Capsaicin

Cat. No.: HY-10448

CAS No.: 404-86-4

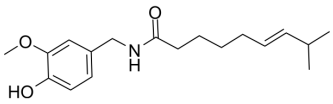
Molecular Formula: $C_{18}H_{27}NO_3$

Molecular Weight: 305.41

Target: TRP Channel; Autophagy; Apoptosis; Endogenous Metabolite

Pathway: Membrane Transporter/Ion Channel; Neuronal Signaling; Autophagy; Apoptosis; Metabolic Enzyme/Protease

Storage: 4°C, protect from light
* In solvent : -80°C, 1 year; -20°C, 6 months (protect from light)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 100 mg/mL (327.43 mM; Need ultrasonic)
Ethanol : 100 mg/mL (327.43 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	3.2743 mL	16.3714 mL	32.7429 mL
	5 mM	0.6549 mL	3.2743 mL	6.5486 mL
	10 mM	0.3274 mL	1.6371 mL	3.2743 mL

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

In Vivo

1. Add each solvent one by one: 10% EtOH >> 90% corn oil
   Solubility: ≥ 20 mg/mL (65.49 mM); Clear solution
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (8.19 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (8.19 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (8.19 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Capsaicin ((E)-Capsaicin), an active component of chili peppers, is a TRPV1 agonist. Capsaicin has pain-relieving, antioxidant, anti-inflammatory, anti-cancer and certain neurotoxic effects[1][2].

IC_{50} & Target

EC50: 290 nM (hTRPV1, in HEK293 cell)[1]

In Vitro

Capsaicin (50-300 μM; 24-72 hours) shows an augmented decrease in cell growth in a dose- and time-dependent manner. The observed IC_{50} value is around 150 μM[2].
Capsaicin (50-300 μM; 24-72 hours) shows increase in cytosolic cytochrome c, activation of caspase 3 and PARP (p85) levels, and decreases anti-apoptotic Bcl-2 protein and increases pro-apoptotic Bad/Bax expression[2].
Capsaicin increases the nuclear condensation, nuclear DNA fragmentation and sub-G1 DNA content[2].
Capsaicin suppresses the cell cycle progression at the G1/S phase in FaDu cells by decreasing the expression of the regulators of cyclin B1 and D1, as well as cyclin-dependent protein kinases cdk-1, cdk-2 and cdk-4[2].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[2]

Cell Line:	Human pharyngeal squamous carcinoma cells (FaDu) cells
Concentration:	50 μM, 100 μM, 200 μM, and 300 μM
Incubation Time:	24 hours, 48 hours and 72 hours
Result:	Showed an augmented decrease in cell growth.

Apoptosis Analysis[2]

Cell Line:	FaDu cells
Concentration:	50 μM, 100 μM and 200 μM
Incubation Time:	12 hours
Result:	Increased the activity of caspase 3 in a time-dependent manner.

Western Blot Analysis[2]

Cell Line:	FaDu cells
Concentration:	200 μM
Incubation Time:	24 hours
Result:	The observed activation of caspase 3 and PARP (p85) levels.

In Vivo

Capsaicin suppresses the development of lung carcinoma by amending the protein expressions of apoptotic regulators p53, Bcl-2, Bax and caspase-3[2].
Capsaicin (2 μg in 40 μL per mice, injected into the plantar surface of the left hind paw) induces pain-related behaviour in mice[4].
Capsaicin (3-30 μg in 10 μL per rat, plantar injection) induces secondary mechanical hypersensitivity (SMH) (used clinically as a model to potentially predict neuropathic pain) in rats[5].
Capsaicin (0-500 μg in 25 μL per rat, injected subcutaneously into the center of the right vibrissae pad) induces pain in the orofacial region or rats[6].
In high dose, Capsaicin may should be adminstered under anesthesia condition[7][8].
Capsaicin is more pungent than Dihydrocapsaicin (HY-N0361) [9].
Note: The spicy taste is choking, please take precautions.

Capsaicin ((E)-Capsaicin) LD50 under different circumstances:

Animal	Backgroud	Route	LD_{50}	References
Rat	adult	ip	10 mg/kg	[10]

	female; 51-54 g	ip	10.40-13.20 mg/kg	[11]
	female; 141 g	ip	9.50 mg/kg	[11]
	male	po	161.2 mg/kg	[12]
	female	po	148.1 mg/kg	[12]
Mice	male; 25-35 g	iv	0.56 mg/kg	[11]
	male	po	118.8 mg/kg	[12]
	male	ip	7.56 mg/kg	[10]
	female	po	97.4 mg/kg	[12]
	female; 30 g	ip	6.50 mg/kg	[11]
		ip	7.65 mg/kg	[11]
		im	7.80 mg/kg	[11]
		sc	9.00 mg/kg	[11]
		po	60-75 mg/kg	[11]
		po	190 mg/kg	[11]
		pr	>218 mg/kg	[11]
		dermal	>512 mg/kg	[11]
		intratracheal	1.60 mg/kg	[11]
Hamster	male; 65 g	ip	>120 mg/kg	[11]
Guinea Pig	male; 405 g	ip	>1.10 mg/kg	[11]
Rabbit	adult; 503 g	ip	>50 mg/kg	[11]

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

Animal Model:	Swiss albino mice (20-25 g; 8-10 weeks old) induced by Benzo(a)pyrene[3]
Dosage:	10 mg/kg
Administration:	Intraperitoneal administration; once in a week; for 14 weeks

Result:	Inhibited the development of mice lung carcinogenesis.

CUSTOMER VALIDATION

- Cell. 2024 Jun 6;187(12):2935-2951.e19.
- Cell Discov. 2024 Nov 12;10(1):114.
- Adv Mater. 2022 Mar;34(11):e2108435.
- Cell Metab. 2022 Nov 11;S1550-4131(22)00490-9.
- Nat Commun. 2023 Apr 17;14(1):2182.

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[2]. Shin YH, et al. The Effect of Capsaicin on Salivary Gland Dysfunction. Molecules. 2016 Jun 25;21(7).

[3]. Anandakumar P, et al. Capsaicin provokes apoptosis and restricts benzo(a)pyrene induced lung tumorigenesis in Swiss albino mice. Int Immunopharmacol. 2013 Jun 6;17(2):254-259.

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[12]. Saito A, Yamamoto M. Acute oral toxicity of capsaicin in mice and rats[J]. The Journal of toxicological sciences, 1996, 21(3): 195-200.

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