Product Data Sheet

Product Name:	Neuropeptide Y (29-64), amide, human
Cat. No.:	GC31165

Chemical Properties

Cas. No.	90880-35-6		
SMILES	Tyr-Pro-Ser-Lys-Pro-Asp-Asn-Pro-Gly-Glu-Asp-Ala-Pro-Ala-Glu-Asp-Met-Ala-Arg-Tyr-Tyr-Ser-Ala-Leu-Arg-His-Tyr-Ile-Asn-Leu-Ile-Thr-Arg-Gln-Arg-Tyr-NH2		
Formula	$C_{189}H_{285}N_{55}O_{57}S$	M.Wt	4271.68
Solubility	30mg/ml in ethanol, DMSO, DMF	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			

Protocol

Cell experiment [1]:

Cell lines	neurons
Preparation Method	Primary cortical neurons were preincubated either alone (positive control) or with three concentrations of Neuropeptide Y (0.5, 1, and 2μM) for 24h and then exposed to Aβ's pathogenic fragment 25-35 ($Aβ_{25-35}$) (50μM) for 48h. At 24 and 48h, neuronal survival was evaluated with the MTS assay.
Reaction Conditions	0.5, 1, and 2μM; 24h, 48h

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Applications	After 48h of incubation, $A\beta_{25-35}$ significantly reduced cell viability. Neuropeptide Y was able to protect cortical neurons from $A\beta_{25-35}$ toxicity. We found that 2μM Neuropeptide Y abolished the toxic effects of $A\beta_{25-35}$ at 24 and 48h. The same effect on neuronal survival was observed in neurons exposed to 1μM and 0.5μM Neuropeptide Y pretreatments.

Animal experiment [2]:

Animal models	male Sprague-Dawley rats
Preparation Method	All rats were acclimated to central injections by gently restraining them within a towel and performing sham injections at least twice on separate days before testing began. On each test day, subjects were pre-satiated by removing all food pellets from the cage hoppers and placing four or five chow pellets on the cage floors. One hour later, testing with Neuropeptide Y began. Neuropeptide Y (0, 24, 78, 156 or 235pmol per injection side) was dissolved in sterile physiological saline (0.9%) and injected in a volume of 0.5μl using a 28-gauge (0.18mm diameter) stainless steel injector cut to terminate 3mm below each guide cannula. The injector was attached to a 5μl microsyringe by a length of plastic tubing. All solutions were infused manually over a period of 1min, and the injector was left inside the guide cannula for an additional 30sec to permit diffusion. Testing began immediately following injections. Intake (g) minus spillage was measured 1 and 2h post-injection. There were at least two Neuropeptide Y-free days interspersed between each testing session.
Dosage form	0, 24, 78, 156 or 235pmol 0.5μl; Intracerebral drug administration

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Applications	At both the 1h and 2h time points, cumulative intake in the eriforinal hypothalamus (PFH)-treated rats was markedly higher than in the nucleus accumbens (NAC)-treated group, and a significant main effect of dose was also observed.

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References:
[1] Croce N, Ciotti MT, Gelfo F, et al. Neuropeptide Y protects rat cortical neurons against β-amyloid toxicity and re-establishes synthesis and release of nerve growth factor. *ACS Chem Neurosci*. 2012;3(4):312-318.
[2] Brown CM, Coscina DV, Fletcher PJ. The rewarding properties of neuropeptide Y in perifornical hypothalamus vs. nucleus accumbens. *Peptides*. 2000;21(8):1279-1287.

Background

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Neuropeptide Y (29-64), amide, human, a 36-aa peptide, binds to five G-protein-coupled receptors (Y1, Y2, Y4, Y5, and y6). Widely distributed in the central and peripheral nervous systems as well as in other peripheral tissues, Neuropeptide Y plays pivotal roles in regulating appetite, blood pressure, cardiac contractility, intestinal secretion, and stem-cell biology[1-2]. Neuropeptide Y modulates cellular functions of NK-cells, and circulating levels of Neuropeptide Y are correlated with NK activity[3].

In vitro, neurons were pretreated with Neuropeptide Y (0.5, 1, and 2μM) for 24h and then exposed to Aβ's pathogenic fragment 25-35 ($Aβ_{25-35}$) (50μM) for 48h. At 24 and 48h, 2μM Neuropeptide Y completely abolished $Aβ_{25-35}$ induced toxicity, and comparable neuroprotective effects on neuronal survival were seen with 1μM and 0.5μM pretreatments[4]. After 24h of treatment with Neuropeptide Y (0, 20, or 200nM), bone-marrow-derived macrophages (BMMs) exhibited a significant up-regulation of matrix metalloproteinases (MMPs)-3 mRNA expression and protein secretion[5].

In vivo, following intracerebral administration of Neuropeptide Y (0, 24, 78, 156, or 235pmol in 5μl), rats receiving injections into the perifornical hypothalamus (PFH) consumed significantly more food than those injected into the nucleus accumbens (NAC), and a clear dose-dependent effect was also observed[6]. Central administration of Neuropeptide Y (4.5nmol) to male Sprague-Dawley rats significantly elevated NAC dopamine (DA) release to 150% of baseline and produced a step-wise increase in NAC norepinephrine efflux[7].

References:

[1] Peng S, Zhou YL, Song ZY, Lin S. Effects of Neuropeptide Y on Stem Cells and Their Potential Applications in Disease Therapy. *Stem Cells Int*. 2017;2017:6823917.
[2] Li C, Wu X, Liu S, Zhao Y, Zhu J, Liu K. Roles of Neuropeptide Y in Neurodegenerative and Neuroimmune Diseases. *Front Neurosci*. 2019;13:869.
[3] Bedoui S, Lechner S, Gebhardt T, et al. NPY modulates epinephrine-induced leukocytosis via Y-1 and Y-5 receptor activation in vivo: sympathetic co-transmission during leukocyte mobilization. *J Neuroimmunol*. 2002;132(1-2):25-33.
[4] Croce N, Ciotti MT, Gelfo F, et al. Neuropeptide Y protects rat cortical neurons against β-amyloid toxicity and re-establishes synthesis and release of nerve growth factor. *ACS Chem Neurosci*. 2012;3(4):312-318.

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[5] Choi B, Shin MK, Kim EY, et al. Elevated Neuropeptide Y in Endothelial Dysfunction Promotes Macrophage Infiltration and Smooth Muscle Foam Cell Formation. *Front Immunol*. 2019;10:1701.
[6] Brown CM, Coscina DV, Fletcher PJ. The rewarding properties of neuropeptide Y in perifornical hypothalamus vs. nucleus accumbens. *Peptides*. 2000;21(8):1279-1287.
[7] Quarta D, Leslie CP, Carletti R, Valerio E, Caberlotto L. Central administration of NPY or an NPY-Y5 selective agonist increase in vivo extracellular monoamine levels in mesocorticolimbic projecting areas. *Neuropharmacology*. 2011;60(2-3):328-335.

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