

GsMTx4

Cat. No.:	HY-P1410	
CAS No.:	1209500-46-8	
Molecular Formula:	$C_{185}H_{273}N_{49}O_{45}S_6$	
Molecular Weight:	4095.84	
Sequence:	Gly-Cys-Leu-Glu-Phe-Trp-Trp-Lys-Cys-Asn-Pro-Asn-Asp-Asp-Lys-Cys-Cys-Arg-Pro-Lys-Leu-Lys-Cys-Ser-Lys-Leu-Phe-Lys-Leu-Cys-Asn-Phe-Ser-Phe-NH ₂ (Disulfide bridge: Cys2-Cys17, Cys9-Cys23, Cys16-Cys30)	GCLEFWWKCNPNDDKCCRPKLCCKSLFKLCNFSF-NH ₂ (Disulfide bridge: Cys2-Cys17, Cys9-Cys23, Cys16-Cys30)
Sequence Shortening:	GCLEFWWKCNPNDDKCCRPKLCCKSLFKLCNFSF-NH ₂ (Disulfide bridge: Cys2-Cys17, Cys9-Cys23, Cys16-Cys30)	
Target:	TRP Channel; Piezo Channel	
Pathway:	Membrane Transporter/Ion Channel; Neuronal Signaling	
Storage:	Sealed storage, away from moisture and light Powder -80°C 2 years -20°C 1 year	
	* In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture and light)	

SOLVENT & SOLUBILITY

In Vitro

H₂O : 50 mg/mL (12.21 mM; Need ultrasonic)
DMSO : 50 mg/mL (12.21 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent Concentration	Mass		
		1 mg	5 mg	10 mg
	1 mM	0.2442 mL	1.2208 mL	2.4415 mL
	5 mM	0.0488 mL	0.2442 mL	0.4883 mL
	10 mM	0.0244 mL	0.1221 mL	0.2442 mL

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

In Vivo

- Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
Solubility: ≥ 1.25 mg/mL (0.31 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
Solubility: ≥ 1.25 mg/mL (0.31 mM); Clear solution
- Add each solvent one by one: 10% DMSO >> 90% corn oil
Solubility: ≥ 1.25 mg/mL (0.31 mM); Clear solution

BIOLOGICAL ACTIVITY

Description	GsMTx4 is a spider venom peptide that selectively inhibits cationic-permeable mechanosensitive channels (MSCs) belonging to the Piezo and TRP channel families. GsMTx4 also blocks cation-selective stretch-activated channels (SACs), attenuates lysophosphatidylcholine (LPC)-induced astrocyte toxicity and microglial reactivity. GsMTx4 is an important pharmacological tool for identifying the role of these excitatory MSCs in normal physiology and pathology ^{[1][2][4]} .																
IC₅₀ & Target	MSCs ^[1]																
In Vitro	<p>GsMTx4 (5 μM) reduces Piezo1-mediated charge transfer to 38% of its initial levels in HEK293 cells transfected with Piezo1 cDNA^[1].</p> <p>GsMTx4 (5 μM) blocks cation-selective stretch-activated channels in astrocytes, cardiac cells, and smooth and skeletal muscle cells^[2].</p> <p>GsMTx4 (2.5 μM, 16 h) significantly diminishes both the leptin-induced AMPK and MLC-2 phosphorylation in breast epithelial cells (MCF10A)^[3].</p> <p>GsMTx4 (500 nM, 48 h) attenuates demyelination induced by the cytotoxic lipid and psychosine (organotypic cerebellar slices)^[4].</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p> <p>Western Blot Analysis^[3]</p> <table border="1"> <tr> <td>Cell Line:</td> <td>MCF10A cells</td> </tr> <tr> <td>Concentration:</td> <td>2.5 μM</td> </tr> <tr> <td>Incubation Time:</td> <td>16 h</td> </tr> <tr> <td>Result:</td> <td>Diminished both the leptin-induced AMPK and MLC-2 phosphorylation.</td> </tr> </table>	Cell Line:	MCF10A cells	Concentration:	2.5 μM	Incubation Time:	16 h	Result:	Diminished both the leptin-induced AMPK and MLC-2 phosphorylation.								
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In Vivo	<p>GsMTx4 (stereotactic injection, 3 μM of 1 μL, a single dose) is neuroprotective and inhibits lysophosphatidylcholine-induced astrocyte toxicity and demyelination in the cerebral cortex^[4].</p> <p>GsMTx-4 (intraperitoneal injection, 270 μg/kg for a single dose) reduces mechanical allodynia induced by inflammation and by sciatic nerve injury in Von Frey test^[6].</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p> <table border="1"> <tr> <td>Animal Model:</td> <td>Male C57BL/6 mice (toxin-induced focal demyelination of cortical brain tissue)^[4]</td> </tr> <tr> <td>Dosage:</td> <td>3 μM for 1 μL, a single dose.</td> </tr> <tr> <td>Administration:</td> <td>Stereotactic injection in the left and right cerebral hemispheres (sacrificed 4 days post-injection)</td> </tr> <tr> <td>Result:</td> <td>Prevented the enhanced increase in microglial reactivity and microglial cell numbers induced by lysophosphatidylcholine (LPC). Prevented LPC-mediated astrocyte toxicity by attenuating the decrease in GFAP+ cells and GFAP fluorescence intensity.</td> </tr> </table> <table border="1"> <tr> <td>Animal Model:</td> <td>Sciatic nerve injury model of male Sprague-Dawley rats^[6]</td> </tr> <tr> <td>Dosage:</td> <td>270 μg/kg, a single dose</td> </tr> <tr> <td>Administration:</td> <td>Intraperitoneal injection</td> </tr> <tr> <td>Result:</td> <td>Reduced inflammation-evoked mechanical allodynia.</td> </tr> </table>	Animal Model:	Male C57BL/6 mice (toxin-induced focal demyelination of cortical brain tissue) ^[4]	Dosage:	3 μM for 1 μL, a single dose.	Administration:	Stereotactic injection in the left and right cerebral hemispheres (sacrificed 4 days post-injection)	Result:	Prevented the enhanced increase in microglial reactivity and microglial cell numbers induced by lysophosphatidylcholine (LPC). Prevented LPC-mediated astrocyte toxicity by attenuating the decrease in GFAP+ cells and GFAP fluorescence intensity.	Animal Model:	Sciatic nerve injury model of male Sprague-Dawley rats ^[6]	Dosage:	270 μg/kg, a single dose	Administration:	Intraperitoneal injection	Result:	Reduced inflammation-evoked mechanical allodynia.
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CUSTOMER VALIDATION

- Cell Discov. 2022 Sep 6;8(1):84.
- Neuron. 2022 Nov 8;S0896-6273(22)00954-0.
- Research (Wash D C). 2023 Jan 20.
- Materials Today Advances. 2023, 17: 100325.
- Hypertension. 2021 Sep;78(3):647-660.

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REFERENCES

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- [2]. T M Suchyna, et al. Identification of a peptide toxin from *Grammostola spatulata* spider venom that blocks cation-selective stretch-activated channels. *J Gen Physiol*. 2000 May;115(5):583-98.
- [3]. Anna Acheva, et al. Adipokine Leptin Co-operates With Mechanosensitive Ca²⁺-Channels and Triggers Actomyosin-Mediated Motility of Breast Epithelial Cells. *Front Cell Dev Biol*. 2021 Jan 6;8:607038.
- [4]. María Velasco-Estevez, et al. Inhibition of Piezo1 attenuates demyelination in the central nervous system. *Glia*. 2020 Feb;68(2):356-375.
- [5]. Medha M Pathak, et al. Stretch-activated ion channel Piezo1 directs lineage choice in human neural stem cells. *Proc Natl Acad Sci U S A*. 2014 Nov 11;111(45):16148-53.
- [6]. Seung Pyo Park, et al. A tarantula spider toxin, GsMTx4, reduces mechanical and neuropathic pain. *Pain*. 2008 Jul;137(1):208-217.

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

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