RESEARCH DOSAGE MANUAL

Semaglutide FlexPen

GLP-1 Receptor Agonist · 10 mg / 3 ml · Research Grade

Selective GLP-1 receptor agonist — Manufactured in the Netherlands under cGMP

INN / Code	Semaglutide
CAS Number	910463-68-2
Class	GLP-1 Receptor Agonist (acylated GLP-1 analogue)
Molecular Weight	~4,113.6 Da
Concentration	10 mg / 3 ml cartridge — 3.33 mg/ml
Pen Dose Scale	1 unit = 0.01 ml = 0.0333 mg | 30 units = 1 mg | 60 units = 2 mg
Total Pen Doses	300 units per cartridge (10 mg total)
Purity	≥ 99.0% HPLC · Endotoxin < 1 EU/mg
Storage	2–8 °C · protect from light · do not freeze
Batch / Expiry	NL-2026-E · Expires 10/2029
Administration	Subcutaneous injection (research)

1. Compound Overview

Semaglutide is a long-acting, acylated GLP-1 receptor agonist developed by Novo Nordisk and first approved for clinical use in 2017. It is a synthetic analogue of native glucagon-like peptide-1 (GLP-1), sharing ~94% structural homology but modified at position 34 (Lys→Arg) and attached to a C-18 fatty diacid chain via a linker at position 26, enabling albumin binding that extends the half-life to approximately 165–184 hours (½-life ~7 days).

Phase 3 SUSTAIN and STEP clinical trials reported mean body weight reductions of 9.6–15.3% at 0.5–2 mg/week, with superior glycaemic control versus placebo and active comparators. The SEMA-HEART and SELECT trials further established cardiovascular risk reduction independent of weight loss. Its once-weekly subcutaneous profile makes it the reference GLP-1 agonist for metabolic, obesity, and cardiometabolic research. The VitalPep Pro formulation delivers research-grade semaglutide at 3.33 mg/ml in a pre-filled FlexPen cartridge.

2. Mechanism of Action

Semaglutide exerts its pharmacological effects through high-affinity agonism at the GLP-1 receptor (GLP-1R), a class B G-protein-coupled receptor widely expressed in the CNS, pancreas, cardiovascular system, and GI tract. Key mechanisms:

- **Hypothalamic appetite suppression:** GLP-1R activation in the arcuate nucleus and area postrema reduces NPY/AgRP signalling and increases POMC/CART activity, producing profound satiety and reduced caloric intake.
- **Gastric emptying delay:** Slows antral motility via vagal afferent pathways, prolonging nutrient absorption and amplifying post-prandial satiety signals.
- **Glucose-dependent insulin secretion:** Potentiates pancreatic beta-cell insulin release in a glucose-dependent manner, reducing post-prandial glycaemic excursions without hypoglycaemia risk at standard doses.
- **Glucagon suppression:** Inhibits alpha-cell glucagon secretion during hyperglycaemia, reducing hepatic glucose output.
- **Cardiovascular benefits:** Reduces MACE via direct GLP-1R signalling in cardiomyocytes and vascular endothelium, independent of weight loss effects (SELECT trial, 2023).

3. FlexPen Operating Instructions

The VitalPep Pro FlexPen is a reusable multi-dose injection pen pre-filled with Semaglutide (10 mg / 3 ml). Each unit on the dose dial delivers exactly 0.01 ml (10 µl) of solution. The pen accepts standard 31-gauge or 32-gauge pen needles (4–8 mm). Follow the steps below before every injection.

■ **Step 1 — Prepare the pen**

Remove the pen cap. Inspect the cartridge window: the solution should be clear and colourless. Do not use if particulates are visible or if the solution appears cloudy or discoloured. Attach a new sterile pen needle by screwing it clockwise until firmly seated. Remove both the outer and inner needle caps and set aside.

■ **Step 2 — Prime the needle**

Select 2 units on the dose dial by turning the dial clockwise. Point the pen needle upward and tap the cartridge gently to collect any air bubbles at the top. Press the injection button fully until it clicks and a small stream (or droplet) appears at the needle tip. Repeat if no flow is seen. Priming removes air and confirms the pen is working correctly.

■ **Step 3 — Set your dose**

Dial your required dose by turning the dose selector clockwise. For example, to inject 1 mg, dial to 30 units; for 2 mg, dial to 60 units. The current dose is displayed in the dose window. You can turn anti-clockwise to reduce the dose before injecting — the pen will not dispense solution while dialling.

■ **Step 4 — Choose the injection site**

Subcutaneous injection sites: abdomen (at least 5 cm from the navel), outer thigh, or upper arm. Rotate sites with each injection to avoid lipohypertrophy. Wipe the skin with an alcohol swab and allow to air-dry for 10 seconds before injecting.

■ **Step 5 — Inject**

Pinch a fold of skin with two fingers. Insert the needle at a 45–90° angle (use 90° for a 4 mm needle, 45° for longer needles). Press the injection button slowly and firmly until it stops. Hold the button down and count to 10 seconds before withdrawing — this ensures full dose delivery and prevents backflow.

■ **Step 6 — Withdraw and recap**

Withdraw the needle at the same angle it was inserted. Do not rub the injection site. Replace the outer needle cap using the one-hand scoop method, then unscrew and safely dispose of the used needle in a sharps container. Replace the pen cap. Never store the pen with the needle attached.

■ **Step 7 — Storage after use**

Store the pen at 2–8 °C (refrigerated) when not in active use. Do not freeze. The pen may be kept at room temperature (up to 25 °C) for a maximum of 28 days during an active dosing cycle. Record the date of first use on the pen label.

■ **Always use a new sterile needle for each injection. Sharing pens or needles poses a serious infection risk. The cartridge is pre-filled and sealed — do not attempt to refill or modify the pen.**

4. Research Dosing Protocol

Concentration 3.33 mg/ml — 1 unit on the pen dial = 0.01 ml = 0.0333 mg | 30 units = 1 mg | 60 units = 2 mg

Semaglutide is administered once weekly by subcutaneous injection. The escalation schedule below mirrors the Phase 3 STEP trial protocol and the standard reference dosing framework documented at peptidedosages.com. Gradual escalation allows gastrointestinal tolerance to develop before reaching the active research dose.

Weekly Dose Escalation Schedule

Phase	Weeks	Weekly Dose	Units to Dial	Volume (ml)	Frequency
Initiation	1–4	0.25 mg	8 units*	0.075 ml	Once weekly
Escalation 1	5–8	0.5 mg	15 units	0.15 ml	Once weekly
Escalation 2	9–12	1.0 mg	30 units	0.30 ml	Once weekly
Maintenance	13+	2.0 mg	60 units	0.60 ml	Once weekly

* Dial to 8 units (nearest whole unit) for the 0.25 mg initiation dose — delivers 0.267 mg. Within acceptable research variance for the initiation phase.

Pen longevity: At 2.0 mg/week maintenance (60 units), the 10 mg cartridge provides approximately 5 weekly doses per pen. At the 0.5 mg escalation phase (15 units), the cartridge provides approximately 20 weekly doses.

Dose day: Choose a consistent weekly injection day. Administer on the same day each week. If a dose is missed by more than 5 days, skip and resume on the next scheduled day.

■ **Semaglutide causes dose-dependent nausea in research models. Do not exceed the escalation schedule. If GI effects occur at a given dose level, remain at that dose for an additional 2–4 weeks before escalating. Never exceed 2 mg per weekly injection (60 units).**

■ **Semaglutide may augment hypoglycaemia risk when combined with insulin or sulphonylureas in metabolic research protocols. Monitor glucose parameters carefully in combined-agent studies.**

5. Storage & Handling

In-use storage	Up to 25 °C for a maximum of 28 days during active dosing cycle
Between-use	2–8 °C (refrigerated) · do not freeze
Light protection	Keep pen cap on at all times when not injecting
Inspection	Solution must be clear, colourless, and free of particles
Expiry	Do not use after printed expiry or 28 days post first puncture

6. Key References

Wilding JPH et al. (2021). Once-Weekly Semaglutide in Adults with Overweight or Obesity. N Engl J Med. 384(11):989–1002.

Marso SP et al. (2016). Semaglutide and Cardiovascular Outcomes in Patients with Type 2 Diabetes. N Engl J Med. 375(19):1834–1844.

Davies M et al. (2021). Semaglutide 2.4 mg once a week in adults with overweight or obesity, and the effect of discontinuation. Lancet. 397(10278):971–984.

Lincoff AM et al. (2023). Semaglutide and Cardiovascular Outcomes in Obesity without Diabetes (SELECT). N Engl J Med. 389:2221–2232.

peptidedosages.com — Semaglutide average research dosing protocols (accessed 2026).