

TESAMORELIN

Growth hormone peptides (GHPs) are a group of compounds designed to stimulate the release of growth hormone (GH) from the pituitary gland. They work by mimicking the body's natural growth hormone-releasing hormones (GHRH) or by acting as growth hormone secretagogues (GHS), signaling the body to increase its own GH production. Increased growth hormone levels can have a range of effects, including muscle growth, fat loss, improved recovery, and anti-aging benefits.

GENERAL GROWTH HORMONE PEPTIDE INFORMATION

Common Types of Growth Hormone Peptides

- 1. Growth Hormone-Releasing Hormones (GHRH):** These peptides stimulate GH release by acting directly on the pituitary. Examples include:
 - Sermorelin
 - CJC-1295 (with or without DAC)
 - Tesamorelin
- 2. Growth Hormone Secretagogues (GHS):** These act on the ghrelin receptors, promoting GH release indirectly. Examples include:
 - GHRP-6
 - GHRP-2
 - Ipamorelin
 - Hexarelin

Potential Benefits Related to Increasing Growth Hormone Production

Increase collagen production

- Improved skin health
 - Collagen provides structural support to the skin. Increased production can lead to enhanced skin elasticity and reduced appearance of fine lines and wrinkles.
 - Collagen helps retain moisture, contributing to a more hydrated and youthful skin appearance.
 - Enhanced collagen synthesis can improve the skin's ability to repair itself after injuries or surgeries.
- Joint, Bone, and Connective Tissue Support

- Collagen is a primary component of cartilage. Increased production can strengthen joint cartilage, potentially reducing symptoms of osteoarthritis.
- Stronger collagen fibers can improve the tensile strength of tendons and ligaments, reducing the risk of injuries.
- Collagen forms the organic matrix of bones. Enhanced production can contribute to increased bone mineral density and overall bone strength.
- Increased collagen can accelerate the healing process of bone fractures.
- **Muscle Mass and Strength**
 - Collagen supports muscle tissues, and increased production can enhance muscle integrity and function.
 - Improved collagen synthesis may reduce muscle soreness and improve recovery times after exercise.
- **Cardiovascular Benefits**
 - Collagen is essential for the structural integrity of blood vessels. Increased collagen can strengthen vessel walls, potentially reducing the risk of aneurysms and vascular injuries.

Immune Function

- GH promotes the regeneration and maintenance of the thymus gland, which is essential for the development and maturation of T-lymphocytes (T-cells). This is particularly important as the thymus naturally atrophies with age. By stimulating thymic activity, GH peptides can increase the output of naive T-cells, strengthening adaptive immunity.
- GH influences the production of cytokines—signaling proteins that regulate immunity and inflammation. It can modulate the balance between pro-inflammatory and anti-inflammatory cytokines. This modulation helps in regulating immune responses, potentially enhancing defense mechanisms against pathogens while preventing excessive inflammation.
- Increased immunoglobulin levels improve the body's ability to neutralize and eliminate antigens.
- Enhance the cytotoxic activity of Natural Killer (NK) cells, which are crucial for targeting virus-infected and tumor cells.
- Can stimulate the activity of macrophages and neutrophils, key cells in the innate immune system responsible for early defense against infections.

Sleep

- Increased GH levels may promote deeper stages of sleep, potentially leading to more restorative sleep experiences. Some users report fewer awakenings during the night and more consistent sleep patterns.

Cognition

Growth hormone peptides, such as growth hormone-releasing hormone (GHRH) analogs and growth hormone secretagogues, stimulate the secretion of human growth hormone (HGH) from the pituitary gland. HGH plays a

significant role not only in physical growth and metabolism but also in cognitive functions. The potential effects of growth hormone peptides on cognition include:

- **Enhanced Neurogenesis:** HGH can promote the growth of new neurons and support neuronal survival, particularly in the hippocampus—a brain region critical for learning and memory. This may lead to improvements in cognitive abilities such as memory consolidation and recall.
- **Improved Synaptic Plasticity:** Growth hormone influences synaptic plasticity, the ability of synapses to strengthen or weaken over time. Enhanced synaptic plasticity facilitates better communication between neurons, which is essential for learning and memory formation.
- **Neuroprotective Effects:** HGH has been shown to exert neuroprotective actions by reducing neuronal apoptosis (programmed cell death) and oxidative stress. This may help preserve cognitive function by protecting brain cells from damage.
- **Modulation of Neurotransmitters:** Growth hormone peptides can affect the levels of neurotransmitters like serotonin, dopamine, and gamma-aminobutyric acid (GABA), which are involved in mood regulation, attention, and anxiety. This modulation may lead to improved focus, mood stability, and reduced anxiety levels.
- **Enhanced Cerebral Blood Flow:** HGH may increase cerebral blood flow, ensuring that the brain receives adequate oxygen and nutrients. Improved blood flow can enhance cognitive performance by supporting neuronal metabolism.
- **Cognitive Function in GH Deficiency:** In individuals with growth hormone deficiency, HGH supplementation has been associated with improvements in cognitive functions such as attention, memory, and executive functions. This suggests that normal HGH levels are important for optimal cognitive performance.
- **Potential Benefits in Aging:** Some studies suggest that HGH may counteract age-related cognitive decline by promoting neuronal health and function. However, more research is needed to fully understand its efficacy and safety in this context.

Considerations and Limitations

- **Individual Variability:** Cognitive responses to growth hormone peptides can vary based on factors like age, baseline HGH levels, and overall health status.
- **Insulin decreases production of growth hormone.** Eating increases insulin production, so growth hormone peptides should be taken at least 1 hour after eating.
- **Your body produces the most growth hormone during sleep,** so it is generally given at bedtime. However, some users report that it negatively affects their sleep. If this occurs, administer in the morning.
- **Clinical Evidence:** While animal studies and some human research indicate potential cognitive benefits, comprehensive clinical trials in humans are limited. The long-term effects and safety profiles require further investigation.

- **Desensitization:** Prolonged and continuous use of peptides can lead to receptor desensitization, making the peptide less effective over time. To potentially prevent this, it's recommended to take breaks in usage. For instance, you might use the peptide from Monday to Friday, taking a break over the weekend. Alternatively, you could cycle the usage by taking the peptide daily for six weeks, followed by a six-week break.
- Because growth hormone peptides increase natural production of growth hormone, they can be less effective in older adults due to decreased functioning of pituitary gland.

Peptide	Sermorelin	Ipamorelin	CJC-1295 w/DAC	Tesamorelin	Hexarelin
Receptor Type	GHRH	GHS-R, Ghrelin	GHRH	GHRH	GHS-R, Ghrelin
Advantages	- No GH spikes - Improves deep sleep - ↓ scarring after heart attack	↓ arrhythmias after heart attack	- Prolonged GH release - ↓ injection frequency	↓ visceral fat and triglycerides	↓ scarring after heart attack
Long/Short Acting	Short (1/2-life 11-12min)	Long (1/2-life 2hrs)	Very Long (1/2-life 6-8 days)	Medium (1/2-life 26-38min)	Long (1/2-life 55-70min)
Time to Peak	Peak – 5-20 min	Peak – 5-20 min	Peak – 30-60min	Peak – 15-30min	Peak – 15-30min
↑Cortisol ↑Prolactin	No	No	No	No	Yes
↑IGF-1	↑	↑↑	↑↑↑↑	↑↑↑	↑↑↑↑
Muscle Growth	+	++	+++++	+++	++++
Fat Burning	+	++	++++	+++++	+++
Healing/Recovery	+	++	+++++	+++	++++
↑Collagen Production	↑	↑↑	↑↑↑↑	↑↑↑↑	↑↑↑
Joint Pain/Water Retention	+	++	++++	+++	+++++

Tesamorelin

Overview

Tesamorelin is a synthetic peptide similar to Growth Hormone Releasing Hormone (GHRH). It is designed to stimulate the pituitary gland to produce and release endogenous growth hormone (GH), which in turn increases levels of insulin-like growth factor 1 (IGF-1) in the body. Because it encourages the body's own growth hormone secretion, it potentially minimizes side effects.

Potential Benefits

All of the benefits of increasing growth hormone mentioned above.

Muscle

- Studies have reported that tesamorelin treatment leads to an increase in lean body mass, which includes muscle tissue.
- The anabolic effects of increased GH and IGF-1 may translate into improved muscle strength.
- Tesamorelin may shorten recovery periods between workouts or after injuries by promoting muscle repair. Enhanced protein synthesis and repair mechanisms can lead to less delayed onset muscle soreness (DOMS).
- As GH and IGF-1 levels decline with age, tesamorelin may help counteract sarcopenia, the age-related loss of muscle mass and strength.

Cognitive Function

- Elevated IGF-1 levels have been associated with improved learning and memory in both animal models and human studies.
- Some studies suggest potential benefits in cognitive performance
- Improvement in the ability to recall words and images, which is often impaired in aging and cognitive disorders.
- Enhanced ability to focus, plan, and execute tasks more efficiently.
- Promotion of neuronal health and resistance to apoptosis (programmed cell death).
- Strengthening of synaptic connections, facilitating better communication between neurons.
- GH and IGF-1 may help reduce the accumulation of beta-amyloid plaques in the brain, a hallmark of Alzheimer's disease, potentially slowing disease progression.

Cardiovascular Benefits

- Some studies report modest improvements in total cholesterol and non-HDL cholesterol levels after tesamorelin treatment.
- Proven to reduce visceral adipose (organ fat) tissue which may decrease cardiovascular risk factors.
- Helps in redistributing fat and increasing lean body mass.

- May reduce CRP levels, an inflammatory marker associated with cardiovascular risk.
- Decreases in pro-inflammatory cytokines can contribute to reduced vascular inflammation and atherogenesis.
- Some research indicates that tesamorelin may slow the progression of cIMT (Carotid Intima-Media Thickness), hinting at protective effects against atherosclerosis.
- While tesamorelin primarily affects fat distribution, reductions in visceral fat can indirectly improve insulin sensitivity over time which is a known cardiovascular risk factor.

Sleep

- By mimicking GHRH, tesamorelin may promote the occurrence of slow-wave sleep (SWS), leading to more restorative sleep.
- Tesamorelin may help normalize sleep architecture disrupted by conditions like aging or hormonal imbalances.
- While primarily affecting sleep stages, tesamorelin might also have minor effects on circadian rhythms through hormonal regulation.

Reproduction

Tesamorelin may have a stronger influence on fertility compared to other growth hormone peptides due to its targeted effects on fat reduction, particularly visceral adiposity, and its ability to optimize insulin-like growth factor 1 (IGF-1) levels. Here's why:

- **Reduction of Visceral Fat:** Excess visceral fat in both men and women is linked to hormonal imbalances that can negatively affect fertility:
 - In women, high visceral fat is associated with conditions like polycystic ovary syndrome (PCOS), which can disrupt ovulation.
 - In men, visceral fat can suppress testosterone production and impair sperm quality. Tesamorelin's ability to reduce visceral fat can improve these hormonal and reproductive parameters.
- **Optimization of IGF-1 Levels:**
 - IGF-1 plays a critical role in follicular development and ovulation in women, as well as sperm production in men.
 - Tesamorelin increases endogenous IGF-1 levels, potentially benefiting fertility more directly than other growth hormone-releasing peptides.
- **Metabolic Benefits:**
 - Tesamorelin improves insulin sensitivity and reduces inflammation, which are important for maintaining healthy ovulatory cycles in women and sperm production in men.
- **Localized and Sustained Effects:**
 - Tesamorelin is a growth hormone-releasing hormone (GHRH) analog, which targets the pituitary gland more directly to stimulate natural GH secretion. This action is less likely to cause desensitization and may maintain a more physiological balance, positively influencing reproductive health.

Potential Side Effects

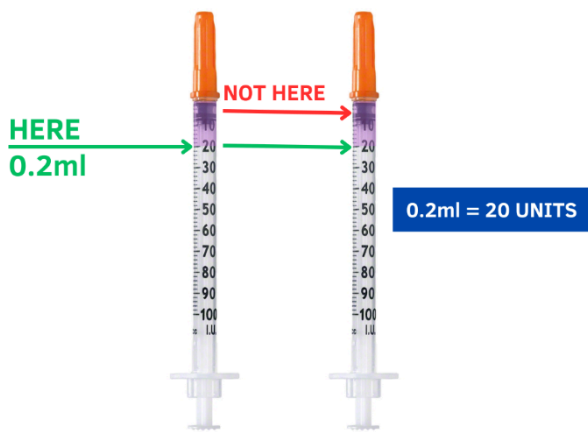
- Joint pain
 - Injection site reactions
 - Increased blood sugar levels.
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Dosage Guidelines

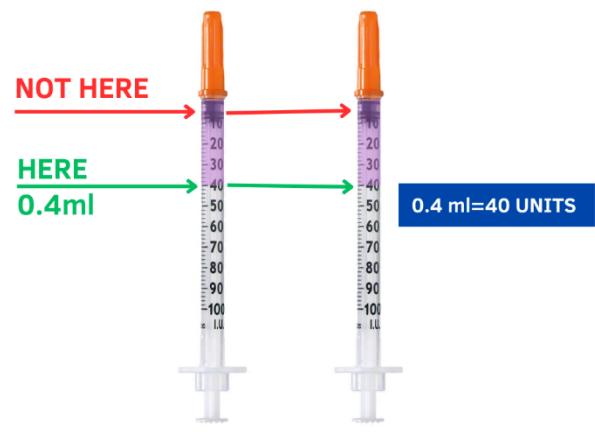
Tesamorelin 5mg/ml

For Muscle Growth: 1-2mg (0.2ml-0.4ml or 20-40 units) SQ every AM, Mon-Fri, before workout in a fasted state.

0.2ml - 20 units (Not 2 units)



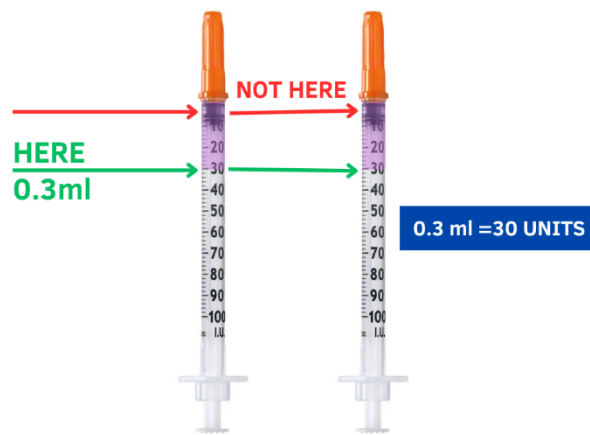
0.4ml - 40 units (Not 4 UNITS)



Tesamorelin/Ipamorelin Blend 3mg/1.5mg/ml

For Muscle Growth: 0.3ml or 30 units SQ every AM, Mon-Fri, before workout in a fasted state.

0.3ml - 30 units (Not 3 UNITS)



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Cost

Currently only available as a research peptide.

Tesamorelin 10mg vial (5mg/ml): \$158.50 (Includes shipping). **One vial = 5-10 doses**

Tesamorelin/Ipamorelin Blend 6mg/3mg Vial: \$168.50 (Includes shipping). **One vial = 6 doses**

Reconstitution Instructions

IMPORTANT:

- Follow the instructions below regarding the amount of bacteriostatic water to use when reconstituting the peptide. **DO NOT** follow the instructions that come with the peptide.
- Do **NOT** throw away the vial of bacteriostatic water!!! It is a multiuse vial and can be used for your next order!

Tesamorelin 10mg Vial (5mg/ml)

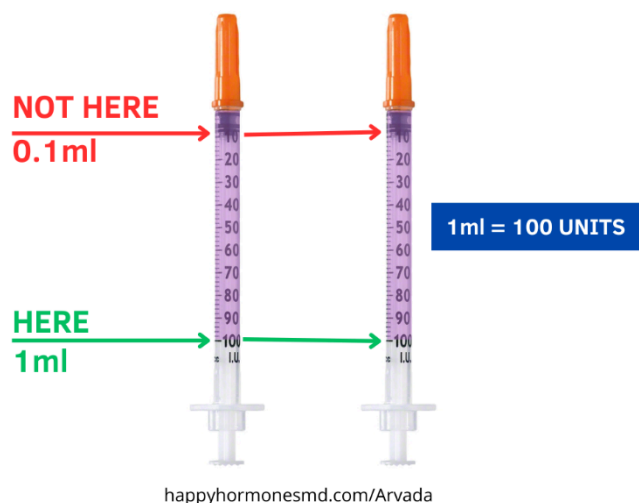
- **10mg Vial:** Inject **2 ml of bacteriostatic water** into the vial of powder (2ml = 200 units). You will need to inject 2 full 1ml syringes of water.

Tesamorelin/Ipamorelin 6mg/3mg Vial (3mg/1.5mg/ml)

- **6mg/3mg Vial:** Inject **2 ml of bacteriostatic water** into the vial of powder (2ml = 200 units). You will need to inject 2 full 1ml syringes of water.

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1 ml - 100 units (Not 10 UNITS)



See the **document** titled “*Reconstituting Medications in Powder Form*” in the Education Folder in the patient portal.

See the following **Instructional videos** in the Education Folder in the patient portal:

- “*Reconstituting Powdered Medications*”
- “*Injection Video – Introduction*”
- “*Injection Video – Drawing Up the Medication*”
- “*Injection Video – Administering the Medication*”

Storage and Stability

- Vials are shipped as **lyophilized powder**, requiring no refrigeration during shipping.
- In Lyophilized Form:
 - Stable for up to 3 years in the freezer and 2 years in the refrigerator.
 - Protect from light.
- Once Reconstituted:
 - Stable for 6 weeks.
 - Must be refrigerated and kept away from light.
 - Avoid placing vials in the refrigerator door to prevent degradation from frequent temperature changes.

Important Disclosures

- These statements have not been evaluated by the US Food and Drug Administration (FDA).
 - Not intended to diagnose, treat, cure, or prevent any disease.
 - Compounded drugs and research peptides are not FDA-approved but are produced under strict quality control measures.
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Quality Assurance

- All peptides are subjected to third-party testing with publicly available Certificates of Analysis (COA).
 - Testing includes:
 - RP-HPLC (Reversed-Phase High-Performance Liquid Chromatography)
 - Mass Spectrometry (MS)
 - Sterility Testing
 - Additional tests meeting or exceeding U.S. Pharmacopeia (USP) and USP-National Formulary (NF) regulations.
 - The manufacturer ensures quality, safety, and efficacy, complying with regulatory standards.
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