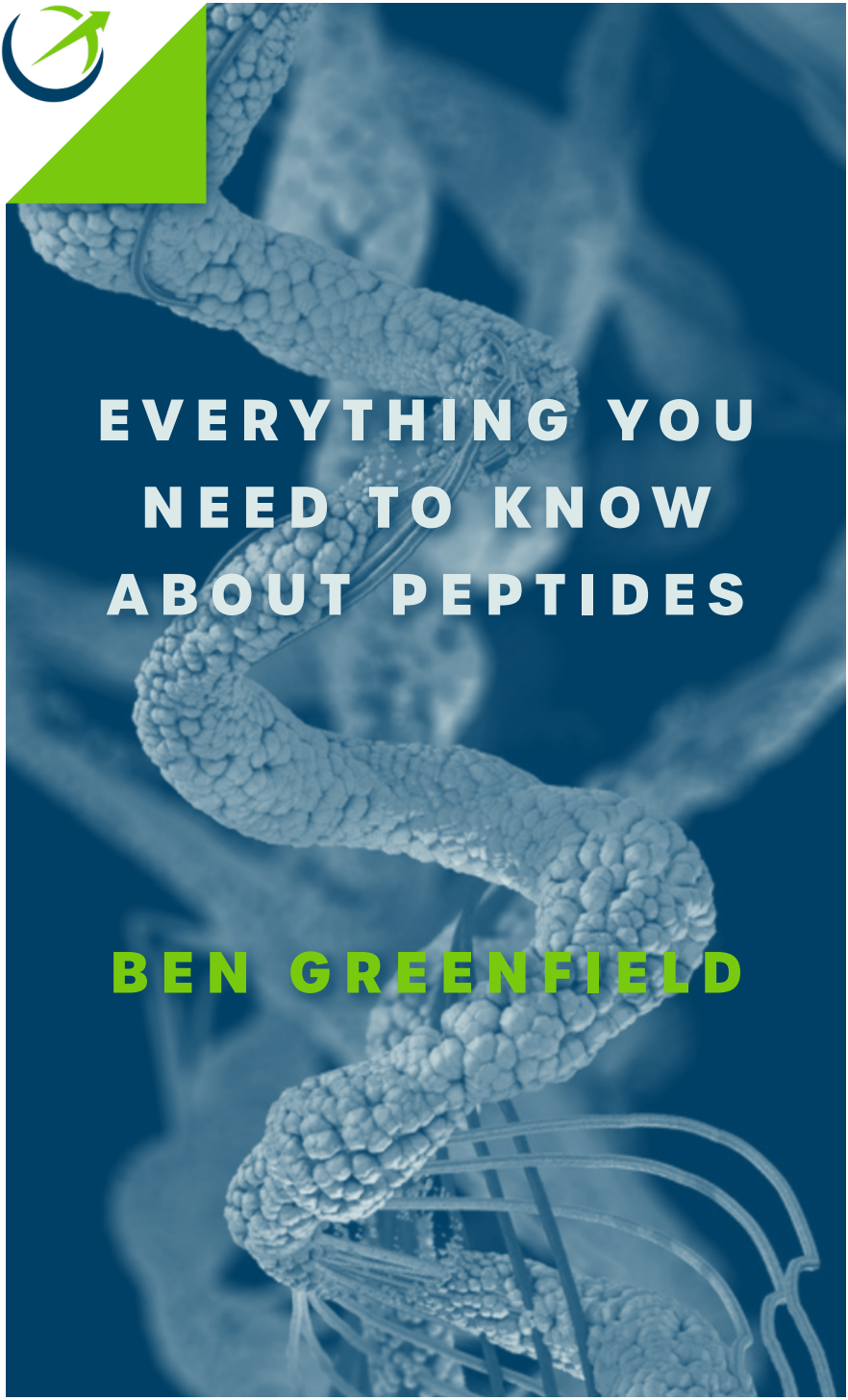

EVERYTHING YOU NEED TO KNOW ABOUT PEPTIDES

BEN GREENFIELD

INTRODUCTION

Despite having written several articles and published just as many podcast episodes about peptides over the last few years, I still get questions about this topic nearly every darn day, including...

What exactly are peptides?

How do they work in the body?

What are the best sources?

How do you "take" them?

How can I stack peptides for the best effects?

Are they safe?

Are they legal?

To be honest, I completely understand why people still have so many unanswered questions about peptides. Peptide therapy is still a fairly new concept for the general population, there aren't many experts out there talking about this stuff (though the numbers are certainly growing), and, what's more, peptides aren't technically FDA approved or patentable, so despite the fact that some of the smartest functional medicine physicians I know use peptides daily in their practice, most mainstream health websites are certainly not talking about peptides.

In other words, most folks have no choice but to seek out alternative sources for information on peptides.

So with that being said, I want to do my very best to educate and be a trusted source of information on the incredibly intriguing field of peptide therapy, not only because I've used them myself to great success, but also because I believe they can truly revolutionize everything from human performance to athletic recovery, anti-aging, immune treatments, skin and hair restoration, and much more.

BEN GREENFIELD

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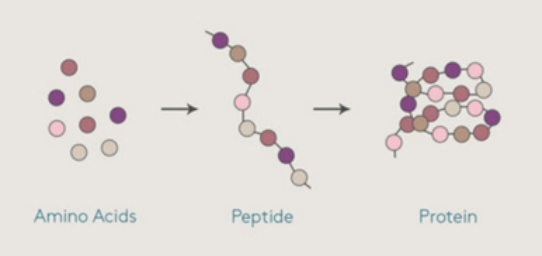
WHAT ARE PEPTIDES?

Peptides are naturally occurring biological molecules containing two or more amino acids connected to one another by peptide bonds.

Like amino acids and proteins, peptides perform a number of critical, fundamental processes in the body. Most notably, they serve as signaling molecules that communicate with our cells and "tell them what to do" with laser-like specificity – whether it's repairing tissues, producing certain hormones, or sending out anti-inflammatory compounds to promote healing.



Structurally speaking, peptides are related to amino acids and proteins in the following way:

- *Amino acids are individual molecules;*
- *Peptides are (generally) short chains of 2-50 amino acids;*
- *Proteins are (generally) long chains of 50+ amino acids.*

But, lest you think peptides are some kind of "fringe biohack," you should know that they've actually been used therapeutically in medicine for over a century. In fact, life-saving medicines like morphine, penicillin, and insulin are all peptides, and there are many peptide-based vaccines as well.

What has changed recently, however, and why peptides have suddenly exploded on the health scene, is two-fold:

1. *Technological advancements have allowed us to enhance the circulatory half-lives and therapeutic potency of peptides – such as attaching the peptide to a molecule that increases the overall*

size which can help with receptor-mediated recycling (absorption by cells) or manipulating the amino acid chain in a way that enhances its stability in the bloodstream.

2. *The commercialization of peptides, which has made them more publicly available, especially online. However, I will issue a forewarning here that the ability to easily buy peptides from just about any website has not exactly been the best thing when it comes to ensuring the safety and purity of peptides, but alas, I will discuss that more below.*

THE HEALTH BENEFITS OF PEPTIDES

So, why would you want to go through all the trouble and expense of finding a trusted peptides practitioner – or, perhaps, if you're taking a more DIY approach – navigating the interwebs to find a safe, reputable source and then proceeding to inject oneself with a syringe full of these strange "wonder compounds," anyway?

The short answer is, the results can undoubtedly be worth it.

Personally, I can attest to the incredible, fast-acting benefits of therapeutic peptides. I've used BPC-157 to shut down gut inflammation, as well as completely banish a number of injuries such as golfer's elbow, medial epicondylitis, inner elbow pain, and a torn upper hamstring. LL-37, an anti-microbial peptide, helped my gut recover from a nasty bout of giardia thanks to a water filter snafu during a wilderness survival course. And for a nootropic-like brain boost, the peptide Semax is one of my favorites, as it can provide hours of focused cognitive performance without deleteriously affecting sleep or causing any type of anxiety or jitters.

(And that's just the tip of the iceberg. I cover many more of my personal favorite peptides in my book *Boundless*.)

When administered correctly, peptides work by replenishing our natural levels that decline with age, providing a seemingly endless list of health benefits (depending on the peptide), such as:

- *Improving sleep*
- *Supporting brain health*

- *Boosting immune health*
- *Increasing lean muscle growth*
- *Enhancing longevity and anti-aging*
- *Stopping hair loss (and even regrowing hair)*
- *Improving insulin sensitivity and metabolic health*
- *Supporting injury healing and muscular/joint recovery*
- *And much, much more...*

How can peptides have such wide-ranging effects on nearly every bodily system? Well, it's because they are essentially "biological chameleons," acting as circulating hormones, neurotransmitters, local regulators–or all of these at once – which allows them to play a fundamental role in controlling human development, reproduction, physiology, and behavior. Additionally, peptides have extremely high specificity and affinity for their intended target (you can think of them like heat-seeking missiles) and can easily penetrate those cell membranes due to their small size. Plus, an added benefit of using peptides as a treatment is that, because of their shorter half-life, they don't accumulate in specific organs (e.g. kidney or liver) which makes their toxicity levels extremely low.

Pretty cool, right? Now that you understand how peptides work and what benefits they have in the body, let's discuss where you might find these magic molecules.

WHERE TO GET PEPTIDES

Now, since peptides are natural compounds, they are technically not patentable, period. That means Big Pharma can't make money off them, and thus, they will never be marketed to your local doctor or hospital or anywhere else in the conventional health care system.

Peptides, though incredibly safe and effective, are also not currently approved by the FDA and are therefore largely unregulated. This doesn't mean they're illegal for you to consume per se (unless you are, say, an athlete competing in a sanctioned sport that restricts peptide use), but rather, that they cannot be legally sold or advertised as "for human consumption" (this is why you'll see them labeled as such on websites).

Because of these reasons, the process of finding a reputable, high-quality source of peptides can be extremely tricky and daunting.

Personally, I have to admit that my first foray into peptides was a bit "sketchy" and I tinkered around with some sites that may or may not have been the most high-quality of sources (though I did not grow a tail or third nipple, thankfully).

However, after I did more research, spoke with a number of doctors and peptide experts, and became aware of quality issues with peptides, which were made public in the *New York Times* article, "At the Heart of a Vast Doping Network, an Alias," I became much pickier about my sources. For example, according to that article, *"the head of Switzerland's anti-doping organization said that his agency's tests have shown that 80 percent of the peptides advertised on the web are adulterated or outright fakes."* Yikes.

Since I'm assuming that you, like me, don't want to be spending your hard-earned money on fake peptides, nor taking the chance of injecting questionable substances into your precious meat suit, I would highly caution you against buying peptides willy-nilly from any old website you find.

Frankly, the very best (and safest) option would be to get your peptides through a legitimate health care provider that can work with you to develop an appropriate protocol for your needs.

You can either visit the International Peptide Society to find a physician near you, or you can seek out working with any number of clinics/

practitioners I've interviewed and can personally vouch for, such as:

- *Matt Cook of BioReset Medical (my trusted source for the highest-quality peptides)*
- *Jean-François Tremblay of CanLabs*
- *Craig Koniver of Koniver Wellness*
- *Matt Dawson of Wild Health*

However, if for whatever reason working with a physician is not an option, I have also managed to find some reputable online sources for quality peptides, including:

- *CanLab Research (The products they offer are for lab research use only by law and available for research and dev purposes only.)*
- *Peptide Sciences (The products they offer are for lab research use only by law and available for research and dev purposes only.)*
- *Tailor Made Compounding (They don't actually offer peptides on their site - you need a consultation first.)*

HOW TO USE PEPTIDES

HOW TO USE PEPTIDES: RECONSTITUTION, STORAGE, & ADMINISTRATION

So, now that you understand what peptides can do and where to get them, you might be wondering how the heck you actually use them.

The truth is, there are a number of ways you can take peptides, and the route you choose depends on a) what peptide you're using and b) what benefits you're seeking.

Some peptides can be applied topically, which is the best route if you're looking for an external benefit such as skin or hair care. For example, Jay Campbell's "age-defying" peptides are designed to be applied directly to your skin or hair for best results.

However, if you're not using a ready-made formula, you can also mix peptides with a cream or gel to make your very own topical formula. For example, this video walks you through how to make your own anti-aging peptide serum.

Peptides like BPC-157 can also be taken orally–such as in a lozenge, spray, or tablet form–which can be the most convenient option for something like intestinal or gut health benefits. However, there are very few peptides that are stable enough to resist gastric digestion, so be sure to do your research before purchasing an oral form.

Additionally, intranasal application, usually in the form of a nasal spray is another option. This route tends to be best if looking to directly target the brain, such as with the aforementioned nootropic peptide Semax.

However, the most effective, most common–and, admittedly, most complicated–way to administer peptides is via injection, which may sound scary but is pretty much the equivalent of what millions of diabetics do every day with the tiny needle found in an insulin syringe. However, the administration route of injection obviously requires a bit more planning and preparation than topical, oral, or nasal peptide formulas, so the remainder of these instructions will cover the process for administering your own peptide injections.

PEPTIDE INJECTIONS: HOW TO RECONSTITUTE PEPTIDES

Before using your peptides, you'll need to "reconstitute" them.

This is because most peptides will come in a powder, or lyophilized form, which will need to be "reconstituted" into a liquid solution using sterilized or bacteriostatic water (BAC).

Here are some general guidelines on how to reconstitute your peptides:

1. *Remove the plastic safety caps on both vials (peptide and BAC).*

2. *Gently alcohol swab the rubber stopper on each of the vials.*

3. *Use the reference guide that came with your peptides, or a helpful tool like this Peptide Reconstitution Calculator or the PepCalc app to determine the amount of BAC you need to reconstitute your specific peptide.*

4. *Draw as much BAC as you need into your syringe (plus a little bit more). Flick the side of your syringe to remove the extra air bubbles and push a little bit of liquid out of the top.*

5. *Carefully insert the tip of the BAC syringe into the peptides vial and very slowly administer the liquid, ideally along the side of the syringe and not directly into the peptides powder.*

6. *Slowly rotate the peptides vial (don't shake, peptides are very fragile) to mix the powder with the BAC.*

Voila, your peptide is now reconstituted!

While many sites will state that reconstituting your peptides is simple math, there's still a ton of confusion. Why? Are we all just too dumb to do a little number crunching? I don't think so. For one, there are numbers of different types of syringes. Insulin syringes are the most popular, but those differ between U40 and U100 (meaning some are smaller and some are larger, so the amount of volume you add to a syringe is going to be different based on the syringe size). There are also non-insulin syringes, called "Tuberculin", which feature decimal markings in milliliters instead of IU's like an insulin syringe does. Your "tick marks" on your syringe will vary based on the type you have, and that can also change your calculations. Peptides also come in different size vials (meaning the mg volume in the

peptide can vary), as does the volume of BAC water sizes.

Anyways, it's pretty simple if you think about it though. If I have a 5mg vial BPC-157 and I want a somewhat standard 250mcg dose, that means I'd need 1/20 of the 5000mcg of BPC-157 that is in that vial. So if I add, say, 5mL of BAC to that via, then 1mL has 1mg and .25mL has my desired 250mcg. Easy, right? Now, if you want to fiddle around with the math, you can also start with this equation in which you'll want to solve for "X" (x = tick marks on syringe).

*(Amount of peptide / Amount of BAC water) * (x tick marks) = (Dose desired) * (Number of ticks / Syringe volume) >> this varies per syringe*

Here's an example of the calculations for reconstituting BCP-157 with a U-100 insulin syringe (you'll want to convert the 5mg BPC-157 to mcg, so 5mg BPC is 5000 mcg BPC):

*(5000mcg / 5mL) * (x ticks) = 250mcg * (100 ticks / 1mL)*

Solving for x, you'd get 25 ticks, so you'd pull back to the 25 mark on a 1mL syringe.

However, I'd highly recommend just using one of the helpful calculators I included above if this is confusing to you. :)

If you're more of a visual learner, you can also follow this handy YouTube video that walks you through the peptide reconstitution process.

PEPTIDE INJECTIONS: HOW TO STORE PEPTIDES

Now, if you're not going to administer your peptide right after you receive it, you'll need to know how to store it properly.

Peptides are fragile compounds, so proper storage is crucial if you don't want to waste your hard-earned dough. Peptides in all forms should be stored away from light, heat, and moisture. Try to leave them undisturbed for the most part, except when taking them out to reconstitute or administer.

Below are some tips for storing and maintaining your peptides to avoid any contamination, oxidation, and degradation that may render your precious peptides useless.

Storing Lyophilized (Powder) Peptides:

If you're going to store your powder peptides, the best practice is to immediately put them in the refrigerator (under 4°C / 39°F), where they can remain stable for 1-2 years.

The exception would be if you're not going to use your peptides within 1-2 months. At that point, you should store them in the freezer (-18°C / 0°F) where they'll typically remain viable for 2-3 years.

Storing Reconstituted (Mixed) Peptides:

Reconstituted peptide solutions should also be stored in the refrigerator, where they will generally remain stable for up to 30 days.

It's typically not recommended to store reconstituted peptides for more than 30 days, which means you should really only reconstitute one month's worth of peptides at a time and leave the remaining powder peptides in the fridge/freezer.

PEPTIDE INJECTIONS: HOW TO ADMINISTER SUBCUTANEOUS AND INTRAMUSCULAR PEPTIDES

Once you're ready to administer your peptide, you'll need to know whether you'll be doing a subcutaneous or intramuscular injection.

Ideally, your physician or peptide source should provide instructions on which type of injection to do for your specific peptide, but if not, below are some guidelines.

A subcutaneous injection is given under the skin but doesn't pierce the muscle, so it's a bit more comfortable, less potentially painful, and easier to administer. Peptides that work "systemically" or need a slower absorption rate into the bloodstream will typically involve subcutaneous injections, and this usually includes peptides used for general health, systemic anti-inflammation, mitochondrial health, or anti-aging.

Intramuscular injections, on the other hand, are a little tougher since you must stab the entire needle through the skin and into the muscle (even though it sounds scary, your basic flu shot is an intramuscular injection). Intramuscular injections are usually used when you want to bypass the

digestion process and enter the bloodstream as quickly as possible, or when you want to target a site of injury directly.

So, make sure to know which type of injection you'll be using before getting started!

PREPARING FOR INJECTION:

Before you actually do the injection, there are a few basic things you'll need to do to prepare.

List of items you'll need:

- *Alcohol wipes*
- *Needle*
  - *For subcutaneous injections: A box of insulin syringes, preferably 1ml/1cc, with 28 gauge 1/2 inch attached needles (single use)*
  - *For intramuscular injections: A box of 22-25 gauge needles (single use)*
- *Disposable gloves (optional)*
- *Your reconstituted peptide*

Before the injection:

1. *Warm the peptide vial to room temperature before opening. This prevents moisture contamination.*
2. *Weigh out the desired quantity of peptide quickly.*
3. *Reseal the vial tightly and store the remaining peptide back in your refrigerator or freezer.*
4. *Put on your disposable gloves or wash your hands well.*
5. *Use your alcohol wipes to sterilize the area of skin you'll be injecting and let it dry.*
6. *Prepare your syringe: Take the syringe in your dominant hand, pull the cover off with your other hand, and pull the correct*

amount of peptide into your syringe from your vial.

7. *Proceed with administering your peptide.*

OK, so let's get to the part of exactly how to exactly jab yourself with a needle. Fun!

SUBCUTANEOUS INJECTION INSTRUCTIONS

Here's a YouTube tutorial on how to do a subcutaneous injection.

First, choose the site of injection–usually either the thighs, abdomen, upper arm, or buttocks (unless your specific peptide requires a different site).

Pinch one to two inches of skin at the injection site. Generally, you can place the needle straight in at a 90-degree angle if you can pinch more skin, but if you can only pinch an inch of skin you can insert the needle at a 45-degree angle. However, if it's too tough to simultaneously pinch your skin and inject yourself, you can always recruit a helper.

At this point, you'll want to inject the needle completely into the skin, making sure to avoid muscle tissue. Once you completely empty the syringe you can pull the needle out, and you're done!

INTRAMUSCULAR INJECTION INSTRUCTIONS

Here's a YouTube tutorial on how to do an intramuscular injection.

If doing an intramuscular injection, you'll want to find a site with lots of muscle, including your shoulder muscle, thigh muscles, or muscles on the hip.

The instructions for intramuscular are essentially the same: Pinch as much skin as you can at the injection site, insert the need at ideally 90 degrees, administer the peptide solution, and pull the needle out carefully (except for this one you may want to try your very best to think of puppies and rainbows as it'll hurt a tad bit more).

POST-INJECTION TIPS

For both the subcutaneous and intramuscular injections, you'll experience better results and a more complete absorption and administration if you "massage" the general area of injection for about 30-60 seconds to really work the peptide into the tissue.

Oh, and of course, be responsible and make sure to clean up and dispose of your needle appropriately–which ideally means don't just throw it in your trash for your local garbage man to stick himself on. Right after injection, you'll want to clean your needle with an antibiotic wipe and put it in a sharps disposal bin. Long-term, take your bin to a proper disposal facility such as a local dropbox or hazardous waste facility, sign up for a residential pick-up service, or look into an FDA mail-back program.

THE BEST PEPTIDE STACKS FOR YOUR HEALTH GOALS

Now, before I jump headfirst into the peptide stacking deep end, let me give just one more quick disclaimer (isn't this legal stuff fun?!)...

...the dosing and frequency recommendations provided below are simply general guidelines.

Like any therapeutic or medication or supplement, peptide doses will change based on your body weight, size, and personal health status. I recommend you start on the lower end of a peptide dose and frequency to see how you personally respond. Above all, you should follow the instructions from your physician or peptide manufacturer.

THE "RECOVER LIKE WOLVERINE" PEPTIDE STACK

One of my first serious forays into peptides was to heal an annoying, persistent, and quite painful torn upper hamstring by using what I call the "Recover Like Wolverine" stack.

And it worked–with pretty surprising speed, no less.

So if you have frustrating joint pain that won't go away, some kind of muscle tear or sprain, or simply want to enhance your athletic recovery, this peptide stack beats the pants off your typical old-school "R.I.C.E." protocol (Rest, Ice, Compression, and Elevation).

This potent recovery stack incorporates the following peptides: BPC-157, TB-500, Ipamorelin, Tesamorelin, and GHK-Cu.

BPC-157

BPC-157, or "body protection compound 157" is found in trace amounts in

your body's gastric juices, and is thus very helpful for intestinal issues and gut healing. Additionally, BPC-157 also accelerates injury and wound healing via interaction with the nitric oxide system, which initiates the protection of endothelial tissue, increases blood flow, and causes an "angiogenic" (blood vessel building) effect.

This is one of the few peptides that can also be taken orally–either for convenience or for targeted gut healing–so the instructions below include guidelines if you're taking oral tablets.

Dosing Guidelines:

- *Injection: 250-350mcg 2x/day; OR*
- *Injection: 500-700 mcg 1x/day; OR*
- *Injection: 0.15mL of 2000mcg/mL solution every day for a 30-day cycle; OR*
- *Oral: 500mcg capsules for a 30-day cycle*

Administration Route:

- Subcutaneous injection for systemic healing
- Intramuscular injection for targeted healing
- Orally for gut healing or convenience

Again, you can click here for dosing/reconstituting instructions.

TB-500 (THYMOSIN BETA-4)

Also known as "Thymosin beta 4," TB-500 is used to promote wound repair and healing, particularly because it acts on actin and myosin fibers in tendons, ligaments, and muscles–which is also likely why this peptide is used as a popular healing and recovery strategy in the horse-racing industry.

Dosing Guidelines: Please note, there are very few guidelines around dosing TB-500 so it's best to follow your practitioner or manufacturer's suggestions. However, here is what I've used.

- *5-2.5 mg, 2-3x/week; OR*
- *25mL of 3000mcg/mL solution daily for a 20-day cycle*

Administration Route:

- *Subcutaneous or intramuscular injection*

IPAMORELIN

Ipamorelin enhances recovery through activation of human growth hormone (known as a "growth hormone secretagogue"), which is well-known to accelerate the healing process. Unlike using human growth hormone (HGH) directly, however, ipamorelin–when used at appropriate doses–appears to be relatively free of side effects and will not affect or interfere with your body's natural production of GH.

Dosing Guidelines:

- *100-500mcg 1-3x/day; OR*
- *10mL of 2000mcg/mL solution 1x/day, 5 days per week*

Administration Route:

- *Subcutaneous injection*

Timing Tips:

- *For best results, it is recommended to administer Ipamorelin at the same time daily and avoid consuming food and large amounts of liquids at least 1 hour before and after.*

TESAMORELIN

Tesamorelin is like Ipamorelin's cousin; it promotes recovery through the same GH pathways, serving as a "growth hormone stimulating hormone." In other words, it binds to and stimulates growth hormone receptors with similar potency as taking endogenous HGH—again, without the unwanted side effects.

Dosing Guidelines:

- *1mg 1-2x/day for 5 days per week for a 6-8 week cycle; OR*
- *5mL of 1mg/0.6mL solution 1x/day, 6 days per week for a 6-8 week cycle*

Administration Route:

- *Subcutaneous injection*

Timing Tips:

- *Before bed, take it at least 90 minutes after eating. Upon waking, take Tesamorelin ideally before exercise and eating.*

GHK-Cu

GHK-Cu is a naturally occurring copper complex found in human plasma, saliva, and urine.

It has many roles in the body, including promoting recovery. It seems to act as an anti-inflammatory agent that controls oxidative damage post-tissue injury, as well as signaling tissue remodeling and the generation of new, healthy tissue.

While GHK-Cu is best injected subcutaneously for recovery, it can also be used topically/transdermally for other purposes like skin health or hair regrowth–such as the case with Jay Campbell's hair regrowth peptide formula.

Dosing Guidelines:

- 5mg 1x/day for a 5-10 day cycle; OR
- 2mL of 10mg/mL solution 2x/day

Administration Route:

- Subcutaneous injection

Here is a list of resources to learn even more about these specific peptides:

- *How To Use BPC-157: A Complete Dummies Guide To Healing The Body Like Wolverine*.
- *How To Build New Blood Vessels, Regenerate Muscle Tissue Fibers, Increase New Cell Growth & More With Something Called "TB-500"*.
- *The Little-Known Russian Wonder Compound & The Fringe Future Of Anti-Aging Medicine*
- *Demystifying Growth Hormone-Releasing Peptides – Everything You Need To Know About GH, Ipamorelin, Tesamorelin & More*!
- *The Wolverine Healing Stack: How To Use Peptides to Never Go To A Doctor's Office Again*
- *Tesamorelin: The HIV Peptide for Extreme Fat Loss*
- *Ipamorelin: The Ultimate Fat Loss Peptide*?
- *TB-500: A Peptide for Exceptional Healing and Enhanced Immunity*

THE "LEAN AND MEAN" PEPTIDE STACK (MUSCLE GAIN & FAT LOSS)

As I've stated many, many times throughout my career, muscle mass is not only helpful for staying strong and looking good naked ;), it's also essential to maintaining a long and healthy life.

So, if you're interested in getting bigger, stronger, sexier, and faster with age–in addition to lifting heavy things, eating adequate protein, and avoiding inflammatory foods–peptides can be another tool in your toolkit to help you simultaneously build muscle and burn fat.

(P.S.: This stack would work wonders when combined with the exercise, lifestyle, and biohacking tips covered in my article "Sexy Forever: How To Build Functional, Good-Looking Muscle For Life."). I particularly like this one for morning fasted workouts.

This muscle gain/fat loss stack includes the following peptides: IGF-1 LR3, Ipamorelin, CJC 1295 (without DAC), and Tesamorelin.

IGF-1 LR3

There are basically two mechanisms by which you can increase muscle mass: hypertrophy (increase in muscle fiber size) or hyperplasia (increase in muscle fiber number).

IGF-1 LR3, which is essentially the long-acting version of IGF-1, a potent anabolic peptide, works to increase muscle by stimulating hyperplasia.

Dosing Guidelines:

- *50-150mcg 1x/day for a 4-week cycle; OR*
- *4mL of 620mcg/mL solution 1x/day*

Administration Route:

- *Subcutaneous injection*

IPAMORELIN

Because it increases growth hormone (GH) secretion, Ipamorelin is also a potent muscle-building peptide. GH has major effects on skeletal muscle and function, which is why it's such a widely used–and abused–sports performance drug.

Dosing Guidelines:

- *100-500mcg 1-3x/day for a 12-week cycle; OR*
- *10mL of 2000mcg/mL solution 1x/day, 5 days per week*

Administration Route:

- *Subcutaneous injection*

Timing Tips:

- *For muscle gain/fat loss, I've personally seen the best results using Ipamorelin before bedtime on an empty stomach.*

CJC 1295 without DAC (Mod GRF 1-29)

CJC 1295 functions as a growth hormone-releasing hormone (GHRH) and increases IGF-1, which helps promote fat loss and increased muscle protein synthesis.

For this stack, you'll want to use CJC without DAC (drug affinity complex), which is the shorter-acting version that more closely mimics your body's natural growth hormone pulses.

Dosing Guidelines:

- *100mcg 1-3x/day for a 12-week cycle; OR*
- *10mL of 2000mcg/ml solution 1x/day, 5 nights per week*

Administration Route:

- *Subcutaneous injection*

Timing Tips:

- *Take CJC 1295 before bedtime on an empty stomach.*

TESAMORELIN

Tesamorelin's mechanism of action is very similar to that of Ipamorelin; it works on growth hormone pathways, stimulates IGF-1, which triggers the production of muscle protein. It's also been shown in large clinical trials to decrease visceral fat and reduce levels of triglyceride in the blood.

Dosing Guidelines:

- *1mg 1-2x/day for 5 days per week; OR*
- *5mL of 1mg/0.6mL solution 1x/day, 6 days per week*

Administration Route:

- *Subcutaneous injection*

Timing Tips:

- *For muscle gain/fat loss, I've experienced the best results taking Tesamorelin in the morning before my fasted workout. But you can also take it before bed, at least 90 minutes after eating.*

Resources to learn more about these specific peptides:

- *How To Use Growth Hormone Stacks For A Better Body: Everything You Need To Know About IGF-LR3, GHRP, and GHRH Peptide Stacks.*
- *Demystifying Growth Hormone-Releasing Peptides – Everything You Need To Know About GH, Ipamorelin, Tesamorelin & More!*
- *The Peptides Podcast: Everything You Need To Know About Anti-Aging, Muscle Gain, Fat Loss & Recovery Peptides.*
- *Tesamorelin: The HIV Peptide for Extreme Fat Loss*
- *CJC-1295: The Growth Hormone Enhancing Peptide*
- *Ipamorelin: The Ultimate Fat Loss Peptide?*

THE "NEVER GET SICK" IMMUNITY PEPTIDE STACK

You may be, like me, pulling out all the stops to bolster your immune systems these days.

Peptides can be incredibly effective for targeting the multi-faceted immune system–which includes many organs, cells, and signaling molecules–providing you with well-rounded support to combat whatever comes your way.

(P.S.: This stack would be excellent for supporting your immune system

when combined with the other suggestions in my article, Three Little Known, Unconventional Antiviral Approaches For Boosting Your Immune System.)

This immune-boosting stack includes the following peptides: TB-500, Thymalin, and LL-37.

TB-500 (THYMOSIN BETA-4)

You don't hear about it much, but the humble thymus gland is critical in developing your immune system. Thymosin beta-4, a peptide produced by this gland, plays a large role in regulating immunity and producing white blood cells, lymphocytes, T cells, B cells, and antibodies.

Dosing Guidelines: There are very few guidelines around dosing TB-500 so it's best to follow your practitioner or manufacturer's suggestions. However, here is what I've used.

- *750 mcg 1x/day, cycle for 3 months on/3 months off; OR*
- *3mg every other day, cycle for 3 months on/3 months off; OR*
- *25mL of 3000mcg/mL solution daily for a 20-day cycle*

Administration Route:

- *Subcutaneous injection*

THYMALIN

Thymalin is yet another immune-boosting peptide produced by the thymus gland. It has immunomodulatory properties and plays a role in Th1 cytokine production (proinflammatory) and T cell (cell-mediated immunity) production and function, both of which are vital for antiviral defense.

Dosing Guidelines:

- *5-10mg 1x/day for 3-10 days, repeat every 6-12 months*

Administration Route:

- *Subcutaneous or intramuscular injection*

LL-37

Research on this so-called "antimicrobial peptide" indicates that it also has antibiotic, antifungal, and antiviral properties. Thus, it may be highly effective for autoimmune issues and gut conditions, including fungal and bacterial overgrowth.

Warning: If you have SIBO, the die-off and Jarisch-Herxheimer reaction from LL-37 can be uncomfortable and may involve flu-like symptoms and diarrhea for up to two weeks. After that, however, many people experience the complete resolution of SIBO symptoms and elimination of bloating and gas in response to carbohydrate intake.

Dosing Guidelines:

- *100mcg 2x/day for 4-6 weeks*

Administration Route:

- *Subcutaneous injection*

Resources to learn more about these specific peptides:

- *Peptides Unveiled: The Best Peptide Stacks For Anti-Aging, Growth Hormone, Deep Sleep, Hair Loss, Enhanced Cognition & Much More!*
- *How To Build New Blood Vessels, Regenerate Muscle Tissue Fibers, Increase New Cell Growth & More With Something Called "TB-500".*
- *Thymalin: The Immunity-Regulating Peptide*
- *TB-500: A Peptide for Exceptional Healing and Enhanced Immunity*
- *How to Use Peptides to Boost Immunity, Heal, Burn Fat, Build*

Muscle, Increase IQ & Slow Aging

THE "BENJAMIN BUTTON" ANTI-AGING & LONGEVITY PEPTIDE STACK

One of my personal favorite ways to stack peptides is to "slow the aging process" and promote longevity–basically turning me into a real-life Benjamin Button.

All joking aside, there's seriously compelling research associated with peptides and aging. One theory, postulated by Professor Vladimir Khavinson who is perhaps the most distinguished medical gerontology researcher in Russia, is that many of the woes of aging are due to the slow-bleed, continuous breakdown of proteins (remember: proteins are made of peptide chains) in tissues and organs, which leads to their eventual degradation and full-body aging.

However, when you replenish your peptide stores, they're able to re-stimulate protein synthesis in tissues. This means that instead of experiencing protein degradation and organ breakdown with age, peptides enable you to actually repair as you get older. Pretty cool, right?

This anti-aging stack includes the following peptides: Epithalon, Thymalin, GHK-Cu, MOTS-C, Humanin, and FOXO4-DRI.

EPITHALON

Epithalon (also confusingly called Epitalon, no "h") is commonly referred to as the "primary anti-aging peptide" because it is one of the very few synthesized compounds that has been shown to directly activate the telomerase enzyme in humans. Telomerase renews and elongates telomeres, the caps on the ends of chromosomes that protect DNA from damage and cancer-causing errors. By activating telomerase, Epithalon can reduce the shortening of telomeres, theoretically helping you "age backward."

I personally use the "Khavinson Protocol" for dosing Epithalon (yes the very same aforementioned professor), which uses the exact dosage from a fifteen-year longevity study in humans that produced impressive results for controlling telomere shortening.

Dosing Guidelines:

- *Khavinson Protocol: 5-10mg 3x/week for 3 weeks, cycle 1x/year; OR*
- *1mL of 3000mcg/mL solution, 1x/day*

Administration Route:

- *Subcutaneous injection*

Timing Tips:

- *Epithalon is best administered in the morning.*

THYMALIN

Thymalin is a peptide produced by the thymus and pineal gland. It has a positive effect on almost every system in the body, including the immune, cardiovascular, endocrine, and nervous systems.

This peptide is also believed to be able to prolong human life, which is why it's an important part of this longevity stack. A 2003 study found that 2-3 years of treatment with Thymalin was shown to reduce all-cause mortality for elderly volunteers by a factor of two!

Dosing Guidelines:

- *5-10mg 1x/day for 10 days, cycle 1-2x/year*

Administration Route:

- *Subcutaneous or intramuscular injection*

GHK-Cu

GHK-Cu helps to keep you young and supple in a number of ways, including promoting wound healing and tissue regeneration (skin, hair follicles, stomach, bone tissue), increasing collagen and glycosaminoglycans, promoting blood vessel growth, possessing antioxidant and anti-inflammatory effects, and much more.

This peptide can be used topically/transdermally–such as in skincare or hair regrowth formulas–or injected for systemic effects.

Dosing Guidelines:

- *Injection: 0.2mL of 100mg/mL, 1x/day*
- *Transdermal: 1mL applied 1x/day at night*

Administration Route:

- *Subcutaneous injection for systemic effects*
- *Transdermal application for topical effects (hair, skin)*

MOTS-c

Anti-aging researchers are now aware of the potent role metabolic health and mitochondria play in longevity. MOTS-c is one peptide that powerfully affects both of these factors, serving as a potent metabolic regulator that can enhance autophagy, mitochondrial function, and improve insulin sensitivity.

It's also been referred to as "exercise in a bottle" because it can mimic some of the effects of exercise by activating the AMP-K pathway.

Dosing Guidelines:

- *10mg 1x/week for 10 weeks, 1x/year*

Administration Route:

- *Subcutaneous injection*

Timing Tips:

- *For added mitochondrial benefit, administer MOTS-c right before endurance exercise, ideally in the morning.*

HUMANIN

Humanin is another mitochondrial peptide and has been shown to produce strong cytoprotective actions against a variety of stressors and age-related diseases, including neurological disorders, mitochondrial dysfunction, oxidative stress, hypoxic damage to the brain, and oxidized LDL cholesterol.

Interestingly, children of centenarians (individuals that live to be over 100 years old) have unusually high levels of Humanin. A potential Fountain of Youth, perhaps?

Dosing Guidelines: There are very few guidelines around dosing Humanin so it's best to follow your practitioner or manufacturer's suggestions. However, here is the range I've seen recommended (I would not suggest exceeding 0.04mg/kg body weight per day).

- *1-1.0mg 1-2x/day for a 2-8 week cycle, 1x/year*

Administration Route:

- *Subcutaneous injection*

FOXO4-DRI

FOXO4 DRI (D-retro inversion isoform) is a cell-penetrating peptide that's been shown in mice to selectively cause destruction, or induce apoptosis, of senescent cells. Senescent cells stop multiplying but they don't die off when they should, which can lead to more inflammation and accelerated aging. In fact, cellular senescence has been tied to a number of age-related conditions like cancer, diabetes, osteoporosis, Alzheimer's, and dementia. So by selectively targeting these senescent cells, FOXO4 can help reduce the risk of diseases related to aging. Pretty cool!

Dosing Guidelines:

- *3mg every other day for 6 days, repeat 1-3x/year*

Administration Route:

- *Subcutaneous injection*

Resources to learn more about these specific peptides:

- *The Little-Known Russian Wonder Compound & The Fringe Future Of Anti-Aging Medicine*
- *Peptides Unveiled: The Best Peptide Stacks For Anti-Aging, Growth Hormone, Deep Sleep, Hair Loss, Enhanced Cognition & Much More!*
- *Thymalin: The Immunity-Regulating Peptide*
- *GHK-Cu: The Multi-Functional Health Peptide (Clear Skin, Hair Growth, Injury Healing, & More)*
- *Epitalon: The "Life Extension" Peptide*
- *MOTS-C: The "Exercise Replacement" Peptide*
- *Humanin: The "Mitochondria Health" Peptide*

FREQUENTLY ASKED QUESTIONS ABOUT PEPTIDES

ANSWERS TO THE TOP 8 MOST COMMON QUESTIONS ABOUT PEPTIDES

You may be wondering...why the top eight?

Why not a top five or top ten list?

Well, you may know by now that I like precision. ;) When I sat down and zeroed in on the questions that come in over and over again in regards to peptides, the questions below were the frequency "winners." Reading through the questions and answers below will take your peptides knowledge to the next level while ensuring that you have a thorough understanding of the important safety considerations—because as I've been careful to note throughout this article series, peptides are not a biohack you want to add to your arsenal without caution.

PEPTIDE QUESTION #1: ARE PEPTIDES SAFE?

The short answer: Yes, peptides are generally considered to be universally safe.

The long answer: Yes, peptides are safe as long as you are getting your peptides from a reputable source, ideally working with a qualified physician, using the correct dose, and administering them properly.

The very long answer: Peptides are still considered to be "experimental" and have not been approved for use in humans. Therefore, long-term safety data and clinical trials on peptides are basically non-existent. While many doctors consider them to be extremely safe, proceed at your own risk.

Confused yet?

Here's what you should know. While peptides have recently emerged as a "fringe-y" alternative healthy therapy, peptides like morphine, penicillin, and insulin have been used safely for over a century in conventional medicine. What has changed for the average consumer, however, is the commercialization of peptides, which has made them more readily available to the general public.

This commercialization is where things can get a little dicey. The truth is, the FDA hasn't approved peptides and therefore doesn't regulate them, so it's a bit of a Wild West when it comes to making sure you're getting what you pay for. Sourcing is one factor to consider with safety, which I talk more about later in this article.

In general, for just about any peptide, what you want to avoid is taking too much. My biggest message to you: Don't just administer these things willy-nilly. Work with a professional to find the right dosage for you, always start small, and adjust accordingly.

To learn more, check out: *The Dark Side Of Peptides: Why You Need To Proceed With Caution When Using These Powerful But Potentially Carcinogenic Molecules*.

PEPTIDE QUESTION #2: ARE THERE SIDE EFFECTS?

As I mentioned, despite being naturally occurring compounds in the body, long-term safety studies in humans on peptides have not yet been published.

However, based on short-term studies, side effects do seem to be extremely rare and are usually due to incorrect use of peptides or an excessive dose.

Common side effects might include:

- *Dry mouth*
- *Increased hunger*
- *Tingling or numbness*
- *Increased water retention*

- *Itchiness or mild pain at the injection site*

So once again, I must emphasize that although I've personally used dozens of peptides myself with extremely satisfactory results and know many others that have also used them safely, proceed with caution and work with a professional. If you get any of these side effects, you probably need to adjust your protocol or stop altogether.

PEPTIDE QUESTION #3: ARE PEPTIDES LEGAL?

Technically, peptides are not "illegal."

Now, this is a bit of a grey area. Here's why: peptides, though shown to be safe and effective, are not currently approved by the FDA. This doesn't mean they're illegal for you to consume, but rather that they cannot be legally sold or advertised as "for human consumption."

However, many websites still sell "experimental" peptides labeled as "research chemicals," "for research use only," or "not for human use." If you're getting them from a reputable source, know that despite the label, I and many others have used peptides without any trouble.

It's probably worth noting that the FDA did a major crack-down on peptides last year, meaning that a lot of the major suppliers of peptides have recently had to completely pause production indefinitely after receiving legal notices regarding the compounding of products that have not been approved by the FDA. The FDA also supported a legal decision that changed the definition of what is considered a biologic drug. Because of this, many FDA-approved products that compounding pharmacies have been making for years are now rendered unable to be legally compounded.

And, sadly, as a result of these changes, it's making it a lot harder to get your hands on peptides. But please remember that even though the FDA has cracked down on laws and regulations regarding peptides, they are still not "illegal," per se.

So in general, yes, peptides are legal for you to take. The story might be different, however, if you're a competitive athlete. To learn more, check out: *Are Peptides Legal? What The FDA's New Bulk Drug Substance Crackdown Means For Peptides (Plus 9 Promising Little-Known Peptides*

To Watch Out For In The Future).

PEPTIDE QUESTION #4: CAN ATHLETES TAKE PEPTIDES?

It depends on the level at which you compete, and the peptide.

If you're a competitive athlete in a sport sanctioned by NCAA, WADA, USADA, etc., certain peptides are banned and, therefore, you should not take them.

As far as I'm aware, the following peptides are on most banned substances lists:

- *Growth hormone fragments (e.g. AOD-9604, hGH 176-191)*
- *Growth hormone-releasing hormone (GHRH) and its analogs (e.g. CJC-1293, CJC-1295, sermorelin, and tesamorelin)*
- *Growth hormone secretagogues (GHS) (e.g. lenomorelin/ghrelin) and their mimetics (e.g. anamorelin, ipamorelin, macimorelin, and tabimorelin)*
- *GH-releasing peptides (GHRPs) (e.g. alexamorelin, GHRP-1, GHRP-2, GHRP-3, GHRP-4, GHRP-5, GHRP-6, and examorelin)*
- *BHP-157, as of January 1, 2022*

This is definitely not a complete list, though, and regulations may have changed by the time you're reading this. Your best bet is to check the GlobalDro.com website before ingesting or injecting any substance unless you're 100% certain that it's legal for your sport.

PEPTIDE QUESTION #5: WHERE SHOULD I GET PEPTIDES?

I covered this topic in-depth in Part 1 of this series, however, since it's such a commonly asked question, I'll briefly address it here as well.

Sourcing is incredibly, incredibly important. Not only for the safety of your peptides, but also to make sure you're actually getting what you paid for with your hard-earned dough, and not just injecting some useless baking soda + water concoction.

You should be aware of the issue that there are definitely websites out there that sell suspect, tainted, or even useless versions of these powerful molecules. In fact, according to a *New York Times* article from 2018, *"80 percent of the peptides advertised on the web are adulterated or outright fakes."*

With that being said, my top recommendation for sourcing your peptides would be through a legitimate health care provider that can work with you to develop an appropriate protocol for your needs. You can either visit the International Peptide Society to find a physician near you, or you can seek out working with any number of clinics/practitioners I've interviewed and can personally vouch for, such as:

- *Matt Cook, BioReset Medical (my trusted source for the highest-quality peptides)*
- *Jean-François Tremblay*
- *Craig Koniver*
- *Matt Dawson*

However, if for whatever reason working with a physician is not an option, I have also managed to find some reputable online sources where you can buy quality peptides yourself, including:

- *CanLab Research (The products they offer are for lab research use only by law and available for research and dev purposes only.)*
- *Peptide Sciences (The products they offer are for lab research use only by law and available for research and dev purposes only.)*
- *Tailor Made Compounding (They don't actually offer peptides on their site—you need a consultation first.)*

PEPTIDE QUESTION #6: DO PEPTIDES NEED TO BE CYCLED?

Whether peptides need to be cycled depends on the peptide.

There are no clinical studies that say how long and at what frequency you can safely take every single peptide. So whether or not you need to cycle (or take a break every few weeks to months) comes down to a) what pathways that peptide works on, and b) the half-life of the peptide.

Peptides that act on the growth hormone pathway (e.g. are anabolic in nature) typically have longer half-lives and should be cycled, usually around every 4-6 weeks. This includes, but is not limited to, peptides like Tesamorelin, IGF-1, and Epitalon.

Other peptides that have a shorter half-life may not need to be cycled or can be taken daily for longer periods, like Ipamorelin (half-life of 2 hours), BPC-157 (half-life of 6 hours), or TB-500 (half-life of 12 hours), and many others. Typically you can take these for several months at a time.

Since this can obviously get a little confusing, I'd suggest following the cycling instructions from your physician or manufacturer above all else.

To learn more, check out: *The Peptides Podcast: Everything You Need To Know About Anti-Aging, Muscle Gain, Fat Loss & Recovery Peptides*.

PEPTIDE QUESTION #7: WHAT'S BETTER: ORAL, TRANSDERMAL, OR INJECTABLE?

This answer also depends on the peptide.

Some peptides may work systemically, which means they have the same effect in the body no matter how or where it is administered. However, most evidence suggests that injectable forms of peptides are more effective than non-injectable (I suppose there's a reason we inject medicines like insulin, morphine, and penicillin instead of taking them in a pill).

Here's why. Due to the enzyme degradation and large molecular size, many peptides don't penetrate well through the intestinal mucosa and therefore may not make it past digestion. In other words, when you take some peptides orally, they don't make it to the bloodstream where they can then travel to other tissues or organs.

Two exceptions, however, are:

1. *If you are taking something like oral BPC-157 for its gut healing effects, in which case oral would be a good option since your goal is to directly target the intestinal mucosa;*

2. *In the case of a surface issue like skincare or haircare, in which case you'd want to apply a transdermal/topical to directly target skin cells or hair follicles.*

PEPTIDE QUESTION #8: CAN YOU COMBINE MORE THAN ONE PEPTIDE INTO A SINGLE INJECTION?

As you can imagine, peptide injections can be quite a process, especially if you're taking a stack of several at one time. Many people wonder if you can combine multiple peptides into a single syringe to save time.

The answer is: some you can, some you can't. Not very helpful, I know...

Since I don't know exactly what peptides you're taking together, your best bet would be to talk to your physician, peptide source, or compounding pharmacy to find out whether or not you can combine your peptides. If you're still not sure, stay on the safe side and keep them separate (even though it sure can be a real pain).

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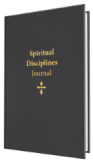

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