



GLP-1 Receptor Agonist

# Semaglutide

## What It Is & What It Does

Semaglutide copies a gut hormone called GLP-1 that your body releases after eating. It tells your brain you're full earlier and keeps food moving through your stomach more slowly, so hunger takes longer to come back. It's given once a week because it's engineered to stick around in the bloodstream for days instead of the minutes the natural hormone lasts.

## What The Research Shows

- In the largest trial (STEP 1), people lost an average of 14.9% of their body weight over 68 weeks, versus 2.4% on placebo.
- About 39-40% of the weight lost in trials was lean muscle, not fat — driving interest in pairing it with resistance training or muscle-preserving compounds like MOTS-c.
- Also separately approved for reducing heart attack and stroke risk in people with existing heart disease, independent of weight lost.

## Men's & Women's Health Research

### Men / General

- A published meta-analysis of GLP-1 drugs (14 studies, including semaglutide specifically) found men lose statistically significantly less weight than women on the same drug — for semaglutide, the difference was about 1.04kg less on average.
- GLP-1 receptors are directly expressed in testicular tissue, and clinical evidence points to improved sperm parameters in men with obesity-related hypogonadism (low testosterone linked to excess weight), though this is described as an indirect effect of weight loss and improved insulin sensitivity rather than a proven direct action on sperm.

### Women

- Real-world prescribing data shows semaglutide/tirzepatide use in women with PCOS grew more than 7-fold between 2021 and 2025 (2.4% to 17.6% of PCOS patients), even though PCOS isn't an FDA-approved indication — this is happening because of the metabolic/hormonal overlap, not formal approval.
- In PCOS-model animal studies, GLP-1 drugs reduced testosterone and LH levels and improved ovarian morphology; small human trials in PCOS (combined with metformin) showed improved insulin resistance and modest weight loss.
- A meta-analysis of RCTs in women with PCOS specifically found reduced BMI, waist circumference, and total testosterone with GLP-1 therapy.

## Reported Side Effects

- Nausea, vomiting, diarrhea, constipation — most common, dose-dependent
- Injection site reactions, generally mild
- Rare but serious: pancreatitis, gallbladder disease
- Boxed warning for thyroid tumor risk, based on rodent studies (not confirmed in humans)

## Regulatory Status

FDA-approved in specific prescription forms (Ozempic, Wegovy, Rybelsus) under physician supervision. Not approved specifically for PCOS. Research-grade material is not the approved pharmaceutical product.

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## Tumor Growth Research Note — Semaglutide

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**Category:** GLP-1 — FDA Boxed Warning (Rodent Data)

This compound carries an FDA boxed warning for thyroid C-cell tumor risk, based on findings in rodent studies. This has not been confirmed in humans, but it was serious enough to require a mandatory label warning on the approved pharmaceutical version, and is a different mechanism from the angiogenesis/IGF-1 pathways covered elsewhere in the full research review — specific to how GLP-1 receptor activation affects thyroid C-cells in rodents.

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*This note is a compound-specific excerpt. For the complete framework, full evidence review, and all compound categories, see the standalone document: Can Peptides Cause Tumor Growth? — A Deep-Dive Research Summary. For laboratory and research use only. Not for human or veterinary use. Nothing here constitutes medical advice or a screening recommendation.*



# Semaglutide

Oral formulation update

## Oral Semaglutide (Wegovy Tablet) — FDA-Approved Since This Document Was Written

In December 2025, the FDA approved a 50mg oral semaglutide tablet (oral Wegovy) for weight management -- the first approved GLP-1 pill specifically for that indication, available in pharmacies starting January 2026.

The OASIS 4 Phase 3 trial supporting approval showed an average of 16.6% body weight loss over 64 weeks, broadly comparable to injectable semaglutide.

This is a new formulation of the same active compound already covered in this document -- it does not change semaglutide's underlying research profile, side effect pattern, or the PCOS-related findings above.

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