THE CANADIAN RESEARCHER'S PEPTIDE HANDBOOK

A comprehensive reference guide for Canadian laboratory researchers working with research-grade peptide compounds.

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Introduction

What This Handbook Covers

The Canadian Researcher's Peptide Handbook is a practical reference guide developed for independent researchers, laboratory professionals, and science enthusiasts working with peptide compounds in Canada. This handbook covers everything from foundational peptide science to supplier verification, reconstitution protocols, and a compound-by-compound reference library. Whether you're sourcing your first batch or refining an existing research protocol, this guide is designed to be the most useful resource on your lab bench.

How to Use This Handbook

This guide is structured to be read front-to-back for those new to peptide research, or used as a chapter-by-chapter reference for experienced researchers looking for specific information. Each chapter is self-contained, so feel free to jump directly to what is most relevant to your work. The Compound Reference Library in Chapter 4 is designed as a quick-lookup resource — each entry covers mechanism of action, research applications, and storage requirements in a consistent format so you can compare compounds at a glance.

A Note on Research-Use Compliance in Canada

All compounds referenced in this handbook are intended strictly for in-vitro laboratory research purposes. They are not approved for human consumption, medical use, or diagnostic purposes by Health Canada. Researchers are responsible for ensuring their work complies with all applicable federal and provincial regulations governing the handling, storage, and use of research compounds. Performance Peptides Canada is committed to supporting the Canadian research community with the highest quality compounds and the most transparent sourcing practices in the domestic market. This handbook is one part of that commitment.

Chapter 1

Peptide Fundamentals

What Are Peptides?

Peptides are short chains of amino acids linked together by peptide bonds — the same building blocks that make up proteins. The key distinction between a peptide and a protein is size: peptides typically contain fewer than 50 amino acids, while proteins are longer, more complex structures. This smaller size gives peptides unique properties that make them particularly interesting for research — they are highly specific in their biological interactions, relatively stable when properly stored, and easier to synthesise in a controlled laboratory setting.

In nature, peptides function as signalling molecules. They carry instructions between cells, regulate hormonal activity, influence immune responses, and play roles in tissue maintenance and repair. Synthetic peptides used in research are designed to replicate or study these naturally occurring signals under controlled conditions.

How Peptides Are Synthesised

Most research-grade peptides are produced using a process called Solid-Phase Peptide Synthesis (SPPS). In this method, amino acids are assembled one at a time onto a solid resin support, building the peptide chain in a precise, controlled sequence. Once the full chain is assembled, it is cleaved from the resin and purified. The advantage of SPPS is precision — researchers can produce peptides with exact amino acid sequences, allowing for highly reproducible results across batches. The quality of this synthesis process is what separates research-grade peptides from lower-quality alternatives, which is why third-party verification through HPLC and Mass Spectrometry is essential.

Lyophilization — Why Peptides Come Freeze-Dried

If you've ordered research peptides before, you'll know they typically arrive as a white or off-white powder in a sealed vial. This is the result of a process called lyophilization, more commonly known as freeze-drying. Lyophilization works by freezing the peptide solution and then reducing the surrounding pressure to allow the frozen water to sublimate — transitioning directly from ice to vapour without passing through a liquid phase. What remains is a dry, stable powder that retains the peptide's full molecular structure. In lyophilized form, peptides are far more stable and have a significantly longer shelf life when stored correctly.

Storage Requirements

Proper storage is one of the most important factors in maintaining peptide integrity. Lyophilized peptides are stable but not indestructible — exposure to heat, moisture, and light will accelerate degradation over time.

- **Short-term storage (up to 4 weeks):** Store at 4°C (standard refrigerator temperature), away from light and moisture.

- **Long-term storage (beyond 4 weeks):** Store at -20°C or below. Many researchers opt for -80°C for maximum longevity.
- **Avoid freeze-thaw cycles:** Repeatedly freezing and thawing degrades peptide structure. Aliquot samples into single-use quantities before freezing.
- **Keep vials sealed until use:** Exposure to ambient air introduces moisture, which can initiate degradation even at low temperatures.

Shelf Life and Degradation Factors

When stored correctly, most lyophilized research peptides maintain their integrity for 24 months or longer from the date of synthesis. However, several factors can shorten this window:

- Temperature fluctuations during shipping or storage
- Exposure to UV light, which can break peptide bonds
- Moisture contamination, which initiates hydrolysis
- Oxidation, particularly in peptides containing methionine or cysteine residues

This is why cold-chain shipping matters — a peptide that reaches your lab in a degraded state cannot be recovered, regardless of how well you store it from that point forward. Performance Peptides Canada ships all orders in UV-shielded, temperature-controlled packaging from our domestic Canadian facilities to protect compound integrity throughout the entire journey.

Chapter 2

Reading & Verifying a Certificate of Analysis (COA)

What Is a Certificate of Analysis?

A Certificate of Analysis (COA) is a document issued by an analytical laboratory that confirms the identity, purity, and quality of a compound. For research peptides, a COA is the single most important piece of documentation a supplier can provide. Not all COAs are created equal — what you should always look for is a batch-specific COA generated from analytical testing performed on the exact lot of peptide you are receiving. At Performance Peptides Canada, every product page includes a downloadable batch-specific COA so researchers can verify their compound before it ever reaches the lab bench.

Understanding HPLC Purity Results

High-Performance Liquid Chromatography (HPLC) is the gold standard method for measuring peptide purity. The process separates components of a dissolved sample under high pressure, allowing the instrument to quantify each component. Purity is expressed as a percentage calculated from the area of the main peak relative to all peaks detected:

- **99%+ purity:** Research grade. Suitable for precise, reproducible research applications.
- **95–98% purity:** Acceptable for many research contexts but may introduce variability in sensitive assays.
- **Below 95% purity:** Generally considered insufficient for serious research applications.

All peptides supplied by Performance Peptides Canada are verified at 99% purity or above.

Mass Spectrometry — Confirming Molecular Identity

HPLC tells you how pure a compound is. Mass Spectrometry (MS) tells you what the compound actually is. MS works by ionising a sample and measuring the mass-to-charge ratio of its molecules. Every peptide has a precise molecular weight — if the measured molecular weight matches the theoretical molecular weight of the target peptide, identity is confirmed. When reviewing a COA, confirm the observed molecular weight matches the expected value. A variance of more than 1 Dalton warrants further scrutiny.

TFA Levels and Residual Solvents

Trifluoroacetic acid (TFA) is a solvent commonly used during synthesis. Residual TFA in the final peptide can interfere with cell-based assays. A quality COA will include TFA screening results — acceptable residual TFA levels for research-grade peptides are generally considered to be below 0.1% by weight.

Red Flags to Watch For in a COA

- No batch number or lot number — a COA without a specific batch identifier cannot be traced to a tested sample
- No laboratory name or accreditation details — the testing lab should be identifiable and ideally third-party
- Missing MS data — purity alone without identity confirmation is insufficient
- Purity figures that seem too perfect — a result of exactly 100.0% is a statistical improbability
- No date of analysis — testing should be recent and tied to the current production batch
- Generic certificates — documents that appear to be templates rather than instrument-generated reports

How to Download and Verify COAs from Performance Peptides Canada

Every product listed on PerformancePeptidesCanada.ca includes a direct link to the batch-specific COA on its product page. To verify:

1. Navigate to the product page for the compound you have ordered
2. Download the COA PDF directly from the product listing
3. Confirm the batch number on the COA matches the batch number on your vial label
4. Review the HPLC chromatogram and confirm purity is 99% or above
5. Cross-reference the MS observed molecular weight against the expected molecular weight
6. Check the date of analysis to confirm the testing is recent and batch-specific

Chapter 3

Reconstitution Guide

What Is Reconstitution?

Reconstitution is the process of dissolving a lyophilized (freeze-dried) peptide powder into a liquid solution in preparation for research use. This is one of the most critical steps in the research process. Errors in reconstitution can compromise compound integrity, introduce contamination, or result in inaccurate concentrations that affect the reproducibility of your results.

Required Materials

- **The lyophilized peptide vial** — kept sealed and at room temperature for 15–20 minutes before opening
- **Reconstitution solvent** — typically bacteriostatic water (BAC water) for most peptides
- **Bacteriostatic water (BAC water)** — sterile water containing 0.9% benzyl alcohol
- **Sterile syringes** — for drawing and transferring solvents
- **Alcohol swabs** — for sterilising vial septa before each puncture
- **A clean, sterile working surface** — ideally within a laminar flow hood if available

Step-by-Step Reconstitution Protocol

Step 1: Allow the vial to reach room temperature

Remove the peptide vial from storage and allow it to sit at room temperature for 15–20 minutes before opening. This reduces the risk of condensation forming inside the vial.

Step 2: Calculate your target concentration

Before adding any solvent, determine how much reconstitution liquid you need to achieve your desired concentration. For example, adding 1ml of BAC water to a 10mg vial yields 10mg/ml. Document your intended concentration before proceeding.

Step 3: Sterilise the vial septum

Wipe the rubber stopper on top of the vial with a fresh alcohol swab and allow it to air dry for 10–15 seconds.

Step 4: Draw the reconstitution solvent

Using a sterile syringe, draw the calculated volume of BAC water needed to achieve your target concentration.

Step 5: Inject the solvent slowly

Insert the needle through the sterilised septum at an angle and direct the stream of solvent gently down the inside wall of the vial — do not aim directly at the peptide powder.

Step 6: Do not shake

Gently swirl the vial in a slow circular motion until the powder is fully dissolved. Shaking creates bubbles and can degrade the peptide structure.

Step 7: Inspect the solution

A properly reconstituted solution should appear clear to slightly opalescent. Cloudiness or visible particulates may indicate contamination or degradation.

Step 8: Label the vial immediately

Record the date of reconstitution, the concentration, and the compound name on the vial before storing.

How to Calculate Concentration

Concentration (mg/ml) = Amount of peptide (mg) ÷ Volume of solvent added (ml)

- 10mg peptide + 1ml BAC water = **10mg/ml**
- 10mg peptide + 2ml BAC water = **5mg/ml**
- 10mg peptide + 5ml BAC water = **2mg/ml**

Remember that 1mg = 1,000mcg, so a 10mg/ml solution contains 10,000mcg per ml, or 10mcg per microlitre (µl).

Storage After Reconstitution

- Store at 4°C in a sealed vial, protected from light
- Use within 4–6 weeks for most peptides when reconstituted in bacteriostatic water
- Avoid repeated freeze-thaw cycles — aliquot into single-use volumes if longer storage is needed
- Keep vials upright and sealed between uses

Common Reconstitution Mistakes

- Shaking the vial — always swirl gently, never shake
- Injecting solvent directly onto the powder — always direct the stream down the vial wall
- Using the wrong solvent — always confirm the recommended solvent for each specific compound
- Skipping vial sterilisation — every puncture of the septum is a contamination risk
- Not allowing the vial to reach room temperature — risks moisture contamination
- Inaccurate volume measurement — use calibrated syringes and double-check calculations
- Failing to label the vial immediately — unlabelled reconstituted vials are a serious research integrity risk

Chapter 4

Compound Reference Library

Each entry in this library is provided for informational and research reference purposes only. All compounds are intended strictly for in-vitro laboratory research use. No information in this section constitutes medical advice or guidance for human use.

Category 1: Tissue Repair & Regenerative Research

BPC-157

Body Protection Compound-157

Overview

BPC-157 is a synthetic pentadecapeptide — a chain of 15 amino acids — derived from a naturally occurring protein found in gastric juice. It has been the subject of extensive research interest due to its stability in biological environments and its involvement in a wide range of physiological signalling pathways.

Molecular Profile

› Molecular Formula: $C_{62}H_{98}N_{16}O_{22}$

› Molecular Weight: 1419.5 Da

› CAS Number: 137525-51-0

› Appearance: White to off-white lyophilized powder

Research Applications

- Angiogenic signalling and vascular modelling
- Tendon and ligament fibroblast behaviour in culture
- Gastrointestinal mucosal integrity research
- Nitric oxide pathway modulation studies
- Interactions with dopaminergic and serotonergic systems in neurological research models

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Dissolves readily in BAC water without requiring acetic acid pre-treatment.

TB-500

Synthetic Thymosin Beta-4 Fragment

Overview

TB-500 is a synthetic analogue of Thymosin Beta-4 (Tβ4), a naturally occurring 43-amino acid protein found in high concentrations in blood platelets, wound fluid, and various tissues. The specific fragment used in TB-500 research corresponds to the actin-binding domain believed to be responsible for many of its studied biological interactions.

Molecular Profile

› Molecular Formula: $C_{212}H_{350}N_{56}O_{78}S$

› Molecular Weight: 4963.5 Da

› CAS Number: 77591-33-4

› Appearance: White lyophilized powder

Research Applications

- Actin dynamics and cytoskeletal regulation in cell culture models
- Endothelial cell migration and angiogenesis research
- Extracellular matrix remodelling studies
- Cardiac tissue research models
- Wound healing and tissue repair modelling

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Allow several minutes for full dissolution. Swirl gently — do not shake.

KPV

Lys-Pro-Val Tripeptide

Overview

KPV is a tripeptide consisting of just three amino acids: Lysine, Proline, and Valine. It is a C-terminal fragment of Alpha-Melanocyte Stimulating Hormone (α-MSH), and has attracted research interest for retaining several of α-MSH's studied properties in a significantly smaller and more stable molecular structure.

Molecular Profile

› Molecular Formula: $C_{14}H_{26}N_4O_4$

› Molecular Weight: 314.38 Da

› Appearance: White lyophilized powder

Research Applications

- NF-κB pathway modulation in inflammatory research models
- Intestinal epithelial cell research and mucosal integrity studies
- Skin cell culture research examining inflammatory signalling
- Antimicrobial peptide research
- Interaction studies with melanocortin receptors

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture.
- Reconstituted: Store at 4°C, use within 4 weeks. Bacteriostatic water recommended.
- Reconstitution note: Small molecular size — dissolves very readily. Use care with volume calculations.

GHK-Cu

Glycyl-L-Histidyl-L-Lysine Copper Complex

Overview

GHK-Cu is a naturally occurring copper peptide complex found in human plasma, saliva, and urine. It consists of a tripeptide — Glycine, Histidine, and Lysine — bound to a copper ion (Cu²■). Plasma concentrations of GHK-Cu have been observed to decline with age, driving significant research interest in its role in cellular maintenance and longevity-related pathways.

Molecular Profile

› Molecular Formula: $C_{14}H_{23}CuN_6O_4$

› Molecular Weight: 403.9 Da

› CAS Number: 89030-95-5

› Appearance: Blue to blue-green lyophilized powder (characteristic of copper complexation)

Research Applications

- Collagen and glycosaminoglycan synthesis studies in fibroblast cultures
- Antioxidant system research and superoxide dismutase activity studies
- Gene expression modulation research
- Angiogenesis and wound contraction research models
- Nerve cell research and neurite outgrowth studies

Storage & Handling

- Lyophilized: Store at -20°C, protected from light. Sensitive to oxidation — keep vials sealed.
- Reconstituted: Store at 4°C, protected from light, use within 3–4 weeks.
- Reconstitution note: Blue colour of solution is normal and expected due to the copper ion.

Category 2: Growth Hormone Secretagogues (GHS)

Growth Hormone Secretagogues are compounds studied for their interactions with the growth hormone axis — specifically their ability to stimulate or modulate the release of growth hormone (GH) from the pituitary gland in biological research models.

Ipamorelin

Selective Growth Hormone Secretagogue

Overview

Ipamorelin is a synthetic pentapeptide and member of the GHRP family. It was developed as a highly selective ghrelin receptor agonist, distinguishing itself from earlier generation GHRPs through its targeted receptor interaction — elevating GH with minimal effect on cortisol, prolactin, or ACTH levels in research models.

Molecular Profile

› Molecular Formula: $C_{38}H_{49}N_9O_5$

› Molecular Weight: 711.85 Da

› CAS Number: 170851-70-4

› Appearance: White lyophilized powder

Research Applications

- Growth hormone pulse modelling and pituitary signalling research
- GHS-R1a receptor binding and selectivity studies
- Comparative GHRP selectivity research
- Bone density and lean tissue composition research in animal models
- Age-related GH decline modelling studies

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Dissolves readily in BAC water. Standard reconstitution protocol applies.

CJC-1295 with DAC

Long-Acting GHRH Analogue

Overview

CJC-1295 with DAC (Drug Affinity Complex) is a synthetic analogue of Growth Hormone Releasing Hormone (GHRH). The addition of the Drug Affinity Complex allows the peptide to bind covalently to albumin, extending its estimated half-life to 6–8 days in research models — dramatically longer than native GHRH.

Molecular Profile

› Molecular Formula: $C_{152}H_{252}N_{44}O_{42}$

› Molecular Weight: 3647.1 Da

› CAS Number: 863288-34-0

› Appearance: White lyophilized powder

Research Applications

- Prolonged GHRH receptor stimulation and pituitary response studies
- GH and IGF-1 axis research in sustained signalling models
- Comparative half-life studies between GHRH analogues
- Albumin-binding drug affinity technology research
- Age-related somatotropic axis decline research

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Allow slightly longer dissolution time due to the DAC modification.

Tesamorelin

Stabilised GHRH Analogue

Overview

Tesamorelin is a synthetic analogue of endogenous GHRH, consisting of the full 44-amino acid sequence with the addition of a trans-3-hexenoic acid group at the N-terminus. This modification stabilises the peptide against enzymatic cleavage by DPP-IV, significantly extending its half-life while preserving its receptor binding profile.

Molecular Profile

› Molecular Weight: 5135.8 Da

› CAS Number: 218949-48-5

› Appearance: White lyophilized powder

Research Applications

- GHRH receptor binding kinetics and signalling cascade research
- DPP-IV resistance and peptide stabilisation mechanism studies

- GH and IGF-1 axis modulation research
- Visceral adipose tissue metabolism research in animal models
- Lipid metabolism and lipolysis research models

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Larger peptide — allow additional swirling time. Do not heat to accelerate dissolution.

HGH

Recombinant Human Growth Hormone (Somatropin)

Overview

Recombinant Human Growth Hormone (rHGH), also known as Somatropin, is a 191-amino acid protein structurally identical to endogenously produced human growth hormone, produced through recombinant DNA technology. It is one of the most extensively studied proteins in endocrinology and metabolic research, with decades of published literature.

Molecular Profile

› Molecular Weight: 22,124 Da

› Structure: 191 amino acid single-chain polypeptide with two disulfide bonds

› CAS Number: 12629-01-5

› Appearance: White lyophilized powder

Research Applications

- GH receptor binding and JAK-STAT signalling pathway research
- IGF-1 axis regulation and downstream anabolic signalling studies
- Lipid metabolism and lipolysis research
- Glucose homeostasis and insulin sensitivity research models
- Age-related somatotropic decline research

Storage & Handling

- Lyophilized: Store at 2–8°C (refrigerator). Use within 12 months.
- Reconstituted: Store at 4°C, use within 2–3 weeks. Bacteriostatic water strongly recommended.
- Reconstitution note: Extremely shear-sensitive. Inject BAC water very slowly down vial wall. Never shake.

Category 3: Metabolic & Weight Management Research

AOD-9604

Lipolytic HGH Fragment (177-191)

Overview

AOD-9604 is a synthetic peptide fragment derived from the C-terminal region of human growth hormone, specifically amino acids 177–191. It was developed to isolate the lipolytic properties of HGH from its growth-promoting effects, interacting with beta-adrenergic receptors involved in lipolysis without meaningfully engaging the IGF-1 axis.

Molecular Profile

› Molecular Formula: $C_{78}H_{123}N_{23}O_{23}S_2$

› Molecular Weight: 1815.1 Da

› CAS Number: 221231-10-3

› Appearance: White lyophilized powder

Research Applications

- Beta-adrenergic receptor interaction studies in adipocyte models
- Lipolysis and fat oxidation pathway research
- Comparative studies of HGH fragment activity versus full-length HGH
- IGF-1 axis independence studies
- Adipogenesis inhibition research in cell culture models

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Contains a disulfide bond — avoid exposure to reducing agents during reconstitution.

Retatrutide

GIP/GLP-1/GCG Triple Hormone Receptor Agonist

Overview

Retatrutide is a synthetic peptide designed as a triple agonist targeting three distinct hormone receptors simultaneously: GIPR, GLP-1R, and GCGR. This triple receptor engagement profile distinguishes it from dual agonists and makes it a subject of significant research interest in metabolic science.

Molecular Profile

› Molecular Formula: $C_{224}H_{358}N_{60}O_{68}$

› Molecular Weight: 4765.4 Da

› CAS Number: 2381089-83-2

› Appearance: White to off-white lyophilized powder

Research Applications

- Triple incretin receptor co-activation and downstream signalling research
- Comparative agonism studies across GLP-1R, GIPR, and GCGR
- Glucose homeostasis and insulin secretion modelling
- Energy expenditure and thermogenesis research models
- Cardiovascular metabolic risk factor research in preclinical models

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Allow slightly longer swirling time due to the fatty acid acylation modification.

5-Amino-1MQ

Selective NNMT Inhibitor

Overview

5-Amino-1MQ is a selective inhibitor of Nicotinamide N-Methyltransferase (NNMT) — an enzyme that plays a significant role in cellular metabolism and the methionine cycle. Note: 5-Amino-1MQ is technically a small molecule rather than a peptide, but is included here given its relevance to metabolic research and its place in the Performance Peptides Canada catalog.

Molecular Profile

› Molecular Formula: $C_6H_9N_3$

› Molecular Weight: 123.16 Da

› CAS Number: 1380672-07-0

› Appearance: White to off-white powder

Research Applications

- NNMT enzyme inhibition kinetics and selectivity studies
- NAD+ biosynthesis pathway research and cellular energy metabolism
- Adipocyte differentiation and lipid accumulation studies in cell culture
- Methionine cycle and SAM availability research

- Longevity pathway research via NAD+ axis interactions

Storage & Handling

- Lyophilized: Store at -20°C in a sealed container, protected from moisture and light.
- In solution: Store at 4°C, protected from light, use within 4 weeks.
- Reconstitution note: Limited aqueous solubility. Initial dissolution in DMSO followed by dilution in aqueous buffer is recommended.

MOTS-c

Mitochondrial Open Reading Frame of the 12S rRNA Type-c

Overview

MOTS-c is a mitochondria-derived peptide (MDP) encoded within the 12S rRNA gene of mitochondrial DNA — one of a small number of known peptides with mitochondrial genomic origins. First identified in 2015, it has attracted significant research interest as a regulator of metabolic homeostasis with relevance to insulin sensitivity, glucose metabolism, and exercise-related cellular adaptations.

Molecular Profile

› Molecular Formula: $C_{101}H_{162}N_{34}O_{29}S_2$

› Molecular Weight: 2174.4 Da

› CAS Number: 1627580-64-6

› Appearance: White lyophilized powder

Research Applications

- Mitochondrial genomic peptide characterisation and expression research
- AMPK pathway activation and glucose metabolism research
- Insulin sensitivity and glucose uptake studies in skeletal muscle cell models
- Age-related metabolic decline and longevity pathway research
- Nuclear-mitochondrial communication research

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Reconstitutes well in BAC water using standard protocol.

Category 4: Nootropic & Cognitive Health Research

Semax

Synthetic ACTH(4-10) Fragment Analogue

Overview

Semax is a synthetic heptapeptide analogue derived from the 4-10 fragment of Adrenocorticotropic Hormone (ACTH). Originally developed in Russia at the Institute of Molecular Genetics, it has accumulated a substantial body of research literature particularly in neurotrophic factor regulation and cerebrovascular research, with particular interest in its interactions with BDNF.

Molecular Profile

› Molecular Formula: $C_{37}H_{51}N_9O_{10}S$

› Molecular Weight: 813.9 Da

› CAS Number: 80714-61-0

› Appearance: White lyophilized powder

Research Applications

- BDNF and NGF expression modulation research in neuronal cell models
- Cerebral ischaemia and neuroprotection research in animal models
- Dopaminergic and serotonergic system interaction studies
- Neuroinflammation pathway research
- Melanocortin receptor interaction studies — particularly MC4R

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 3–4 weeks. Bacteriostatic water recommended.
- Reconstitution note: Dissolves readily in BAC water. Standard reconstitution protocol applies.

Selank

Synthetic Regulatory Heptapeptide

Overview

Selank is a synthetic analogue of the endogenous tetrapeptide Tuftsin, developed by appending an additional tripeptide sequence (Pro-Gly-Pro) to the C-terminus to improve stability. It has been studied primarily in the context of anxiety pathway modulation and GABAergic system interactions.

Molecular Profile

› Molecular Formula: $C_{33}H_{57}N_9O_{11}$

› Molecular Weight: 751.86 Da

› CAS Number: 129954-34-3

› Appearance: White lyophilized powder

Research Applications

- GABAergic system modulation research — particularly GABA-A receptor interaction studies
- Anxiolytic mechanism research in rodent behavioural models
- BDNF expression modulation studies in neuronal models
- Immune system modulation research reflecting its Tuftsin-derived structure
- Memory consolidation and learning research in animal models

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 3–4 weeks. Bacteriostatic water recommended.
- Reconstitution note: Dissolves readily in BAC water using standard protocol.

Pinealon

Synthetic Pineal Bio-Regulator Tripeptide

Overview

Pinealon is a synthetic tripeptide — Glu-Asp-Arg — belonging to a class of short peptide bio-regulators from the St. Petersburg Institute of Bioregulation and Gerontology. Research interest centres on its apparent interactions with neuronal gene expression and its relevance to neuroprotection and age-related neurological research.

Molecular Profile

› Molecular Formula: $C_{13}H_{21}N_5O_9$

› Molecular Weight: 391.33 Da

› Appearance: White lyophilized powder

Research Applications

- Neuronal gene expression modulation research in cell culture models
- Pineal gland biology and melatonin pathway research
- Circadian rhythm and sleep-wake cycle regulation studies
- Neuroprotection research in oxidative stress models
- Age-related neurological decline modelling

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4 weeks. Bacteriostatic water recommended.
- Reconstitution note: Very small molecular weight — dissolves extremely readily. Use careful volumetric technique.

Cerebrolysin

Multi-Modal Neurotrophic Preparation

Overview

Cerebrolysin is a multi-component neurotrophic preparation derived from purified porcine brain tissue through standardised enzymatic hydrolysis. The peptide fraction includes fragments with structural and functional similarities to endogenous neurotrophic factors including BDNF, NGF, CNTF, and GDNF — giving it a broad multi-modal research footprint.

Molecular Profile

› Composition: Complex mixture of low-molecular-weight peptides (<10,000 Da) and free amino acids

› Primary Active Fractions: Neurotrophic peptide fragments analogous to BDNF, NGF, CNTF, GDNF

› Source: Standardised enzymatic hydrolysate of purified porcine brain protein

› Appearance: Clear to slightly yellow lyophilized preparation

Research Applications

- Neurotrophic factor signalling research — BDNF, NGF, CNTF, GDNF pathway studies
- Neuroprotection research in ischaemia and oxidative stress models
- Neuroplasticity and synaptic remodelling research
- Alzheimer's disease and tau pathology research models
- Neurogenesis research — adult hippocampal neurogenesis models

Storage & Handling

- Lyophilized: Store at 2–8°C (refrigerator). Use within 12 months.
- In solution: Store at 4°C, protected from light, use within 2–3 weeks.
- Reconstitution note: Reconstitutes in sterile saline or BAC water. Clear to slightly amber colour is normal.

DSIP

Delta Sleep-Inducing Peptide

Overview

Delta Sleep-Inducing Peptide (DSIP) is a naturally occurring neuropeptide first isolated in 1977. It is a nonapeptide named for its observed ability to induce delta wave sleep activity in early research models. Since its characterisation, research has expanded to cover neuroendocrine and stress-related pathways across multiple systems.

Molecular Profile

› Molecular Formula: $C_{35}H_{48}N_{10}O_{15}$

› Molecular Weight: 848.8 Da

› CAS Number: 62568-57-4

› Appearance: White lyophilized powder

Research Applications

- Delta wave sleep induction and sleep architecture research in animal models
- Hypothalamic-pituitary axis interaction studies
- Stress response modulation research
- Circadian rhythm regulation studies alongside other sleep-related peptides
- Antioxidant activity research in neuronal models

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, protected from light, use within 3–4 weeks.
- Reconstitution note: Protect from light exposure — contains a tryptophan residue sensitive to photodegradation.

Category 5: Longevity & Cellular Health Research

Epithalon

Synthetic Pineal Tetra-Peptide

Overview

Epithalon is a synthetic tetrapeptide — Ala-Glu-Asp-Gly — developed by Professor Vladimir Khavinson at the St. Petersburg Institute of Bioregulation and Gerontology. Its primary research focus centres on telomere biology — specifically its studied ability to activate telomerase in cell culture models, placing it at the forefront of telomere-related longevity research.

Molecular Profile

› Molecular Formula: $C_{14}H_{22}N_4O_9$

› Molecular Weight: 390.34 Da

› CAS Number: 307297-39-8

› Appearance: White lyophilized powder

Research Applications

- Telomerase activation and telomere length regulation research in cell culture models
- Cellular senescence pathway research
- Pineal gland function and melatonin synthesis regulation studies
- Antioxidant system research — superoxide dismutase and catalase activity
- Retinal cell research and age-related retinal degeneration modelling

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4–6 weeks. Bacteriostatic water recommended.
- Reconstitution note: Small molecular weight — dissolves very readily. Use careful volumetric technique.

NAD+

Oxidised Nicotinamide Adenine Dinucleotide

Overview

Nicotinamide Adenine Dinucleotide (NAD+) is one of the most fundamental coenzymes in cellular biology, found in every living cell. It functions as an essential electron carrier in cellular respiration and is a required substrate for Sirtuins (SIRT1-7) and PARPs — proteins with profound relevance to longevity research. NAD+ levels

decline consistently with age across multiple tissues and species.

Molecular Profile

› Molecular Formula: $C_{21}H_{27}N_7O_{14}P_2$

› Molecular Weight: 663.43 Da

› CAS Number: 53-84-9

› Appearance: White to off-white lyophilized powder

Research Applications

- Sirtuin pathway research — SIRT1-7 activation and downstream gene regulation studies
- PARP enzyme activity and DNA damage repair research
- Mitochondrial function and electron transport chain research
- Age-related NAD+ decline modelling and repletion research
- Neurodegeneration research — NAD+ decline implicated in multiple neurodegenerative disease models

Storage & Handling

- Lyophilized: Store at -20°C in a sealed container with desiccant. Hygroscopic — keep sealed. Use within 12–18 months.
- In solution: Store at 4°C, protected from light, use within 2–3 weeks.
- Reconstitution note: Dissolves readily in sterile water or PBS. Use pH-neutral solvents — avoid acidic or basic conditions.

SS-31

Mitochondrial-Targeted Tetra-Peptide (Elamipretide)

Overview

SS-31 (also known as Elamipretide or MTP-131) is a synthetic tetrapeptide belonging to the Szeto-Schiller peptide family. Its alternating aromatic-cationic amino acid structure allows it to selectively concentrate in the inner mitochondrial membrane, where it interacts with cardiolipin — making it an exceptionally valuable tool for studying mitochondrial biology at the membrane level.

Molecular Profile

› Molecular Formula: $C_{32}H_{49}N_9O_5 \cdot 4HCl$

› Molecular Weight: 639.8 Da (free base)

› CAS Number: 736992-21-5

› Appearance: White lyophilized powder

Research Applications

- Cardiolipin interaction and inner mitochondrial membrane integrity research
- Electron transport chain efficiency and ATP synthesis studies
- Reactive oxygen species (ROS) production and mitochondrial oxidative stress studies
- Cardiac ischaemia-reperfusion injury modelling
- Neurodegenerative disease mitochondrial pathway research

Storage & Handling

- Lyophilized: Store at -20°C, protected from light and moisture. Stable for up to 24 months.
- Reconstituted: Store at 4°C, use within 4 weeks. Sterile water or PBS recommended.
- Reconstitution note: Supplied as HCl salt — account for this when calculating molar concentrations.

Glutathione

High-Potency Reduced L-Glutathione

Overview

Glutathione (GSH) is the most abundant endogenous antioxidant in mammalian cells — a tripeptide composed of glutamate, cysteine, and glycine that serves as the primary intracellular defence against oxidative stress. The ratio of GSH to GSSG within a cell is one of the most reliable indicators of cellular oxidative stress. Glutathione levels decline consistently with age and are depleted by chronic oxidative stress and inflammation.

Molecular Profile

› Molecular Formula: $C_{10}H_{17}N_3O_6S$

› Molecular Weight: 307.32 Da

› CAS Number: 70-18-8

› Appearance: White lyophilized powder

Research Applications

- Cellular redox balance and GSH/GSSG ratio research
- Oxidative stress modelling and antioxidant capacity studies
- Detoxification pathway research — glutathione S-transferase activity
- Immune cell function research — essential for lymphocyte proliferation
- Neurodegeneration research — GSH depletion implicated in Parkinson's and Alzheimer's models

Storage & Handling

- Lyophilized: Store at -20°C with desiccant, protected from light and oxygen. Use within 12–18 months.
- In solution: Store at 4°C, protected from light and air, use within 1–2 weeks.
- Reconstitution note: Highly oxidation-sensitive. Use freshly degassed solvent. Handle with minimal air exposure.

Chapter 5

Sourcing & Supply Chain in Canada

The Canadian Research Peptide Landscape

Canada occupies a unique position in the global research peptide market — a well-developed life sciences research sector combined with distinct customs and import regulations that differ meaningfully from both the American and European markets. For Canadian researchers, domestic sourcing eliminates a set of challenges that have historically complicated international procurement.

Why Domestic Sourcing Matters

Customs Risk

Peptide compounds shipped internationally into Canada pass through the Canada Border Services Agency (CBSA). International shipments are subject to inspection, seizure, or delay at the border — particularly for compounds that fall into ambiguous regulatory categories. Domestic sourcing eliminates customs risk entirely — shipments originating and delivered within Canada never pass through CBSA as import shipments.

Cold-Chain Integrity

Peptide stability is directly tied to temperature. International shipments face extended transit times, multiple handling touchpoints, and temperature variations that are difficult to monitor across thousands of kilometres. Domestic Canadian shipments are shorter, faster, and involve fewer handling transitions. Performance Peptides Canada packs all orders in UV-shielded, temperature-controlled packaging dispatched from Canadian facilities.

Lead Time Reliability

International shipping timelines are inherently variable — customs processing, carrier delays, seasonal backlogs, and geopolitical disruptions can all extend delivery windows unpredictably. Domestic shipping eliminates the customs variable and dramatically reduces geographic distance, producing more consistent and predictable lead times.

Regulatory Clarity

Domestic suppliers operating within the Canadian regulatory environment are directly accountable to Canadian standards and are positioned to provide documentation that meets Canadian requirements, removing the ambiguity of importing compounds across jurisdictions with different regulatory frameworks.

What to Look for in a Canadian Peptide Supplier

Batch-Specific COA Availability

A supplier that cannot provide batch-specific HPLC and MS data for every compound is not operating at a research-grade standard. COAs should be freely available without requiring a special request.

Third-Party Testing

The most credible COAs come from independent third-party analytical laboratories. Third-party testing removes the conflict of interest inherent in a supplier testing their own products.

Transparent Sourcing Information

A reputable supplier should provide clear information about where peptides are synthesised, what quality standards govern the process, and how compounds are handled between synthesis and dispatch.

Responsive Technical Support

A supplier's ability to provide knowledgeable, responsive technical support is a meaningful indicator of their engagement with the research community they serve.

Proper Cold-Chain Shipping

Compounds should be shipped in UV-shielded packaging with appropriate temperature management — not in standard postal packaging.

Honest Research-Use Positioning

A reputable supplier will be unambiguous about the research-use-only nature of their products and will not make health claims or imply personal use applications.

Understanding Cold-Chain Shipping

Cold-chain shipping refers to a temperature-controlled supply chain in which a product is maintained within a defined temperature range from origin through to final delivery. A properly executed cold-chain shipment for research peptides typically involves:

- Insulated packaging — rigid or flexible insulated containers that slow heat transfer
- Cooling media — refrigerant packs, dry ice, or phase-change materials maintaining internal temperature
- UV-shielded outer packaging — opaque or UV-blocking materials preventing light exposure during transit
- Sealed, moisture-resistant vial packaging — protecting individual vials against moisture ingress

How to Evaluate a Supplier's Transparency Practices

- Are COAs available on the product page without requesting them?
- Do COAs include both HPLC and MS data?
- Is the testing laboratory identified and independently verifiable?
- Does the supplier provide clear information about storage and reconstitution?
- Is the research-use-only status of products clearly communicated?
- Does the supplier respond to technical inquiries knowledgeably and promptly?

Chapter 6

Research Safety & Compliance

Research safety and regulatory compliance are foundational to the integrity of any serious research operation. This chapter provides an overview of the key safety and compliance considerations relevant to Canadian researchers working with research-grade peptides. Researchers are always encouraged to consult directly with their institutional compliance office, legal counsel, or Health Canada where specific regulatory questions arise.

The Canadian Regulatory Landscape

In Canada, the regulation of drugs, biological substances, and research chemicals falls primarily under the jurisdiction of Health Canada, operating under the authority of the Food and Drugs Act (FDA) and its associated regulations. The Controlled Drugs and Substances Act (CDSA) governs scheduled controlled substances — most research peptides covered in this handbook do not fall under CDSA scheduling, though researchers should verify the status of specific compounds relevant to their work.

Food and Drugs Act (FDA) — Canada

The Canadian Food and Drugs Act prohibits the sale of substances as treatments or cures for medical conditions without Health Canada approval. Research peptides sold with explicit research-use-only labelling and without health claims are positioned outside the therapeutic product framework — but this depends entirely on how compounds are marketed, sold, and used.

Institutional Research Compliance

Researchers operating within universities, hospitals, or other institutions are subject to their institution's own research ethics and compliance frameworks. IACUCs, Research Ethics Boards (REBs), and biosafety committees may have jurisdiction over specific research protocols involving peptide compounds.

Provincial Regulations

While federal regulation under Health Canada provides the primary framework, provincial health and safety regulations may impose additional requirements on laboratory operations, chemical handling, and waste disposal.

Import and Export Considerations

Researchers who source internationally should be aware that CBSA has authority to inspect and seize shipments of research chemicals that lack adequate documentation. Domestic sourcing eliminates this complexity entirely.

Research-Use-Only Guidelines

- Compounds are intended for use in controlled laboratory settings, not for administration to humans or animals outside of formally approved research protocols

- Research-use-only compounds have not been evaluated for safety, efficacy, or quality as therapeutic products by Health Canada or any other regulatory authority
- The absence of clinical approval means there is no established safety profile, dosing guidance, or quality standard applicable to human use
- Researchers are responsible for ensuring their use of these compounds remains within the research-use-only framework at all times

Proper Lab Handling and Safety

Personal Protective Equipment (PPE)

- **Nitrile gloves** — changed regularly and whenever contamination is suspected
- **Laboratory coat** — full-length, fastened, with long sleeves
- **Safety glasses or goggles** — particularly important when working with lyophilized powders
- **Face mask** — recommended when working with lyophilized powders to prevent inhalation of fine particulates

Sharps Safety

- Always use a new, sterile needle for each vial puncture
- Never recap needles by hand — use a one-handed scoop technique or mechanical recapping device
- Dispose of all sharps immediately after use in an approved sharps disposal container
- Report any needlestick injury immediately according to your institution's protocol

Chemical Waste Disposal

Liquid Waste

Reconstituted peptide solutions and associated solvents should be disposed of as chemical waste through your facility's designated chemical waste management system.

Sharps Waste

All sharps must be disposed of in approved sharps containers. Full containers should be sealed and disposed of through a licensed sharps waste disposal service.

Solvent Waste

DMSO and other organic solvents must be segregated from aqueous waste streams and disposed of as organic solvent waste through your facility's chemical waste management system.

Record-Keeping Best Practices

Compound Inventory Records — maintain records including:

- Compound name and lot/batch number
- Supplier name and order date

- Quantity received and quantity remaining
- Storage location and conditions
- COA reference and date of analysis

Reconstitution Records — document each reconstitution event including:

- Date and time of reconstitution
- Compound name and batch number
- Solvent used and volume added
- Final concentration achieved
- Researcher name

Performance Peptides Canada is committed to supporting researchers who work within the research-use-only framework, and we take our responsibility as a supplier seriously. If you have questions about compliance considerations relevant to your work, we encourage you to consult your institutional compliance office and to reach out to our technical team at PerformancePeptidesCanada.ca.

Appendix A

Peptide Storage Temperature Quick-Reference Chart

All temperatures refer to lyophilized form unless otherwise noted. Reconstituted solutions should be stored at 4°C in all cases and used within the timeframes specified in Chapter 4.

Compound	Lyophilized Storage	Reconstituted Storage	Max Reconstituted Shelf Life	Recommended Solvent	Notes
BPC-157	-20°C	4°C	4–6 weeks	BAC Water	Stable at room temp short-term
TB-500	-20°C	4°C	4–6 weeks	BAC Water	Allow extra dissolution time
KPV	-20°C	4°C	4 weeks	BAC Water	Small mass — measure carefully
GHK-Cu	-20°C	4°C	3–4 weeks	BAC Water	Blue colour in solution is normal
Ipamorelin	-20°C	4°C	4–6 weeks	BAC Water	Standard protocol
CJC-1295 with DAC	-20°C	4°C	4–6 weeks	BAC Water	Allow extra dissolution time
Tesamorelin	-20°C	4°C	4–6 weeks	BAC Water	Do not heat to dissolve
HGH	2–8°C	4°C	2–3 weeks	BAC Water	Never shake — extremely shear-sensitive
AOD-9604	-20°C	4°C	4–6 weeks	BAC Water	Avoid reducing agents
Retatrutide	-20°C	4°C	4–6 weeks	BAC Water	Allow extra dissolution time
5-Amino-1MQ	-20°C	4°C	4 weeks	DMSO then buffer	Limited aqueous solubility
MOTS-c	-20°C	4°C	4–6 weeks	BAC Water	Maintain cold chain throughout
Semax	-20°C	4°C	3–4 weeks	BAC Water	Protect from light
Selank	-20°C	4°C	3–4 weeks	BAC Water	Standard protocol
Pinealon	-20°C	4°C	4 weeks	BAC Water	Small mass — measure carefully
Cerebrolysin	2–8°C	4°C	2–3 weeks	BAC Water or Saline	Clear to amber colour normal
DSIP	-20°C	4°C	3–4 weeks	BAC Water	Protect from light — Trp sensitive
Epithalon	-20°C	4°C	4–6 weeks	BAC Water	Small mass — measure carefully
NAD+	-20°C	4°C	2–3 weeks	Sterile Water/PBS	Hygroscopic — keep sealed with desiccant
SS-31	-20°C	4°C	4 weeks	Sterile Water/PBS	Account for HCl salt in molar calculations
Glutathione	-20°C	4°C	1–2 weeks	Sterile Water/PBS	Highly oxidation-sensitive

General Rules: Never store any peptide in a frost-free freezer. Always store vials upright and sealed. Keep a desiccant sachet in storage containers where possible, particularly for hygroscopic compounds such as NAD+ and Glutathione. Label all reconstituted vials immediately with compound name, concentration, date of reconstitution, and researcher initials.

Appendix B

Reconstitution Calculator Reference Table

Formula: Solvent Volume (ml) = Peptide Amount (mg) ÷ Desired Concentration (mg/ml)

For 10mg Vials

Applicable to: BPC-157, TB-500, KPV, GHK-Cu, Ipamorelin, Tesamorelin, MOTS-c, Semax, Selank, Pinealon, Epithalon, SS-31

Desired Concentration	Solvent to Add	Resulting Volume	Notes
10 mg/ml (10,000 mcg/ml)	1.0 ml	1.0 ml	Most concentrated — use for small volume assays
5 mg/ml (5,000 mcg/ml)	2.0 ml	2.0 ml	Common working concentration
2 mg/ml (2,000 mcg/ml)	5.0 ml	5.0 ml	Useful for larger volume protocols
1 mg/ml (1,000 mcg/ml)	10.0 ml	10.0 ml	Most dilute — use for high-volume low-concentration work

For 5mg Vials

Applicable to: AOD-9604, CJC-1295 with DAC

Desired Concentration	Solvent to Add	Resulting Volume	Notes
5 mg/ml (5,000 mcg/ml)	1.0 ml	1.0 ml	Most concentrated
2.5 mg/ml (2,500 mcg/ml)	2.0 ml	2.0 ml	Common working concentration
1 mg/ml (1,000 mcg/ml)	5.0 ml	5.0 ml	Standard dilution
0.5 mg/ml (500 mcg/ml)	10.0 ml	10.0 ml	Most dilute

For 1mg Vials

Applicable to: IGF-1 LR3, Follistatin-344

Desired Concentration	Solvent to Add	Resulting Volume	Notes
1 mg/ml (1,000 mcg/ml)	1.0 ml	1.0 ml	Most concentrated
0.5 mg/ml (500 mcg/ml)	2.0 ml	2.0 ml	Common working concentration
0.1 mg/ml (100 mcg/ml)	10.0 ml	10.0 ml	Most dilute

Mcg/µl Quick Reference

For precision pipetting in assay work, concentrations are often expressed as mcg per microlitre (µl). Use this conversion reference:

Concentration (mg/ml)	Equivalent (mcg/µl)	Volume for 100mcg	Volume for 250mcg	Volume for 500mcg
10 mg/ml	10 mcg/µl	10 µl	25 µl	50 µl
5 mg/ml	5 mcg/µl	20 µl	50 µl	100 µl
2 mg/ml	2 mcg/µl	50 µl	125 µl	250 µl
1 mg/ml	1 mcg/µl	100 µl	250 µl	500 µl
0.5 mg/ml	0.5 mcg/µl	200 µl	500 µl	1000 µl

Appendix C

COA Verification Checklist

Use this checklist when reviewing a Certificate of Analysis for any research peptide. All items should be confirmed before accepting a compound for research use.

Section 1: Document Authenticity

- ■ The COA identifies a specific analytical laboratory by name
- ■ The laboratory is independently verifiable — not an in-house facility operated by the supplier
- ■ The COA includes a date of analysis
- ■ The date of analysis is recent and corresponds to the current production batch
- ■ The COA includes a batch number or lot number
- ■ The batch number on the COA matches the batch number printed on the vial label

Section 2: Identity Confirmation

- ■ The COA includes Mass Spectrometry (MS) data
- ■ The observed molecular weight from MS is recorded
- ■ The theoretical molecular weight for the compound is stated
- ■ The observed and theoretical molecular weights match within acceptable variance (≤1 Da)
- ■ The compound name and sequence on the COA match the ordered compound

Section 3: Purity Assessment

- ■ The COA includes HPLC chromatogram data
- ■ The HPLC purity result is stated as a percentage
- ■ The purity result is 99% or above for research-grade use
- ■ The chromatogram is instrument-generated — not a template or approximation
- ■ Any secondary peaks are identified and quantified

Section 4: Residual Solvent Screening

- ■ TFA (Trifluoroacetic acid) screening results are included
- ■ Residual TFA levels are below 0.1% by weight
- ■ Any other residual solvents are identified and fall within acceptable limits

Section 5: Red Flag Assessment

- ■ The COA does not show a purity of exactly 100.0% (statistically improbable)
- ■ The COA is not a generic template with the compound name filled in

- The COA includes actual instrument data — chromatograms and spectra — not just summary numbers
- The supplier made the COA freely available without requiring a special request

Overall Assessment

- All checklist items confirmed — compound accepted for research use
- One or more items unconfirmed — follow up with supplier before use
- Multiple red flags identified — do not use, contact supplier or seek alternative source

Appendix D

Glossary of Key Terms

ACTH (Adrenocorticotropic Hormone)
A pituitary hormone that stimulates the adrenal cortex to produce cortisol. Several research peptides, including Semax, are derived from fragments of the ACTH molecule.

Acylation
A chemical modification in which an acyl group is added to a molecule. Used in peptide research to extend half-life through albumin binding — as seen in Retatrutide and CJC-1295 with DAC.

Albumin
The most abundant protein in blood plasma. Several peptides are modified to bind albumin, dramatically extending their half-life in biological systems.

Aliquot
A measured portion of a larger sample. In peptide research, aliquoting refers to dividing a reconstituted solution into single-use volumes to avoid repeated freeze-thaw cycles.

AMPK (AMP-Activated Protein Kinase)
A master regulator of cellular energy homeostasis. Activation of AMPK is associated with improved metabolic function and is studied in the context of longevity research. Relevant to MOTS-c research.

Angiogenesis
The formation of new blood vessels from pre-existing vessels. A key area of research for BPC-157, TB-500, and GHK-Cu.

Bacteriostatic Water (BAC Water)
Sterile water containing 0.9% benzyl alcohol, used as a reconstitution solvent for research peptides. The benzyl alcohol acts as a preservative, extending the shelf life of reconstituted solutions.

BDNF (Brain-Derived Neurotrophic Factor)
A key neurotrophic factor involved in neuronal survival, growth, and synaptic plasticity. Relevant to Semax, Selank, and Cerebrolysin research.

Cardiolipin
A unique phospholipid found almost exclusively in the inner mitochondrial membrane, essential for electron transport chain function. The primary interaction target of SS-31.

CBSA (Canada Border Services Agency)
The federal agency responsible for administering and enforcing Canadian laws governing the importation of goods, including research chemicals.

Certificate of Analysis (COA)
A document issued by an analytical laboratory confirming the identity, purity, and quality of a compound. The foundational quality assurance document for research peptides.

Cold Chain
A temperature-controlled supply chain that maintains products within a defined temperature range from manufacture through to delivery.

DPP-IV (Dipeptidyl Peptidase IV)
An enzyme that rapidly cleaves many peptides in biological systems. Several research peptides, including Tesamorelin, are modified to resist DPP-IV degradation.

Extracellular Matrix (ECM)
The network of proteins and molecules that provides structural and biochemical support to surrounding cells. Relevant to tissue repair peptide research.

GABAergic System
The system of neurons and receptors that respond to gamma-aminobutyric acid (GABA) — the primary inhibitory neurotransmitter in the central nervous system. Relevant to Selank research.

GHS-R1a
Growth Hormone Secretagogue Receptor 1a — the ghrelin receptor. The primary binding target of Ipamorelin and other GHRP compounds.

GHRH (Growth Hormone Releasing Hormone)
The hypothalamic hormone that signals the pituitary to release growth hormone. CJC-1295 with DAC and Tesamorelin are synthetic analogues of GHRH.

GLP-1 (Glucagon-Like Peptide-1)
An incretin hormone involved in insulin secretion and appetite regulation. One of three receptor targets of Retatrutide.

Half-Life
The time required for the concentration of a compound in a biological system to reduce by half. A key parameter in peptide pharmacokinetics and research design.

HPLC (High-Performance Liquid Chromatography)
The gold standard analytical method for measuring peptide purity. Separates components of a sample under high pressure to quantify their relative proportions.

IGF-1 (Insulin-Like Growth Factor-1)
A hormone produced primarily by the liver in response to growth hormone stimulation. Central to the anabolic and growth-promoting effects of the GH axis.

In-Vitro
Latin for "in glass" — referring to research conducted in a controlled environment outside a living organism, such as in cell culture or test tubes.

JAK-STAT Pathway
A signal transduction pathway used by many cytokines and growth factors, including growth hormone. Relevant to HGH receptor signalling research.

Lyophilization
The process of freeze-drying a substance by removing water through sublimation under reduced pressure. Produces a stable powder suitable for long-term storage.

Mass Spectrometry (MS)
An analytical technique that measures the mass-to-charge ratio of molecules, used to confirm the molecular identity of peptide compounds.

Mitochondria-Derived Peptide (MDP)
A class of bioactive peptides encoded by the mitochondrial genome. MOTS-c is a member of this class.

NAD+ (Nicotinamide Adenine Dinucleotide)
A coenzyme essential to cellular energy metabolism and a required substrate for Sirtuin and PARP enzymes. Declines with age across multiple tissues.

NNMT (Nicotinamide N-Methyltransferase)
An enzyme involved in cellular metabolism and the methionine cycle. The inhibition target of 5-Amino-1MQ.

PARP (Poly ADP-Ribose Polymerase)
A family of enzymes involved in DNA damage repair that consume NAD+ as a substrate. Relevant to NAD+ research.

Reconstitution
The process of dissolving a lyophilized peptide powder into a liquid solution for research use.

Sirtuin
A family of NAD+-dependent deacetylase enzymes (SIRT1-7) involved in gene expression regulation, DNA repair, and stress response. Central to NAD+ longevity research.

Solid-Phase Peptide Synthesis (SPPS)
The standard method for synthesising research peptides, in which amino acids are assembled sequentially onto a solid resin support.

Telomerase
The enzyme responsible for maintaining and extending telomere length. The primary activation target studied in Epithalon research.

Telomere
The protective cap at the end of a chromosome that shortens with each cell division. Telomere length is widely considered a marker of cellular biological age.

TFA (Trifluoroacetic Acid)
A solvent used during peptide synthesis and purification. Residual TFA in the final peptide product is undesirable and should be screened for in COA documentation.

Tuftsin

A naturally occurring immunomodulatory tetrapeptide derived from immunoglobulin G. The parent compound from which Selank was developed.

Appendix E

Recommended Further Reading & Research Resources

Scientific Literature Databases

PubMed / NCBI — pubmed.ncbi.nlm.nih.gov

The primary database for peer-reviewed biomedical and life sciences literature. The most important research resource for any peptide researcher — searchable by compound name, mechanism, or research area.

Google Scholar — scholar.google.com

A broad academic search engine covering peer-reviewed papers, theses, books, and conference papers across all disciplines.

ScienceDirect — sciencedirect.com

Elsevier's platform for peer-reviewed scientific and medical research. Particularly strong coverage of biochemistry, pharmacology, and molecular biology.

ResearchGate — researchgate.net

A professional network for researchers that hosts full-text papers and allows direct communication with authors.

Regulatory Resources

Health Canada — canada.ca/en/health-canada.html

The primary federal regulatory authority for drugs, biologics, and research chemicals in Canada.

Canada Border Services Agency (CBSA) — cbsa-asfc.gc.ca

Relevant for researchers sourcing compounds internationally. Provides information on import regulations and documentation requirements.

Tri-Council Policy Statement (TCPS 2) — ethics.gc.ca

The foundational ethical framework for human research in Canada. Essential reading for any researcher whose work involves human subjects.

Peptide Science Reference Resources

UniProt — uniprot.org

A comprehensive database of protein and peptide sequence and functional information. Useful for verifying amino acid sequences and molecular weights.

PubChem — pubchem.ncbi.nlm.nih.gov

The NIH's open chemistry database. Provides molecular structure, properties, and bioactivity data for a wide range of compounds.

ChemSpider — chemspider.com

A free chemical structure database providing access to molecular data including CAS numbers, molecular formulas, and molecular weights.

Performance Peptides Canada Resources

Product Pages with Downloadable COAs — performancepeptidescanada.ca/shop

Every product listing includes a downloadable batch-specific COA. Use the COA verification checklist in Appendix C when reviewing documentation.

Research Blog — performancepeptidescanada.ca/blogs

Regularly updated articles covering compound research, protocol guidance, and Canadian researcher resources.

Technical Support — performancepeptidescanada.ca/contact-us

Our technical team is available to answer questions about compound selection, reconstitution, storage, and COA interpretation.

This concludes The Canadian Researcher's Peptide Handbook. All content is provided for educational and research reference purposes only. Performance Peptides Canada does not provide medical advice. All compounds referenced are intended strictly for in-vitro laboratory research use in compliance with applicable Canadian regulations.

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