EDITION 1 · 2026

The Peptide Decision Tree

A practitioner's framework for thinking about peptide selection, sequencing, and stop-rules.

ANTHONY CASTORE

SSRP Fellow · "King of Peptides" · CASTORE Method

"Peptides reward humility. The body is the protocol — you're just turning dials."

How to use this guide

A Feynman framing. If you can't teach it back, you don't understand it yet.

I wrote this the way I wish someone had handed it to me when I was first learning peptides: from the inside out. We're going to walk down a tree of decisions — outcome first, then mechanism, then molecule. Along the way I'll stop and explain things twice, once in technical language and once in the language you'd use over coffee.

Two reading habits will make this worth your time. First, treat the small **80/20 boxes** as your anchor — those are the lines I'd save if the rest of the document burned in a fire. Second, close the guide every few pages and try to **teach the last section back** — out loud, to nobody in particular. If you stumble, the gap is real. Go back. That stumble is the whole point.

HOW THE BOXES WORK

80/20 boxes compress a chapter into the lines you'd memorize. **Mnemonic boxes** give you a phrase to carry into the gym, the kitchen, or the clinic. **Stop-rule boxes** tell you when to back off — always the hardest decision, always the most important.

Last note before we begin: nothing here replaces a thoughtful clinician. The point of this guide isn't to make you a prescriber. It's to make you a better thinker — so when you do sit across from a clinician, you ask the right questions and you know what you're agreeing to.

The 80/20 of peptides

Eight lines that carry most of the framework.

01 Peptides are signals, not building blocks.
They're a tap on the shoulder, not a brick in the wall. The body still has to do the work.

02 Length predicts behavior.
Short peptides (2–4 AA) nudge epigenetic and regulatory dials. Long peptides (50+ AA) drive systemic shifts.

03 Outcome before molecule.
Name the adaptation you want before you name the peptide. Reverse that order and you'll stack noise.

04 Ground before you stack.
Repair → Regulate → Reinforce. Performance peptides on a damaged system make damage faster.

05 Mitochondrial readiness is the floor.
If the cell can't generate ATP, no signal in the world will make it adapt the way you want.

06 Minimum effective dose, always.
Most published doses overshoot. Titrate up — never down from a heroic starting point.

07 If you can't say when to stop, you don't have a protocol.
Stop-rules are the part nobody writes down. Write them down first.

08 Source matters more than the molecule.
A clean BPC from a compounding pharmacy beats a 'research-grade' anything from the internet.

CHAPTER 1

What a peptide actually is

If you only remember one thing: a peptide is a message in chemical form.

Strictly, a peptide is a chain of two to fifty amino acids linked by peptide bonds[1]. Cross fifty amino acids and most biochemists start calling it a protein. The line is fuzzy, and it should be — biology rarely respects our cataloging instincts. But the length tells you something real about **how** the molecule behaves in the body.

Think of it as three rough buckets:

Bioregulators (2–4 amino acids). Tiny, fast-moving signal peptides — short enough to cross cell membranes and even enter the nucleus, where they appear to influence gene expression directly. Epitalon (a tetrapeptide) is the canonical example[2].

Signaling peptides (5–45 amino acids). The workhorse middle of the field. Most of the peptides people talk about — BPC-157, TB-500, Tesamorelin, the GHRPs — live here. They typically dock with a specific receptor on the cell surface and trigger a downstream cascade.

Polypeptide hormones (50+ amino acids). Insulin (51 AA), growth hormone (191 AA). At this length we're really talking about small proteins. They tend to act systemically and require strict regulation; small dosing errors become large clinical events.

Here's the part that took me longest to internalize: **peptides are not building blocks.** They are not lego bricks that you snap into a tissue and suddenly it heals. They are signals. They're the tap on the shoulder that says, 'wake up and start the program you already know how to run.' The body still has to have the raw materials, the energy, and the receptors to listen.

CHAPTER 1 · CONTINUED

Length predicts behavior

Why does length matter so much? Two reasons. First, smaller peptides diffuse better — across the gut, across cell membranes, even across the blood-brain barrier in some cases. A tetrapeptide can sneak into a nucleus; a 100-amino-acid protein cannot. Second, longer peptides fold. Folding creates the three-dimensional shape that lets a molecule lock into a specific receptor like a key into a lock. Short peptides tend to act as regulatory nudges; long ones tend to act as specific, high-amplitude commands.

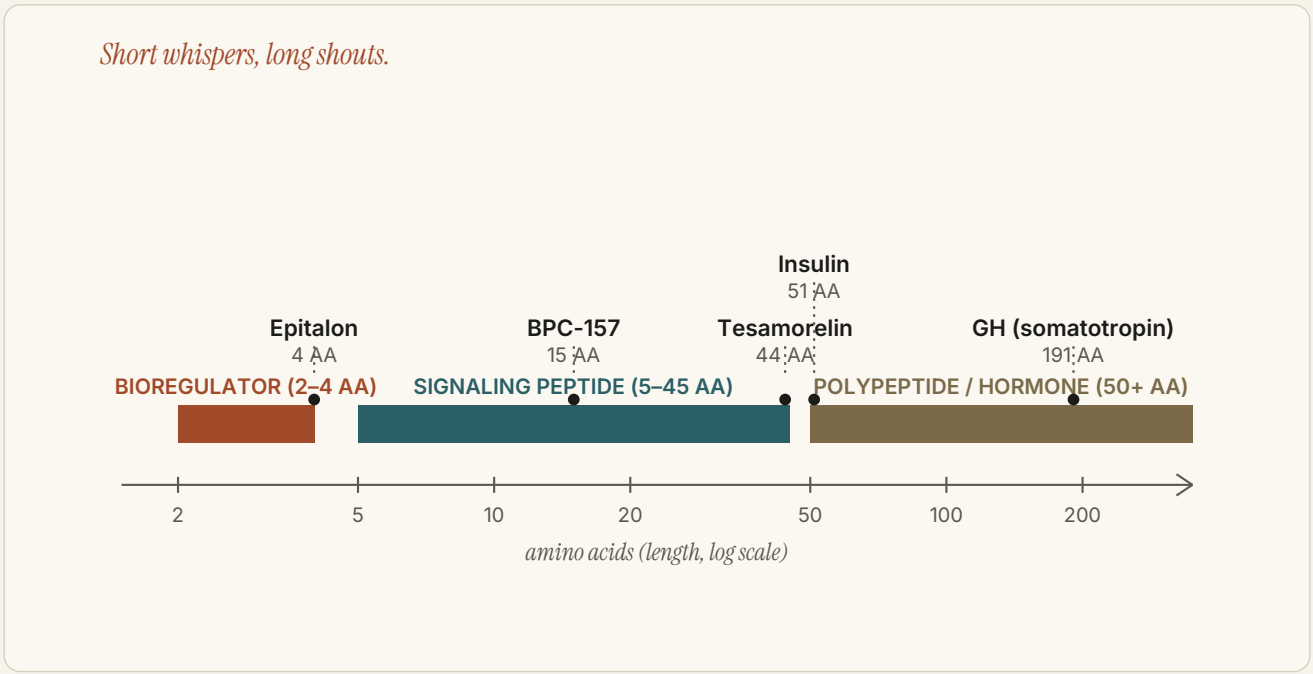


Figure 1 — Peptides plotted by length. Bioregulators whisper to the epigenome. Polypeptide hormones shout across systems. The middle band — signaling peptides — is where most therapeutic action lives.

MNEMONIC

Short whispers, long shouts.

Short peptides nudge epigenetic dials and behave like regulators. Long peptides drive systemic, high-amplitude effects. When in doubt, ask: am I trying to whisper or shout?

CHAPTER 1 · CONTINUED

The tap-on-the-shoulder analogy

Imagine a factory floor with thousands of workers. Each worker is a cell. Each one has a job description written in DNA, tools in the cytoplasm, and a supervisor (the receptor) waiting at the door. A peptide walks onto the floor, taps a specific supervisor on the shoulder, and says, 'start the repair shift.' That's it. The peptide doesn't pick up a wrench. It doesn't weld anything. It tells the workers, who already know how to weld, that **now** is the time.

Three implications fall out of this metaphor, and they're worth burning into memory:

If the workers are exhausted, the tap doesn't matter. This is the mitochondrial readiness problem. Cellular energy comes before signaling. Tap a tired worker and nothing happens.

If the supervisor is missing, the tap goes unheard. Receptors get downregulated by chronic over-stimulation, by inflammation, by age. Some peptides won't work because the listening apparatus is broken — not because the molecule is wrong.

More taps does not equal more work. After a certain dose, signaling saturates and side-effects rise. This is why minimum effective dose is not just a safety principle — it's a biology principle.

Hold this image in your head for the rest of the book. Every chapter that follows is some version of the same question: who am I tapping, and is the worker ready to listen?

1. Lau, J.L. & Dunn, M.K. "Therapeutic peptides: Historical perspectives, current development trends, and future directions." Bioorganic & Medicinal Chemistry, 2018. https://doi.org/10.1016/j.bmc.2017.06.052

2. Khavinson, V.K. "Peptides and ageing." Neuroendocrinology Letters, 2002. https://pubmed.ncbi.nlm.nih.gov/12374906/

CHAPTER 2

The five questions before any peptide

If you can't answer these out loud, you don't have a protocol yet.

Most peptide mistakes I see — including my own — don't come from picking the wrong molecule. They come from skipping the questions **before** the molecule. The acronym I use with clients and students is **SAFER**. Five letters. Five conversations you have with yourself, on paper, before a single vial leaves the fridge.

S.A.F.E.R.

Substrate · Aim · Failure mode · Exit · Reassess

Read it as a checklist, in order. Skip a letter and you skip the answer to the most expensive question this protocol will ask you later. The point isn't to slow you down for the sake of slowness. The point is to make sure that by the time a vial leaves the fridge, you have already done the thinking that the molecule cannot do for you.

On the next page I'll walk through each letter with a real example. Then a short closing piece on why this framework beats stack-shopping nearly every time.

CHAPTER 2 · CONTINUED

Walking through SAFER

S — Substrate — Is the cell metabolically ready to receive the signal? Before any growth signal, I want to see clean sleep, stable glucose, and at least baseline mitochondrial health. **Example:** a client wants CJC/Ipamorelin for body composition. Resting HR is 78 and HRV has been crashing for a month. The answer is not 'lower the dose.' The answer is repair the substrate first — sleep, mineral status, and load management — and revisit in four weeks.

A — Aim — What adaptation are we trying to create? Be specific. 'Feel better' is not an aim. 'Reduce visceral adipose by 8% while preserving lean mass, measured by DEXA at week 16' is an aim. **Example:** Tesamorelin is a tool for visceral adiposity — not a generic 'GH booster.' The aim selects the tool; the tool doesn't select the aim[3].

F — Failure mode being addressed — What's actually broken? A peptide is a tool that addresses a specific failure mode in a specific system. **Example:** BPC-157 isn't a 'healing peptide' — it's a tool for a specific cluster of failure modes around angiogenesis, gut integrity, and tendon repair[4]. If you can't name the failure mode, you're guessing.

E — Exit — What's the stop rule? Decide before you start. The stop rule has two halves: a success exit ('we reached the aim, we taper and reassess') and a safety exit ('biomarker X moves more than Y, we pause regardless of how we feel'). **Example:** 'I stop CJC/Ipamorelin if fasting glucose drifts above 100 mg/dL on two consecutive weekly checks.'

R — Reassess — When and how do we measure? Calendar the check-in **before** day one. A protocol without a reassessment window is a habit, not a protocol. **Example:** a six-week peptide block gets a four-week midpoint review (HRV trend, sleep, target biomarker) and a six-week formal reassessment (blood panel + subjective scorecard) — both already on the calendar.

> **80/20 OF SAFER**
> Most peptide failures are **S** failures (substrate wasn't ready) and **E** failures (no stop rule). If you fix only two letters, fix those. Everything else gets easier when those two are honest. And remember: SAFER is recursive — every reassessment is a new SAFER conversation.

3. Falutz, J. et al. "Effects of tesamorelin on visceral fat and liver fat in HIV-infected patients with abdominal fat accumulation." JAMA, 2014. https://pubmed.ncbi.nlm.nih.gov/24737366/

4. Sikiric, P. et al. "Stable gastric pentadecapeptide BPC 157: novel therapy in gastrointestinal tract." Current Pharmaceutical Design, 2011. https://pubmed.ncbi.nlm.nih.gov/21443487/

CHAPTER 3

The decision tree itself

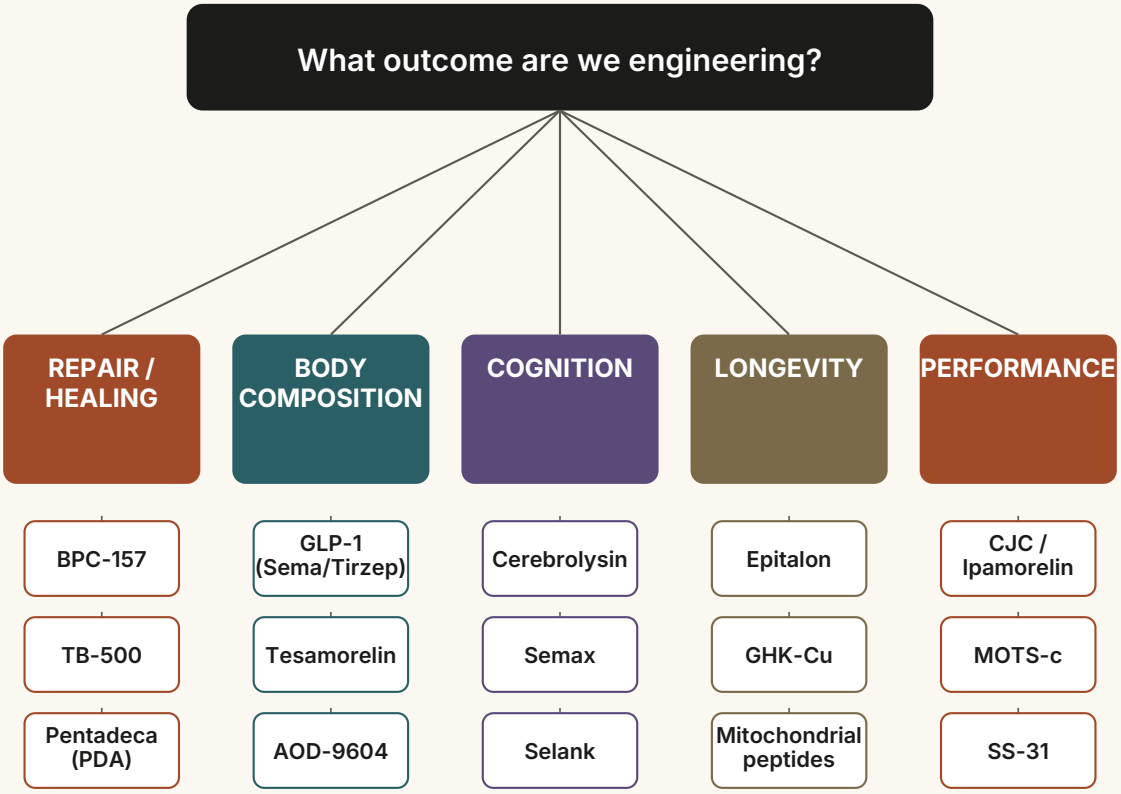
The centerpiece. Outcome first, then mechanism, then molecule.

What follows on the next spread is the tree I actually use. It is intentionally shallow — five outcome branches, each with two to three candidate classes. Reality is more complicated than this tree. **Every** useful map is. The tree's job isn't to make the choice for you. Its job is to get you in the right room. From there, mechanism — substrate, receptor density, failure mode, dose — keeps you alive in the room.

Read the tree top-down. The root question is the only one most people skip: what outcome am I engineering? Not 'what do I want to take.' Not 'what's everyone else taking.' What **adaptation** am I trying to create in this body? Be ruthless. Be specific. If you can't answer in a sentence, you're not ready to pick a branch.

The Peptide Decision Tree

Outcome first. Mechanism second. Stack last.



HOW TO USE THIS TREE

1. Name the outcome out loud, in one sentence — before reading any branch.
2. Walk down only the branch that matches that outcome. Resist the urge to scan others.
3. Treat each box at the bottom as a class to investigate, not a prescription to fill.
4. Apply SAFER to your chosen candidate. If any letter is unanswered, you're not ready.

Read top-down. Each candidate below is a class to investigate — not a recommendation.

Figure 2 — Five outcome branches. Each candidate is a class to investigate, not a recommendation.

CHAPTER 3 · CONTINUED

Reading the branches

Repair / Healing. When the failure mode is structural — a tendon, a gut lining, soft tissue post-injury — you're in this branch. BPC-157 is the workhorse, with TB-500 (Thymosin Beta-4) as the complementary signal for migration and inflammation modulation. Pentadeca (PDA) is the next-generation cousin: similar regulatory effects, slightly different pharmacokinetics[5].

Body Composition. GLP-1 agonists (semaglutide, tirzepatide) dominate the modern conversation for weight loss. Tesamorelin sits in its own niche for visceral adiposity. AOD-9604 is a much lower-amplitude lever — think of it as a finishing tool, not a primary one.

Cognition. Cerebrolysin is the heavyweight — a complex of neurotrophic peptides with the longest clinical track record. Semax and Selank are short, fast-acting Russian-developed regulatory peptides for attention and anxiety modulation, respectively. Different tools; different aims.

Longevity. Epitalon is the canonical bioregulator — the four amino acids that started the conversation. GHK-Cu operates more as a tissue-level regulator (skin, copper-dependent enzymes, wound signaling). Mitochondrial peptides (MOTS-c, humanin) belong here too, though they cross over into performance.

Performance. CJC-1295 paired with Ipamorelin is the classic GHRH/GHRP combination — a pulsatile, physiologic growth hormone signal rather than a pharmacologic flood. MOTS-c and SS-31 (elamipretide) target mitochondrial efficiency directly. Performance is downstream of repair; don't reverse the order.

> **CALLOUT**
>
> "The tree gets you in the room. Mechanism keeps you alive in the room."
>
> Picking the branch is the easy part. Once you're inside it, every interesting question is mechanical: what does this receptor want from me? what's the half-life? what does the substrate need first? That's where real practitioners earn their hours.

5. Sikiric, P. et al. "Brain-gut axis and pentadecapeptide BPC 157." Current Neuropharmacology, 2016. https://pubmed.ncbi.nlm.nih.gov/26521943/

CHAPTER 4

Sequencing

Ground first, then stack. The order is the medicine.

If the decision tree is about which, sequencing is about when. The single most common mistake I see in self-directed peptide use is reaching for performance tools before the system is stable enough to use them. You don't put a Formula 1 engine into a car with bad tires. The engine isn't wrong. The order is.

I run almost every client through a three-phase model. It isn't fancy. It's the same logic any honest strength coach uses: address what's broken, restore what's regulating, and only then ask for adaptation.

REPAIR. Address the obvious failures first. Soft-tissue injuries, gut integrity, sleep architecture, basic mitochondrial function. Typical tools: BPC-157, TB-500, foundational lifestyle work. You want a body that responds to signals before you spend signals.

REGULATE. Restore the rhythms that the body uses to regulate itself: sleep, growth hormone pulsatility, appetite/insulin signaling, HPA-axis. Typical tools: CJC/Ipamorelin (pulsatile GH), GLP-1 at low microdoses, possibly Tesamorelin. The job is to bring the metronome back.

REINFORCE. Now — and only now — do you ask for adaptation: hypertrophy, mitochondrial density, cognitive performance, longevity programming. Typical tools: MOTS-c, Epitalon, performance GHRPs at full dose. If the first two phases were honest, this one feels easy.

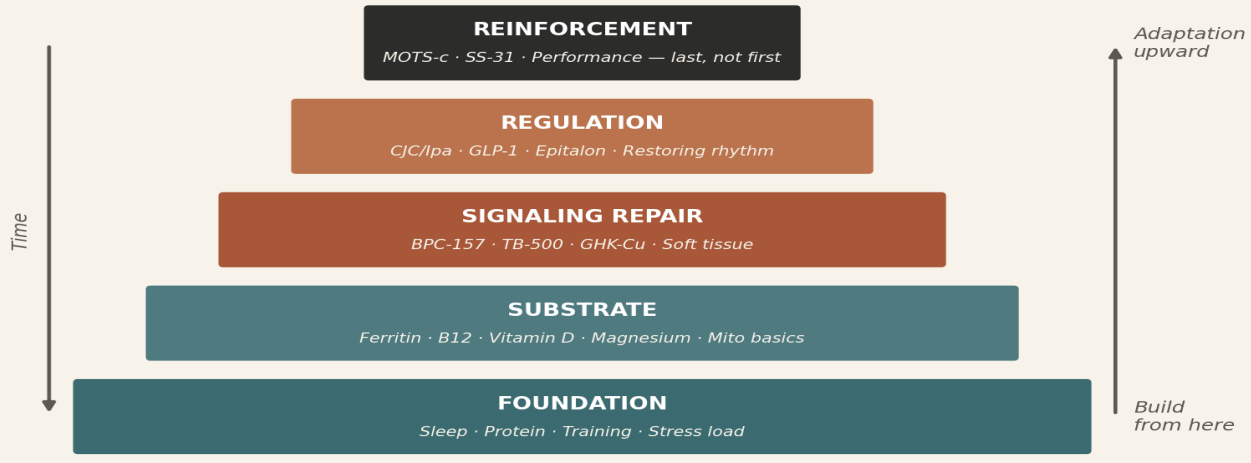


Figure 3 — The substrate pyramid. The peptide is the top floor; the foundation is everything else.

CHAPTER 4 · CONTINUED

The R-R-R sequence in practice

Here's what a sample 16-week sequence might look like in calendar form. Weeks one through six are REPAIR: BPC-157 and TB-500, layered onto sleep work and a magnesium/zinc check. Weeks seven through twelve are REGULATE: CJC/Ipamorelin at minimum effective dose, or a low GLP-1 titration if body composition is the aim. Weeks thirteen through sixteen are REINFORCE: a short MOTS-c or Epitalon block to consolidate mitochondrial and longevity signaling. Reassessment at week six, twelve, and sixteen.

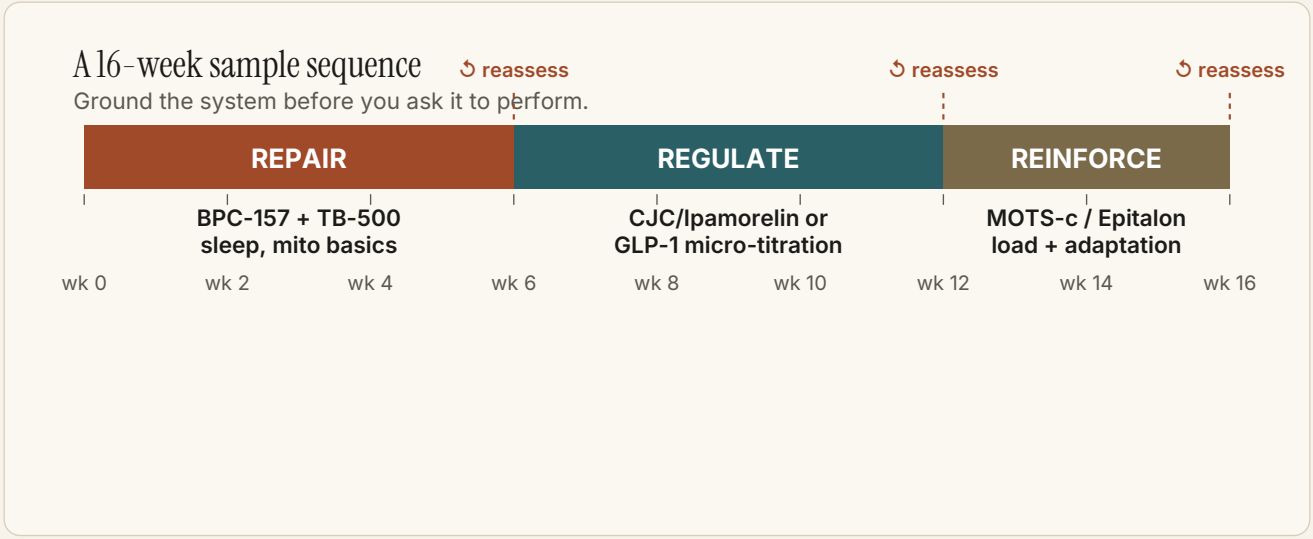


Figure 4 — A representative 16-week sequence. Dashed lines mark formal reassessment windows.

MNEMONIC

R · R · R

Repair → Regulate → Reinforce.

If you skip a stage, you'll pay for it in the next one. The order is the medicine.

Why this order, specifically

REPAIR sits first because damaged tissue, leaky gut, and disrupted sleep produce a chronic low-grade inflammatory signal that **desensitizes receptors** — the very receptors your later peptides need to dock with. REGULATE matters because most adaptations depend on **pulsatile** rhythm, not constant signal. By REINFORCE, the dose that gave you nothing in week one gives you something real — because the substrate is finally ready. Less peptide, more adaptation.

CHAPTER 5

Stop rules

If you can't say when to stop, you don't have a protocol — you have a hope.

Every protocol I write begins with the conditions under which it ends. This sounds backwards. It's the single most useful habit I've adopted. Without a stop rule, you'll keep going on momentum and call it discipline. With a stop rule, you can act on data instead of on hope.

Here are the four signals I watch in nearly every client. None of them are exotic. All of them are available with a wearable and a notebook.

Resting heart rate trending up. Three to five beats above your personal baseline, sustained for a week. RHR is a downstream readout of inflammatory load, sleep debt, and sympathetic tone. If it's drifting up while you're on a peptide, the peptide isn't causing the drift — but the system is telling you it can't absorb more signal right now.

HRV trending down. Heart-rate variability is the best non-invasive proxy we have for autonomic resilience. A clear downward trend over seven to fourteen days — independent of training load — is a stop signal, full stop. Pause. Reassess[6].

Sleep degradation. Falling asleep harder. Waking earlier. Less deep sleep on your wearable. Sleep is the master regulator of every adaptation we care about. If a peptide is degrading sleep, the cost is almost certainly exceeding the benefit, even if you feel sharper during the day.

Unexplained inflammation or edema. Persistent water retention. New joint stiffness. Skin changes. Sudden bloodwork shifts in CRP or ferritin. These are loud signals. They're rare on minimum-effective-dose protocols and common on heroic ones.

CHAPTER 5 · CONTINUED

Writing the stop rule down

Vague stop rules don't work. 'I'll back off if I feel weird' isn't a stop rule. A real stop rule has three parts: **a metric**, **a threshold**, and **an action**. Examples:

- If **resting HR** exceeds **baseline + 4 bpm** for **7 consecutive nights**, **pause and reassess**.
- If **HRV** drops below **baseline minus 1 standard deviation** for **10 days**, **cut dose by 50%**.
- If **fasting glucose** exceeds **100 mg/dL** on **two consecutive weekly checks**, **stop the GHRP block**.
- If any new **edema, joint stiffness, or carpal-tunnel symptom** appears, **stop immediately and consult clinician**.

> *"If you can't say when to stop, you don't have a protocol — you have a hope."*

Stop rules are the single most under-practiced skill in this field. They're also the thing that separates a clinician from a cowboy. Write them before day one. Hold yourself to them. They are how you trade short-term momentum for long-term progress.

6. Shaffer, F. & Ginsberg, J.P. "An overview of heart rate variability metrics and norms." Frontiers in Public Health, 2017. https://www.frontiersin.org/articles/10.3389/fpubh.2017.00258/full

CHAPTER 6

Dosing sanity

Minimum effective dose isn't a slogan. It's how the biology works.

Most published peptide doses overshoot. They were chosen for visible effects in trials, not for the long-tail adaptation work most people actually want. The biology of receptor signaling is non-linear: below threshold, you get nothing; just above threshold, you get most of the available signal; further above threshold, you mostly get side effects and receptor downregulation. The sweet spot is narrow, and it is almost always lower than the package insert suggests.

Here's the analogy I use in my podcasts. Imagine a rockstar performing in a 6×6 room. One person in the room — incredible experience, every word lands. Add nine more — still good, but the signal is starting to fight with itself. Pack thirty people in there — now it's noise. The rockstar didn't change. The signal-to-noise ratio did. Stacking four or five peptides on day one is exactly that 30-person room. The molecule isn't wrong. The volume is.

> **UNITS — DO NOT CONFUSE**
> **mcg** (microgram) = one millionth of a gram. **mg** (milligram) = one thousandth of a gram. A thousand-fold difference. Dosing errors in this field are almost always unit errors. Read the vial. Read it again. Have someone else read it.

CHAPTER 6 · CONTINUED

A reference table

Below is a starting-point reference for common peptides. These are typical ranges from clinical and compounding-pharmacy literature — not a prescription, and not a recommendation. Always work with a qualified clinician on your specific dose.

Peptide	Typical dose range	Cycle length	Interval
BPC-157	250–500 mcg, 1–2× daily	4–8 weeks	4-week washout
TB-500	2–5 mg / week (loading)	4–6 weeks	8-week pause
Tesamorelin	1–2 mg SC nightly	12–26 weeks	Per clinician
CJC-1295 / Ipamorelin	100/100 mcg, 1–3× daily	8–12 weeks	4-week off
Semaglutide (GLP-1)	0.25–2.4 mg / week	Titrate up slowly	Per clinician
Epitalon	5–10 mg / day	10–20 days	Quarterly
MOTS-c	5–10 mg, 2–3× / week	4–6 weeks	4-week pause
GHK-Cu (topical)	0.1–2% topical	Ongoing	—
Selank	250–500 mcg intranasal	10–14 days	As needed

Two notes on titration. **First**, start at the bottom of the range and move up only after you've seen two weeks of clean tolerance — no drift in resting HR, no degraded sleep, no unusual bloodwork. **Second**, never titrate two variables at once. If you change the dose, hold everything else constant for at least one cycle. Otherwise you can't attribute a result to a cause.

REFERENCE

Mechanism quick-reference

Plain-language mechanism notes for the peptides you'll meet most often.

This is a cheat sheet, not a textbook. The idea is to give you a single sentence about how each molecule actually does its job — so when a clinician or a paper mentions a target, you can place it on the map. Treat each entry as a thread to pull on, not a final answer.

Peptide	Target	What it actually does
BPC-157	VEGFR-2 / NO / 5-HT	Stable pentadecapeptide of human gastric juice. Upregulates angiogenesis and modulates the nitric-oxide system; supports gut barrier integrity and tendon repair.
TB-500 (Thymosin β4)	G-actin sequestration	Binds monomeric actin, promoting cell migration, anti-inflammatory signaling, and tissue remodeling. Pairs with BPC for soft-tissue work.
Tesamorelin	GHRH receptor	Stabilized GHRH analogue. Drives endogenous, pulsatile GH release. FDA-approved for HIV-associated lipodystrophy; off-label use targets visceral adiposity.
CJC-1295 (DAC)	GHRH receptor (long t½)	GHRH analogue with extended half-life via albumin binding. Sustains GH-release signal; typically paired with a GHRP for combined GHRH + ghrelin-axis stimulus.
Ipamorelin	GHSR-1a (ghrelin)	Selective GH secretagogue. Triggers a clean GH pulse without significant cortisol or prolactin elevation. The ghrelin half of the CJC/Ipamorelin pair.
Semaglutide / Tirzepatide	GLP-1 (± GIP) agonism	Incretin mimetics. Slow gastric emptying, enhance glucose-dependent insulin release, and act centrally to reduce appetite. Tirzepatide adds GIP agonism.
AOD-9604	GH C-terminal fragment	Modified fragment of GH (residues 176–191). Hypothesized to stimulate lipolysis without the IGF-1 effects of full GH. Treat as a lower-amplitude lever.
Cerebrolysin	Mixed neurotrophic peptides	Porcine brain peptide complex. Demonstrated neurotrophic and neuroprotective signaling; used clinically for stroke recovery and cognitive impairment.
Semax / Selank	BDNF, melanocortin / GABA-ergic	Russian-developed regulatory peptides. Semax upregulates BDNF and acts on attention; Selank modulates GABA/serotonin and is used for anxiolysis.
Epitalon	Pineal / telomerase signaling	Khavinson tetrapeptide (Ala-Glu-Asp-Gly). Influences melatonin rhythm and reported telomerase activity in human cell lines; classic bioregulator.

Peptide	Target	What it actually does
GHK-Cu	Copper-peptide carrier	Tripeptide complexed with copper. Modulates extracellular matrix, wound signaling, and skin remodeling enzymes. Mostly topical or low-dose subcutaneous.
MOTS-c	AMPK / mitochondrial peptide	Mitochondrial-derived 16-AA peptide. Activates AMPK, improves insulin sensitivity, and signals metabolic flexibility. Endogenous; declines with age[8].
SS-31 (elamipretide)	Cardiolipin / inner-membrane stabilizer	Targets and stabilizes cardiolipin in the inner mitochondrial membrane, improving ATP production and reducing ROS leak. Efficiency, not amplification.

Two pattern-recognition shortcuts. **GHRH + GHRP.** Any 'CJC-something' is the GHRH side; any '-relin' (Ipamorelin, Ibutamoren, GHRP-2/6) is the GHRP side. They're additive precisely because they hit different receptors. **Bioregulators.** Anything 2–4 amino acids long, attributed to Khavinson or his collaborators, is almost certainly a bioregulator — short whisper, epigenetic dial.

CHAPTER 7

Red flags and common mistakes

The four patterns that wreck most self-directed peptide work.

Stacking four or more peptides on day one. If something works, you won't know which thing worked. If something hurts you, you won't know which thing hurt you. The biology of signal saturation also argues against it — too many simultaneous taps produce noise, not adaptation. **Fix:** introduce one molecule at a time, hold for at least two weeks, then layer.

Ignoring mitochondrial readiness. Sleep, mineral status, basic metabolic flexibility. If those aren't squared away, every peptide underperforms — because the cell can't pay the energetic cost of the adaptation you're requesting. **Fix:** run a four-to-six week mitochondrial primer (sleep, light, magnesium, modest aerobic base) before any growth signal.

'Optimization stacking' without an adaptation aim. Adding peptides because you read about them, not because you've named a failure mode and an outcome. This is the most common mistake I see. **Fix:** apply SAFER. If you can't answer all five letters, you're not ready.

Sourcing from unverified vendors. Purity, sterility, and accurate concentration are not given. 'Research grade' from an internet vendor is a phrase that means nothing. Endotoxin contamination, mis-dosed vials, and outright counterfeits are all documented in the gray market. **Fix:** source through compounding pharmacies with clinician oversight, certificates of analysis, and chain-of-custody.

CHAPTER 7 · CONTINUED

The meta-mistake

All four of these errors share a single root: the user reached for a molecule before doing the thinking. Peptides are a leverage tool. Leverage amplifies whatever you point it at. Point it at a well-grounded, well-sequenced, honestly-assessed adaptation aim and you get real progress. Point it at noise and you amplify the noise.

The good news is that this whole field rewards patience disproportionately. The practitioners I trust most are the slowest movers. They run substrate work first. They introduce one molecule at a time. They write the stop rule before they fill the syringe. None of that is exciting. All of it works.

ON SOURCING

If you can't trace your vial back to a licensed compounding pharmacy with a current certificate of analysis, you don't know what's in it. Full stop. The molecule on the label is the easy part to get right. Purity, sterility, and accurate concentration are the hard parts[7].

7. U.S. Food and Drug Administration. "Compounded Drug Products That Are Essentially Copies of Commercially Available Drug Products Under Section 503A." Guidance for Industry.
https://www.fda.gov/drugs/human-drug-compounding/compounding-laws-and-policies

The teach-it-back checklist

If you can answer these out loud, in your own words, you've earned the framework.

01 Why does a bioregulator need so few amino acids to work? What does length have to do with where the peptide can physically reach inside the cell?
02 Explain the 'tap on the shoulder' analogy. What does a peptide not do?
03 Why is a GHRP capped by your own pituitary? What does that tell you about the difference between a pulsatile and a pharmacologic signal?
04 Walk through SAFER. Give a real-world example for each of the five letters.
05 Why does REPAIR come before REGULATE before REINFORCE? What happens when you reverse the order?
06 Name the four stop signals and the format of a real stop rule (metric, threshold, action).
07 Explain the 'rockstar in a 6×6 room' analogy. How does it relate to receptor downregulation?
08 Why is sourcing more important than the molecule itself? What does a compounding pharmacy give you that a gray-market vendor cannot?

If a question stumps you, that's the gap. Go back to the chapter, re-read the analogy, and try again. The point isn't to memorize. The point is to be able to explain it to a curious friend who has never heard of any of this.

BONUS · COMMUNICATION

Conversation starters with your clinician

Eight questions that pressure-test a peptide recommendation — yours or theirs.

One of the highest-leverage things any patient can do is bring better questions to the room. When you push — politely, with curiosity — you learn whether the clinician has a real model, and you co-author the decision instead of receiving it. The first three frame the problem, the middle three test the proposed solution, the last two close the loop.

01 What adaptation are we engineering?

Force a single-sentence answer in plain English. "Sleep deeper," "build lean mass at maintenance," "recover a torn supraspinatus." If the answer is "optimize" or "anti-aging," that's a flag.

02 What's the substrate picture right now?

Do we know my ferritin, B12, vitamin D, magnesium, and basic thyroid panel? Is sleep adequate? If these aren't on file, why are we layering a signal on top of them?

03 What did we try first, and how did it fail?

Peptides are rarely the first lever. If we're skipping diet, sleep, training, and basic micronutrient repletion, we're paying for amplitude we may not need.

04 What's the mechanism — in one sentence?

Receptor agonism? Enzyme modulation? Bioregulatory? If the clinician can't sketch it on a napkin, they're recommending a brand, not a molecule.

05 What's the minimum effective dose, and why aren't we starting there?

Most peptides are dose-shaped curves with a sweet spot. Ask why this number, not the lower one. “The study used X” is a starting point, not an argument.

06 What's the stop rule — metric, threshold, action?

If we can't write the sentence "If [X] does [Y], we stop and do [Z]," we don't have a stop rule. We have a hope.

07 What's the source, and can I see the certificate of analysis?

A licensed compounding pharmacy with a current COA is the floor, not the ceiling. If sourcing is vague, the rest of the conversation doesn't matter.

08 What does success look like at six weeks — and what does failure look like?

Both answers should be specific and pre-committed. "Feels better" is not a metric. "HRV stable or up, RHR stable or down, sleep latency under 20 minutes" is a metric.

BONUS · CASE PATTERNS

Field notes — four common scenarios

Composite cases, drawn from years of consults, with the reasoning made explicit.

These are not protocols. They are pattern sketches — how a careful practitioner would think through a typical presenting picture. Names and details are composites. The goal is to show the framework operating, not to prescribe.

The high-mileage CrossFitter, age 42, with a torn rotator cuff

Outcome: heal the cuff well enough to avoid surgery and return to overhead work in six months. Substrate first — confirm protein intake at 1.8 g/kg, ferritin above 80, vitamin D above 50. Sleep audit: 7.5 hours, HRV stable. SAFER says we have a real failure (a structural injury that is not healing on rest alone) and a clean exit point (imaging at month three). **Sequence:** REPAIR phase — BPC-157 SC near the lesion, four to six weeks, paired with eccentric loading. No TB-500 yet; we want to see what BPC alone does. **Stop rule:** if pain score does not drop 30% by week four, we stop and re-image. **Reassess at week six.**

The post-COVID lawyer, age 51, with brain fog and broken sleep

Outcome: restore daytime cognition and consolidate sleep architecture. Substrate first — thyroid panel, B12, ferritin, fasting insulin. CPAP screen if any snoring. SAFER says the real failure is sleep, not cognition; cognition is downstream. **Sequence:** REGULATE phase — Epitalon short cycle to test pineal/melatonin rhythm response, plus basic sleep hygiene. If sleep latency and HRV improve, we hold. Only if cognition lags after sleep is fixed do we consider a separate neurotrophic lever (Cerebrolysin or Semax). **Stop rule:** if Epitalon does not move sleep latency by week three, we stop and look harder at the airway.

The 58-year-old executive with rising visceral fat and rising A1c

Outcome: lower visceral adiposity and pull A1c back under 5.7 without crushing lean mass. Substrate first — fasting insulin, lipid panel, liver enzymes, sleep, training load. SAFER says diet and sleep matter most, but the patient has done that work and is plateaued. **Sequence:** REPAIR-then-REGULATE — mitochondrial substrate (CoQ10, magnesium, creatine) for six weeks first, then a low-dose GLP-1 agonist titrated slowly with explicit protein floor and resistance training prescription. **Stop rule:** if lean mass drops more than 3% on DEXA at month three, we drop the dose. **Do not stack** Tesamorelin on top until GLP-1 effect is plateaued and reassessed.

The 34-year-old endurance athlete chasing a longevity stack

Outcome: this is where most practitioners get into trouble. The patient is asymptomatic and high functioning. The real intervention is conversation, not pharmacology. **Sequence:** nothing yet. Run a substrate panel and a careful training-load history. If everything is clean, the highest-leverage intervention is to pick one well-grounded lever (often sleep optimization or mitochondrial substrate) and run it for a quarter with clean before-and-after biomarkers. **Stop rule:** if the patient cannot articulate what they are trying to optimize, the protocol is the conversation, not the molecule.

Glossary

Plain-language definitions of the terms used in this guide.

Peptide. A short chain of 2–50 amino acids linked by peptide bonds. Acts as a signaling molecule.

Bioregulator. A very short peptide (2–4 AA) that influences gene expression — Khavinson's term for short epigenetic-regulatory peptides like Epitalon.

Signaling peptide. Mid-length (5–45 AA) peptides that bind cell-surface receptors to trigger downstream cascades.

GHRP. Growth Hormone Releasing Peptide — a class (Ipamorelin, GHRP-2, GHRP-6) that stimulates pulsatile GH release from the pituitary.

GHSR. Growth Hormone Secretagogue Receptor — the receptor GHRPs and ghrelin bind to in order to trigger GH release.

GLP-1. Glucagon-Like Peptide-1 — an incretin hormone; agonists (semaglutide, tirzepatide) drive satiety and glycemic control.

mTOR. Mechanistic Target of Rapamycin — the cellular nutrient/growth sensor; chronic over-activation blocks autophagy.

AMPK. AMP-activated protein kinase — the cellular energy gauge; activates when ATP is low, drives mitochondrial biogenesis.

Mitophagy. The targeted recycling of damaged mitochondria — the cell's quality control for its own power plants.

NAD+. Nicotinamide Adenine Dinucleotide — a coenzyme central to ATP production and sirtuin-mediated longevity signaling.

HRV. Heart-Rate Variability — the beat-to-beat variation in heart rate; a non-invasive readout of autonomic resilience.

SC injection. Subcutaneous injection — delivered into the fat layer just under the skin; the default route for most therapeutic peptides.

Compounding pharmacy. A licensed pharmacy that formulates customized medications under regulatory oversight, with certificates of analysis.

Pulsatile signaling. A pattern of release in bursts rather than continuously — the body's preferred mode for most regulatory hormones.

Receptor downregulation. The reduction in receptor density or sensitivity that follows chronic over-stimulation. Less signal heard, even if more sent.

A closing note

From Anthony.

Peptides reward humility. I want to be honest about that because the field doesn't always sound humble. Read enough podcasts and forums and you'll hear language that makes peptides sound like cheat codes. They aren't. They're tools, and like every tool I've ever worked with, they reward the person who spent more time understanding the wood than admiring the saw.

Most of what I do with clients is unglamorous. We fix sleep. We rebuild mitochondrial substrate. We write stop rules. We pick one molecule at a time. We hold for six weeks before we change anything. Most of the dramatic transformations I've watched up close came from that kind of slow, deliberate, tedious work — not from a heroic stack.

If this guide has done its job, you should now have a framework to think with — not a protocol to copy. The framework is: outcome before molecule, ground before stack, dose at the floor not the ceiling, and always know when you'll stop. That's the whole game.

> *"Peptides reward humility. The body is the protocol — you're just turning dials.*
>
> — Anthony Castore, SSRP Fellow

Further reading and sources cited throughout this guide:

1. Lau, J.L. & Dunn, M.K. "Therapeutic peptides: Historical perspectives, current development trends, and future directions." Bioorganic & Medicinal Chemistry, 2018. doi.org/10.1016/j.bmc.2017.06.052

2. Khavinson, V.K. "Peptides and ageing." Neuroendocrinology Letters, 2002. pubmed.ncbi.nlm.nih.gov/12374906

3. Falutz, J. et al. "Tesamorelin, a growth hormone-releasing factor analogue, in HIV-infected patients with abdominal fat accumulation." JAMA, 2014. pubmed.ncbi.nlm.nih.gov/24737366

4. Sikiric, P. et al. "Stable gastric pentadecapeptide BPC 157: novel therapy in gastrointestinal tract." Current Pharmaceutical Design, 2011. pubmed.ncbi.nlm.nih.gov/21443487

5. Sikiric, P. et al. "Brain-gut axis and pentadecapeptide BPC 157." Current Neuropharmacology, 2016. pubmed.ncbi.nlm.nih.gov/26521943

6. Shaffer, F. & Ginsberg, J.P. "An overview of heart rate variability metrics and norms." Frontiers in Public Health, 2017. frontiersin.org/articles/10.3389/fpubh.2017.00258

7. U.S. Food and Drug Administration. "Compounding Laws and Policies." fda.gov/drugs/human-drug-compounding/compounding-laws-and-policies

8. Lee, C., Zeng, J. et al. "The mitochondrial-derived peptide MOTS-c promotes metabolic homeostasis and reduces obesity and insulin resistance." Cell Metabolism, 2015. doi.org/10.1016/j.cmet.2015.02.009