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PEPTIDE GUIDE

WHAT THEY ARE AND HOW THEY WORK

WHAT ARE PEPTIDES?

Peptides are short chains of amino acids (the same building blocks that make up proteins). Your body makes thousands of them naturally. They act as messengers, signaling cells to repair tissue, release hormones, regulate inflammation, and perform dozens of other functions.

Therapeutic peptides are synthetic versions of these natural compounds, designed to replicate specific biological signals. Some have been studied in clinical trials for decades. Others are newer, with exciting early data but less human research. This guide covers both because biohackers don't wait around for permission.

How They Are Administered

Most therapeutic peptides are injected subcutaneously aka SubQ (under the skin, like insulin). Others are taken nasally, orally, or applied topically. Injection is preferred because most peptides break down in your digestive tract before reaching your bloodstream. Nasal and oral forms work for peptides that are either small enough to survive digestion or designed for local gut effects.

Who Uses Peptides

Physicians specializing in functional and regenerative medicine, athletes recovering from injury, and individuals focused on longevity and performance improvement use peptides.

> **IMPORTANT: WORK WITH A PROVIDER**
>
> The protocols in this guide are based on clinical and research literature. They are reference information, not medical advice. Peptide quality, purity, and dosing vary significantly. Work with a licensed practitioner before starting any peptide protocol.

A Note on Dosing

The doses throughout this guide come from published research, animal studies, or community-reported use, not from FDA-reviewed clinical trials in most cases. A handful of compounds here (semaglutide, tirzepatide, PT-141, tesamorelin) have gone through that process and have doses set by a drug label. Most of the others don't; their numbers are best estimates, not established standards, and individual response varies. Treat every dose in this guide as a starting reference to discuss with a provider, not a fixed prescription.

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WHERE TO SOURCE PEPTIDES

Things can get kinda sketchy here. Peptide sourcing falls into three categories: licensed compounding pharmacies (requiring a prescription, highest regulatory oversight), grey market research chemical suppliers (legal to sell as research chemicals, not approved for human use, quality varies), and international pharmacies.

BioLongevity Labs carries an extensive catalog of research peptides including most compounds in this guide. They're third-party tested, with 99%+ purity and COAs (certificates of analysis) available.

Thrive Better offers physician-guided metabolic health, hormone optimization, and longevity programs with ongoing medical supervision. Through virtual visits with licensed healthcare providers, eligible patients may receive prescriptions for FDA-approved GLP-1 medications or, when clinically appropriate and permitted, compounded medications prepared by licensed pharmacies. Treatment options may also include testosterone replacement therapy (TRT), hormone replacement therapy (HRT), and other evidence-based therapies based on each patient's clinical evaluation.

Retatrutide is available through grey market research peptide suppliers. Quality varies. Source from suppliers with verified third-party testing and COAs.

How to Read a COA

A certificate of analysis (COA) confirms what's actually in the vial. Before trusting one, check four things:

- The purity percentage (98%+, tested by HPLC or mass spec, not just listed as a number)
- That the batch or lot number on the COA matches the lot number on your vial
- A mass spec or amino acid sequence confirmation showing it's the compound it claims to be
- A testing date recent enough to reflect the batch you're holding

> A COA with no lot number, no test method, or a date years old isn't verifying anything.

RECOVERY & REPAIR

Peptides that accelerate tissue healing, reduce inflammation, and support injury recovery.

BPC-157

Also known as: Body Protection Compound 157

BPC-157 is a synthetic peptide derived from a protein found naturally in gastric juice. It promotes the healing of tendons, ligaments, muscle, and gut lining. It works by stimulating the formation of new blood vessels at injury sites (angiogenesis) and upregulating growth factor signaling. It is one of the most studied healing peptides in animal models, with a growing body of human clinical experience.

KEY BENEFITS

- Accelerates tendon and ligament repair
- Heals gut lining: useful for leaky gut, IBS, and IBD
- Reduces systemic inflammation
- Supports nerve repair and neuroprotection
- Promotes new blood vessel formation at injury sites

TYPICAL PROTOCOL

Dose	250-500 mcg per injection
Route	SubQ injection or oral (capsule form for gut-specific effects)
Frequency	Once daily
Duration	4-6 weeks; reassess at end of cycle
Timing	Any time of day; oral form best taken on empty stomach

> **SAFETY NOTE** Do not use with active cancer (BPC-157 promotes angiogenesis, new blood vessel formation, which theoretically could support tumor growth).

TB-500

Also known as: Thymosin Beta-4 Fragment

TB-500 is a synthetic fragment of Thymosin Beta-4, a protein that regulates actin, a key structural protein in muscle and other tissues. Unlike BPC-157, which targets local injury sites, TB-500 works systemically throughout the body. It improves circulation, reduces inflammation, and supports recovery from muscle tears, cardiovascular damage, and chronic conditions. Many people **combine BPC-157 and TB-500** for a synergistic effect.

KEY BENEFITS

- Systemic tissue repair: works throughout your body, not just at the injection site
- Reduces chronic inflammation
- Supports heart muscle repair and cardiovascular recovery
- Improves blood flow and circulation
- Speeds recovery from muscle injuries and surgeries

TYPICAL PROTOCOL

Dose	2-5 mg per week, split across 2 injections
Route	SubQ injection
Frequency	Twice weekly (e.g. Monday and Thursday)
Duration	4-6 weeks; can continue at lower maintenance dose
Stack	Often combined with BPC-157 for comprehensive tissue repair

> **SAFETY NOTE** Do not use with active cancer (TB-500 promotes cell motility and tissue growth throughout the body, a mechanism some research links to supporting migration in existing cancer cells).

METABOLIC & BODY COMPOSITION

Peptides that influence fat loss, muscle preservation, and metabolic health.

SEMAGLUTIDE

Also known as: GLP-1 Receptor Agonist (brand names: Ozempic, Wegovy)

Semaglutide is a GLP-1 receptor agonist and the best-studied drug in its class. It mimics glucagon-like peptide-1, a hormone your body releases after eating that signals satiety, slows gastric emptying, and regulates insulin. FDA-approved for type 2 diabetes and obesity, semaglutide produces significant weight loss and cardiovascular risk reduction in large clinical trials.

KEY BENEFITS

- Substantial weight loss (STEP trials showed ~15%)
- Reduces appetite and food cravings
- Improves blood sugar regulation
- Lowers cardiovascular event risk
- May reduce neuroinflammation (emerging research)
- Microdosing may be good for longevity (see below)

TYPICAL PROTOCOL

Starting Dose	0.25 mg weekly for 4 weeks
Titration	0.5 mg to 1.0 mg to 1.7 mg to 2.4 mg, stepping up monthly
Route	SubQ injection, once weekly
Duration	Ongoing; weight often returns when discontinued

> **SAFETY NOTE** Common side effects: nausea, constipation, and vomiting, which improve with titration. Rare but serious: pancreatitis, gallbladder disease. Not for use with personal or family history of medullary thyroid cancer or MEN-2 syndrome.

TIRZEPATIDE

Also known as: Dual GIP/GLP-1 Agonist (brand names: Mounjaro, Zepbound)

Tirzepatide is a dual-acting peptide that targets both GLP-1 and GIP receptors. GIP (glucose-dependent insulinotropic polypeptide) is a second gut hormone involved in fat storage and insulin response. The dual mechanism gives you greater weight loss than semaglutide in head-to-head trials, producing up to 22% body weight reduction. It also improves insulin sensitivity and lipid profiles.

KEY BENEFITS

- Superior weight loss vs. semaglutide in clinical trials
- Stronger improvements in blood sugar control
- Better lipid profile outcomes

TYPICAL PROTOCOL

Starting Dose	2.5 mg weekly for 4 weeks
Titration	5 mg to 7.5 mg to 10 mg to 12.5 mg to 15 mg, stepping up monthly
Route	SubQ injection, once weekly
Duration	Ongoing with medical supervision

> **SAFETY NOTE** Similar side effect profile to semaglutide: nausea, constipation, vomiting. Same contraindications: personal or family history of medullary thyroid cancer or MEN-2.

RETATRUTIDE

Also known as: Triple GIP/GLP-1/Glucagon Receptor Agonist, "GLP-3"

Retatrutide is the next generation of weight loss peptides beyond tirzepatide. Where semaglutide hits one receptor and tirzepatide hits two, retatrutide hits three: GLP-1, GIP, and glucagon. The glucagon receptor component increases energy expenditure and drives fat burning independent of appetite suppression. In Eli Lilly's Phase 2 trial, participants lost up to 24% of body weight over 48 weeks. Retatrutide is not yet FDA-approved. It's available through grey market research peptide suppliers.

KEY BENEFITS

- Significant weight loss (up to 24% body weight)
- Targets fat burning through three separate receptor mechanisms
- Strong improvements in blood sugar and lipids
- Preserves lean mass
- Reduces liver fat (NAFLD)

TYPICAL PROTOCOL

Starting Dose	0.5-1 mg weekly
Titration	Titrate to 4-12 mg weekly over 8-12 weeks
Route	SubQ injection, once weekly
Duration	Ongoing with medical supervision

SAFETY NOTE Similar GI side effects to semaglutide and tirzepatide (nausea, constipation). Not FDA-approved. Grey market sourcing means quality varies by supplier. Not for use with personal or family history of medullary thyroid cancer or MEN-2.

GLP-1 MICRODOSING (LONGEVITY PROTOCOL)

Also known as: Low-Dose GLP-1 Therapy

GLP-1 receptors don't just live in your gut and pancreas. Your brain, heart, immune cells, and blood vessels all carry them. At weight-loss doses, appetite suppression dominates. At much lower doses, those receptors are still firing, without the appetite suppression or gastrointestinal side effects. That's the basis for microdosing GLP-1 as a longevity protocol. Semaglutide is the most commonly used option (typically 0.1 to 0.5 mg weekly). Clinicians and biohackers also use tirzepatide and retatrutide at doses below the weight-loss threshold.

The SELECT cardiovascular outcomes trial showed semaglutide reduced major cardiac events by 20% in people who were overweight but did not have diabetes, independent of weight loss. That signal points to mechanisms beyond appetite: less inflammation throughout the body, better blood vessel function, and direct receptor activity in the heart. GLP-1 receptors in the brain also reduce brain inflammation. Preclinical data shows GLP-1 agonists lower markers of neuroinflammation and help protect brain cells from breaking down.

Microdosing is for people already at a healthy weight who want the whole-body and brain-protective benefits without weight loss as the goal. The protocol isn't standardized. Most clinicians using this approach start at 0.1 to 0.25 mg weekly and stay there rather than increasing the dose.

KEY BENEFITS

- Reduces systemic and neuroinflammation at sub-weight-loss doses
- Cardiovascular protection independent of weight loss (SELECT trial data)
- May reduce neuroinflammation markers
- Minimal GI side effects at microdose range
- For people at healthy weight pursuing longevity protocols

TYPICAL PROTOCOL

Dose	0.1-0.5 mg semaglutide weekly (or equivalent tirzepatide)
Route	SubQ injection, once weekly
Goal	Hold at low dose. Do not titrate for weight loss
Duration	Ongoing with periodic reassessment
Note	Not standardized: work with a physician familiar with longevity protocols

> **SAFETY NOTE** Same contraindications as standard GLP-1 use: personal or family history of medullary thyroid cancer or MEN-2 syndrome. At microdose range, GI side effects are uncommon. Requires medical supervision.

CJC-1295 + IPAMORELIN

Also known as: GHRH + GHRP Stack (Growth Hormone Secretagogues)

CJC-1295 and Ipamorelin are almost always used together. CJC-1295 is a growth hormone releasing hormone (GHRH) analogue that signals the pituitary gland to produce more growth hormone. Ipamorelin is a growth hormone releasing peptide (GHRP) that extends this signal. Together they produce a strong, clean pulse of growth hormone with minimal effect on cortisol or prolactin, the side effects common with older GHRPs.

KEY BENEFITS

- Increases growth hormone and IGF-1 levels
- Supports fat loss, especially visceral fat
- Improves sleep quality and recovery
- Preserves and builds lean muscle mass
- Supports joint health and connective tissue

TYPICAL PROTOCOL

Dose	CJC-1295 (no DAC): 100-200 mcg + Ipamorelin: 200-300 mcg per injection
Route	SubQ injection. CJC-1295 comes in two forms: no-DAC has a short half-life and creates a natural GH pulse; the DAC version lasts days and blunts that effect. For this stack, always use no-DAC.
Frequency	1-3x daily; bedtime dose most important for GH release
Duration	8-12 week cycles, then 4-8 weeks off
Timing	Take fasted: food and insulin suppress GH release

SAFETY NOTE Do not use with active cancer (GH is a growth signal).

AOD-9604

Also known as: Anti-Obesity Drug Fragment 9604

AOD-9604 is a fragment of human growth hormone (HGH): specifically the section responsible for fat metabolism, isolated from the rest of the molecule. Unlike full HGH or GH secretagogues, AOD-9604 does not raise IGF-1 or affect blood sugar, making it safer for people with metabolic concerns. It stimulates lipolysis (fat breakdown) and inhibits fat accumulation, particularly in stubborn fat depots.

KEY BENEFITS

- Targets fat loss without raising IGF-1 or blood sugar
- Stimulates breakdown of stored fat (lipolysis)
- May support cartilage repair (early research)
- Well-tolerated metabolic profile

TYPICAL PROTOCOL

Dose	250-500 mcg daily
Route	SubQ injection
Frequency	Once daily, morning, fasted
Duration	Cycle 12-16 weeks on, 4 weeks off

TESAMORELIN

Also known as: GHRH Analogue (brand name: Egrifta)

Tesamorelin is a stabilized GHRH analogue, FDA-approved for the reduction of visceral fat in HIV-associated lipodystrophy, and used off-label in wellness medicine for body recomposition. Clinical trials show significant reductions in visceral fat, improvements in lipid profiles, and cognitive benefits in older adults. It raises IGF-1 and GH, so it carries more potency, and more considerations, than AOD-9604.

KEY BENEFITS

- Significant reduction in visceral fat
- Improves lipid profiles and metabolic markers
- Raises GH and IGF-1
- Potential cognitive benefits in older adults

TYPICAL PROTOCOL

Dose	1-2 mg daily
Route	SubQ injection, abdomen
Frequency	Daily, 5 days on / 2 days off is a common clinical approach
Duration	10-26 week cycles with medical supervision

SAFETY NOTE May increase blood glucose. Monitor if diabetic or pre-diabetic. Not for use with active cancer. Requires prescription in most countries.

5-AMINO-1MQ

Also known as: 5-Amino-1-methylquinolinium

5-Amino-1MQ is a small molecule that blocks an enzyme called NNMT, one of the main things draining your NAD+ levels and pushing fat cells toward storage. Block it, and NAD+ goes up, your cells switch into fat-burning mode, and longevity pathways kick in. In animal studies, 5-Amino-1MQ reduces fat mass and body weight without caloric restriction. Human data is limited but clinical use is growing.

KEY BENEFITS

- Raises intracellular NAD+ without direct NAD+ supplementation
- Reduces fat mass in animal models
- Activates SIRT1 and longevity pathways
- Stacks well with NAD+ and MOTS-C

TYPICAL PROTOCOL

Dose	50-100 mg orally once daily
Route	Oral
Duration	8-12 weeks on, 4-6 weeks off
Stack	Often stacked with MOTS-C and NAD+

CAGRILINTIDE

Also known as: Amylin Analogue (Long-Acting)

Cagrilintide is a long-acting synthetic analogue of amylin, a hormone co-released with insulin from the pancreas after meals. Amylin slows stomach emptying, suppresses glucagon, and signals satiety through the brain. Cagrilintide extends amylin signaling

with a half-life supporting once-weekly dosing. In clinical trials, cagrilintide combined with semaglutide (the CagriSema combination) produced weight loss exceeding either agent alone.

KEY BENEFITS

- Slows gastric emptying and reduces appetite
- Complements GLP-1 agonists for greater combined weight loss
- Suppresses glucagon after meals
- Once-weekly dosing

TYPICAL PROTOCOL

Dose	0.3-2.4 mg weekly
Route	SubQ injection
Titration	Titrate monthly
Stack	Often stacked with semaglutide or tirzepatide
Duration	Ongoing with medical supervision

> **SAFETY NOTE** Nausea is the primary side effect, particularly during titration. Additive GI effects when combined with GLP-1 agonists. Titrate slowly.

FOLLISTATIN 344

Also known as: FS-344, Myostatin Inhibitor

Follistatin is a naturally occurring protein that binds and neutralizes myostatin, the body's primary brake on muscle growth. Less myostatin means more muscle. Follistatin 344 is the most basic version, and the one most used in the bodybuilding community. It also interacts with activin and GDF11, not just myostatin, which can lead to bone weakness and unwanted vascular effects at higher doses. Evidence in healthy humans is limited. Most data comes from animal studies or patients with muscle-wasting diseases. Follistatin 344 is a banned WADA substance.

TYPICAL PROTOCOL

Dose	100-300 mcg per injection
Route	Intramuscular (IM), injected directly into the target muscle
Frequency	Daily or every other day
Duration	4-8 week cycles

SAFETY NOTE WADA banned. Temporarily weakened ligaments and tendons reported. Do not use with active cancer.

FLGR242 (RECOMBINANT FOLLISTATIN)

Also known as: Modified Follistatin 344, BioLongevity Labs Recombinant Follistatin

FLGR242 is a modified version of Follistatin 344 fused with an albumin-binding construct that extends its half-life from 1-2 hours to 19 days. Unlike Follistatin 344, it is designed to target myostatin specifically with minimal effect on activin and GDF11, reducing the bone and vascular risks of older myostatin inhibitors. It is injected systemically, not into individual muscles, and produces whole-body effects on skeletal muscle growth and preservation.

TYPICAL PROTOCOL

Dose	2.5 mg subQ weekly, or 5 mg subQ every two weeks
Advanced	5 mg subQ weekly
Route	SubQ ONLY. Never intramuscular (IM)
Duration	Ongoing. 3-4 month break optional

SAFETY NOTE Do not inject intramuscularly under any circumstances. The albumin-binding construct expands inside muscle tissue and causes severe pain. Do not use with active cancer.

PEG-MGF

Also known as: PEGylated Mechano Growth Factor

MGF (Mechano Growth Factor) is a form of IGF-1, a key muscle growth factor, that your muscles produce locally when you train. On its own it breaks down in minutes, which makes it useless as an injectable. PEGylation is a chemical modification that attaches a stabilizing molecule, extending its half-life from minutes to days so it can work throughout the body. PEG-MGF activates your muscle's own stem cells responsible for repair and growth, even without exercise. Research focuses on muscle injury recovery, age-related muscle loss, and post-surgical rehabilitation.

KEY BENEFITS

- Activates your muscle's own stem cells for repair and growth
- Makes your training do more at the cellular level
- Supports recovery from muscle injuries
- Potential for age-related muscle loss (sarcopenia)

TYPICAL PROTOCOL

Dose	100-200 mcg per injection
Route	SubQ injection
Frequency	2-3x weekly, post-workout or on rest days for recovery focus
Duration	Cycle 4-6 weeks on, 4 weeks off

SAFETY NOTE Do not use with active cancer.

SLU-PP-332

SLU-PP-332 is a small molecule that activates a set of receptors called ERRs (estrogen-related receptors) inside your cells. Despite the name, ERRs don't bind estrogen or drive estrogen signaling. They control how your mitochondria produce and use energy. When those receptors fire, your body responds the way it would to a long endurance workout: more mitochondria, better fat burning, more energy output. In animal studies, SLU-PP-332 significantly improved endurance and metabolic markers without any exercise.

Early protocols dosed this at 10-20 mg daily. Some peptide experts and biohackers who have used it extensively now argue that was a massive underdose. After applying proper scaling from the mouse research, updated protocols call for 100 mg daily.

TYPICAL PROTOCOL

Dose	10-20 mg daily (conservative) or 100 mg daily (intense protocol)
Route	Oral
Timing	Any time, no need to take with food
Duration	Cycle 4-8 weeks on with 1-2 weeks off. Support mitochondria during off cycle

SAFETY NOTE No liver, kidney, or cardiac toxicity in 28-day animal studies. Hot flashes and increased sweating are common at these doses.

BRAIN & COGNITION

Peptides that support focus, memory, neuroprotection, and mood.

SEMAX

Also known as: ACTH(4-7) Pro-Gly-Pro Analogue

Semax is a synthetic peptide originally developed in Russia in the 1980s for stroke recovery and cognitive enhancement. It is derived from ACTH, a stress hormone, but lacks its hormonal effects. Semax increases BDNF (brain-derived neurotrophic factor), the primary growth factor for neurons, and modulates dopamine and serotonin activity. It has decades of clinical use in Russia for cognitive decline, ADHD, stroke rehabilitation, and nerve damage.

KEY BENEFITS

- Increases BDNF: supports neuronal growth and plasticity
- Sharpens focus and working memory
- Supports recovery from stroke and traumatic brain injury
- Mood stabilization and reduced anxiety
- Immune modulation (secondary effect)

TYPICAL PROTOCOL

Dose	50-1000 mcg depending on concentration and goal
Route	Intranasal spray (most common); SubQ injection
Frequency	1-3x daily
Duration	Cycles of 2-4 weeks; can be used as needed
Timing	Morning and early afternoon only. Avoid evening, disrupts sleep

SAFETY NOTE Mild nasal irritation with intranasal use.

Na-Semax Amidate (N-Acetyl Semax Amidate) is a modified version that's 3–5x more potent with a longer half-life. Use 100–300 mcg per dose. Lower dose, same or better effect. Cycle 21–30 days on, 10–14 days off.

SELANK

Also known as: Tuftsin Analogue (Anxiolytic Peptide)

Selank is a peptide that was developed in Russia, where it's approved for anxiety and PTSD. It modulates GABA, serotonin, and dopamine without the sedation or addiction risk of benzodiazepines (anti-anxiety drugs like Xanax and Valium). Users describe it as calm clarity.

KEY BENEFITS

- Reduces anxiety and stress without sedation
- Non-addictive alternative to benzodiazepines
- Improves mood and emotional stability
- Supports immune function
- May help with PTSD and social anxiety

TYPICAL PROTOCOL

Dose	250–500 mcg per dose
Route	Intranasal spray; SubQ injection as alternative
Frequency	2–3x daily (total 500–1,500 mcg)
Duration	Can be used long-term; non-habit-forming
Timing	Morning only. Avoid evening, disrupts sleep

Na-Selank Amidate (N-Acetyl Selank Amidate) is a more potent version that crosses the blood-brain barrier more effectively, with a longer half-life. The dose is 600–900 mcg daily. Lower total dose than standard Selank, but a stronger effect. Even less research data than standard Selank.

DIHEXA

Also known as: N-hexanoic-Tyr-Ile-(6) aminohexanoic amide

Dihexa is one of the most potent brain-building compounds ever identified. It comes from angiotensin IV and works by stimulating synaptogenesis (the formation of new connections between neurons). Human data is very early, but the clinical interest for Alzheimer's, TBI, and cognitive decline is significant.

KEY BENEFITS

- Potent stimulator of new synapse formation (neurogenesis)
- Potential for cognitive decline, Alzheimer's, and TBI
- May reverse age-related cognitive deterioration in animal models

TYPICAL PROTOCOL

Dose	10-20 mg daily (oral); 20-40 mg daily (transdermal)
Route	Oral or transdermal
Duration	Cycle 4-8 weeks on, 2-4 weeks off. Dose every other day or 2x weekly during on phase

SAFETY NOTE Because it promotes cell growth, theoretical concern exists for people with cancer.

CEREBROLYSIN

Also known as: Porcine Brain-Derived Neuropeptide Mixture

Cerebrolysin is not a single peptide but a mixture of low-molecular-weight neuropeptides derived from pig brain tissue. It has been used clinically in Europe and Asia for over 40 years for Alzheimer's disease, stroke recovery, and traumatic brain injury. It mimics the effects of nerve growth factor (NGF) and BDNF, supporting neuronal survival, repair, and plasticity. It is one of the most studied neuroprotective compounds in clinical medicine.

KEY BENEFITS

- Supports recovery from stroke and traumatic brain injury
- Used clinically for Alzheimer's and vascular dementia
- Promotes neuronal survival and plasticity
- Reduces neuroinflammation

TYPICAL PROTOCOL

Dose	10–50 mL per session (stroke/TBI); 10–30 mL (Alzheimer's/dementia)
Route	IV infusion (primary); IM up to 5 mL
Frequency	5 days per week
Duration	4-week cycles; often repeated 2-3x per year
Timing	Morning preferred. Can be stimulating and cause excitability if given late

SAFETY NOTE Derived from porcine brain tissue, not suitable for those with religious dietary restrictions regarding pork. Rare allergic reactions possible. Administer under medical supervision due to dosing complexity.

PINEALON

Also known as: Khavinson Tripeptide EDR (Glu-Asp-Arg)

Pinealon is a short peptide developed by Russian scientist Dr. Vladimir Khavinson, targeting the brain and pineal gland. It crosses the blood-brain barrier and regulates gene expression in brain tissue, with research showing neuroprotective and antioxidant effects, and some influence on circadian rhythm gene expression. Used in Russian clinical practice for age-related cognitive decline.

KEY BENEFITS

- Neuroprotective and antioxidant effects in brain tissue
- Supports circadian rhythm regulation via pineal gland pathway
- Crosses the blood-brain barrier
- Used for age-related cognitive decline
- Stacks with Epithalon for pineal/longevity protocols

TYPICAL PROTOCOL

Dose	100–300 mcg daily; some protocols up to 2 mg
Route	SubQ injection
Duration	10-day course, 2-3 cycles per year (Khavinson protocol)

SLEEP

Peptides that support sleep architecture, depth, and quality.

DSIP

Also known as: Delta Sleep-Inducing Peptide

DSIP is a naturally occurring neuropeptide first isolated in 1977 from rabbits. DSIP induces slow-wave (delta) sleep. Beyond sleep, DSIP modulates stress responses, reduces cortisol, and has antioxidant properties. It is not a sedative. DSIP works by normalizing sleep architecture rather than forcing sedation. Users report improved sleep quality, particularly better slow-wave sleep.

KEY BENEFITS

- Promotes slow-wave (deep) delta sleep
- Normalizes disrupted sleep architecture without sedation
- Reduces cortisol and stress response
- Antioxidant properties
- Non-habit-forming

TYPICAL PROTOCOL

Dose	100-500 mcg per injection
Route	SubQ injection
Timing	30-60 minutes before sleep
Duration	Use as needed or in 5-10 day cycles

IMMUNE SUPPORT

Peptides that modulate immune function, fight infection, and balance inflammation.

THYMOSIN ALPHA-1

Also known as: TA-1 (brand name: Zadaxin)

Thymosin Alpha-1 is a naturally occurring peptide produced by the thymus gland, the organ responsible for training T-cells (your immune system's frontline fighters against infection and cancer). TA-1 is approved in over 35 countries for hepatitis B and C, and is used adjunctively in cancer treatment. It upregulates the innate immune response, improves T-cell activity, and has been used for chronic infections, immune deficiency, and as an anti-aging protocol given that thymus function declines sharply with age.

KEY BENEFITS

- Enhances T-cell production and immune surveillance
- Used clinically for hepatitis B, C, and cancer support
- Helps with chronic infections and immune deficiency
- Anti-aging via restoration of thymic immune function
- Reduces chronic inflammation

TYPICAL PROTOCOL

Dose	1.6 mg per injection
Route	SubQ injection
Frequency	Twice weekly for general immune support; daily for acute illness
Duration	6-12 months for chronic conditions; shorter cycles for acute use

LL-37

Also known as: Cathelicidin Antimicrobial Peptide

LL-37 is the only human cathelicidin, a class of antimicrobial peptides produced by immune cells, skin, and gut lining. It kills a broad spectrum of bacteria, viruses, and fungi directly. It also disrupts biofilms, the protective matrices that allow chronic infections (like SIBO, Lyme, and UTIs) to persist against antibiotics. Beyond antimicrobial action, LL-37 modulates immune signaling and supports wound healing.

KEY BENEFITS

- Broad-spectrum antimicrobial against bacteria, viruses, and fungi
- Disrupts biofilms: helpful for chronic, treatment-resistant infections
- Supports wound healing
- Modulates immune response to prevent runaway inflammation

TYPICAL PROTOCOL

Dose	100-500 mcg daily depending on indication
Route	SubQ injection; topical for skin applications
Frequency	Once or twice daily
Duration	2-4 weeks for acute infection; reassess for chronic use

SAFETY NOTE Start at lower doses. Can cause injection-site irritation.

THYMULIN

Also known as: Facteur Thymique Serique (FTS)

Thymulin is a short peptide that your thymus gland makes. Thymulin production drops sharply after puberty and declines to near-zero by age 60, paralleling the shrinkage of the thymus. The peptide is required for T-cell differentiation and immune competence. Zinc is an essential cofactor. Thymulin is inactive without zinc binding. Supplementation aims to restore thymic immune signaling in older adults and those with immune deficiency.

KEY BENEFITS

- Restores T-cell differentiation and immune competence
- Addresses age-related thymic decline
- Requires zinc as cofactor (ensure adequate zinc intake)
- Supports immune response in older adults
- Complements Thymosin Alpha-1 for comprehensive immune support

TYPICAL PROTOCOL

Dose	0.5–2 mg
Route	SubQ injection
Frequency	Once daily
Duration	Cycle 20 days on, 3x per year (roughly every 4 months)

SAFETY NOTE Zinc is required for activation. Take 15–30 mg elemental zinc daily, starting at least 7 days before your first injection. Balance zinc with copper to avoid deficiency.

HORMONAL & SEXUAL HEALTH

Peptides that support hormone signaling, libido, and sexual function.

PT-141

Also known as: Bremelanotide (FDA-approved as Vyleesi)

PT-141 is a melanocortin receptor agonist, the first peptide FDA-approved for female hypoactive sexual desire disorder (HSDD). Unlike drugs that work through the vascular system (like sildenafil), PT-141 acts centrally in the brain, activating the neural pathways involved in sexual desire and arousal. It is used by both men and women for low libido, erectile dysfunction, and arousal disorders.

KEY BENEFITS

- Increases sexual desire by acting on brain receptors, not blood vessels
- FDA-approved for female sexual dysfunction (HSDD)
- Works for both men and women
- Does not require sexual stimulation to be effective

TYPICAL PROTOCOL

Dose	0.5-2 mg per use
Route	SubQ injection
Timing	45-60 minutes before sexual activity
Frequency	As needed; maximum 8 doses per month

> **SAFETY NOTE** Common side effects: nausea, flushing, headache, more frequent at higher doses. Transient blood pressure increase possible. Avoid in patients with uncontrolled hypertension or cardiovascular disease.

KISSPEPTIN

Also known as: Metastin (KiSS-1 Gene Product)

Kisspeptin is a naturally occurring neuropeptide that sits at the top of the hormonal cascade controlling reproductive function. It signals the hypothalamus to release GnRH, which triggers LH and FSH, which drive testosterone and estrogen production. It is

used to restore natural hormonal signaling, support fertility, and improve libido, often as an alternative to testosterone replacement in people who want to preserve natural hormone production.

KEY BENEFITS

- Stimulates natural testosterone production via the hypothalamic pathway
- Supports fertility in both men and women
- Improves libido without suppressing natural hormone production
- May help with hypothalamic amenorrhea

TYPICAL PROTOCOL

Dose	100-200 mcg per injection
Route	SubQ injection
Frequency	2-3x weekly
Duration	4-8 weeks; reassess hormonal response

> **SAFETY NOTE** Requires hormone monitoring. Use under endocrinology or functional medicine supervision. Do not use with active cancer, particularly breast cancer (including ER-negative and triple-negative) and liver cancer, where kisspeptin receptor activity has been shown to promote tumor progression.

GONADORELIN

Also known as: GnRH, Gonadotropin-Releasing Hormone

Gonadorelin is synthetic GnRH, the hormone that sits one step downstream of Kisspeptin in the same cascade; it binds GnRH receptors in the pituitary directly and triggers the pulsatile release of LH and FSH. Its main use is in men on testosterone replacement therapy. Exogenous testosterone suppresses the body's own LH and FSH, which shrinks the testes and can impair fertility, and intermittent Gonadorelin dosing keeps that signal active. hCG has traditionally been used for the same purpose and remains more effective for preserving fertility specifically, but it's gotten harder to access through compounding pharmacies.

KEY BENEFITS

- Maintains testicular size and function during TRT
- Preserves natural LH and FSH signaling
- Alternative to hCG where hCG access is limited
- Used by both men and women to support the same hypothalamic-pituitary-gonadal pathway

TYPICAL PROTOCOL

Dose	50-100 mcg per injection
Route	SubQ injection
Frequency	2-3x weekly
Duration	Ongoing alongside TRT; reassess with hormone panels

SAFETY NOTE Dosing frequency matters here more than with most peptides in this guide. Intermittent dosing stimulates LH and FSH release, but continuous or too-frequent dosing desensitizes the same receptors and can suppress the signal instead. Don't use with a personal or family history of hormone-sensitive cancers (prostate, breast) without medical guidance. Requires hormone monitoring.

OXYTOCIN

Also known as: OT, 'The Bonding Hormone'

Oxytocin is a hormone your hypothalamus produces and your posterior pituitary releases, most known for its role in childbirth (it drives uterine contractions) and breastfeeding (the milk-ejection reflex), which is also its only FDA-approved use, as IV Pitocin for labor induction and postpartum bleeding control. Outside of obstetrics, oxytocin also plays a role in social bonding, trust, and sexual response, and that's the effect people are usually after when using it as a peptide, typically as an intranasal spray rather than the IV form used in delivery rooms. Research on its behavioral effects is real but mixed.

KEY BENEFITS

- May increase feelings of trust, bonding, and social connection
- May reduce social anxiety and stress reactivity in some studies
- Plays a role in sexual arousal and orgasm intensity
- Studied, with mixed results, for social cognition in autism spectrum research

TYPICAL PROTOCOL

Dose	10-40 IU per dose (commonly 24 IU in research settings)
Route	Intranasal spray
Frequency	As needed, or once daily in research protocols
Duration	Not established for chronic use; most research is single-dose or short-term

SAFETY NOTE Do not use if pregnant. Oxytocin's core biological role is inducing labor, and that holds regardless of route. Behavioral effects are context-dependent and not uniformly positive in the research.

ANTI-AGING & LONGEVITY

Peptides targeting the fundamental mechanisms of cellular aging.

EPITHALON

Also known as: Epitalon, Tetrapeptide Ala-Glu-Asp-Gly

Epithalon is a synthetic tetrapeptide based on Epithalamin, a naturally occurring compound from the pineal gland. It was developed by Russian scientist Vladimir Khavinson, who has published extensively on its effects. Epithalon activates telomerase, the enzyme that lengthens telomeres (the protective caps on chromosomes that shorten with each cell division). Longer telomeres are associated with slower biological aging. Animal studies show extended lifespan. Human data is more limited but spans several decades of Russian clinical use.

KEY BENEFITS

- Activates telomerase, supporting telomere maintenance
- Antioxidant effects: reduces cellular oxidative damage
- Regulates circadian rhythm and melatonin production
- Immune modulation and anti-cancer properties in animal models

TYPICAL PROTOCOL

Dose	5-10 mg daily
Route	SubQ or intramuscular injection
Frequency	Daily for 10-20 days
Cycles	2-3 cycles per year based on Khavinson protocols

> **SAFETY NOTE** Theoretical concern is telomerase activation in cancer cells. Do not use with active cancer.

GHK-CU

Also known as: Copper Peptide GHK-Cu (Glycyl-L-histidyl-L-lysine copper)

GHK-Cu is a naturally occurring copper-binding tripeptide found in human plasma, saliva, and urine. Plasma levels decline significantly with age. It stimulates collagen, elastin, and glycosaminoglycan synthesis. Beyond aesthetics, GHK-Cu resets genes toward a healthier expression pattern in preclinical research, activates antioxidant pathways, and supports wound healing. It's grouped here under Anti-Aging & Longevity for its cellular effects, but it's just as relevant to Skin & Aesthetics, this is one of the most-used peptides for skin quality specifically.

KEY BENEFITS

- Stimulates collagen and elastin synthesis: skin, hair, nails
- Promotes wound healing and tissue remodeling
- Activates antioxidant defenses
- Supports hair follicle health and growth
- Gene-regulatory effects: resets aging-associated gene expression

TYPICAL PROTOCOL

Injectable Dose	1-2 mg daily
Route	SubQ injection or topical
Topical	2-4% concentration cream or serum, applied 1-2x daily
Duration	Cycle 8-12 weeks on, 4 weeks off. Can use topical continuously

SAFETY NOTE Blue tinting of skin at injection site is normal and temporary.

MOTS-C

Also known as: Mitochondrial Open Reading Frame Peptide

MOTS-C is encoded in mitochondrial DNA rather than nuclear DNA, making it unlike virtually every other peptide in clinical use. It activates AMPK, your cell's master energy-sensing enzyme, and improves how your cells produce and use energy. In animal studies it extends lifespan, improves insulin sensitivity, and mimics the metabolic benefits of physical training. Circulating MOTS-C levels decline with age and track closely with insulin resistance. Centenarians have plasma levels resembling people decades younger. Human clinical research is still early.

KEY BENEFITS

- Activates AMPK, improving how cells produce and use energy
- Mimics the metabolic benefits of exercise in animal models
- Improves insulin sensitivity
- Extends lifespan in animal models

- Mitochondrial-derived, pairs with Humanin for combined mitochondrial support

TYPICAL PROTOCOL

Dose	2–10 mg per injection
Route	SubQ injection
Frequency	5x per week to daily
Cycle	8–12 weeks on, 4 weeks off

> **SAFETY NOTE** WADA prohibited as of January 2025. Competitive athletes should not use. Protocols vary significantly; work with a physician to find the right dose for you.

HUMANIN

Also known as: HN, Mitochondrial-Derived Peptide (MDP)

Humanin is encoded in mitochondrial DNA, the same origin as MOTS-C, making it one of only two well-characterized peptides your mitochondria produce directly rather than peptides encoded in the nuclear genome. It protects cells from oxidative stress and programmed cell death (apoptosis), and circulating levels decline with age in a pattern similar to MOTS-C. Animal research shows lifespan extension; the synthetic analogue HNG (S14G-Humanin) is more potent than native Humanin and is the form most commonly used in practice, at a fraction of the dose.

KEY BENEFITS

- Protects cells from oxidative stress and apoptosis
- Lifespan extension shown in animal models

TYPICAL PROTOCOL

Dose	100-500 mcg per injection (HNG analogue; native Humanin requires 1-4 mg)
Route	SubQ injection
Frequency	2-3x weekly
Duration	Cycle 8-12 weeks on, 4-6 weeks off

SS-31

Also known as: Elamipretide, Szeto-Schiller Peptide 31

SS-31 targets cardiolipin, a phospholipid found exclusively in the inner mitochondrial membrane that is essential for efficient electron transport and ATP production. Cardiolipin integrity declines with age. SS-31 binds to and stabilizes it, improving mitochondrial

efficiency and reducing reactive oxygen species (ROS) production. Clinical trials are underway for heart failure, chronic kidney disease, and mitochondrial myopathy.

KEY BENEFITS

- Stabilizes mitochondrial membranes and improves ATP output
- Reduces mitochondrial oxidative stress (ROS)
- Clinical trials for heart failure and kidney disease
- Addresses a root cause of cellular aging

TYPICAL PROTOCOL

Dose	2-5 mg daily
Route	SubQ injection
Frequency	Once daily
Duration	Cycle 8-12 weeks on, 4-8 weeks off

NAD+

Also known as: Nicotinamide Adenine Dinucleotide

NAD+ is a coenzyme present in every cell, essential for energy production, DNA repair, and sirtuin activation. NAD+ levels decline 40-50% between ages 20 and 60. Oral precursors (NMN, NR) raise NAD+ but with variable conversion. **Injectable NAD+** delivers the coenzyme directly into circulation, bypassing gut conversion. Clinical use focuses on energy restoration, mitochondrial support, cognitive function, and addiction recovery.

KEY BENEFITS

- Supports mitochondrial energy production
- Activates sirtuins (longevity-associated proteins)
- Supports DNA repair mechanisms
- Cognitive clarity and energy restoration
- Used in addiction recovery protocols

TYPICAL PROTOCOL

Dose	100-500 mg IV or subQ injection
Route	IV or subQ
IV Timing	2-4 hours for higher doses to minimize side effects
SubQ Dose	50-100 mg daily
Duration	Cycles of 4 days on / 3 days off, or as needed

SAFETY NOTE IV administration at high doses causes chest tightness, nausea, and flushing. Slow infusion rate resolves symptoms. Subcutaneous form is better tolerated.

KLOTHO & ALPHAKLOTHOLR

Also known as: Soluble Alpha-Klotho, KL gene product; alphaKlothoLR is BioLongevity Labs' Long-Release Klotho

Klotho is a protein your body makes primarily in the kidneys. Circulating levels decline steadily with age, from around 900 pg/mL in adults aged 20-34 to roughly 720 pg/mL by ages 50-64. Low levels associate with accelerated aging across multiple systems: cognitive decline, cardiovascular disease, kidney dysfunction, reduced muscle mass, and frailty. When the Klotho gene is knocked out in mice, they develop rapid aging syndrome; overexpress it, and they live longer. Klotho drives mitochondrial biogenesis, supports nitric oxide production, helps kidneys regulate phosphate and calcium, and may help clear amyloid proteins linked to Alzheimer's.

Native soluble alpha-Klotho has a half-life of only 7.5 hours, requiring frequent dosing. alphaKlothoLR is BioLongevity Labs' proprietary modified version: it fuses the Klotho protein with a 29-amino acid albumin-binding construct, extending its activity to approximately 19 days and enabling once-every-two-weeks dosing.

TYPICAL PROTOCOL (ALPHAKLOTHOLR)

Dose	10 mcg per injection. Do not exceed
Route	SubQ or IM injection
Frequency	Once every 2 weeks
Duration	Ongoing, no cycling needed
Note	Supplement with electrolytes during use. High cost: $375+ per vial

What to expect: Improved sensitivity to feel, taste, and smell within a week. Endurance improvements at 2–4 weeks. Increased energy, so dose in the morning or afternoon, not before bed. A mild warmth or burning sensation is normal, reflecting increased mitochondrial activity. Effects return to baseline if you stop.

SAFETY NOTE Do not exceed 10 mcg. Klotho levels that are too high cause vascular calcification, phosphate depletion, and potassium depletion.

FOXO4-DRI

Also known as: Senolytic Peptide (FOXO4-p53 Disruptor)

FOXO4-DRI is a senolytic peptide, a compound designed to selectively eliminate senescent cells aka zombie cells. Senescent cells are aged, dysfunctional cells resisting normal cell death and secreting inflammatory signals (the senescence-associated secretory phenotype, or SASP). FOXO4-DRI works by disrupting the interaction between FOXO4 and p53 in senescent cells, restoring apoptosis specifically in those cells. In aged mice, treatment reduced senescent cell burden and restored physical function.

KEY BENEFITS

- Selectively eliminates senescent cells without harming healthy cells
- Reduces SASP-driven inflammation
- Restored physical function in aged animal models
- Different mechanism from rapamycin or senolytics like dasatinib+quercetin

TYPICAL PROTOCOL

Dose	1-5 mg per injection
Route	SubQ injection
Protocol	3 injections over 5 days (days 1, 3, and 5)
Duration	1-3 cycles per year, minimum 4-6 months between cycles

> **SAFETY NOTE** Theoretical risk: p53 pathway disruption in cancer cells. Do not use with active cancer or during chemotherapy, known pulmonary hypertension, or during active tissue repair/post-surgery recovery. Do not run regenerative peptides (GHK-Cu, BPC-157, GH secretagogues) during or the week immediately following a cycle. Use under medical supervision.

PNC-27

Also known as: p53-Derived Anticancer Peptide

PNC-27 is a peptide derived from the MDM-2-binding domain of p53, the tumor suppressor protein. PNC-27 selectively targets cancer cells by binding to HDM-2 expressed in cancer cell membranes, a protein not present on healthy cell membranes. Once bound, PNC-27 forms pores in the cancer cell membrane, triggering lysis. Research is in early preclinical stages.

KEY BENEFITS

- Selective activity against cancer cells via membrane targeting
- Does not affect healthy cells in research
- Preclinical data across multiple cancer cell lines

TYPICAL PROTOCOL

Dose	Not standardized: varies widely in research
Route	SubQ injection
Protocol	Use only under oncology-informed medical supervision

SAFETY NOTE Preclinical compound. Do not use without oncology and medical supervision. Not a replacement for standard cancer treatment.

SKIN & AESTHETICS

Peptides that influence pigmentation, skin quality, and cosmetic outcomes.

MELANOTAN 1

Also known as: Afamelanotide (alpha-MSH Analogue)

Melanotan 1 is a synthetic analogue of alpha-melanocyte-stimulating hormone. It binds to melanocortin receptors in skin and stimulates melanogenesis, producing melanin pigment throughout the body, giving you a tan without UV exposure. Unlike Melanotan 2, Melanotan 1 does not significantly cross the blood-brain barrier and does not produce the sexual arousal, appetite suppression, or spontaneous erections associated with Melanotan 2. FDA-approved as Scenesse for erythropoietic protoporphyria (a rare sun-sensitivity condition).

KEY BENEFITS

- Produces a tan without UV exposure
- FDA-approved (Scenesse) for sun-sensitivity condition erythropoietic protoporphyria
- Cleaner side effect profile than Melanotan 2
- Potential photoprotection through melanin increase

TYPICAL PROTOCOL

Clinical Use	16 mg subcutaneous implant (Scenesse)
Research Use	SubQ injection. Start at 0.5 mg. Increase to 1–2 mg once tolerance established
Frequency	2-3x weekly for tanning protocols
Duration	As needed

> **SAFETY NOTE** Common side effects include nausea and flushing, particularly at higher doses. Darkening of existing moles and new mole formation. Monitor for changes. Medical supervision recommended.

MELANOTAN 2

Also known as: MT-2, Melanotan II

Melanotan 2 is a cyclic peptide analogue of alpha-MSH, chemically distinct from Melanotan 1 and far less selective. Where Melanotan 1 acts mainly on the skin's pigment receptor, Melanotan 2 also activates receptors involved in appetite, energy use, and sexual function, which is why it tans faster and more intensely, but also why it comes with a broader range of side effects. That last effect led directly to the development of PT-141 (bremelanotide), derived from Melanotan 2 specifically to isolate the sexual-arousal effect from the tanning effect.

KEY BENEFITS

- Produces a deeper, faster tan than Melanotan 1
- Increases libido and sexual arousal as a secondary effect
- Some users report appetite suppression as a side benefit

TYPICAL PROTOCOL

Dose	0.25-0.5 mg per injection, starting lower (0.1 mg) to assess tolerance
Route	SubQ injection
Frequency	Daily or every other day for 1-2 weeks (loading), then 1-2x weekly for maintenance
Duration	As needed. Reduce frequency once you reach desired pigmentation

SAFETY NOTE Nausea and flushing are common, especially when starting. Darkening of existing moles and new mole formation are more pronounced than with Melanotan 1. Monitor skin changes and stop if you notice anything new or changing. Spontaneous, unwanted erections are a known side effect in men. Not for use with uncontrolled hypertension or cardiovascular disease.

GUT & INFLAMMATION

Peptides targeting gut health, mucosal healing, and systemic inflammatory regulation.

KPV

Also known as: Lysine-Proline-Valine (Alpha-MSH Fragment)

KPV is a tripeptide fragment of alpha-MSH, a hormone your immune system uses to regulate inflammation. It works by dialing down the molecular switches that drive inflammation, and by stabilizing mast cells. Oral KPV is one of the few peptides that survives digestion and reaches the gut lining intact, making oral the preferred route for gut-specific use.

KEY BENEFITS

- Reduces gut inflammation: supports healing in IBD, Crohn's, and ulcerative colitis
- Stabilizes mast cells and reduces histamine release: useful for allergies
- Antimicrobial properties
- Systemic anti-inflammatory effects when used SubQ

TYPICAL PROTOCOL

Dose	200–500 mcg per dose
Route	Oral (capsule) for gut effects; SubQ for systemic use
Frequency	1–3x daily
Duration	4–8 week cycles; reassess based on symptoms

VIP

Also known as: Vasoactive Intestinal Peptide

VIP is a naturally occurring neuropeptide with broad anti-inflammatory and immunomodulatory effects. It is used clinically for Chronic Inflammatory Response Syndrome (CIRS), a condition of systemic inflammation often triggered by mold toxin exposure or Lyme disease. VIP also acts as a bronchodilator, supports pulmonary health, and has potential applications in pulmonary hypertension.

KEY BENEFITS

- Potent systemic anti-inflammatory; key treatment in CIRS/mold illness protocols

- Bronchodilation and pulmonary health support
- Immune modulation and regulation
- Supports gut and mucosal immune function

TYPICAL PROTOCOL

Dose	50 mcg per spray, 1 spray per nostril, 4x daily; SubQ: 0.2 mg per injection, 5x weekly
Route	Intranasal spray (primary); subQ as alternative
Frequency	Nasal: 4x daily for CIRS, 1-2x daily general use. SubQ: 5x weekly
Duration	30 days minimum for CIRS; often 3-6 months. SubQ cycle 3 months on, 1 month off

SAFETY NOTE Should only be used for CIRS after toxin exposure has been removed and prior steps of the CIRS protocol completed. Using VIP in the presence of ongoing toxin exposure can worsen symptoms. Medical supervision required.

ARA-290

Also known as: Cibinetide (Erythropoietin Analogue)

ARA-290 is a peptide derived from EPO (erythropoietin), the hormone that signals your bone marrow to produce more red blood cells. ARA-290 is engineered to keep only EPO's tissue-repair and anti-inflammatory effects, without triggering red blood cell production. It works by activating a receptor called the innate repair receptor (IRR), which turns on nerve-protective and anti-inflammatory activity. Human trials showed improvements in nerve pain and nerve fiber density in people with sarcoidosis-related neuropathy and type 2 diabetes neuropathy.

KEY BENEFITS

- Anti-inflammatory via innate repair receptor pathway
- Neuroprotective for peripheral neuropathy
- No red blood cell effects (unlike full EPO)
- Supports CIRS protocols

TYPICAL PROTOCOL

Dose	4 mg per injection (2 mg for conservative start)
Route	Subcutaneous injection
Frequency	Daily
Duration	28 days. Extended protocol: 15-week tapered schedule, every 2 days for weeks 1–2, then once weekly for weeks 3–15

BIOREGULATORS

Short peptides that regulate gene expression in specific organs and tissues.

Bioregulators are short peptides of 2-4 amino acids developed by Russian scientist Dr. Vladimir Khavinson over 40 years of research at the St. Petersburg Institute of Bioregulation and Gerontology. Each bioregulator targets a specific organ or tissue, penetrating cell membranes and binding directly to DNA to regulate gene expression, rather than acting as a receptor agonist or enzyme inhibitor.

Khavinson's research spans more than 80 published clinical studies, primarily in Russian-language literature. In his protocols, bioregulators are used in short courses (10-14 days) 2-3 times per year to reset gene expression in aging tissues toward more youthful patterns. Khavinson developed bioregulators for many more organ systems than the four covered here (prostate, eyes, blood vessels, liver, and others); the four below show how the category works.

CARDIOGEN

Also known as: Heart Bioregulator (Ala-Glu-Asp-Arg tetrapeptide)

Cardiogen is a tetrapeptide bioregulator targeting cardiac tissue. Khavinson's research shows it regulates gene expression in heart muscle cells and supports cardiac cell regeneration. Studies demonstrate improvements in cardiac function in aged animals and in post-cardiac event recovery.

TYPICAL PROTOCOL

Dose	1–2 mg per injection
Route	SubQ injection
Frequency	Daily
Duration	10 days per course, 2–3 cycles per year

CORTAGEN

Also known as: Brain and Nerve Bioregulator (Ala-Glu-Asp-Gly tetrapeptide)

Cortagen targets cortical and nervous system tissue. Research shows neuroprotective effects, support for nerve cell regeneration, and regulation of brain aging genes. Used in protocols for age-related cognitive decline and neurological recovery. Stacks with Pinealon and Semax for brain aging protocols.

TYPICAL PROTOCOL

Dose	1–2 mg per injection
Route	Subcutaneous injection
Frequency	Daily
Duration	10–20 days per course, 2–3 cycles per year

CARTALAX

Also known as: Cartilage and Connective Tissue Bioregulator (Ala-Glu-Asp-Leu tetrapeptide)

Cartalax targets cartilage and connective tissue. Khavinson's research shows it regulates gene expression in chondrocytes and supports cartilage regeneration. Animal studies show extended lifespan in addition to cartilage benefits. Stacks with BPC-157 and TB-500.

TYPICAL PROTOCOL

Dose	1–2 mg per injection
Route	Subcutaneous injection
Frequency	Daily
Duration	10–20 days per course, 2-3 cycles per year

VILON

Also known as: Immune System Bioregulator (Lys-Glu dipeptide)

Vilon is a dipeptide bioregulator targeting immune and hematopoietic tissue. One of the simplest bioregulators in structure, Vilon modulates T-cell activity and immune gene expression. Animal studies show extended lifespan and immune restoration in aged animals. It has a simpler structure than the tetrapeptide bioregulators, with a shorter 5-day cycle.

TYPICAL PROTOCOL

Dose	100–500 mcg per injection
Route	Subcutaneous injection
Frequency	Daily
Duration	5 days per course, 2-3 cycles per year

SAFETY & DISCLAIMER

Quality & Sourcing

Peptide quality varies dramatically. The same compound purchased from a research chemical supplier and a compounding pharmacy will often differ in purity, potency, and sterility. Only source peptides from a reputable source. For injectables, sterility is not optional. Infections from non-sterile preparations are a real risk.

Reconstitution

Most injectable peptides are supplied as lyophilized (freeze-dried) powder and must be reconstituted with bacteriostatic water before use. Bacteriostatic water contains a small amount of benzyl alcohol that prevents bacterial growth in the vial. Do not use plain sterile water: it has no preservative and the reconstituted peptide will degrade faster and carry contamination risk.

Choosing a diluent: Bacteriostatic water works for most peptides in this guide and is the default choice. A few situations call for something else: saline (0.9% NaCl) if the peptide is going straight into a biological system without a preservative, a buffered solution like PBS if the peptide is unstable outside a specific pH range, or a small amount of acetic acid (0.1-10%) first for peptides that resist dissolving in water, followed by dilution to the final concentration.

How much diluent to add: Aim for a diluent amount that puts your typical single dose somewhere between 0.1 and 0.3 mL (10 to 30 units on a standard insulin syringe). As a starting point, 2 mL of bacteriostatic water per 5 mg vial (or 4 mL for a 10 mg vial) keeps most of the mcg-range doses in this guide inside that window.

Doing the math: Concentration is peptide mass divided by diluent volume. A 5 mg vial reconstituted with 2 mL of bacteriostatic water gives you 2,500 mcg/mL. To draw a 250 mcg dose from that vial, you need 0.1 mL.
mcg per sc-camel-m-l = (vial mass in mg × 1,000) ÷ mL of diluent added
Dose volume (mL) = target dose (mcg) ÷ concentration (mcg/mL)

Reading your syringe: Insulin syringes are marked in units, not mL or mg. On a U-100 syringe, 100 units equals 1 mL. Once you know your dose in mL, multiply by 100 to get units. A 0.1 mL dose is 10 units. A 0.25 mL dose is 25 units.

Storage

Lyophilized (unreconstituted) peptides last much longer than reconstituted ones: refrigerated (36-46°F / 2-8°C), most stay stable for 6 months to 2 years; frozen (-4°F / -20°C or colder), 1-2 years or more.

Once reconstituted, shelf life depends on temperature: about 1-2 weeks refrigerated at 36-46°F (2-8°C), about 3-4 months in a standard freezer at -4°F (-20°C), and about a year in an ultra-low freezer at -112°F (-80°C). Never freeze and re-thaw a reconstituted peptide repeatedly, each cycle degrades it. Keep all vials away from direct sunlight and heat. Label every reconstituted vial with the peptide name, concentration, diluent used, reconstitution date, and storage condition.

Injection Technique

Subcutaneous injections are administered into fatty tissue: typically the lower abdomen or outer thigh. Use insulin syringes (29-31 gauge, 0.5 inch). Rotate injection sites to prevent fat tissue buildup or breakdown. Always clean the skin and vial stopper with an alcohol swab before injection. Dispose of all sharps in a proper sharps container, never household trash.

First injection, step by step: clean the injection site and vial stopper with an alcohol swab. Pinch an inch of skin at the site. Insert the needle at a 45-90 degree angle, less angle for leaner areas. Push the plunger slowly and steadily. Withdraw and press a clean cotton ball over the site, no need to rub. Rotate to a new site next time, at least an inch from the last one.

> **WATCH FOR** Mild redness, a small bruise, or brief stinging at the site is normal and resolves in a day or two. Spreading redness, warmth, swelling that worsens after 48 hours, pus, fever, or a red streak extending from the site are signs of infection. Stop and contact a provider if you see any of those.

Troubleshooting

- **Peptide won't fully dissolve:** warm it gently (86-104°F) and give it more time. Swirl gently, don't shake, shaking causes foaming and can degrade the peptide.
- **No COA or unclear purity:** don't guess at dosing. Contact the supplier for documentation first.
- **Cloudy or discolored after reconstitution:** don't use it. That's degradation or contamination.

- **Unsure about sterility:** use bacteriostatic water, swab the vial stopper and injection site with alcohol every time, and don't touch the needle tip or let it contact anything before injecting.

Some peptides are just more fragile than others. Ones containing cysteine, methionine, or tryptophan oxidize faster, and ones with asparagine or glutamine in the sequence degrade through a different pathway. Store it colder, minimize air exposure when drawing doses, and use it sooner rather than later.

Medical Supervision

The protocols in this guide reflect published research and clinical experience but are not personalized medical advice. Individual response to peptides varies based on genetics, health status, medications, and other factors. Work with a licensed practitioner, particularly for peptides that affect hormones, immune function, or require injection. If you have a medical condition, you're pregnant, or you're under 18, don't do peptides unless you get clearance from your doctor.

Regulatory Status

Regulatory status varies by country. In the United States, most therapeutic peptides are available only through compounding pharmacies with a prescription, or as research chemicals not approved for human use.

> **DISCLAIMER**
>
> This guide is for informational purposes only and does not constitute medical advice, diagnosis, or treatment recommendations. The information presented reflects published research and clinical literature as of 2026 but may not be complete or current. Therapeutic peptides carry real risks when used improperly. Consult a licensed healthcare provider before starting any peptide protocol. The authors and publishers of this guide are not liable for outcomes arising from use of the information herein.

Dave Asprey

KNOW WHAT YOU'RE TAKING.

Peptides are powerful tools. Used with the right protocol, the right sourcing, and a provider who knows this territory, they belong in any serious longevity and performance strategy.