine at the cell surface receptors. Thus, it increases heart rate and contractility.

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

REFERENCES

- [1]. Daly JW, et al. Adenosine receptors: development of selective agonists and antagonists. *Prog Clin Biol Res.* 1987;230:41-63.
- [2]. Ming-Chih Yu, et al. Luteolin, a non-selective competitive inhibitor of phosphodiesterases 1-5, displaced [3H]-rolipram from high-affinity rolipram binding sites and reversed xylazine/ketamine-induced anesthesia. *ur J Pharmacol.* 2010 Feb 10;627(1-3):269-75.
- [3]. E Tai, et al. Response of blood gas tensions to aminophylline and isoprenaline in patients with asthma. *Thorax.* 1967 Nov;22(6):543-9.

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

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