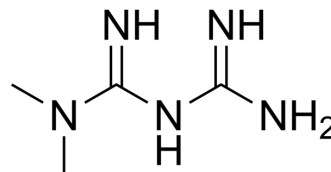


## Metformin

<b>Cat. No.:</b>	HY-B0627
<b>CAS No.:</b>	657-24-9
<b>Molecular Formula:</b>	C <sub>4</sub> H <sub>11</sub> N <sub>5</sub>
<b>Molecular Weight:</b>	129.16
<b>Target:</b>	AMPK; Autophagy; Mitophagy
<b>Pathway:</b>	Epigenetics; PI3K/Akt/mTOR; Autophagy
<b>Storage:</b>	-20°C, protect from light, stored under nitrogen * In solvent : -80°C, 6 months; -20°C, 1 month (protect from light, stored under nitrogen)



### SOLVENT & SOLUBILITY

#### In Vitro

H<sub>2</sub>O : 50 mg/mL (387.12 mM; Need ultrasonic)  
DMSO : 25 mg/mL (193.56 mM; ultrasonic and warming and heat to 60°C)

Concentration	Solvent	Mass	1 mg	5 mg	10 mg
			1 mg	5 mg	10 mg
Preparing Stock Solutions	1 mM		7.7423 mL	38.7117 mL	77.4233 mL
	5 mM		1.5485 mL	7.7423 mL	15.4847 mL
	10 mM		0.7742 mL	3.8712 mL	7.7423 mL

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

#### In Vivo

- Add each solvent one by one: PBS  
Solubility: 100 mg/mL (774.23 mM); Clear solution; Need ultrasonic
- Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline  
Solubility: ≥ 2.08 mg/mL (16.10 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)  
Solubility: ≥ 2.08 mg/mL (16.10 mM); Clear solution

### BIOLOGICAL ACTIVITY

#### Description

Metformin (1,1-Dimethylbiguanide) inhibits the mitochondrial respiratory chain in the liver, leading to activation of AMPK, enhancing insulin sensitivity for type 2 diabetes research. Metformin can cross the blood-brain barrier and triggers autophagy<sup>[1]</sup>.

#### IC<sub>50</sub> & Target

AMPK

#### In Vitro

Metformin (1,1-Dimethylbiguanide) inhibits proliferation of ESCs in a concentration-dependent manner. The IC<sub>50</sub> is 2.45 mM

for A-ESCs and 7.87 mM for N-ESCs. Metformin shows pronounced effects on activation of AMPK signaling in A-ESCs from secretory phase than in cells from proliferative phase<sup>[3]</sup>.  
Metformin (0-500  $\mu$ M) decreases glycogen synthesis in a dose-dependent manner with an IC<sub>50</sub> value of 196.5  $\mu$ M in cultured rat hepatocytes<sup>[4]</sup>.  
Metformin shows cell viability and cytotoxic effects on PC-3 cells with IC<sub>50</sub> of 5 mM<sup>[5]</sup>.  
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

#### In Vivo

Metformin (1,1-Dimethylbiguanide; 100 mg/kg, p.o.) alone, and metformin (25, 50, 100 mg/kg) with isoproterenol groups attenuates myocyte necrosis through histopathological analysis<sup>[1]</sup>.  
Metformin (> 900 mg/kg/day, p.o.) results in moribundity/mortality and clinical signs of toxicity in Crl:CD(SD) rats<sup>[2]</sup>.  
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

## CUSTOMER VALIDATION

- Nature. 2023 Sep;621(7977):188-195.
- Cancer Cell. 2020 Sep 14;38(3):350-365.e7.
- Cell Res. 2023 Jul 17.
- Signal Transduct Target Ther. 2023 Mar 6;8(1):95.
- Signal Transduct Target Ther. 2020 May 20;5(1):56.

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## REFERENCES

- [1]. Soraya H, et al. Acute treatment with metformin improves cardiac function following isoproterenol induced myocardial infarction in rats. Pharmacol Rep. 2012;64(6):1476-84.
- [2]. Quaille MP, et al. Toxicity and toxicokinetics of metformin in rats. Toxicol Appl Pharmacol. 2010 Mar 15;243(3):340-7.
- [3]. Xue J, et al. Metformin inhibits growth of eutopic stromal cells from adenomyotic endometrium via AMPK activation and subsequent inhibition of AKT phosphorylation: a possible role in the treatment of adenomyosis. Reproduction. 2013 Aug 21;146(4):397-406.
- [4]. Otto M, et al. Metformin inhibits glycogen synthesis and gluconeogenesis in cultured rat hepatocytes. Diabetes Obes Metab. 2003 May;5(3):189-94.
- [5]. Avci CB, et al. Therapeutic potential of an anti-diabetic drug, metformin: alteration of miRNA expression in prostate cancer cells. Asian Pac J Cancer Prev. 2013;14(2):765-8.

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

Tel: 609-228-6898

Fax: 609-228-5909

E-mail: [tech@MedChemExpress.com](mailto:tech@MedChemExpress.com)

Address: 1 Deer Park Dr, Suite Q, Monmouth Junction, NJ 08852, USA