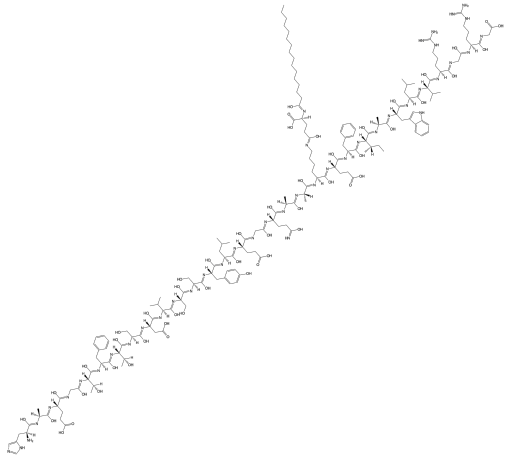
Product Data Sheet

Product Name: Liraglutide
Cat. No.: GC10311

Chemical Properties

Cas. No.	204656-20-2		
SMILES	CCCCCCCCCCCCCCCC(=O)NC(CCC(=O)NCCCCC(C(=O)NC(CCC(=O)O)C(=O)NC(CC1=CC=CC=C1)C(=O)NC(C(C)CC)C(=O)NC(C)C(=O)NC(CC2=CNC3=CC=CC=C32)C(=O)NC(CC(C)C)C(=O)NC(C(C)C)C(=O)NC(CCCNC(=N)N)C(=O)NCC(=O)NC(CCCNC(=N)N)C(=O)NCC(=O)O)NC(=O)C(C)NC(=O)C(C)NC(=O)C(CCC(=O)N)NC(		
Formula	$C_{172}H_{265}N_{43}O_{51}$	M.Wt	3751.2
Solubility	<20mg/mL in Water, ≥ 3.85mg/mL in Acetic acid:Water:DMSO=1:1:1	Storage	Store at -20°C,protect from light
General tips	For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C 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

Product Data Sheet

Cell experiment [1]:	
Cell lines	LNCaP cells (human prostate cancer cell line)
Preparation Method	LNCaP cells were maintained in RPMI 1640 medium supplemented with 10% heat-inactivated fetal bovine serum at 37°C, 5% CO_2. LNCaP cells were treated with Liraglutide at concentrations of 100nM-40μM alone or in combination with Docetaxel for 1 to 48 hours, followed by MTT assay, cell cycle analysis, Annexin-V/PI staining, quantitative RT-PCR and western blotting.
Reaction Conditions	100nM-40μM; 1h-48h
Applications	Liraglutide decreased the viability of LNCaP cells dose-dependently. Liraglutide caused G2/M cell cycle arrest and induced apoptosis in combination with Docetaxel. Liraglutide upregulated Bax mRNA and downregulated Bcl-2 mRNA expression in combination treatments. Liraglutide reduced phosphorylation level of ERK1/2 and AKT proteins in combination with Docetaxel.
Animal experiment [2]:	
Animal models	C57BL/6J mice (male, 8-week-old) with HFpEF induced by high-fat diet plus N-nitro-L-arginine methyl ester (L-NAME) for 15 weeks
Preparation Method	Mice were intraperitoneally injected with Liraglutide at 0.3mg/kg for 4 weeks, then euthanized for cardiac ultrasound, exercise exhaustion test, blood pressure/fasting blood glucose/intraperitoneal glucose tolerance test, tissue histology (H&E, Masson, WGA, Oil Red O, immunofluorescence), snRNA-seq of ventricular nuclei, and qPCR/western blot analysis.

Caution: Product has not been fully validated for medical applications. For research use only.
Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

Dosage form	0.3mg/kg/day; i.p.; daily for 4 weeks
Applications	Liraglutide improved diastolic function (reduced E/A and E/e' ratios), ameliorated cardiomyocyte hypertrophy and cardiac fibrosis, increased exercise tolerance, lowered body weight, improved glucose metabolism and insulin sensitivity, lowered blood pressure, and improved liver and kidney function. Liraglutide restored Erbb4 expression in a myocyte subcluster, reversed downregulation of ERK1/2 phosphorylation and upregulation of PKCa phosphorylation in heart tissue, and diminished these effects after 1-week withdrawal.

References:

[1] Eftekhari S, Montazeri H, Tarighi P. Synergistic anti-tumor effects of Liraglutide, a glucagon-like peptide-1 receptor agonist, along with Docetaxel on LNCaP prostate cancer cell line. Eur J Pharmacol. 2020;878:173102.

[2] Ni X, Feng X, Wang Z, et al. Empagliflozin and liraglutide ameliorate HFpEF in mice via augmenting the Erbb4 signaling pathway. Acta Pharmacol Sin. 2024;45:1-14.

Background

Liraglutide is a novel human glucagon-like peptide-1 (GLP-1) receptor agonist. Liraglutide binds to the GLP-1 receptor and promotes insulin secretion and inhibits glucagon secretion in a glucose-dependent manner. Liraglutide can be used in studies related to type 2 diabetes, obesity and weight management[1-4].

In vitro, treatment of LNCaP cells with Liraglutide (100nM-40μM) for 1-48 hours inhibited cell proliferation, induced G2/M phase cell cycle arrest, upregulated Bax mRNA expression, downregulated Bcl-2 mRNA expression, and reduced ERK1/2 and AKT protein phosphorylation levels[5]. Treatment of IL-1β-induced mouse chondrocytes with 6.6nM-3.4μM Liraglutide for 24 hours dose-dependently reduced nitric oxide, PGE2 and IL-6 secretion, downregulated iNos, Cox2 and Tnf-

α gene expression, and decreased Adamts4, Adamts5, Mmp-3 and Mmp-13 gene expression as well as MMP-3, MMP-13 and soluble GAG release[6]. Treatment of BTC-6 cells with 1nM-1μM Liraglutide for 15 to 30 minutes stimulated PI3K-dependent AKT phosphorylation and increased BAD and FoxO1/FoxO3a phosphorylation[7].

In vivo, subcutaneous injection of 200μg/kg Liraglutide at the wound edge into db/db mice and diabetic db/db mice for 11 consecutive days accelerated wound closure, improved re-epithelialization, collagen deposition and extracellular matrix remodeling, and enhanced keratinocyte proliferation, migration and adhesion functions[8]. Daily intraperitoneal injection of 200μg/kg Liraglutide combined with angiotensin II subcutaneous infusion into $APOE^{-/-}$ mice for 4 consecutive weeks reduced the incidence and mortality of aortic aneurysm and dissection, decreased abdominal aortic diameter, and alleviated elastic fiber degradation[9]. Intraperitoneal injection of 0.3mg/kg Liraglutide into C57BL/6J mice fed a high-fat diet combined with N-nitro-L-arginine methyl ester for 4 consecutive weeks improved diastolic function, attenuated cardiomyocyte hypertrophy and cardiac fibrosis, increased exercise tolerance, reduced body weight, improved glucose metabolism, lowered blood pressure, and improved liver and kidney function[10].

References:

[1] Meza N, Bracchiglione J, Escobar Liquitay CM, et al. Liraglutide for adults living with obesity. Cochrane Database Syst Rev. 2025 Oct 30;10(10):CD016017.

[2] Pandey A, Goyal AK. Liraglutide innovations: a comprehensive review of patents (2014-2024). Pharm Pat Anal. 2024;13(1-3):73-89.

[3] Pastor R, Tur JA. Liraglutide for the Treatment of Obesity: Analyzing Published Reviews. Curr Pharm Des. 2019;25(15):1783-1790.

[4] Gupta P, Ekbbal R. Liraglutide Improves Diabetic Cardiomyopathy by Downregulation of Cardiac Inflammatory and Apoptosis Markers. Curr Drug Res Rev. 2024;16(3):289-299.

[5] Eftekhari S, Montazeri H, Tarighi P. Synergistic anti-tumor effects of Liraglutide, a glucagon-like peptide-1 receptor agonist, along with Docetaxel on LNCaP prostate cancer cell line. Eur J Pharmacol. 2020 Jun 5;878:173102.

Product Data Sheet

[6] Meurot C, Martin C, Sudre L, et al. Liraglutide, a glucagon-like peptide 1 receptor agonist, exerts analgesic, anti-inflammatory and anti-degradative actions in osteoarthritis. Sci Rep. 2022 Jan 28;12(1):1567.

[7] Kapodistria K, Tsilibary EF, Kotsopoulou E, et al. Liraglutide, a human glucagon-like peptide-1 analogue, stimulates AKT-dependent survival signalling and inhibits pancreatic β-cell apoptosis. J Cell Mol Med. 2018;22(6):2970-2980.

[8] Zhang Q, Zhang C, Kang C, et al. Liraglutide promotes diabetic wound healing via Myo1c/Dock5. Adv Sci. 2024;11:2405987.

[9] Zhang K, Li R, Matniyaz Y, et al. Liraglutide attenuates angiotensin II-induced aortic dissection and aortic aneurysm via inhibiting M1 macrophage polarization in APOE-/- mice. Biochem Pharmacol. 2024;223:116170.

[10] Ni X, Feng X, Wang Z, et al. Empagliflozin and liraglutide ameliorate HFpEF in mice via augmenting the Erbb4 signaling pathway. Acta Pharmacol Sin. 2024;45:1-14.

Caution: Product has not been fully validated for medical applications. For research use only.
Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA