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Dexamethasone acetate

Cat. No.: HY-14648A

CAS No.: 1177-87-3

Molecular Formula: $C_{24}H_{31}FO_6$

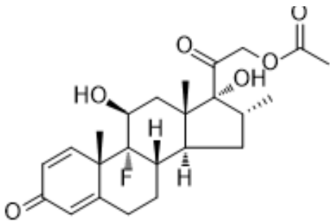
Molecular Weight: 434.5

Target: Glucocorticoid Receptor; Autophagy; Mitophagy; Bacterial; SARS-CoV; Antibiotic; Complement System; ADC Cytotoxin

Pathway: Immunology/Inflammation; Vitamin D Related/Nuclear Receptor; Autophagy; Anti-infection; Antibody-drug Conjugate/ADC Related

Storage: 4°C, protect from light

* In solvent : -80°C, 6 months; -20°C, 1 month (protect from light)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 50 mg/mL (115.07 mM; Need ultrasonic)

Preparing Stock Solutions	Mass / Solvent / Concentration	1 mg	5 mg	10 mg
	1 mM	2.3015 mL	11.5075 mL	23.0150 mL
	5 mM	0.4603 mL	2.3015 mL	4.6030 mL
	10 mM	0.2301 mL	1.1507 mL	2.3015 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: ≥ 2.08 mg/mL (4.79 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.08 mg/mL (4.79 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.08 mg/mL (4.79 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Dexamethasone acetate (Dexamethasone 21-acetate) is a glucocorticoid receptor agonist. Dexamethasone also significantly decreases CD11b, CD18, and CD62L expression on neutrophils, and CD11b and CD18 expression on monocytes. Dexamethasone is highly effective in the control of COVID-19 infection. Dexamethasone inhibits production of exosomes containing inflammatory microRNA-155 in lipopolysaccharide-induced macrophage inflammatory responses.

IC_{50} & Target

Glucocorticoid receptor[1]

In Vitro	protein-1, nuclear factor-AT, and nuclear factor-kB, leading to the activation and repression of key genes involved in the inflammatory response[1]. Dexamethasone potently inhibits granulocyte-macrophage colony stimulating factor (GM-CSF) release from A549 cells with EC_{50} of 2.2 nM. Dexamethasone (EC_{50}=36 nM) induces transcription of the β_2-receptor is found to correlate with glucocorticoid receptor (GR) DNA binding and occurred at 10-100 fold higher concentrations than the inhibition of GM-CSF release. Dexamethasone (IC_{50}=0.5 nM) inhibits a 3×κB (NF-κB, IκBα, and I-κBβ), which is associated with inhibition of GM-CSF release[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	A single dose of Dexamethasone 10 mg/kg (i.p.) significantly decreases recruitment of granulocytes as well as spontaneous production of oxygen radicals compared with animals expose to LPS and injected with solvent alone (saline)[3].Rats treated with Dexamethasone consume less food and weighed less than control rats. Treated rats also weigh less than pair-fed animals though their food intake is similar. Five days of Dexamethasone injection result in a significant increase in both the liver mass (+42%) and the liver to body weight ratio (+65%). The wet weight of gastrocnemius muscle decreases 20% after 5 days of treatment, but it remains unaffected relative to body weight (g/100 g body weight), indicating that muscle weight loss paralleled body weight loss[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Animal Administration [3][4]	Mice[3] Female C57Bl/6JBom mice (age 10-12 weeks) are used in all experiments. Dexamethasone is administered as a single injection of 1 or 10 mg/kg. Dexamethasone is dissolved in saline and 400 µL are injected intraperitoneally, either 1 h before or 1 h after LPS exposure. In one experiment, N-acetylcysteine (NAC) (100 and 500 mg/kg) is injected successively every 4•5 h, starting 1 h before challenge (five injections in total). A control group of LPS-exposed animals are injected intraperitoneally with solvent alone (saline). Intratracheal administration is performed by instillation of 100 µL NAC (50, 100 or 500 mg/kg) or Dexamethasone (10 mg/kg) into the lungs of mice anaesthetized with 15 mg/kg Rapinovet (i.v.). Rats[4] Male Sprague-Dawley rats are used.Dexamethasone-treated rats are injected intraperitoneally once daily with Dexamethasone (1.5 mg/kg body weight) for 5 days and are allowed to feed ad libitum. The Dexamethasone dose (1.5 mg/kg/day) and the duration of treatment (5 days) are specifically chosen as this treatment induced a reproducible and marked catabolic state. Control rats received no treatment and are fed ad libitum. In order to take into account the decrease in food intake induced by Dexamethasone treatment, a third group of pair-fed rats are used. These rats are provided with the same amount of food as Dexamethasone-injected rats and are treated with a daily isovolumic intraperitoneal injection of NaCl (0.9%) for 5 days. After the final injection of Dexamethasone or NaCl, the animals are fasted overnight prior to being killed by decapitation. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- J Ethnopharmacol. 2021 Mar 1;267:113516.
- Cell Transplant. 2023 Jan-Dec;32:9636897231177356.

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REFERENCES

[1]. Heidi Ledford. et al. Coronavirus Breakthrough: Dexamethasone Is First Drug Shown to Save Lives. Nature. 2020 Jun 16.

[2]. Yun Chen, et al. Glucocorticoids inhibit production of exosomes containing inflammatory microRNA-155 in lipopolysaccharide-induced macrophage inflammatory responses. Int J Clin Exp Pathol 2018;11(7):3391-3397.

[3]. LaLone CA, et al. Effects of a glucocorticoid receptor agonist, Dexamethasone, on fathead minnow reproduction, growth, and development. Environ Toxicol Chem. 2012 Mar;31(3):611-22.

[4]. Adcock IM, et al. Ligand-induced differentiation of glucocorticoid receptor (GR) trans-repression and transactivation: preferential targetting of NF-kappaB and lack of I-kappaB involvement. Br J Pharmacol. 1999 Jun;127(4):1003-11

[5]. Rocksén D, et al. Differential anti-inflammatory and anti-oxidative effects of Dexamethasone and N-acetylcysteine in endotoxin-induced lung inflammation. Clin Exp Immunol. 2000 Nov;122(2):249-56

[6]. Roussel D, et al. Dexamethasone treatment specifically increases the basal proton conductance of rat liver mitochondria. FEBS Lett. 2003 Apr 24;541(1-3):75-9.

[7]. Ballabh P, et al. Neutrophil and monocyte adhesion molecules in bronchopulmonary dysplasia, and effects of corticosteroids. Arch Dis Child Fetal Neonatal Ed. 2004 Jan;89(1):F76-83.

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