ESSENTIALS OF PEPTIDE THERAPY IN AESTHETIC MEDICINE

CBAM Aesthetic Mastery Series

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Dr. Reza Akef is a highly experienced and respected cosmetic physician, with over 15 years of experience in teaching and practicing cosmetic medicine. He is currently the Assistant Professor at McMaster University and the Chairman of the Canadian Board of Aesthetic Medicine (CBAM), where he shares his knowledge and expertise with other healthcare professionals to provide the best care for their patients.

Dr. Akef is board certified by the College of Family Physicians of Canada in both Family and Emergency Medicine. Additionally, he is deeply involved in interventional pain practice cooperation for the treatment of Migraines, chronic pain, TMJ, Myofascial pain, and Fibromyalgia. He is a leading cosmetic physician and an internationally recognized specialist in non-surgical cosmetic procedures.

Dr. Akef is dedicated to understanding his clients' concerns and creating personalized treatment plans that meet their needs and goals. He is committed to thoughtfully and strategically creating individualized combinations of leading, safe treatments that exceed client expectations. He is also the founder of Angel Gloss spa in Toronto, an established, leading destination for non-surgical cosmetic procedures for individuals seeking leading physicians with proven experience, the latest technology, and cutting-edge techniques.

Dr. Akef is actively involved in multiple training courses, webinars, and conferences all around the world, including prestigious international conferences such as IMCAS, AMWC, and Dubai Derma. He participates as a speaker at these events and is always looking to stay up to date with the latest developments in the field of cosmetic medicine.

Mohsen Talani is the Director of CBAM. He has over 18 years of experience teaching anatomy in Canada and internationally to students and healthcare practitioners in different fields of medicine such as physicians, dentists, nurses, chiropractors, and physiotherapists.

After graduating from medical school at a young age, he became a medical doctor in his home country, Iran, and practiced in the field of emergency medicine. While pursuing his Master's thesis in neuroscience at McGill University, he discovered his passion for teaching. Since then, he has been working in the field of medical science education, with a focus on anatomy.

He strongly believes that with the rapidly growing aesthetic industry, all practitioners should have a profound knowledge of skin basics, fat compartments, muscles, blood vessels, and nerves, in order to provide safe and effective care to clients and prevent or minimize post-treatment complications linked to lack of anatomy knowledge.

He is currently training healthcare practitioners who seek to have a deep knowledge of anatomy. He incorporates fun, innovative, and easy-to-understand methods of teaching in all of his classes, guest lectures, and presentations. Additionally, he supervises the cadaver lab dissections and hands-on practicals.

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Preface

Peptide therapy has arrived in aesthetic medicine faster than the evidence, the regulations, or the training has been able to keep pace. Patients walk into clinics asking for compounds by name — sometimes compounds their practitioner has never heard of — armed with claims from forums, influencers, and sellers whose interest is the sale, not the outcome. The result is a field moving at the speed of marketing while the science, in many cases, is still catching up.

This handbook exists to close that gap. It is written for the licensed practitioner who wants to offer peptide therapy well — to know which peptides are backed by real human evidence and which rest on animal data and hope, which are FDA-approved and which are legally precarious, what to actually prescribe and monitor, and when the right answer is simply "no." It is not a catalog of everything on the market, and it is not a sales tool. It is a working reference for clinical judgment.

Two commitments run through every page. The first is honesty about evidence: this book distinguishes proven clinical outcomes from biomarker changes and marketing narratives, and it says plainly when the data is thin. The second is regulatory and legal defensibility: it treats compliance not as a bureaucratic afterthought but as a core clinical competency. A practitioner who internalizes both will be able to navigate this field with confidence long after any single peptide's status has changed.

The goal is not to make you enthusiastic about peptides. It is to make you good at using them.

How to Use This Book

This is a reference, not a narrative. It is built to be opened to the page you need, not read cover to cover — though the foundations in Part I will make everything that follows more useful.

Part I — Foundations establishes the thinking: what peptides are, how they behave in the body, how to triage any peptide's evidence, the regulatory framework that governs what you can legally prescribe, and the practical mechanics of sourcing, reconstitution, dosing math, and injection. Read this part first. It contains the skills that let you evaluate peptides this book doesn't even cover.

Part II — The Peptides is the core. Each peptide is presented in a fixed format so you can find what you need fast and compare across compounds:

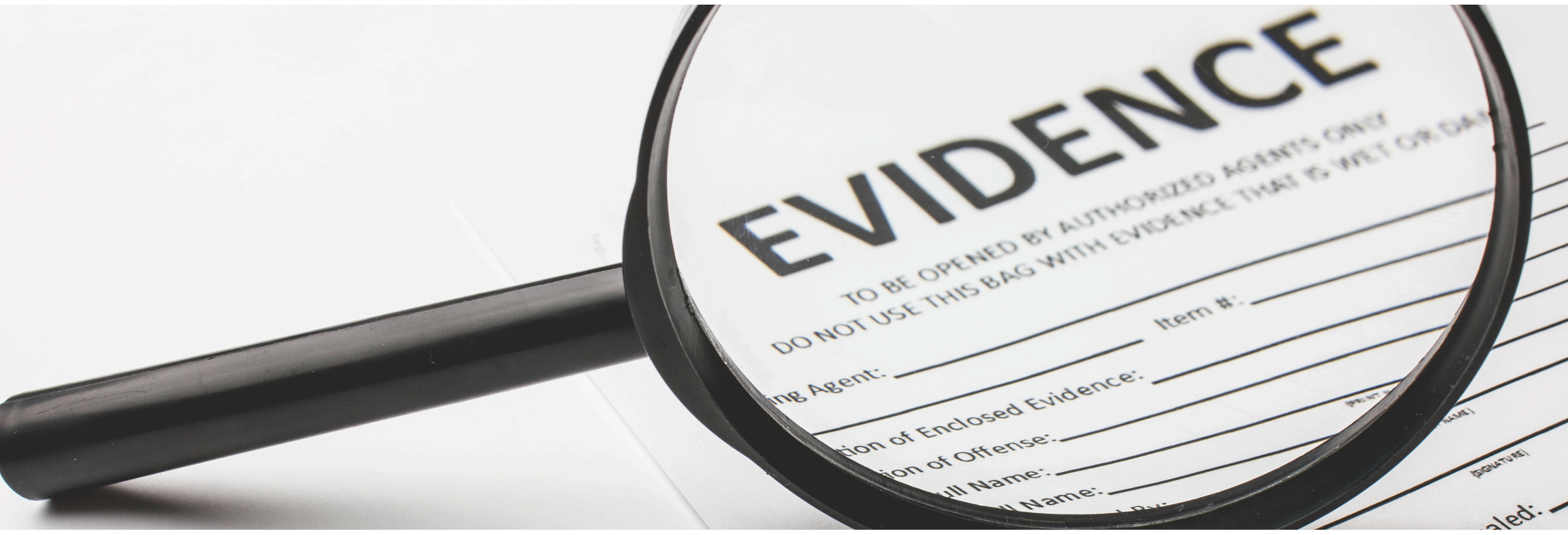
- **Status box** — FDA approval, regulatory category, and anti-doping status, up front
- **Mechanism** — how it works, briefly
- **Evidence** — what the human data actually shows
- **Dosing** — approved regimens where they exist; clearly labeled reference ranges where they do not
- **Monitoring** — what to track
- **Cautions** — contraindications and red flags
- **Counseling** — what to tell the patient

Part III — Clinical Practice covers the work around the prescription: patient selection and consent, titration and monitoring, the aesthetic crossover, and how to build a compliant practice.

Back Matter holds the quick-reference tools — master dosing tables, a status-at-a-glance chart, an anti-doping reference, a glossary,

and instructions for verifying current regulatory status.

A note on the dosing information: where a peptide is FDA-approved, this book gives the approved regimen. Where a peptide is not approved but a dose is commonly cited in the literature or compounding practice, that dose is included and explicitly labeled as a non-approved reference — so you can recognize what patients are encountering and make an informed decision, not so that you treat it as an endorsement.



A Note on Evidence and Regulation

Two truths shape how this book should be read.

Evidence is a spectrum, not a verdict. A compound can have an elegant mechanism, promising animal studies, and enthusiastic users — and still lack the human trial data that would make it genuinely proven. Throughout this handbook, you will see peptides placed along a range from *proven* (strong human trials and FDA approval) through *plausible* (real mechanism, limited human outcomes) to *hype* (marketing claims with preclinical or no data). A mechanism that "makes sense" is a hypothesis, not a result. The most valuable skill this book can give you is the habit of asking, for any peptide, *what is the human evidence, and how good is it?*

Regulatory status is a snapshot, not a fact. The legal standing of a peptide can change quickly — driven not by new science but by new regulatory determinations, shortage listings, and enforcement decisions. A compound that is legally compoundable in one quarter can be precarious the next. Every status statement in this book reflects a particular moment, and several of the peptides discussed are actively under review. Because of this, the book repeatedly directs you to verify current status before prescribing, and the back matter explains how. Treat any specific status claim here as a starting point for your own verification, not a substitute for it.

These two principles — evidence honesty and regulatory humility — are what separate a defensible peptide practice from a reckless one.

Safety and Legal Disclaimer

This book is an educational reference for licensed healthcare practitioners. It is not medical advice, and it does not establish a standard of care. Nothing in it should be used to diagnose or treat any individual patient without the independent clinical judgment of a qualified, licensed practitioner who has evaluated that specific patient.

The information here — including mechanisms, evidence summaries, dosing ranges, and regulatory statements — is provided for general educational purposes and may become outdated. Drug approvals, compounding rules, regulatory categories, and anti-doping classifications change frequently. Before prescribing, compounding, administering, or recommending any peptide, the practitioner is responsible for verifying the current FDA approval status, applicable compounding regulations, product labeling, and, where relevant, anti-doping rules, and for complying with all federal, state, and local laws and the requirements of their professional licensing body.

Dosing information for non-FDA-approved peptides is presented solely to inform practitioners of ranges cited in the literature and in compounding practice. Its inclusion is not an endorsement, a recommendation, or a representation that such use is safe, effective, or legal. Many of the peptides discussed in this book are not approved for human use, are designated by the FDA as substances that should not be compounded, and/or are prohibited in athletic competition.

The author and publisher make no warranties regarding the accuracy, completeness, or currency of this material and disclaim any

liability arising from its use. The practitioner assumes full responsibility for all clinical and prescribing decisions. By using this handbook, you acknowledge that peptide therapy carries inherent and in some cases unknown risks, and that the responsibility for safe, legal, and ethical practice rests entirely with you.

Part I

Foundations

1

PEPTIDES 101: STRUCTURE, CLASSIFICATION, AND HOW THEY WORK

What a Peptide Is

A peptide is a short chain of amino acids linked by peptide bonds — chemically the same building blocks as proteins, just smaller. The convention is loose but useful: chains of roughly 2 to 50 amino acids are called peptides; longer chains fold into the complex three-dimensional structures we call proteins. Insulin, at 51 amino acids, sits right at that boundary and is often described either way.

This size matters clinically. Peptides are large enough to carry specific biological instructions — they fit receptors with precision, like a key cut for one lock — but small enough to be synthesized, modified, and manufactured at scale. That combination of specificity and manufacturability is exactly why the category has exploded.

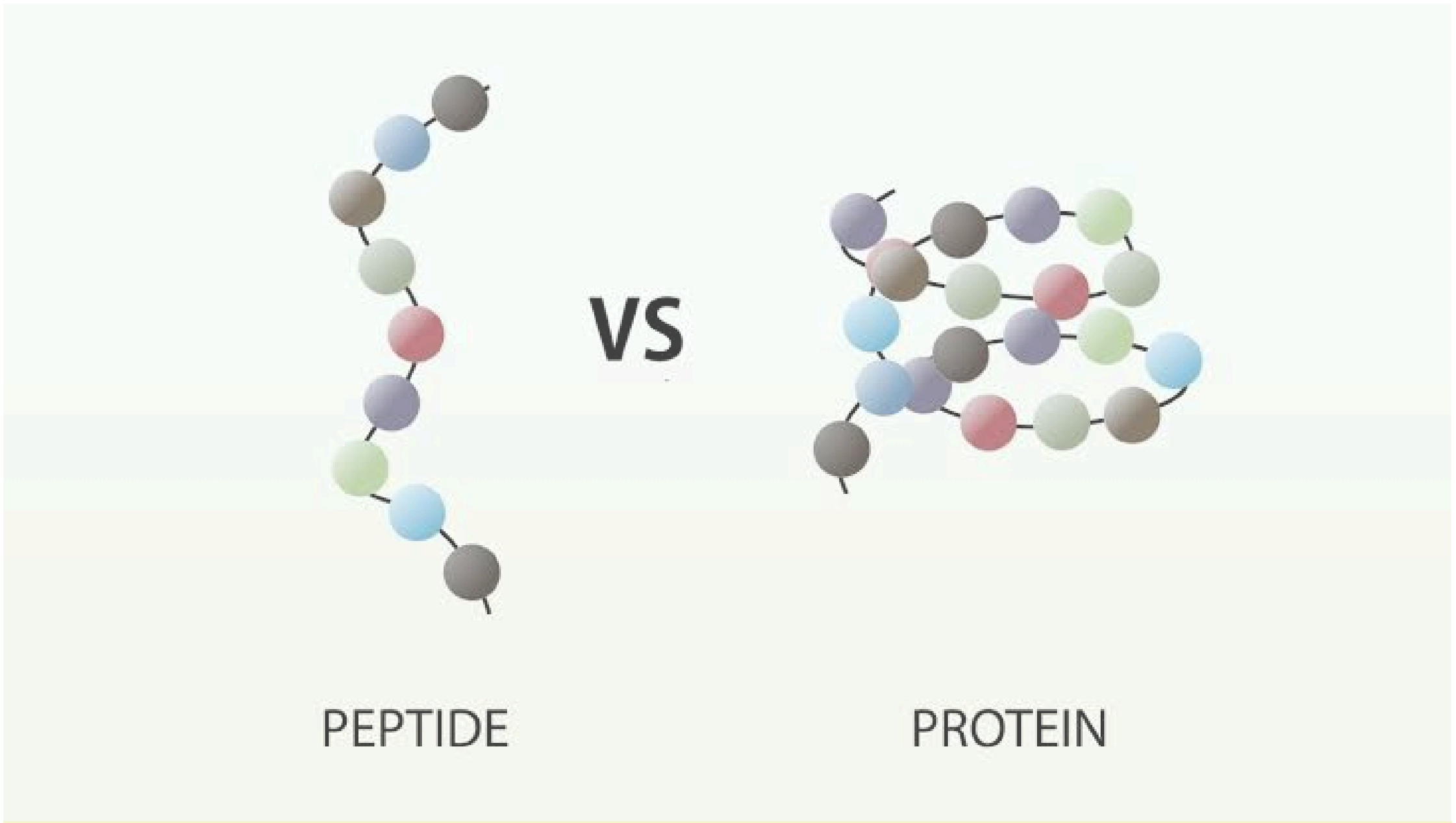


Figure 1.1 — A peptide is a short chain of amino acids linked by peptide bonds; longer chains fold into proteins. This size difference underlies both their specificity and their manufacturability."

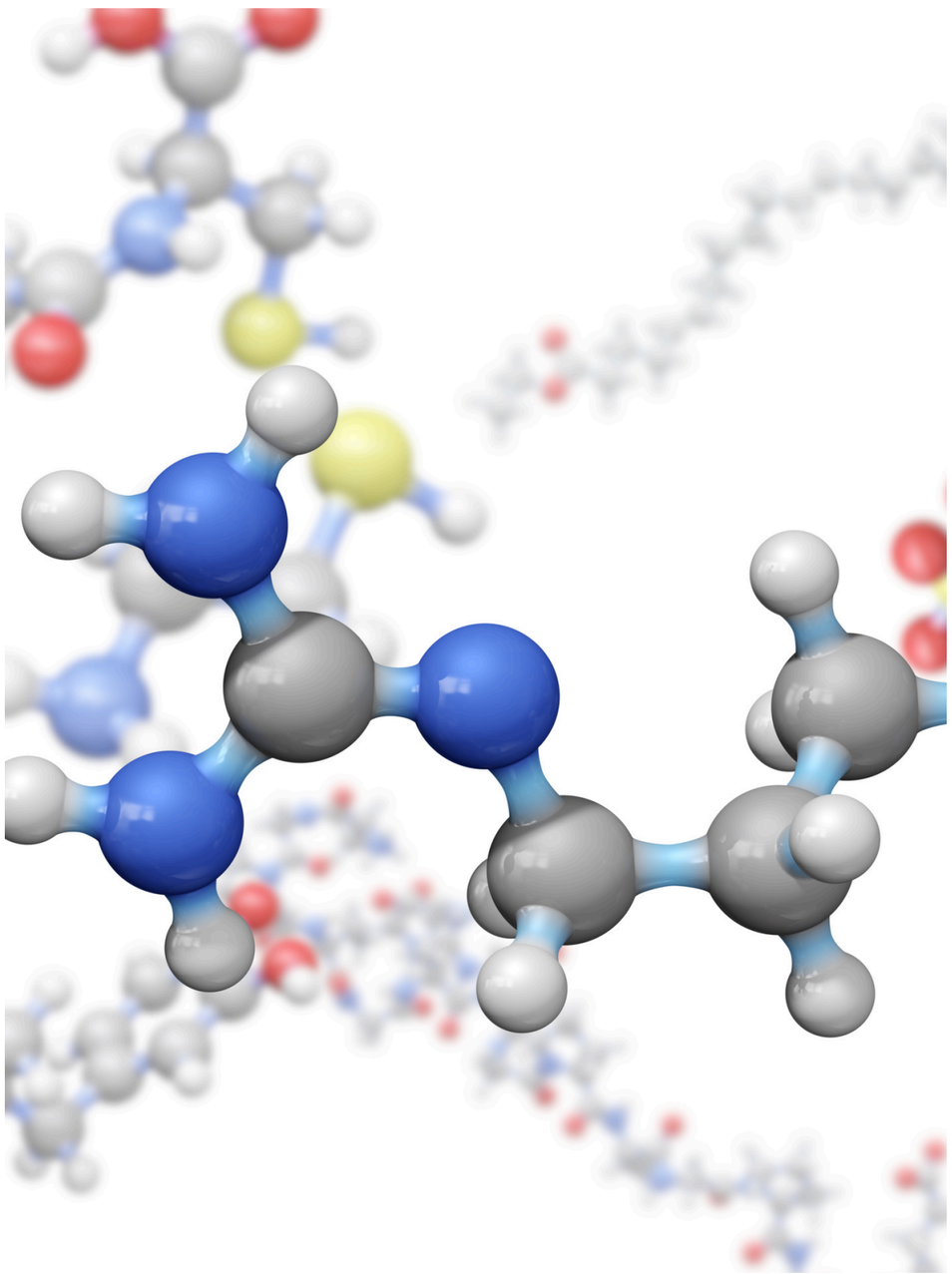
The body runs on peptides. Hormones (insulin, glucagon, growth hormone–releasing hormone), signaling molecules, and regulatory factors are peptides or proteins. Therapeutic peptides work by mimicking, blocking, or amplifying these natural signals. Understanding a peptide therefore starts with a single question: what natural signal is this molecule imitating or interrupting? Answer that, and its effects — and its side effects — usually follow logically.

How Peptides Are Built and Named

Each amino acid in the chain has a sequence position, and that sequence determines the peptide's shape and function. Change one amino acid and you can change everything — potency, half-life, receptor selectivity, or whether the molecule works at all.

This is why so many therapeutic peptides are *analogs* — deliberately modified versions of natural peptides. A natural hormone might be broken down in minutes; a single amino acid substitution or an added chemical group can extend that to days. Semaglutide, for example, is a GLP-1 analog engineered with a fatty-acid chain that binds albumin in the blood, stretching its half-life to about a week and enabling once-weekly dosing. The natural hormone it mimics lasts only minutes. The modification is the therapy.

Naming in this field is inconsistent and worth a caution. Peptides may go by a research code (AOD-9604, CJC-1295, TB-500), a generic drug name (semaglutide, tesamorelin, bremelanotide), or a brand name (Wegovy, Egrifta, Vyleesi). One compound can carry all three. Recognizing that "TB-500," "thymosin β-4 fragment," and various brand labels may point to related — or not quite identical — molecules is part of reading this field accurately.



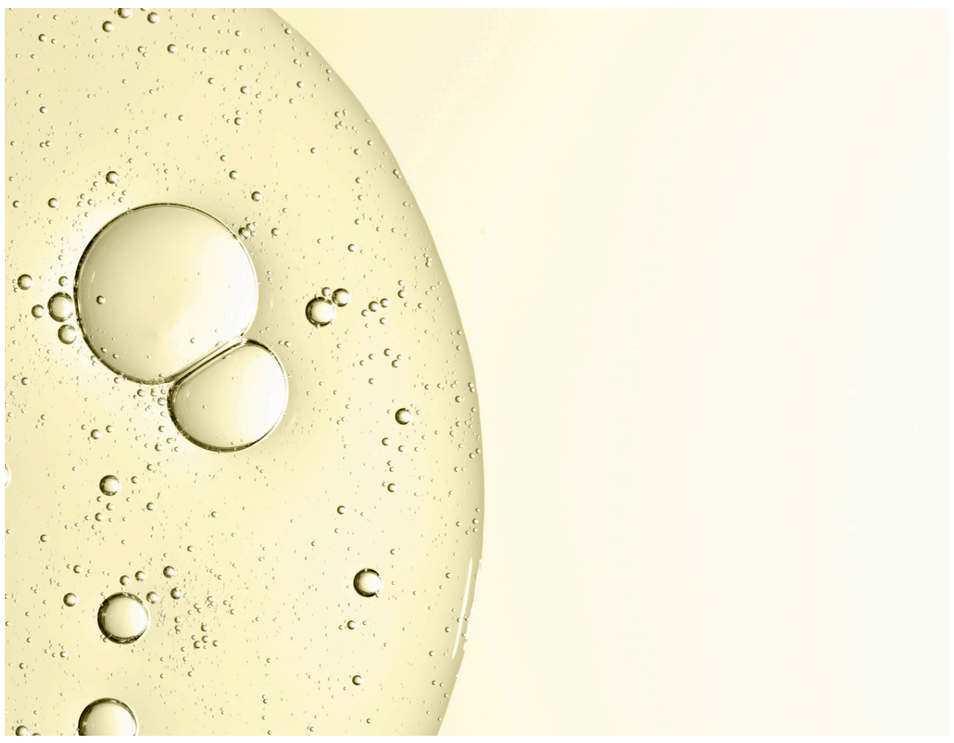
A small but important literacy point: not everything sold as a "peptide" is one. Some popular compounds in this space, such as MK-677 (ibutamoren) and 5-Amino-1MQ, are small molecules, not peptides at all. When a catalog labels a small molecule a "peptide," that is usually a sign of marketing-driven framing rather than scientific accuracy.

Classifying Peptides

There is no single official taxonomy, but for clinical purposes peptides are most usefully grouped by what they do — their functional target. This is the organizing logic of Part II of this book. The major functional classes a practitioner will encounter are:

- **Skin and structural peptides** — signal collagen production or modulate the neuromuscular junction (e.g., GHK-Cu, Matrixyl, Argireline)
- **Regenerative and wound-healing peptides** — promote tissue repair and angiogenesis (e.g., BPC-157, TB-500/thymosin β-4)
- **Metabolic peptides** — act on incretin and appetite pathways for weight and glucose control (e.g., semaglutide, tirzepatide)
- **Growth hormone axis peptides** — stimulate the body's own growth hormone release (e.g., sermorelin, CJC-1295, ipamorelin, tesamorelin)
- **Sexual health, cognitive, and longevity peptides** — act centrally on desire, mood, cognition, or immune and aging pathways (e.g., PT-141, semax, selank, thymosin α-1, epitalon)

A second, cross-cutting distinction matters for daily practice: route of administration. Peptides may be delivered subcutaneously (the most common), intramuscularly, intranasally, orally, or topically. Most peptides are poorly absorbed orally because the digestive tract breaks them down — which is why injection dominates the field, and why oral or topical formulations always raise the question of whether enough drug actually reaches its target. (Pharmacokinetics is the subject of Chapter 2.)



Class	What They Do	Representative Peptides	Covered In
Skin & structural	Signal collagen synthesis or modulate the neuromuscular junction	GHK-Cu, Matrixyl, Argireline	Ch. 6
Regenerative & wound-healing	Promote tissue repair and angiogenesis	BPC-157, TB-500/thymosin β-4	Ch. 8
Metabolic	Act on incretin and appetite pathways	Semaglutide, tirzepatide	Ch. 9
Growth hormone axis	Stimulate the body's own GH release	Sermorelin, CJC-1295, ipamorelin, tesamorelin	Ch. 10
Sexual health, cognition & longevity	Act centrally on desire, mood, cognition, immunity, aging	PT-141, semax, selank, thymosin α-1, epitalon	Ch. 11

Table 1.1 — Functional Classes of Peptides

A third distinction is regulatory, and it cuts across every functional class: whether a peptide is FDA-approved, compounded under a recognized pathway, or sold on the gray market. Two peptides with similar biology can occupy completely different legal worlds. This distinction is so central. that Chapter 4 is devoted to it — but it is worth flagging now that functional class tells you what a peptide does, while regulatory status tells you whether you can legally use it. Both questions must always be asked.

How Peptides Work: The Receptor Principle

Almost every therapeutic peptide works the same fundamental way: it binds a receptor and triggers a downstream effect.

Receptors are proteins, usually on the cell surface, shaped to recognize specific signaling molecules. When a peptide binds its receptor, it initiates a cascade inside the cell — switching genes on or off, releasing hormones, contracting or relaxing tissue, or altering metabolism. The peptide itself rarely does the work directly; it delivers a *message* that the cell then acts on.

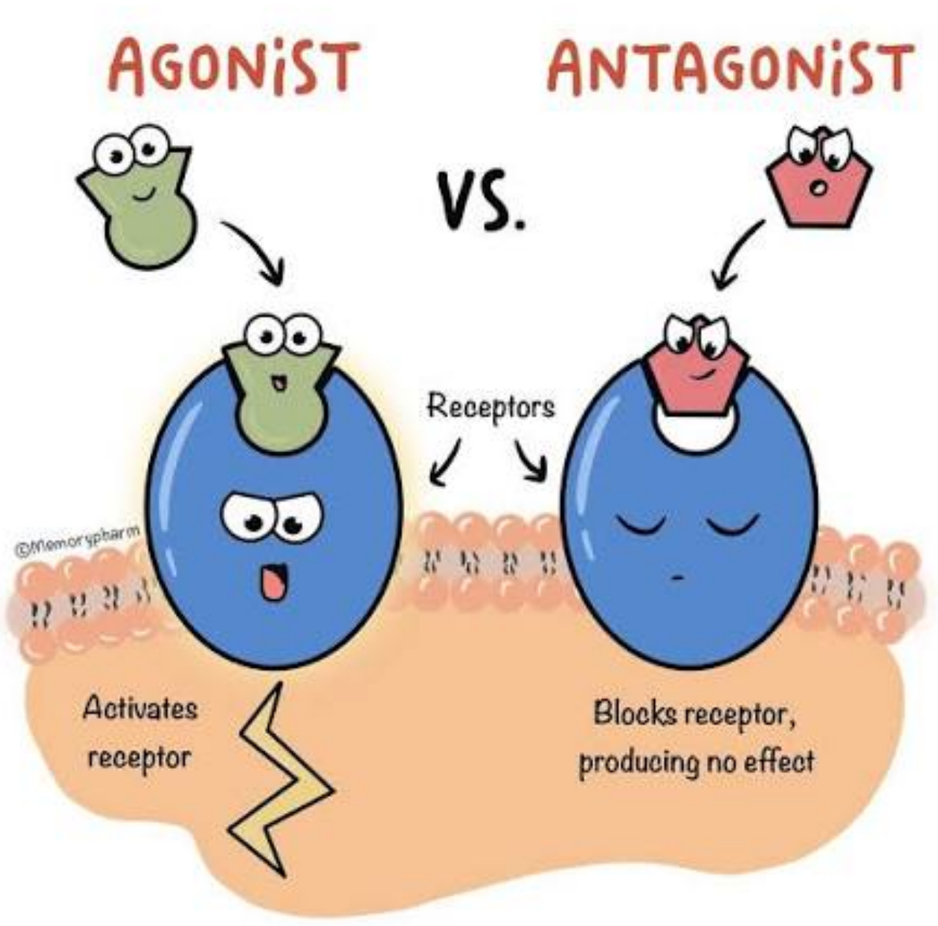


Figure 1.2 — Agonist vs antagonist

Three concepts make this clinically useful:

Agonist vs. antagonist:
An agonist binds a receptor and activates it, mimicking the natural signal. An antagonist binds and blocks it, preventing the natural signal. Most peptides used in aesthetic and metabolic medicine are agonists — they amplify a desired pathway. GLP-1 agonists, melanocortin agonists (PT-141), and GH secretagogues all work by turning a system on.

Receptor distribution explains side effects:
A receptor is rarely found in just one place. GLP-1 receptors sit in the pancreas, stomach, brain, and cardiovascular system — which is why a GLP-1 agonist both suppresses appetite (brain) and causes nausea (delayed gastric emptying). When you know where a peptide's receptors live, its side-effect profile stops being a surprise and becomes predictable. This single principle — map the receptors, anticipate the effects — is one of the most useful clinical habits in the field.