

CELL-BASED ASSAY PERFORMANCE REPORT

GLP-1 Cell-Based Assay *Performance*

Functional comparability against a commercial reference standard.

A functional comparability evaluation of LuvionBio CDMO test article against a commercial reference standard, performed independently by Reaction Biology Europe GmbH using cAMP-based receptor activation in engineered HEK293 cell lines.

TESTING
LABORATORY

**Reaction Biology
Europe GmbH**

PROJECT NUMBER

PQ25445

STUDY DATE

31 March 2026

DOCUMENT

v1.0 · 29 April 2026

01 · EXECUTIVE SUMMARY

A close functional match against the *commercial reference standard*.

In an independent cAMP-based GLP-1R activation assay, the LuvionBio CDMO GLP-1 test article produced a dose-response profile within approximately 9.5% of the commercial reference standard.

LuvionBio commissioned Reaction Biology Europe GmbH to evaluate the agonistic activity of a LuvionBio CDMO GLP-1 test article on the glucagon-like peptide-1 receptor (GLP-1R), measured by intracellular cAMP accumulation in engineered HEK293 cells. The commercial reference standard was sourced and prepared by the testing laboratory.

LUVIONBIO CDMO —
EC₅₀

1.05 × 10⁻¹⁰

g/mL · GLP-1R

cAMP-based activation, 4-PL fit
(Reaction Biology Europe).

REFERENCE STANDARD
— EC₅₀

1.16 × 10⁻¹⁰

g/mL · GLP-1R

Commercial reference standard
sourced by Reaction Biology.

Δ FROM REFERENCE

9.5%

EC₅₀ percent difference

Falls within the **Excellent alignment** tier of LuvionBio's internal review framework (≤ 10%).

BOTTOM LINE

The LuvionBio CDMO GLP-1 test article and the commercial reference standard produced **nearly superimposable dose-response curves** on GLP-1R, with EC₅₀ values within roughly one part in ten of one another. This is a stronger quality signal than purity alone, because it speaks to the functional behavior of the molecule in a biologically relevant assay system.

Why *functional* performance matters.

A peptide can test at high purity and still fail to perform. Functional comparability against a recognized reference is a more meaningful quality signal than purity alone.

The RUO peptide market has historically anchored itself to a single number: purity. A "99% purity" claim has become shorthand for quality, but it describes only the chromatographic profile of the molecule. It does not describe whether the molecule *works*.

Sequence integrity, secondary structure, residual solvents, degradation products, oxidation state, manufacturing discipline, handling, lyophilization conditions, and storage history all influence whether a synthesized peptide produces the biological response associated with its reference compound. None of these are captured by purity testing alone.

What a cell-based potency comparison adds

A cell-based receptor activation assay places the test article inside a biologically relevant signaling system and measures whether it activates the intended receptor with potency comparable to a recognized commercial reference standard. It is a functional performance check, not a structural check, and answers a different and more demanding question: **does this peptide behave like the reference?**

PLAIN LANGUAGE

Purity tells you what is in the bottle. A cell-based potency comparison tells you whether what is in the bottle activates the receptor the same way the commercial reference does — at the same concentration range, in the same direction, with the same shape of dose response.

Why LuvionBio commissioned this work

LuvionBio commissioned independent testing at Reaction Biology Europe GmbH to evaluate whether the LuvionBio CDMO test article reproduces the functional dose-response behavior of a commercial reference standard sourced and prepared by the testing laboratory. The result is a transparent record of how closely the LuvionBio CDMO material aligns with that reference in a defined, reproducible assay system.

03 · INTERPRETATION

An *internal* comparative review framework.

A simple, transparent way to interpret how closely a LuvionBio test article aligns with the commercial reference standard in this specific assay model.

The framework below is used internally by LuvionBio to describe the closeness of fit between a test article and its reference standard for this category of cell-based receptor activation assay. EC₅₀ values are compared on a percent-difference basis from the reference.

Within 10%	Excellent alignment	Highly comparable functional performance to the reference standard in this assay model.
10% – 20%	Strong alignment	Acceptable functional similarity in this assay model.
20% – 35%	Moderate alignment	Functional similarity is partial; further internal review is recommended before release.
> 35% deviation	Low alignment	May indicate poor comparability to the reference standard in this assay model and warrants investigation.

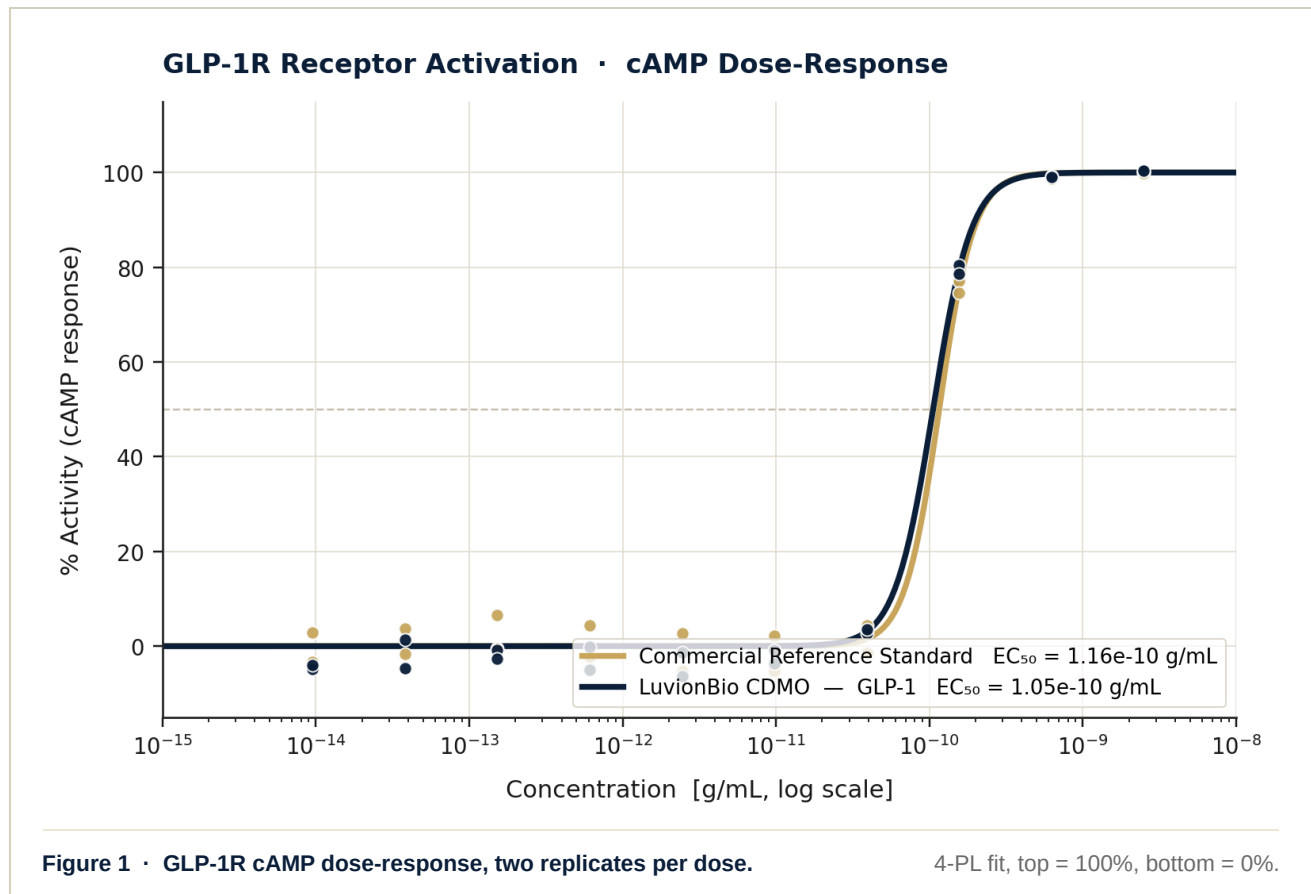
IMPORTANT FRAMING

This framework is an internal comparative review tool used by LuvionBio. It is not a regulatory potency standard, an industry benchmark, or a certified release specification. It is presented here to make the interpretation of the results in this report transparent and reviewable.

04 · RESULTS

GLP-1R receptor activation — *dose response.*

cAMP accumulation in engineered HEK293-GLP-1R cells across a 10-point dose range, 4-parameter logistic fit, two replicates per dose.



KEY TAKEAWAY The LuvionBio CDMO curve overlays closely with the commercial reference standard across the full dose range. EC₅₀ values differ by approximately **9.5%**, which falls inside the **Excellent alignment** tier (≤ 10%) of the LuvionBio internal comparative review framework.

Full methodology, cell system details, and assay parameters are summarized in the Appendix on page 9.

Side-by-side *numerical* comparison.

A one-page view of the LuvionBio CDMO test article versus the commercial reference standard, with the interpretation tier applied.

GLP-1R · CAMP ACTIVATION

Excellent alignment with the reference standard.

A 9.5% EC₅₀ deviation places the LuvionBio CDMO test article inside the top tier of the internal framework.

LUVIONBIO CDMO — GLP-1

1.05 × 10⁻¹⁰ g/mL

EC₅₀, GLP-1R cAMP activation

COMMERCIAL REFERENCE

1.16 × 10⁻¹⁰ g/mL

EC₅₀, sourced by testing lab

COMPARISON METRIC	VALUE	INTERPRETATION
EC ₅₀ percent difference from reference	9.5%	Within ±10% · Excellent alignment
Direction of difference	-9.5%	LuvionBio CDMO EC ₅₀ is slightly lower (numerically more potent in this assay).
Curve shape (4-PL fit)	Comparable	Sigmoidal dose response with comparable Hill slope.
Plateau behavior	Comparable	Both curves plateau near 100% normalized activity at top doses.

PLAIN ENGLISH

Across every dose tested, the LuvionBio CDMO GLP-1 test article tracks the commercial reference standard closely — the two curves are nearly indistinguishable on the plotted scale.

What this means for the *RUO peptide market*.

A first step toward functional benchmarking, not a replacement for the work that still needs to be done.

The research-use-only peptide category has matured rapidly, but its quality vocabulary has not kept pace. Marketing claims still center on a single number — purity — even though purity alone has well-known limitations as a quality indicator for synthesized peptides.

A move toward functional evidence

Independent third-party cell-based potency testing against a recognized commercial reference standard introduces a different kind of evidence into the conversation: evidence about whether the molecule works as expected in a biologically meaningful assay system. This evidence is harder to fake, harder to overstate, and easier for technical buyers to evaluate than isolated purity claims.

What this study is, and what it isn't

- **It is** a single-batch comparative potency assay performed by an independent CRO using a defined cAMP-based receptor activation system, with the LuvionBio CDMO test article evaluated against a commercial reference standard.
- **It is not** a substitute for batch-to-batch consistency data, stability data, or a full qualification dataset.
- **It is not** a regulatory potency assay or a release specification.

LUVIONBIO'S POSITION

This study represents an early step toward a more complete quality framework for RUO peptides — one that evaluates not only purity, but also **functional performance against recognized reference standards**.

How LuvionBio thinks about *quality*.

*Reference-standard benchmarking, third-party testing, and documented evidence
— applied at the batch level, not the marketing level.*

SUPPLIER QUALIFICATION

LuvionBio evaluates manufacturing partners against documented functional performance criteria, not vendor self-attestations.

MANUFACTURING DISCIPLINE

Synthesis, purification, lyophilization, and handling steps are controlled and reviewed against internal specifications.

THIRD-PARTY TESTING

Independent CROs are engaged for orthogonal characterization, including the cell-based assay work documented in this report.

BATCH-LEVEL QC

Quality control is applied to representative batches with the intention of generating evidence reviewable by technical partners.

REFERENCE-STANDARD BENCHMARKING

Where possible, LuvionBio test articles are compared against recognized commercial reference standards in defined assay systems.

SCIENTIFIC ACCOUNTABILITY

Results are reported as found — including the underlying source data, the testing laboratory, and the project identifier — so technical reviewers can independently evaluate the evidence.

POSITION

LuvionBio is committed to raising the floor on what counts as evidence of quality in the RUO peptide category. This report is one piece of that commitment — and is not the last piece.

Source Data Summary.

The numbers in this report, traceable to the underlying Reaction Biology study.

EC₅₀ values

SAMPLE	RECEPTOR	EC ₅₀ (G/ML)	Δ VS REFERENCE	TIER
Commercial Reference Standard	GLP-1R	1.16 × 10 ⁻¹⁰	—	—
LuvionBio CDMO — GLP-1	GLP-1R	1.05 × 10 ⁻¹⁰	9.5%	Excellent alignment

Assay summary

PARAMETER	VALUE
Testing laboratory	Reaction Biology Europe GmbH, Freiburg, Germany
Project number · Date	PQ25445 · 31 March 2026
Cell system	Engineered HEK293 cells expressing human GLP-1R
Readout	Intracellular cAMP via competitive TR-FRET (LANCER® Ultra cAMP, Revvity)
Stimulation	10 doses, 75 min at 37 °C, 2 replicates per concentration
Normalization & fit	0% = no-compound control, 100% = top-dose reference; 4-PL fit (top = 100%, bottom = 0%)

The complete underlying Reaction Biology study report and raw plate-reader data are retained by LuvionBio and made available to qualified technical partners under appropriate agreements.

Claims Substantiation Review.

Every major claim in this report, classified by the strength of its underlying support.

CLAIM MADE IN THIS REPORT	SUPPORT TYPE	SOURCE
LuvionBio CDMO GLP-1 $EC_{50} = 1.05 \times 10^{-10}$ g/mL on GLP-1R	DIRECT	Reaction Biology PQ25445, Table 1
Reference standard $EC_{50} = 1.16 \times 10^{-10}$ g/mL on GLP-1R	DIRECT	Reaction Biology PQ25445, Table 1 / plots
EC_{50} percent difference of approximately 9.5%	DIRECT	Calculated from source EC_{50} values
Dose-response curves track closely across the tested range	DIRECT	Reaction Biology PQ25445, plot file
Result falls within LuvionBio's "Excellent alignment" tier	INFERRED	LuvionBio internal framework applied to source data
Functional comparability is a stronger quality signal than purity alone	INDUSTRY CONTEXT	General peptide manufacturing literature
Cell-based potency assays are not regulatory release specifications	INDUSTRY CONTEXT	General regulatory framing

HOW TO READ THIS TABLE

Direct = read off the source report. **Inferred** = LuvionBio framework applied. **Industry context** = widely held views, not specific to this study.

Research Use Only.

The materials referenced in this report are RUO products. The scope and limits of permitted use are stated below.

RESEARCH USE ONLY DISCLAIMER

All LuvionBio materials referenced in this report are provided strictly for laboratory research use only. They are not intended for human consumption, clinical use, diagnostic use, therapeutic use, veterinary use, or household use. This report is provided for informational and research-quality evaluation purposes only and does not constitute medical, clinical, or regulatory advice.

About the testing laboratory

The data in this report were generated by Reaction Biology Europe GmbH, an independent contract research organization specializing in biochemical and cellular pharmacology assays. LuvionBio commissioned this work and is the data owner. The reference standard used in the assay was sourced and prepared by the testing laboratory.

About this document

This document is a customer-facing summary of selected data from the underlying Reaction Biology study. The complete underlying study report and raw data are retained by LuvionBio and are available to qualified technical partners under appropriate agreements.