Psalmotoxin 1

Cat. No.:	HY-P1411
CAS No.:	880107-52-8
Molecular Formula:	$C_{200}H_{312}N_{62}O_{57}S_6$
Molecular Weight:	4689.41
Sequence:	Glu-Asp-Cys-Ile-Pro-Lys-Trp-Lys-Gly-Cys-Val-Asn-Arg-His-Gly-Asp-Cys-Cys-Glu-Gly-Leu-Glu-Cys-Trp-Lys-Arg-Arg-Arg-Ser-Phe-Glu-Val-Cys-Val-Pro-Lys-Thr-Pro-Lys-Thr (Disulfide bridge: Cys3-Cys18, Cys10-Cys23, Cys17-Cys33)
Sequence Shortening:	EDCIPKWKGCVNRHGDCCEGLECWKRRRSFEVCVPKTPKT (Disulfide bridge: Cys3-Cys18, Cys10-Cys23, Cys17-Cys33)
Target:	Sodium Channel; Apoptosis
Pathway:	Membrane Transporter/Ion Channel; Apoptosis
Storage:	Sealed storage, away from moisture Powder -80°C 2 years -20°C 1 year * In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)

BIOLOGICAL ACTIVITY

Description	Psalmotoxin 1 (PcTx1) is a protein toxin that can bind at subunit-subunit interfaces of acid-sensing ion channel 1a (ASIC1a). Psalmotoxin 1 is a potent and slective ASIC1a inhibitor (IC_{50}: 0.9 nM) by increasing the apparent affinity for H^+ of ASIC1a. Psalmotoxin 1 can induce cell apoptosis, also inhibits cell migration, proferliration and invasion of cancer cells. Psalmotoxin 1 can be used in the research of cancers, or neurological disease[1][3][4][6].
IC_{50} & Target	IC50: 0.9 nM (ASIC1a), 50 nM (ASIC1b, ASIC2a, and ASIC3)[6].
In Vitro	Psalmotoxin 1 (20 nM, 125 s) inhibits ASIC1a currents by drastically shifting the steady-state desensitization curve to lower H^+ concentrations[1]. Psalmotoxin 1 (30 nM) competes with Ca^{2+} in binding to ASIC1a channels[1]. Psalmotoxin 1 (100 or 200 ng, 24-72 h) significantly weakens the migration, proliferation and invasion of MCF-7 and MDA-MB-231 cells[4]. Psalmotoxin 1 (100 ng/mL, 24 h) significantly inhibits acid-induced increases in intracellular calcium and LDH release, induces cell apoptosis and cell cycle arrest in nucleus pulposus cells (NPCs)[5]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Proliferation Assay[4]

Cell Line:	MCF-7 and MDA-MB-231 cells
Concentration:	100 or 200 ng
Incubation Time:	24, 48, 72 h
Result:	Inhibited the cell migration, proliferation and invasion of breast cancer cells.

Western Blot Analysis[5]

Cell Line:	Nucleus pulposus cells (NPCs)
Concentration:	100 ng/mL
Incubation Time:	24 h
Result:	Decreased Bax and cleaved caspase-3 expression, and increased Bcl-2 expression.

In Vivo

Psalmotoxin 1 (i.c.v., 1 ng/kg, a single dose) is neuroprotective in a conscious model of stroke via direct inhibition of ASIC1a [2].

Psalmotoxin 1 (tail vein injection, 10 ng/kg, daily for 7 days) inhibits tumor growth in breast cancer mice model[4].

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

Animal Model:	Male spontaneously hypertensive rats (SHR)[2]
Dosage:	1 ng/kg, a single dose.
Administration:	Intracerebroventricular (i.c.v.) injection
Result:	Reduced cortical and striatal infarct volumes measured 72 h post-stroke. Reduced the severity of motor deficit at 1 and 3 days after stroke compared to control rats. Displayed an anti-apoptotic effect in the occluded hemisphere (reduced stroke-induced caspase-3 positive cells).

Animal Model:	Female nude BALB/C mice (orthotopic implantation, MCF-7 and MDA-MB-231 cells)[3]
Dosage:	10 ng/kg, daily for 7 days.
Administration:	Tail vein injection
Result:	Inhibited breast tumor growth.

CUSTOMER VALIDATION

- Aging. 2021 Apr 6;13(7):10703-10723.

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REFERENCES

[1]. Claudia A McCarthy, et al. PcTx1 affords neuroprotection in a conscious model of stroke in hypertensive rats via selective inhibition of ASIC1a. Neuropharmacology. 2015 Dec;99:650-7.

[2]. Niko Joeres, et al. Functional and pharmacological characterization of two different ASIC1a/2a heteromers reveals their sensitivity to the spider toxin PcTx1. Sci Rep. 2016 Jun 9;6:27647. doi: 10.1038/srep27647.

[3]. Chao Yang, et al. Overexpression of acid-sensing ion channel 1a (ASIC1a) promotes breast cancer cell proliferation, migration and invasion. Transl Cancer Res. 2020 Dec;9(12):7519-7530.

[4]. Feng Cai, et al. Acid-sensing ion channel 1a regulates the survival of nucleus pulposus cells in the acidic environment of degenerated intervertebral discs. Iran J Basic Med Sci. 2016 Aug;19(8):812-820.

[5]. P Escoubas, et al. Isolation of a tarantula toxin specific for a class of proton-gated Na+ channels. J Biol Chem. 2000 Aug 18;275(33):25116-21.

[6]. Chen X, et al. The tarantula toxin psalmotoxin 1 inhibits acid-sensing ion channel (ASIC) 1a by increasing its apparent H^+ affinity. J Gen Physiol. 2005 Jul;126(1):71-9.

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

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