

Semaglutide — Research Summary

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1. What It Is

Semaglutide is a glucagon-like peptide-1 (GLP-1) receptor agonist. Unlike most compounds in this set, semaglutide IS an FDA-approved prescription drug (Ozempic for type 2 diabetes; Wegovy for chronic weight management) — its research/RUO relevance here is limited to non-prescription, non-pharmacy-dispensed material.

Mechanism: GLP-1 receptor activation in hindbrain and hypothalamic circuits (dorsal vagal complex, arcuate nucleus) reduces energy intake and slows gastric emptying; central GLP-1 receptor engagement is necessary for the weight-loss effect in animal knockout models.

2. Reported Effects in Research Literature

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- Animal data: GLP1R conditional knockout and pharmacological blockade studies in mice show central nervous system GLP-1 receptor signaling (via cAMP-dependent pathways in hindbrain neurons) is required for semaglutide's weight-loss and food-intake-suppressing effects.
- Human data: The STEP program (Phase 3a, ~4,500 adults with overweight/obesity) established semaglutide 2.4 mg once-weekly efficacy, leading to FDA approval for chronic weight management.
- Human data: A systematic review of 9 RCTs/case-control studies found semaglutide 2.4 mg produced mean weight loss of 14.9% versus 2.4% placebo (mean difference -12.4 percentage points, $P < 0.001$).

3. Clinical & Preclinical Study References

STEP program summary. NCT05040971 protocol documentation, Novo Nordisk.

Systematic review: Semaglutide in Obesity and Type 2 Diabetes Management. PMC11887937.

Chao AM, et al. Semaglutide for Weight Loss: Was It Worth the Weight? PMID: 36201244

Semaglutide drives weight loss through cAMP-dependent mechanisms in GLP1R-expressing hindbrain neurons (mouse model). bioRxiv 2025.

Regulatory/Safety Note: Semaglutide is FDA-approved by prescription (Ozempic, Wegovy).

Non-prescription/compounded/research-labeled semaglutide is a distinct regulatory category from the approved product and carries its own sourcing, purity, and legal risk considerations independent of the drug's approval status.

This compound has not been evaluated by the FDA and is not intended to diagnose, treat, cure, or prevent any disease in humans or animals.

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