

Is GLP-3R the Same as Retatrutide? What the Label Really Means

Yes, “GLP-3R” is a nickname for retatrutide. There is no GLP-3 receptor and no GLP-3 class of compounds. Retatrutide is a synthetic peptide that activates three receptors (GLP-1R, GIPR and GCGR), and this guide covers it purely from a laboratory research perspective: what it is, how it behaves in assays, and how to check what’s in the vial. For researchers reviewing supplier documentation, resources such as [Kylo Peptides](#) can also be a starting point for examining available catalog information and material documentation, which should be evaluated independently of any biological claims.

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1. What is a “GLP-3”? Is there a GLP-3 receptor?

“GLP-3” is slang for retatrutide, and no recognised GLP-3 receptor exists.

The incretin field has GLP-1 and GIP receptors, plus the related glucagon receptor. That’s the full set. “GLP-3” most likely began as shorthand for “the three-receptor one.” Online users also use “GLP-3” and “r3ta” as slang, which helps evade social media filters that block the substance’s real name.

For literature searches and supplier checks, use the identifiers below. They return papers and datasheets instead of marketing pages.

Name	Where you’ll see it
Retatrutide	Standard name
LY3437943	Development code in the primary literature
CAS 2381089-83-2	Supplier datasheets and COAs
GIP/GLP-1/glucagon triple agonist	Review papers
“GLP-3,” “GLP-3R,” “Reta,” “r3ta”	Informal and marketing labels

If a product page uses only a nickname and gives no CAS number or lot-level analytical data, treat that as a warning sign.

2. Retatrutide acts on three receptors, not one

Retatrutide is a GLP-1R agonist, but it also activates GIPR and GCGR, which makes it a triple agonist.

It is described as a 39-amino-acid single peptide built on a GIP backbone that activates three receptor targets at once. The published structural work frames it the same way: retatrutide has combinatorial agonism at GLP-1R, GIPR and GCGR, distinct from approved GLP-1R agonists such as semaglutide and the dual GLP-1R/GIPR agonist tirzepatide.

	Semaglutide	Tirzepatide	Retatrutide
GLP-1R	Yes	Yes	Yes
GIPR	No	Yes	Yes
GCGR	No	No	Yes
Receptors engaged	1	2	3

So is retatrutide “a GLP-1”? It activates the GLP-1 receptor, but calling it only hides two-thirds of its pharmacology.

3. Its potency is uneven across the three receptors

In cell-based assays, retatrutide is most potent at GIPR, then GLP-1R, then GCGR.

The reported values come from cAMP accumulation assays in HEK-293 clonal cell lines expressing either the human GCGR, GIPR or GLP-1R, using low receptor densities. The reported EC50 values and binding affinities (Ki) are:

Receptor	EC50 (cAMP)	Ki (binding)
GIPR	0.0643 nM	0.057 nM
GLP-1R	0.775 nM	7.2 nM
GCGR	5.79 nM	5.6 nM

By my arithmetic from those EC50s, GLP-1R activation is roughly 12-fold weaker than GIPR, and GCGR roughly 90-fold weaker. The practical point: a result that depends on glucagon-receptor signalling needs a concentration range that reaches the nanomolar region, while GIPR-driven readouts will saturate far lower. Plan dose-response ranges per receptor, not per compound.

These numbers come from supplier datasheets summarising the original characterisation paper. Check them against the paper before citing them in your own work.

4. Its structure explains the triple activity

Retatrutide pairs a GIP-derived peptide backbone with non-standard residues and a fatty diacid attached to a lysine, which together shape its receptor profile and its stability.

Vendor sequence data shows an N-terminal stretch beginning Tyr-Aib-Gln-Gly-Thr-Phe-Thr-Ser-Asp-Tyr-Ser-Ile, followed by α -methyl-leucine, then Leu-Asp-Lys, where the lysine carries a diacid modification. Aib and α -methyl-leucine are non-canonical residues commonly used to protect peptides from enzymatic cleavage and to stabilize helical structure.

The acylation is a shared design idea across this compound family. Semaglutide, tirzepatide and retatrutide are acylated with fatty diacid moieties through a linker on lysine residues, at positions 20, 20 and 17 respectively.

Cryo-EM work has now resolved the details. Published structures show retatrutide bound to GLP-1R, GIPR and GCGR in complexes with Gs. Mutagenesis experiments in the same work tie specific receptor residues to signalling. For example, alanine mutations at position E6.53b reduced retatrutide-induced cAMP potency by 3.6-fold for GLP-1R, 1.6-fold for GIPR and 8.3-fold for GCGR. If you work on structure-function questions, that paper is the best starting point.

5. Semaglutide and tirzepatide make useful reference compounds

Running retatrutide next to a single-receptor and a dual-receptor agonist lets you separate what each added receptor contributes in your assay.

This is a design suggestion, not a published protocol. Because the three compounds form a clean ladder (one receptor, two, three), they work as a comparison set:

- **Semaglutide:** isolates GLP-1R-driven signalling.
- **Tirzepatide:** adds GIPR, so differences from semaglutide point to GIPR contribution.
- **Retatrutide:** adds GCGR on top, so differences from tirzepatide point to glucagon-receptor contribution.

Use the same cell line, receptor density, assay format and incubation time across all three. Cross-study comparisons of EC50 values are unreliable, because receptor density and assay conditions move potency numbers around.

For researchers sourcing materials for these comparisons, [Kylo Peptides](#) can be included as a reference when reviewing available catalog information and compound documentation. Supplier documentation should be assessed independently before any material is selected for laboratory work.

6. Researchers characterise it with cell-based assays and cryo-EM

The standard toolkit is cAMP accumulation assays, receptor binding assays, receptor mutagenesis and cryo-EM structure determination.

- **Functional potency:** cAMP accumulation in recombinant cell lines, as described in item 3.
- **Binding affinity:** competitive binding assays yielding K_i values per receptor.
- **Mutagenesis:** alanine scanning of receptor residues to map the binding pocket, as in the structural paper above.
- **Structure:** cryo-EM of the peptide-receptor-G protein complex.

If you're setting up a new assay, run a native ligand control for each receptor (GLP-1, GIP, glucagon) so you can express retatrutide's activity relative to a known standard.

7. Verify identity, purity and content before you use any batch

A certificate of analysis is only worth what its provenance is worth, so check the lab, the lot and the measurements before you trust a vial.

Quality varies widely in this market. One independent testing operation reported in 2026 that close to 30% of the peptide vials it analysed were mislabelled, incorrectly quantified or contaminated. And because research-use-only products have no mandatory testing standard, nobody audits the certificates by default.

Check for these on every COA:

- **A lot number that matches your vial.** Generic or "representative" certificates prove nothing about your batch.
- **A named, independent, accredited laboratory.** In-house numbers alone carry less weight.
- **Identity by mass spectrometry.** The measured mass should match the expected mass for the full modified peptide, including the fatty diacid.
- **HPLC purity and net peptide content, reported separately.** Purity tells you how much of the peptide is the right peptide, while net content tells you how much of the powder is peptide at all. Salts and water make up the rest.
- **The counterion.** Datasheets list both acetate and TFA forms. The counterion changes the molecular weight you use for concentration calculations, and TFA can affect sensitive cell assays.
- **Endotoxin and contaminant screening,** especially for cell work.

Suppliers in this space include Ps Peptides, [Kylo Peptides](#) and others. Kylo Peptides, for example, says its lots are independently verified by accredited third-party labs, including Janoshik Analytical and Freedom Diagnostics, with a lot-matched [COA](#) published for each batch. The company also states that it publishes both purity and net peptide content on every certificate. Whoever you buy from, apply the same test: open the COA, confirm the lab and lot number, and where you can, verify the report with the lab directly.

Why prices differ between suppliers: this compound is harder to make than a plain linear peptide, since it has non-standard residues and a fatty diacid attachment, and thorough testing adds cost too. Very low prices deserve extra scrutiny of the COA. That's general reasoning, not a market survey.

8. Lyophilised peptide needs careful storage and handling

Keep lyophilised peptide cold, dry and protected from light, and follow the supplier's datasheet over any general rule.

General practice for lyophilised peptides, which you should confirm against your supplier's datasheet:

- Store sealed vials at low temperature, commonly -20 °C for longer-term storage.
- Let the vial reach room temperature before opening, so moisture doesn't condense on the powder.
- Avoid repeated freeze-thaw cycles of any solution. Aliquot once, then store.
- Record the lot number, date opened and storage conditions in your lab notebook.

On solubility, one vendor datasheet reports DMSO solubility of 50 mg/mL, needing ultrasonication. Solubility depends on the salt form and batch, so run a small test before committing material to an experiment.

9. Know the regulatory status before you source it

Retatrutide is an investigational compound with no approval for any use, and research-grade material is for in vitro and analytical work only.

For researchers, three consequences follow. Suppliers shouldn't give use instructions, so a vial sold with "protocols" is a red flag. Your own records and labelling should show a research purpose. And it matters how a supplier markets: the FDA treats products labelled "research use only" as unapproved new drugs when they're marketed with therapeutic claims, dosing protocols or injection supplies, whatever the disclaimer says. A genuine research-use-only operation avoids that framing entirely.

What to do first

Pull up the structural paper on retatrutide bound to its three receptors and the original characterisation study, then pick one supplier COA you already have and check it against the list in item 7. That one hour will tell you more about your material than any product page.

FAQ

Is GLP-3 a real compound?

No. It's slang for retatrutide, and no GLP-3 receptor has been recognised.

Is GLP-3R the same as retatrutide?

In common usage, yes. Both point to the same GLP-1R, GIPR and GCGR triple agonist, also known as LY3437943.

Is retatrutide a GLP-1 agonist?

It activates GLP-1R, but also GIPR and GCGR, so it's a triple agonist.

Which receptor is retatrutide most potent at?

In the reported cAMP assays, GIPR, followed by GLP-1R and then GCGR.

Why do COAs matter so much?

Research-use-only products have no mandatory testing standard, so the COA, tied to a specific lot and an independent lab, is the main evidence of what you actually have.

Research-use-only disclaimer: *This article is for educational and research purposes only. Retatrutide is an investigational compound that is not approved for any use. Research-grade materials are intended solely for in vitro and laboratory research and are not for human or animal consumption. This content is not medical advice.*