Piperonylic acid

Cat. No.: HY-41404

CAS No.: 94-53-1

Molecular Formula: $C_8H_6O_4$

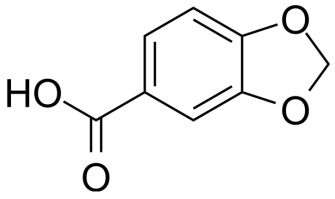
Molecular Weight: 166.13

Target: Cytochrome P450; Interleukin Related; EGFR; IGF-1R

Pathway: Metabolic Enzyme/Protease; Immunology/Inflammation; JAK/STAT Signaling; Protein Tyrosine Kinase/RTK

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	6 months
	-20°C	1 month



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (601.94 mM; Need ultrasonic)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	6.0194 mL	30.0969 mL	60.1938 mL
5 mM	1.2039 mL	6.0194 mL	12.0388 mL
10 mM	0.6019 mL	3.0097 mL	6.0194 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: ≥ 2.5 mg/mL (15.05 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: 2.5 mg/mL (15.05 mM); Suspended solution; Need ultrasonic
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (15.05 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Piperonylic acid is a natural molecule bearing a methylenedioxy function that closely mimics the structure of trans-cinnamic acid. Piperonylic Acid is a selective, mechanism-based inactivator of the trans-cinnamate 4-Hydroxylase. Piperonylic acid has anticancer, antioxidant and antibacterial activities[1][2][3][4].

IC_{50} & Target

IL-6	IL-10	EGFR	MCP-1
IGF-1			

In Vitro

Piperonylic acid (10 mg/mL, 24 h) has inhibitory effects on both gram-negative and gram-positive bacteria, of which S. epidermidis is the most sensitive with the MIC value is 78.12 mg/ml[3].
Piperonylic acid (50/100 μM, 24 h) ultimately promotes the growth and survival of HaCaT cells and restores cell viability after UV-induced cell damage by activating the EGFR signaling pathway[2].
Piperonylic acid (20-300 μg/mL, 60 min) has antioxidant activity and inhibits the oxidation of β-Carotene (HY-N0411) [3].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Western Blot Analysis [2]

Cell Line:	HaCaT cells
Concentration:	100 μM
Incubation Time:	10 min
Result:	Promoted EGFR tyrosine phosphorylation. Piperonylic acid-induced EGFR activation resulted in activation of ERK and AKT. Increased gene expression involved in cell growth and survival, such as c-Myc, c-Fos, and EGR-1.

In Vivo

Piperonylic acid (20 μL of 10 μM per day, applied topically to wounds) accelerates wound healing in mice by modulating inflammation and collagen deposition[4].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	4 weeks male C57BL6/J mice[4]
Dosage:	20 μL of 10 μM per day unitil the wound heals completely
Administration:	applied topically to wounds
Result:	Positively modulated EGFR expression in epidermal cells. Promoted the increase of IL-10, IL-6, MCP-1 and IGF-1 expression.

REFERENCES

[1]. Lee D, et al. Piperonylic acid stimulates keratinocyte growth and survival by activating epidermal growth factor receptor (EGFR). Sci Rep. 2018 Jan 9;8(1):162.

[2]. Zarai, Zied, et al. "Antioxidant and antimicrobial activities of various solvent extracts, piperine and piperic acid from Piper nigrum." Lwt-Food science and technology 50.2 (2013): 634-641.

[3]. Moreira KG, et al. Accelerative action of topical piperonylic acid on mice full thickness wound by modulating inflammation and collagen deposition. PLoS One. 2021 Oct 26;16(10):e0259134.

[4]. Schalk M, et al, Werck-Reichhart D. Piperonylic acid, a selective, mechanism-based inactivator of the trans-cinnamate 4-hydroxylase: A new tool to control the flux of metabolites in the phenylpropanoid pathway. Plant Physiol. 1998;118(1):209-218.

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