

The Peptide Guide.

What peptides are, which molecule classes exist, what they are researched for — and how to recognise quality.

What exactly is a peptide?

The shortest honest answer: a short chain of amino acids. The longer answer explains why that makes them so interesting for research.

Amino acids are the building blocks of life. Link several of them into a chain via so-called peptide bonds and you get a **peptide**. If the chain becomes very long and folds into a complex shape, it is called a **protein**. The boundary is fluid — as a rule of thumb: up to about 50 amino acids is a peptide, above that a protein.

The key point

Peptides are **signalling molecules**. They carry no energy and build no tissue — they transmit information. A peptide docks onto a matching receptor, like a key in a lock, and triggers a response there. This precision is exactly what makes them interesting for research: a single signalling pathway can be studied in a very targeted way.

Why the order is everything

The order of the amino acids — the **sequence** — determines the shape of the molecule. The shape determines which receptor it fits. A single swapped amino acid can turn an active molecule into an inactive one. That is why **identity testing** in the lab (by mass spectrometry) is just as important as purity testing.

Natural or synthetic?

Both. Many research peptides are replicas or variants of molecules the body produces itself. GHK-Cu, for example, occurs naturally in blood plasma. Others, such as Semax, were developed in the lab and have no exact natural counterpart. For analytics it makes no difference — what is tested is always what is actually in the vial.

The molecule classes at a glance

Peptides are usually grouped by the research field in which they are studied. These are the classes you will come across most often.

Metabolic peptides (GLP family)

Currently the most studied group. It concerns receptors involved in regulating energy and glucose metabolism.

Molecule	What it is
Semaglutide GLP-1	A GLP-1 receptor agonist — a molecule that docks onto the same receptor as the body's own GLP-1. One of the most intensively studied peptides of all.
Tirzepatide GLP-2	A dual agonist: it targets two receptors instead of one. Subject of metabolic and endocrinological studies.
Retatrutide GLP-3	A triple agonist — three receptor pathways at once. The newest and internationally most sought-after molecule in this group.

Regenerative peptides

Molecule	What it is
TB-500	A synthetic fragment of the body's own protein thymosin β 4. Researched in the context of tissue renewal and repair mechanisms.

Copper peptides (anti-ageing / longevity)

Molecule	What it is
GHK-Cu	A tripeptide (only three amino acids!) that binds a copper ion. Occurs naturally in blood plasma. Studied in dermatological and cell-biology research on skin regeneration and collagen synthesis.

Neuropeptides (nootropics)

Molecule	What it is
Semax	A synthetic neuropeptide derived from a fragment of the hormone ACTH. Studied in relation to cognitive and neuroprotective processes.
Selank	A synthetic neuropeptide derived from tuftsin. Subject of stress-related and anxiolytic research approaches.

Important context

These descriptions state **what a molecule is** and **in which field it is studied**. They make no claim as to whether a substance is effective, safe or suitable for any application. Research peptides are intended exclusively for laboratory use.

Purity — the only number that counts

Two vials can carry the same label and still be completely different. The difference is in the certificate of analysis.

HPLC: how purity is measured

In high-performance liquid chromatography (HPLC), a sample is sent through a separation column. Different molecules take different amounts of time to pass through and therefore appear as separate **peaks** in a diagram. The area under the main peak divided by the total area of all peaks gives the purity as a percentage.

Purity is not the same as peptide content

Two values that are often confused:

Purity (HPLC) — share of the target molecule among all peptide components.

Peptide content — share of the peptide in the total contents of the vial. The rest is water, salts, carriers. A vial can be 99 % pure and still have only 70 % peptide content. Both values are legitimate — anyone who states both has nothing to hide.

How to read a purity claim

Claim	Meaning
99.2 % (HPLC)	A specific measured value with a method. The best you can get.
>99 %	A lower limit. Solid — provided the chromatogram is included.
“High purity”	Not a value. Marketing.
100 %	Warning sign. Analytically practically impossible.

Identity: is it even what the label says?

Purity alone is not enough. A vial can be 99 % pure — and contain the wrong substance. That is why a complete certificate always includes **mass spectrometry**: it determines the molecular weight and thus confirms that the measured molecule is actually the expected one.

In short

Purity tells you: how much foreign matter is in it.

Identity tells you: is it the right substance at all.

Batch number tells you: does this certificate belong to this vial.

If one of the three is missing, the certificate is incomplete.

Storage in the lab

Peptides are sensitive molecules. Incorrect storage quietly destroys what you paid for.

The four enemies

Factor	Why it does harm
Heat	Accelerates the breakdown of peptide bonds. The single most important factor.
Moisture	Lyophilised (freeze-dried) peptide draws water from the air. An opened vial at room temperature is a problem.
Light	UV radiation can damage certain amino acids — especially those with aromatic rings.
Freeze-thaw cycles	Repeated freezing and thawing puts mechanical stress on the molecule. Freeze once, not ten times.

Basic rules of lab practice

- **Lyophilised (powder):** Considerably more stable than in solution. Stored cool, dry and dark, it remains stable for a long time.
- **Cold chain in shipping:** A reputable supplier ships chilled and insulated. A parcel that arrives warm is grounds for a complaint.
- **Aliquoting:** If you work in solution, divide it once into small portions rather than repeatedly opening and freezing the same container.
- **Labelling:** Substance, batch, date. Without the batch number you lose the link to the certificate of analysis.

What this guide does not cover

Reconstitution, dosing, use — you will deliberately find nothing on these here. Research peptides are not intended for use on or in the human body. This section describes storage and handling in a laboratory context only.

How to recognise a reputable supplier

The peptide market is hard to navigate. These nine questions separate the wheat from the chaff.

Checkpoint

- ☐ Is there a COA for **my** batch — not just “an example”?
- ☐ Does the batch number on the COA match the one on the vial?
- ☐ Is a **chromatogram** included, not just a percentage?
- ☐ Is the method stated (HPLC for purity, MS for identity)?
- ☐ Is the testing lab **independent** of the seller and named?
- ☐ Is it shipped chilled and insulated?
- ☐ Is the purity value a specific measurement — and not suspiciously round?
- ☐ Is there a genuine legal notice with reachable contact details?
- ☐ Is it clearly labelled “For Research Purposes Only” — without promises of health benefits?

The three biggest warning signs

- **Claims of effects.** “Burns fat”, “repairs joints”, “sharpens focus” — anyone advertising like this is not selling a research chemical but an unapproved medicine.
- **No chromatogram.** Anyone can type a number. Not a measurement curve.
- **One COA for all batches.** Meaning: not every batch is tested; a good day is documented.

At Peptélia

Every batch comes with a COA from **Janoshik Laboratories** — an independent testing lab that we do not control. Purity by HPLC, identity by MS, batch number on certificate and vial. Shipped chilled from Germany and the EU.

If anything on one of our certificates does not seem plausible to you, write to us: info@peptelia.com

Glossary

Term	Meaning
Amino acid	Building block of a peptide. 20 different ones occur in natural peptides.
Sequence	The order of the amino acids. Determines the shape and function of the molecule.
Agonist	A molecule that binds to a receptor and activates it.
Receptor	Docking site on a cell. The “lock” for the peptide “key”.
HPLC	High-performance liquid chromatography. Standard method for determining purity.
MS	Mass spectrometry. Determines the molecular weight and thus the identity.
COA	Certificate of Analysis. The lab report for a specific batch.
Batch / lot	A production unit. Each batch is tested individually.
Lyophilised	Freeze-dried. The most stable storage form for peptides.
Chromatogram	The measurement curve from HPLC. Shows the peaks from which purity is calculated.
Peak	A spike in the chromatogram. The main peak is the target molecule.

Want to go deeper?

How to read a certificate of analysis line by line, interpret peaks and spot forgeries is covered in our second guide: **“Understanding the COA”** — free at peptelia.com.

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