Allantoin

Cat. No.: HY-N0543

CAS No.: 97-59-6

Molecular Formula: $C_4H_6N_4O_3$

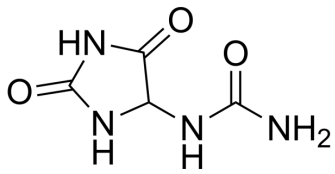
Molecular Weight: 158.12

Target: Imidazoline Receptor; Endogenous Metabolite

Pathway: Neuronal Signaling; Metabolic Enzyme/Protease

Storage:

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



SOLVENT & SOLUBILITY

In Vitro

DMSO : 50 mg/mL (316.22 mM; Need ultrasonic)

H_2O : 3.85 mg/mL (24.35 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	6.3243 mL	31.6216 mL	63.2431 mL
5 mM	1.2649 mL	6.3243 mL	12.6486 mL
10 mM	0.6324 mL	3.1622 mL	6.3243 mL

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

In Vivo

1. Add each solvent one by one: 50% PEG300 >> 50% saline
   Solubility: 12.5 mg/mL (79.05 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 0.5% CMC-Na/saline water
   Solubility: 8.33 mg/mL (52.68 mM); Clear solution; Need ultrasonic
3. Add each solvent one by one: corn oil
   Solubility: 6.25 mg/mL (39.53 mM); Suspended solution; Need ultrasonic
4. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (15.81 mM); Clear solution
5. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (15.81 mM); Clear solution
6. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (15.81 mM); Clear solution
7. Add each solvent one by one: PBS
   Solubility: 2 mg/mL (12.65 mM); Clear solution; Need ultrasonic and warming and heat to 60°C

BIOLOGICAL ACTIVITY

Description	Allantoin is a skin conditioning agent that promotes healthy skin, stimulates new and healthy tissue growth.	
IC_{50} & Target	Microbial Metabolite	Human Endogenous Metabolite
In Vitro	Allantoin is a well-known cosmetic ingredient reported to have anti-oxidative and anti-inflammatory activities[1]. Allantoin attenuates apoptosis and cytotoxicity and increased the viability of STZ-induced β-cells in a dose-dependent manner. Allantoin decreases the level of caspase-3 and increases the level of phosphorylated B-cell lymphoma 2 (Bcl-2) expression. Allantoin has been demonstrated to activate imidazoline 3 (I3) receptors[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	
In Vivo	The subchronic administration of allantoin (1, 3 or 10 mg/kg, for 7 days) significantly increases the latency time measured during the passive avoidance task in scopolamine-induced cholinergic blockade and normal naive mice. Allantoin treatment (3 or 10 mg/kg, for 7 days) also increases the expression levels of phosphorylated phosphatidylinositide 3-kinase (PI3K), phosphorylated protein kinase B (Akt) and phosphorylated glycogen synthase kinase-3β (GSK-3β). Allantoin significantly increases the neuronal cell proliferation of immature neurons in the hippocampal dentate gyrus region[1]. Daily injection of allantoin for 8 days in STZ-treated rats significantly lowers plasma glucose and increases plasma insulin levels [2]. Allantoin decreases blood pressures in SHRs at 30 minutes, as the most effective time. Also, this antihypertensive action is shown in a dose-dependent manner from SHRs treated with allantoin. Moreover, in anesthetized rats, allantoin inhibits cardiac contractility and heart rate. Also, the peripheral blood flow is markedly increased by allantoin[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	

PROTOCOL

Cell Assay [2]	Pancreatic β-cells are treated with 1, 10, 100 μM of allantoin before 30 min prior to the addition of 5 mM STZ and incubated for 6 h. Cell viability is measured using the ApoTox-Glo triplex assay[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [1][3]	Rats: Animals are randomly assigned into four groups: (I) the control group treated with the vehicle, saline; (II) the allantoin group treated by intravenous injection of allantoin at 0.5 mg/kg; (III) the allantoin+efaroxan group treated with allantoin at the most effective dose (0.5 mg/kg, i.v.) and efaroxan at effective dose (1.5 mg/kg, i.v.) 30 minutes before injection of allantoin; and (IV) the allantoin treated SHRs group treated by intravenous injection of allantoin at various dose for desired time. After treatment of allantoin, the rats are placed into a holder for the determination of the mean blood pressure[3]. Mice: For memory ameliorating study, mice are administered vehicle solution, allantoin (1, 3 or 10 mg/kg, p.o.) or donepezil (5 mg/kg, p.o.) at the same time (10:00-12:00 a.m) and same place for 7 days. For memory enhancing study, mice are administered vehicle solution, allantoin (1, 3 or 10 mg/kg, p.o.) or piracetam (200 mg/kg, i.p.). The final administration of allantoin, donepezil or piracetam is performed 1 h before an acquisition trial in the passive avoidance task[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- FASEB J. 2022 May;36(5):e22305.
- Research Square Preprint. 2021 Aug.

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REFERENCES

[1]. Ahn YJ, et al. Effects of allantoin on cognitive function and hippocampal neurogenesis. Food Chem Toxicol. 2014 Feb;64:210-6.

[2]. Amitani M, et al. Allantoin ameliorates chemically-induced pancreatic β-cell damage through activation of the imidazoline I3 receptors. PeerJ. 2015 Aug 6;3:e1105.

[3]. Chen MF, et al. Antihypertensive action of allantoin in animals. Biomed Res Int. 2014;2014:690135.

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

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