LUVIONBIO

BRILLIANCE IN BIOSCIENCE

FOR RESEARCH USE ONLY

CELL-BASED ASSAY PERFORMANCE REPORT

GLP-2 Cell-Based Assay *Performance*

Functional comparability across two receptor systems 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	PROJECT NUMBER	STUDY DATE	DOCUMENT
Reaction Biology Europe GmbH	**PQ25445**	**31 March 2026**	**v1.0 · 29 April 2026**

01 · EXECUTIVE SUMMARY

A close functional match across *both receptors*.

In an independent cAMP-based assay measuring activation of GLP-1R and GIP-R, the LuvionBio CDMO GLP-2 test article produced dose-response profiles within approximately 8% of the commercial reference standard at GLP-1R and within 7% at GIP-R.

GLP-1R · Δ FROM REFERENCE

8.0%

EC_{50}: 2.30 vs 2.50 × 10^{-10} g/mL

Excellent alignment tier (≤ 10%).

GIP-R · Δ FROM REFERENCE

6.2%

EC_{50}: 1.89 vs 1.78 × 10^{-10} g/mL

Excellent alignment tier (≤ 10%).

CURVE SHAPE

Closely overlapping

across the full dose range

Sigmoidal dose response with comparable Hill slope on both receptors.

NOTE ON RECEPTORS

"GLP-2" is the LuvionBio internal product designation for this test article. The functional assay system used in this study measures activity at the **GLP-1R** and **GIP-R** receptors, against a commercial reference standard evaluated on those same receptors.

BOTTOM LINE

Across both receptors tested, the LuvionBio CDMO GLP-2 test article and the commercial reference standard produced **closely overlapping dose-response curves**, with EC_{50} values within approximately 6 to 8% of one another. Both results sit inside the top tier of LuvionBio's internal comparative review framework.

02 · CONTEXT

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. EC_{50} 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.

04A · RESULTS · GLP-1R

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.

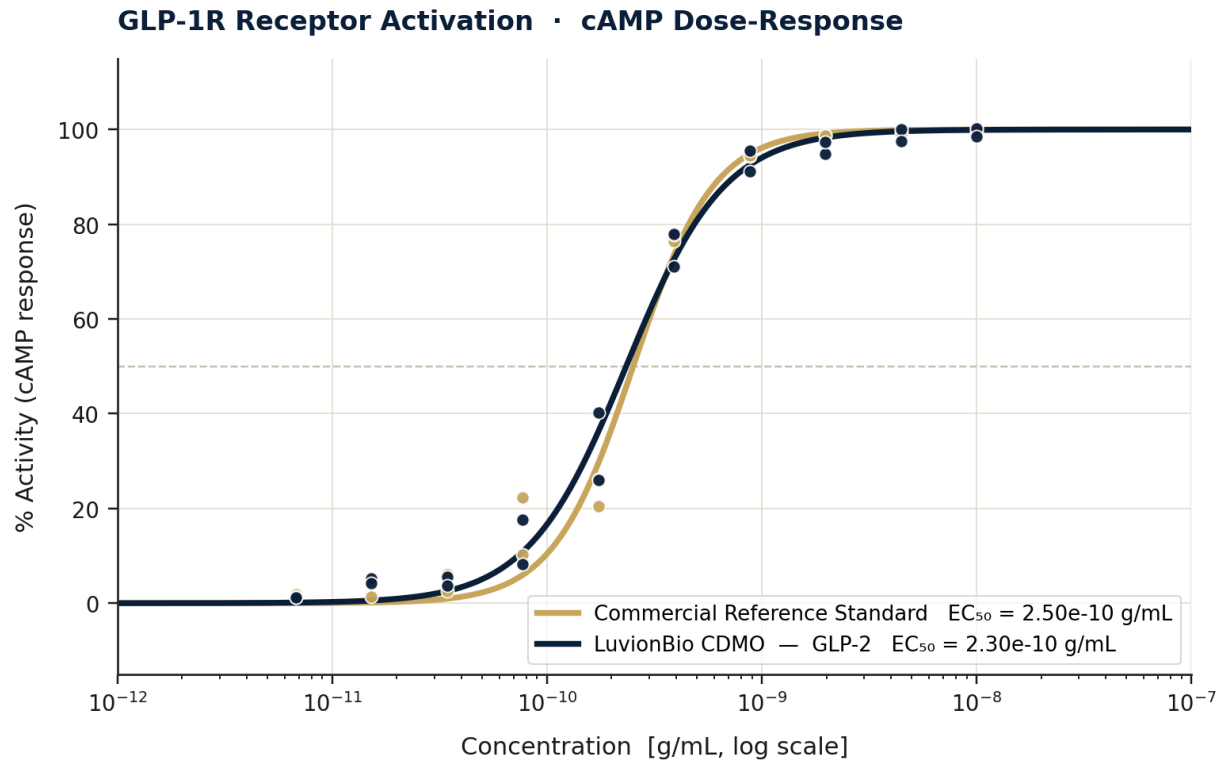

Figure 1 · GLP-1R cAMP dose-response. 4-PL fit, top = 100%, bottom = 0%.

TAKEAWAY · GLP-1R

EC_{50} deviation of approximately **8.0%** places this result inside the **Excellent alignment** tier (≤ 10%). The LuvionBio CDMO curve tracks the reference closely, with the LuvionBio EC_{50} slightly lower (numerically more potent in this assay).

The companion GIP-R receptor analysis follows on the next page. Full methodology and assay parameters are summarized in the Appendix on page 10.

04B · RESULTS · GIP-R

GIP-R receptor activation — *dose response*.

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

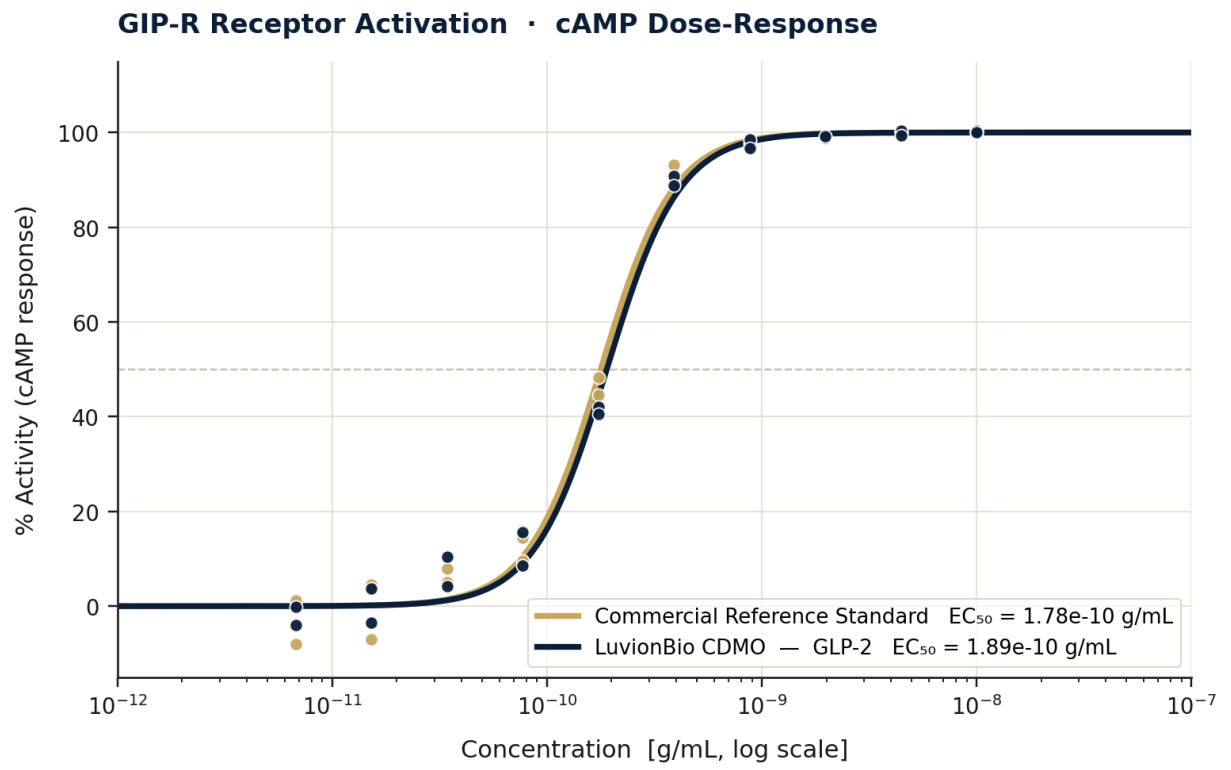

Figure 2 · GIP-R cAMP dose-response. 4-PL fit, top = 100%, bottom = 0%.

TAKEAWAY · GIP-R

EC_{50} deviation of approximately **6.2%** places this result inside the **Excellent alignment** tier (≤ 10%). The two curves are essentially superimposable across the responsive dose range.

Full methodology and assay parameters are summarized in the Appendix on page 10.

05 · VISUAL COMPARISON

Side-by-side *numerical* comparison.

A one-page view of the LuvionBio CDMO GLP-2 test article versus the commercial reference standard across both receptors.

GLP-1R · CAMP ACTIVATION

Excellent alignment — 8.0% EC_{50} deviation.

LUVIONBIO CDMO — GLP-2	COMMERCIAL REFERENCE
2.30×10^{-10} g/mL	2.50×10^{-10} g/mL

GIP-R · CAMP ACTIVATION

Excellent alignment — 6.2% EC_{50} deviation.

LUVIONBIO CDMO — GLP-2	COMMERCIAL REFERENCE
1.89×10^{-10} g/mL	1.78×10^{-10} g/mL

COMPARISON	EC_{50} Δ	DIRECTION	TIER
GLP-1R cAMP activation	8.0%	LuvionBio EC_{50} slightly lower (numerically more potent)	Excellent alignment
GIP-R cAMP activation	6.2%	LuvionBio EC_{50} slightly higher (numerically less potent)	Excellent alignment

06 · SIGNIFICANCE

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**.

07 · QUALITY POSITIONING

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**
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> 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.

08 · APPENDIX

Source Data Summary.

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

EC_{50} values

SAMPLE	RECEPTOR	EC_{50} (G/ML)	Δ VS REFERENCE	TIER
Commercial Reference Standard	GLP-1R	2.50×10^{-10}	–	—
LuvionBio CDMO — GLP-2	GLP-1R	2.30×10^{-10}	8.0%	Excellent alignment
Commercial Reference Standard	GIP-R	1.78×10^{-10}	–	—
LuvionBio CDMO — GLP-2	GIP-R	1.89×10^{-10}	6.2%	Excellent alignment

Assay summary

PARAMETER	VALUE
Testing laboratory	Reaction Biology Europe GmbH, Freiburg, Germany
Project number · Date	PQ25445 · 31 March 2026
Cell systems	Engineered HEK293 cells expressing human GLP-1R or human GIP-R
Readout	Intracellular cAMP via competitive TR-FRET (LANCE® 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%)

09 · SUBSTANTIATION

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-2 EC_{50} = 2.30 × 10^{-10} g/mL on GLP-1R	DIRECT	Reaction Biology PQ25445, Table 1
LuvionBio CDMO GLP-2 EC_{50} = 1.89 × 10^{-10} g/mL on GIP-R	DIRECT	Reaction Biology PQ25445, Table 1
Reference standard EC_{50} values (2.50 × 10^{-10} at GLP-1R, 1.78 × 10^{-10} at GIP-R)	DIRECT	Reaction Biology PQ25445, Table 1 / plots
EC_{50} percent differences of approximately 8.0% (GLP-1R) and 6.2% (GIP-R)	DIRECT	Calculated from source EC_{50} values
Dose-response curves track closely across the tested range	DIRECT	Reaction Biology PQ25445, plot file
Both results fall within LuvionBio's "Excellent alignment" tier	INFERRED	LuvionBio internal framework applied to source data
"GLP-2" is a LuvionBio internal product designation; assay measures GLP-1R and GIP-R activation	INFERRED	LuvionBio naming convention; source assay scope
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 or naming applied. **Industry context** = widely held views, not specific to this study.

10 · COMPLIANCE

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.