
Product Data Sheet

Product Name: (Gly¹⁴)-Humanin (human)

Cat. No.: GA20196

Chemical Properties

Cas. No. 330936-70-4

Formula C₁₁₈H₂₀₂N₃₄O₃₁S₂

M.Wt 2657.25

Solubility Soluble in DMSO

Storage Store at -20°C

General tips For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.

Structure **Protocol****Cell experiment [1]:**

Cell lines

EMP(from Primary HUVECs)

Preparation Method

For cells receiving (Gly¹⁴)-Humanin (human), cells were pretreated with (Gly¹⁴)-Humanin (human) for 3 hours.

Reaction Conditions

1 μM (Gly¹⁴)-Humanin (human) for 3 hours

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

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Applications	(Gly14)-Humanin (human) can attenuate HG-induced apoptosis of HUVECs cells by reducing the expression of Mir-155 in EMPs.
Animal experiment [2]:	
Animal models	10-12-week-old adult male CD-1 mice weighing 25-30 g
Preparation Method	(Gly14)-Humanin (human) -treated groups were administered 0.1 µg of (Gly14)-Humanin (human) in 5 µL of saline intraventricularly (i.c.v., coordinates 1 mm posterior, 1 mm lateral, 2.5 mm deep to bregma) before TBI or 1 µg in 100 µL of saline intraperitoneally (i.p.) post TBI.
Dosage form	0.1 µg of (Gly14)-Humanin (human) in 5 µL saline intraperitoneally post TBI.
Applications	(Gly14)-Humanin (human) reduced TBI-induced cell damage.

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References:

[1]: Shen MY, Wang M, et.al. [Gly14]-Humanin Ameliorates High Glucose-Induced Apoptosis by Inhibiting the Expression of MicroRNA-155 in Endothelial Microparticles. *Diabetes Metab Syndr Obes.* 2021 May 24;14:2335-2347. doi: 10.2147/DMSO.S306026. PMID: 34079312; PMCID: PMC8163639.

[2]: Wang T, Zhang L, et.al. [Gly14]-Humanin reduces histopathology and improves functional outcome after traumatic brain injury in mice. *Neuroscience.* 2013 Feb 12;231:70-81. doi: 10.1016/j.neuroscience.2012.11.019. Epub 2012 Nov 20. PMID: 23178909.

Background

Humanin is both an intracellular protein and a secreted protein. It is the first newly discovered peptide encoded in the mitochondrial genome, which exerts robust protective effects against a myriad of cytotoxic stimuli in many cell types^[2]. Replacement of serine at position 14 of the HN peptide chain (Ser14) with glycine (Gly) leads to the formation of (Gly14)-Humanin (human), which has cytoprotective activity enhanced by 1000-fold when compared with that of Humanin^[3].

(Gly14)-Humanin (human) reduced Dil-ox-LDL accumulation in the RAW 264.7 macrophages. (Gly14)-Humanin (human) could inhibit ox-LDL-induced macrophage-derived foam cell formation, which occurs because of a decrease in lipid uptake and an increase in cholesterol efflux from macrophage cells^[7]. (Gly14)-Humanin (human) pretreatment inhibits HG-induced apoptosis of vascular endothelial cells by down-regulating miR-155, which was transferred to adjacent vascular endothelial cells via cell-derived EMPs. EMPs could serve as a potential tool for the specific delivery of miRNAs,

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contributing to a stronger therapeutic effect of (Gly14)-Humanin (human) in anti-diabetic vascular complications therapy^[1]. (Gly14)-Humanin (human) could restore cathepsin D activity and protein level in HUVECs to repair lysosomal functional damage induced by Ox-LDL, further repairing Ox-LDL-induced autophagic damage in HUVECs^[4].

Pretreatment with (Gly14)-Humanin (human) not only protected spatial memory but also rescued STAT3 from A β -induced disruption; and the neuroprotective effects of (Gly14)-Humanin (human) were effectively counteracted by genistein, a specific tyrosine kinase inhibitor. Sequence 31-35 in A β is the shortest active center responsible for the neurotoxicity of A β from molecule to behavior; and (Gly14)-Humanin (human) protects spatial learning and memory in rats against A β -induced insults; and probably involves the activation of tyrosine kinases and subsequent beneficial modulation of STAT3 and caspase3^[5]. Mice administered (Gly14)-Humanin (human) intracerebroventricularly (i.c.v.) prior to TBI had decreased cells with plasmalemma permeability in the injured cortex and hippocampus, reduced brain lesion volume, improved motor performance and ameliorated performance in the Morris water maze test post TBI. Reduced lesion volume was also observed even when (Gly14)-Humanin (human) was administered intraperitoneally (i.p.) at 1h and 2h post TBI, and minor amelioration in motor and Morris water maze test deficits was also observed. (Gly14)-Humanin (human) treatment improved morphological and functional outcomes after TBI in mice and the protective effect of (Gly14)-Humanin (human) against TBI may be associated with down-regulating apoptosis and autophagy^[6].

References:

- [1]: Shen MY, Wang M, et,al. [Gly14]-Humanin Ameliorates High Glucose-Induced Apoptosis by Inhibiting the Expression of MicroRNA-155 in Endothelial Microparticles. *Diabetes Metab Syndr Obes.* 2021 May 24;14:2335-2347. doi: 10.2147/DMSO.S306026. PMID: 34079312; PMCID: PMC8163639.
- [2]: Kim SJ, Mehta HH, et,al. Mitochondrial peptides modulate mitochondrial function during cellular senescence. *Aging (Albany NY).* 2018 Jun 10;10(6):1239-1256. doi: 10.18632/aging.101463. PMID: 29886458; PMCID: PMC6046248.
- [3]: Hashimoto Y, Niikura T, et,al. A rescue factor abolishing neuronal cell death by a wide spectrum of familial Alzheimer's disease genes and Abeta. *Proc Natl Acad Sci U S A.* 2001 May 22;98(11):6336-41. doi: 10.1073/pnas.101133498. Erratum in: *Proc Natl Acad Sci U S A* 2001 Oct 23;98(22):12854. PMID: 11371646; PMCID: PMC33469.

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- [4]: Ding Y, Feng Y, et.al. [Gly14]-humanin restores cathepsin D function via FPRL1 and promotes autophagic degradation of Ox-LDL in HUVECs. *Nutr Metab Cardiovasc Dis*. 2020 Nov 27;30(12):2406-2416. doi: 10.1016/j.numecd.2020.07.022. Epub 2020 Jul 25. PMID: 32917500.
- [5]: Yuan L, Liu XJ, et.al. [Gly14]-Humanin Protects Against Amyloid β Peptide-Induced Impairment of Spatial Learning and Memory in Rats. *Neurosci Bull*. 2016 Aug;32(4):374-82. doi: 10.1007/s12264-016-0041-x. Epub 2016 Jun 15. PMID: 27306655; PMCID: PMC5563781.
- [6]: Wang T, Zhang L, et.al. [Gly14]-Humanin reduces histopathology and improves functional outcome after traumatic brain injury in mice. *Neuroscience*. 2013 Feb 12;231:70-81. doi: 10.1016/j.neuroscience.2012.11.019. Epub 2012 Nov 20. PMID: 23178909.
- [7]: Zhu WW, Wang SR, et.al. Gly[14]-humanin inhibits ox-LDL uptake and stimulates cholesterol efflux in macrophage-derived foam cells. *Biochem Biophys Res Commun*. 2017 Jan 1;482(1):93-99. doi: 10.1016/j.bbrc.2016.10.138. Epub 2016 Nov 1. PMID: 27815075.

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