Product Data Sheet

Product Name: Cyclo(-Gly-Pro)
Cat. No.: GA21330

Chemical Properties

Cas. No.	3705-27-9		
Formula	$C_7H_{10}N_2O_2$	M.Wt	154.17
Solubility	Soluble in DMSO	Storage	Store at -20°C
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ 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	Cyclo(-Gly-Pro)		

Protocol

Cell experiment [1]:

Cell lines	RAW 264.7 cells
Preparation Method	RAW 264.7 cells were cultured in DMEM medium supplemented with 10% FBS in a humidified atmosphere of 5% CO_2 at 37°C and passaged every 1-2 days to maintain logarithmic growth. 10000 cells were seeded per well in a 96-well plate overnight. Cells were pre-incubated with different concentrations of Cyclo(-Gly-Pro) (0.1, 1, 10, and 100μg/ml) for 1h, and then stimulated with 1mg/mL LPS for another 6h. The cytokine concentrations were calculated.
Reaction Conditions	0.1, 1, 10, and 100μg/ml; 1h

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Applications	Cyclo(-Gly-Pro) treatment reduced the TNF-α production in RAW 264.7 cells in a dose-dependent manner after treatment with LPS.

Animal experiment [2]:

Animal models	Male Swiss mice
Preparation Method	Male Swiss mice (weighing 18-22g) were housed in a temperature/humidity-controlled room on a 12h/12h light/dark cycle with free access to food and water. Mice were injected with formalin (2.5%, 20μl) in the subplantar area of the right hind paw. The time of paw licking (in seconds) was determined over 0-5min (early phase, neurogenic) and 15-30min (late phase, inflammatory) after formalin injection. Mice (n=6) were pretreated with Cyclo(-Gly-Pro) (10μmol/kg; i.p.) 60min before intraplantar injection of the stimulus or the reference compound, morphine (17.5μmol/kg, i.p.), 1h before administration of formalin. Control mice were treated with sterile saline. Analysis of the effect of Cyclo(-Gly-Pro) treatment on the harmful sensation induced by formalin.
Dosage form	10μmol/kg for once; i.p.
Applications	Cyclo(-Gly-Pro) treatment significantly reduced nociceptive behaviors and inflammatory responses in mice.

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References:
[1] Khan R, Basha A, Goverdhanam R, et al. Attenuation of TNF-α secretion by L-proline-based cyclic dipeptides produced by culture broth of Pseudomonas aeruginosa[J]. Bioorganic & Medicinal Chemistry Letters, 2015, 25(24): 5756-5761.
[2] Ferro J N S, de Aquino F L T, de Brito R G, et al. Cyclo-Gly-Pro, a cyclic dipeptide, attenuates nociceptive behaviour and inflammatory response in mice[J]. Clinical and Experimental Pharmacology and Physiology, 2015, 42(12): 1287-1295.

Background

Cyclo(-Gly-Pro) is a cyclic dipeptide with oral activity, and exhibits antinociceptive

activity [1]. Cyclo(-Gly-Pro) inhibits the *Escherichia coli* tryptophan indole-lyase (TIL) with a K_i value of 17μM through a mixed-type mechanism, which can reduce indole production in bacterial cultures and human fecal samples [2]. Cyclo(-Gly-Pro) has been widely used to inhibit the growth of tumor cells, suppress chitinase and enhance the antibiotic production of microorganisms[3].

In vitro, Cyclo(-Gly-Pro) treatment for 1 hour significantly inhibited the production of TNF-α in RAW 264.7 macrophages induced by lipopolysaccharide (LPS), with an IC_{50} value of 4.5μg/ml[4].

In vivo, sixty minutes before subcutaneous injection of formalin, intraperitoneal injection of 10μmol/kg dose of Cyclo(-Gly-Pro) (dissolved in 0.9% NaCl) could alleviate the nociceptive behaviors and inflammatory responses in mice[5].

References:
[1] Liu S, Mohri S, Manabe Y, et al. Gly-Pro protects normal human dermal fibroblasts from UVA-induced damages via MAPK-NF-κB signaling pathway[J]. Journal of Photochemistry and Photobiology B: Biology, 2022, 237: 112601.
[2] Oikawa D, Nakayama T. Cyclo-glycylproline, a food-derived diketopiperazine, inhibits bacterial indole production: implications for diabetic nephropathy prevention[J]. Bioscience, Biotechnology, and Biochemistry, 2026, 90(1): 57-65.
[3] Hu L, Lin J, Qin F, et al. Exploring Sources, Biological Functions, and Potential Applications of the Ubiquitous Marine Cyclic Dipeptide: A Concise Review of Cyclic Glycine-Proline[J]. Marine Drugs, 2024, 22(6): 271.
[4] Khan R, Basha A, Goverdhanam R, et al. Attenuation of TNF-α secretion by L-proline-based cyclic dipeptides produced by culture broth of Pseudomonas aeruginosa[J]. Bioorganic & Medicinal Chemistry Letters, 2015, 25(24): 5756-5761.
[5] Ferro J N S, de Aquino F L T, de Brito R G, et al. Cyclo-Gly-Pro, a cyclic dipeptide, attenuates nociceptive behaviour and inflammatory response in mice[J]. Clinical and Experimental Pharmacology and Physiology, 2015, 42(12): 1287-1295.

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