# Product Data Sheet

Product Name: Endomorphin-2
Cat. No.: GC10059

## Chemical Properties

| | | | |
|---|---|---|---|
| Cas. No. | 141801-26-5 | | |
| Chemical Name | (S)-N-((S)-1-(((S)-1-amino-1-oxo-3-phenylpropan-2-yl)amino)-1-oxo-3-phenylpropan-2-yl)-1-((S)-2-amino-3-(4-hydroxyphenyl)propanoyl)pyrrolidine-2-carboxamide | | |
| SMILES | O=C([C@H]1N(C([C@H](CC(C=C2)=CC=C2O)N)=O)CCC1)N[C@H](C(N[C@H](C(N)=O)CC3=CC=CC=C3)=O)CC4=CC=CC=C4 | | |
| Formula | $C_{32}H_{37}N_5O_5$ | M.Wt | 571.65 |
| Solubility | ≥ 57.2mg/mL in DMSO | Storage | Desiccate 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 | Endomorphin-2 | | |

## Protocol

**Animal experiment [1]:**

| | |
|---|---|
| Animal models | Wistar rats |


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| Preparation Method | Sixty-four rats were anesthetized with chloral hydrate (400mg/kg, i.p.), treated with ketoprofen (1.4mg/kg), and fixed in a stereotaxic apparatus. After midline incision and local lidocaine (2%), a 21-gauge stainless steel cannula (1.7cm) was implanted into the arcuate nucleus (ARC; AP −3mm from bregma, DV −7mm) and secured with screws and dental cement. A sterile obturator was used to prevent occlusion. Postoperatively, rats received s.c. saline (1mL), 5% glucose (1mL), and piperacillin (30mg/kg, i.p.) and were monitored for 72h until recovery. At 72h, 10μL of drug/vehicle was microinjected into the ARC at 9:00 AM: Endomorphin-2 (0.50–0.75μmol/kg) or Endomorphin-2 (0.50μmol/kg) plus β-funaltrexamine (0.20μmol/kg). Injections were performed via a 10μL syringe connected to the cannula. |
| Dosage form | 0.50-0.75μmol/kg; intrahypothalamic injection; single injection |
| Applications | Compared to vehicle, intrahypothalamic injection of Endomorphin-2 induced a significant dose-related increase in food intake, as evaluated 24h after treatment. |


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References:
[1]. Brunetti L, Ferrante C, Orlando G, et al. Orexigenic effects of endomorphin-2 (EM-2) related to decreased CRH gene expression and increased dopamine and norepinephrine activity in the hypothalamus[J]. Peptides, 2013, 48: 83-88.

## Background

Endomorphin-2 is a high-affinity and highly selective agonist of the μ-opioid receptor ($K_i$ = 0.69nM) [1]. Endomorphin-2 activates MOR, blocking calcium channels and enhancing potassium channel opening on neurons, thereby inhibiting neural activity and achieving analgesic effects [2-3]. Endomorphin-2 is primarily used in the study of chronic pain[4].

In Wistar rats, intrahypothalamic injection of Endomorphin-2 (0.50-0.75μmol/kg; intrahypothalamic injection; single injection) induced a significant dose-related increase in food intake [5]. In CD1 mice, intraventricular injection of Endomorphin-2 (0.3-30μg; 10μL; intraventricular injection; single injection) can dose-dependently shorten the immobility time of animals in the TST test [6].

References:
[1]. Dvoracsko S, Stefanucci A, Novellino E, et al. The design of multitarget ligands for chronic and neuropathic pain[J]. Future medicinal chemistry, 2015, 7(18): 2469-2483.
[2]. Horvath G. Endomorphin-1 and endomorphin-2: pharmacology of the selective

endogenous μ-opioid receptor agonists[J]. Pharmacology & therapeutics, 2000, 88(3): 437-463.
[3]. Chen Y B, Huang F S, Fen B, et al. Inhibitory effects of endomorphin-2 on excitatory synaptic transmission and the neuronal excitability of sacral parasympathetic preganglionic neurons in young rats[J]. Frontiers in cellular neuroscience, 2015, 9: 206.
[4]. Wolfe D, Hao S, Hu J, et al. Engineering an endomorphin-2 gene for use in neuropathic pain therapy[J]. PAIN®, 2007, 133(1-3): 29-38.
[5]. Brunetti L, Ferrante C, Orlando G, et al. Orexigenic effects of endomorphin-2 (EM-2) related to decreased CRH gene expression and increased dopamine and norepinephrine activity in the hypothalamus[J]. Peptides, 2013, 48: 83-88.
[6]. Fichna J, Janecka A, Piestrzeniewicz M, et al. Antidepressant-like effect of endomorphin-1 and endomorphin-2 in mice[J]. Neuropsychopharmacology, 2007, 32(4): 813-821.


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