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Product Data Sheet

Cell lines SH-SY5Y cells (human neuroblastoma cell line)

SH-SY5Y cells were serum-starved (with 0.5% serum) overnight before Preparation Method pretreatment with various concentrations of Oxyntomodulin (1–1000nM) for 1h. Cells were then exposed to glutamate (100–150μM) or H₂O₂ (150μM) for 24h.

Reaction Conditions 1–1000nM; 1 hours

Applications Oxyntomodulin dose-dependently increased cell viability and protected against glutamate-induced excitotoxicity and oxidative stress. In SH-SY5Y cells, Oxyntomodulin (1–1000nM) effectively reduced glutamate (100mM)-mediated cell death, while higher concentrations (100nM) were required to counteract glutamate (150mM) toxicity.

Animal experiment [2]:

Animal models Adult male Wistar rats

Preparation Method Rats received intraperitoneal (i.p.) injections of Oxyntomodulin at doses of 3-100nmol/kg. For acute studies, food intake was measured after 24-hour fasting or during the dark phase. For chronic studies, rats received twice-daily i.p. injections of Oxyntomodulin (50nmol/kg) for 7 days.

Dosage form 3-100nmol/kg; i.p.

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Applications

Peripheral Oxyntomodulin administration dose-dependently inhibited both fast-induced and dark-phase food intake. Oxyntomodulin (30-100nmol/kg) significantly reduced cumulative food intake for up to 24 hours. Chronic administration for 7 days decreased body weight gain and adiposity (reduced white and brown adipose tissue mass) compared to pair-fed controls, suggesting effects beyond reduced caloric intake.

References:

- [1] Li Y, Wu KJ, Yu SJ, et al. Neurotrophic and neuroprotective effects of oxyntomodulin in neuronal cells and a rat model of stroke. *Exp Neurol*. 2017 Feb;288:104-113.
- [2] Dakin CL, Small CJ, Batterham RL, et al. Peripheral oxyntomodulin reduces food intake and body weight gain in rats. *Endocrinology*. 2004 Jun;145(6):2687-95.

Background

Oxyntomodulin is a 37-amino-acid peptide hormone that simultaneously activates both the glucagon-like peptide-1 receptor and the glucagon receptor, thereby regulating appetite, energy expenditure, and blood glucose levels^[1]. Oxyntomodulin is a product of the glucagon precursor proglucagon and is produced and released by intestinal L-cells after processing by prohormone convertase^[2]. Oxyntomodulin holds potential for the treatment of diabetes and obesity^[3-4].

In vitro, pretreatment of SH-SY5Y cells with Oxyntomodulin (10–1000nM) for 1 hour, followed by stimulation with glutamate (100–150μM) or hydrogen peroxide (150μM) for 24 hours, significantly increased cell viability and reduced cell death induced by glutamate excitotoxicity and oxidative stress^[5].

In vivo, Oxyntomodulin (4–25μg per mouse) was administered intravenously or intraperitoneally to 8–24-week-old C57BL/6J mice to simulate the regulation of liver circadian rhythms by food intake. When administered early in the circadian cycle, Oxyntomodulin acutely induced the expression of core liver clock genes *Per1/2* and reset the rhythmic expression of hepatic clock genes (*Per2*, *Dbp*) and metabolism-related genes (*Foxo1*, *Pdk4*, *Slc2a2*), resulting in phase delays or reduced amplitude^[6]. In Wistar rats weighing 180–400g, intraperitoneal injection of Oxyntomodulin (3–

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100nmol/kg) dose-dependently inhibited fasting-induced refeeding and dark-phase feeding without delaying gastric emptying. Additionally, peripheral injection of Oxyntomodulin significantly reduced fasting plasma ghrelin levels and increased c-fos immunoreactivity in the hypothalamic arcuate nucleus (ARC), suggesting that it suppresses appetite by activating ARC neurons^[7].

References:

- [1] Holst JJ, Rosenkilde MM. Oxyntomodulin - past, present and future. *Peptides*. 2025 Jun;188:171393.
- [2] Holst JJ, Albrechtsen NJW, Gabe MBN, et al. Oxyntomodulin: Actions and role in diabetes. *Peptides*. 2018 Feb;100:48-53.
- [3] Zhihong Y, Chen W, Qianqian Z, et al. Emerging roles of oxyntomodulin-based glucagon-like peptide-1/glucagon co-agonist analogs in diabetes and obesity. *Peptides*. 2023 Apr;162:170955.
- [4] Wynne K, Field BC, Bloom SR. The mechanism of action for oxyntomodulin in the regulation of obesity. *Curr Opin Investig Drugs*. 2010 Oct;11(10):1151-7.
- [5] Li Y, Wu KJ, Yu SJ, et al. Neurotrophic and neuroprotective effects of oxyntomodulin in neuronal cells and a rat model of stroke. *Exp Neurol*. 2017 Feb;288:104-113.
- [6] Landgraf D, Tsang AH, Leliavski A, et al. Oxyntomodulin regulates resetting of the liver circadian clock by food. *Elife*. 2015 Mar 30;4:e06253.
- [7] Dakin CL, Small CJ, Batterham RL, et al. Peripheral oxyntomodulin reduces food intake and body weight gain in rats. *Endocrinology*. 2004 Jun;145(6):2687-95.

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