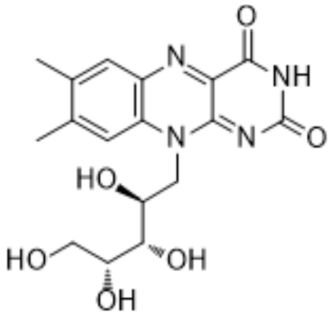
Riboflavin

Cat. No.:	HY-B0456
CAS No.:	83-88-5
Molecular Formula:	$C_{17}H_{20}N_4O_6$
Molecular Weight:	376.36
Target:	Endogenous Metabolite; Bacterial
Pathway:	Metabolic Enzyme/Protease; Anti-infection
Storage:	4°C, protect from light * In solvent : -80°C, 1 year; -20°C, 6 months (protect from light)



SOLVENT & SOLUBILITY

In Vitro

H_2O : 14.29 mg/mL (37.97 mM; ultrasonic and adjust pH to 8 with NaOH)
DMSO : 5.56 mg/mL (14.77 mM; ultrasonic and warming and heat to 60°C)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	2.6570 mL	13.2852 mL	26.5703 mL
5 mM	0.5314 mL	2.6570 mL	5.3141 mL
10 mM	0.2657 mL	1.3285 mL	2.6570 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: ≥ 0.56 mg/mL (1.49 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 0.56 mg/mL (1.49 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Riboflavin, an orally active and easily absorbed micronutrient, is a precursor of flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD), which serve as coenzymes for numerous enzymatic reactions and perform key metabolic functions by mediating the transfer of electrons in biological oxidation-reduction reaction[1].

IC_{50} & Target

Human Endogenous Metabolite	Microbial Metabolite

In Vitro

Riboflavin (5-50 μM, 24 h) has a strong cytotoxic effect on HL60 cells after UV irradiation that is mediated by apoptosis[2].
Riboflavin (0.76-48.76 nM, 96 h) increases cell viability and glutathione reductase activity and reduces apoptosis of HepG2 cells in a dose-dependent manner[3].

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

Cell Viability Assay[2]

Cell Line:	HL60 cells
Concentration:	5-10 μM
Incubation Time:	24 h
Result:	Didn't affect cell viability with no UV irradiation.

Western Blot Analysis[2]

Cell Line:	HL60 cells
Concentration:	5-50 μM
Incubation Time:	24 h
Result:	Increased the ratio Bax/Bcl2 and decreased the level of inhibitory apoptosis protein type 1 (IAP1). Caused overexpression of Fas and FasL. Decreased the expression of TNFR1 and TRADD at the concentration of 10-50 μM. Inhibited the cell survival relevant kinases phospho-JNK, phospho-MEK, phospho-ERK. Increased the expression of p21 and decreased the expression of PCNA, STATs 1 and STATs 2.

In Vivo

Riboflavin (10 mg/kg, p.o., daily) promotes the growth of swiss albino mice[4].
Riboflavin (1-600 mg/kg, p.o., one time) produces antinociceptive, antihyperalgesic, and anti-inflammatory effect in formalin, carrageenan-induced thermal hyperalgesia, and spinal nerve ligation rat models[5].
Riboflavin (3-100 mg/kg, i.p., one time) inhibits the nociceptive response in a dose-dependent manner in mice model of acetic acid-induced constriction[6].
Riboflavin (6-12 mg/kg, i.p., one time) decreases the second phase nociceptive response in mice model of formaldehyde-induced[6].

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

Animal Model:	Swiss albino mice[4]
Dosage:	10 mg/kg
Administration:	Oral gavage (p.o.), daily
Result:	Increased the growth rate of pregnant and newbron mice. Increased the percent conception and average litter size of pregnant mices. Improved the percent zinc absorption in male mices. Increased the levels of zinc and iron in organs in male and female mices. Increased the percent hemoglobin and the blood zinc value of female mices.

Animal Model:	Female Wistar rats[5]
Dosage:	1-600 mg/kg
Administration:	Oral gavage (p.o.), one time
Result:	Reduced flinching behavior during phase 2 in formalin-injected mice by doses of 1-50

	mg/kg. Produced a significant antihyperalgesic effect in carrageenan-injected mice by doses of 6.25-150 mg/kg. Reduced carrageenan-induced edema by doses of 50-150 mg/kg. Didn't reduce tactile allodynia in the spinal nerve ligation model by doses of 150-600 mg/kg.

REFERENCES

[1]. Thakur K, et al. Riboflavin and health: A review of recent human research. Crit Rev Food Sci Nutr. 2017 Nov 22;57(17):3650-3660.

[2]. de Souza AC, et al. A promising action of riboflavin as a mediator of leukaemia cell death. Apoptosis. 2006 Oct;11(10):1761-71.

[3]. Xin Z, et al. Riboflavin deficiency induces a significant change in proteomic profiles in HepG2 cells. Sci Rep. 2017 Apr 3;7:45861.

[4]. Agte VV, et al. Effect of riboflavin supplementation on zinc and iron absorption and growth performance in mice. Biol Trace Elem Res. 1998 Nov;65(2):109-15.

[5]. Granados-Soto V, et al. Riboflavin reduces hyperalgesia and inflammation but not tactile allodynia in the rat. Eur J Pharmacol. 2004 May 10;492(1):35-40.

[6]. França DS, et al. B vitamins induce an antinociceptive effect in the acetic acid and formaldehyde models of nociception in mice. Eur J Pharmacol. 2001 Jun 15;421(3):157-64.

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