Product Data Sheet

Product Name: Cyclo(-Phe-Phe)
Cat. No.: GA21338

Chemical Properties

Cas. No.	2862-51-3		
Formula	$C_{18}H_{18}N_2O_2$	M.Wt	294.35
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(-Phe-Phe)		

Protocol

Cell experiment [1]:

Cell lines	HepG2 cells (human hepatocellular carcinoma cell line)
Preparation Method	HepG2 cells were maintained in Dulbecco's minimal essential medium (DMEM) supplemented with 10% heat-inactivated fetal bovine serum (FBS) at 37°C, 5% CO_2. Cells were pretreated with Cyclo(-Phe-Phe) (0.06–6μmol/L) for 2 hours, followed by co-treatment with AAPH (60–100mmol/L) for 1–24 hours to induce oxidative stress.
Reaction Conditions	0.06–6μM; pretreatment for 2 hours

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Applications	Cyclo(-Phe-Phe) significantly suppressed intracellular ROS accumulation and mitochondrial membrane potential depolarization induced by AAPH. Cyclo(-Phe-Phe) enhanced the expression of antioxidant genes HO-1 and NQO1 by activating the Nrf2 pathway, while inhibiting Nrf2 ubiquitination and promoting its nuclear translocation.

Animal experiment [1]:

Animal models	Fertilized White Leghorn chicken embryos
Preparation Method	Embryos were treated with 2,2-azobis(2-amidinopropane) dihydrochloride (AAPH, 0.75μmol per egg) to induce oxidative stress, followed by administration of Cyclo(-Phe-Phe) (0.1, 0.5, or 1nmol per egg) every three days until the 17th day of development. Embryos were harvested for liver analysis.
Dosage form	0.1–1nmol; administered via air chamber
Applications	Cyclo(-Phe-Phe) significantly reduced AAPH-induced embryonic death and liver hypoplasia, alleviated liver pathological damage, and inhibited excessive ROS production.

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References:
[1] Zhang QY, Han SC, Huang RP, et al. Cyclo(-Phe-Phe) alleviates chick embryo liver injury via activating the Nrf2 pathway. Food Funct. 2022 Jul 4;13(13):6962-6974.

Background

Cyclo(-Phe-Phe) is a cyclic dipeptide formed by the cyclization of two phenylalanine molecules via a peptide bond[1]. This compound can activate the Nrf2 signaling pathway, thereby enhancing cellular antioxidant defense capacity and exerting a protective effect against chemical-induced liver injury[2].

In vitro cell experiments, HepG2 cells were pretreated with Cyclo(-Phe-Phe) at concentrations of 0.06–6μmol/L for 2 hours, followed by co-treatment with the oxidative stress inducer AAPH (60–100mmol/L) for 1–24 hours. Cyclo(-Phe-Phe) significantly suppressed intracellular reactive oxygen species (ROS) accumulation and mitochondrial membrane potential depolarization. Cyclo(-Phe-Phe) activated the Nrf2 pathway, upregulating the expression of the antioxidant genes heme oxygenase-1 (HO-1) and NAD(P)H quinone oxidoreductase 1 (NQO1)[2].

In vivo embryo models, fertilized chick embryos were administered Cyclo(-Phe-Phe) via air chamber injection at doses of 0.1–1nmol per egg every three days until the 17th day of embryonic development. Cyclo(-Phe-Phe) significantly reduced AAPH-induced embryonic mortality, improved liver development parameters (including liver weight and volume), and effectively attenuated liver tissue fibrosis and cellular apoptosis[2].

References:
[1] Sheinblatt M. NMR studies on the conformation of cyclodipeptides with two identical L-aromatic amino acid residues in solutions--cyclo[L-5(OH)Trp-L-5(OH)Trp] and cyclo[-L-Phe-L-Phe]. Int J Pept Protein Res. 1991 Jul;38(1):8-14.

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