

## Growth Hormone - The Master Hormone of Repair & Regeneration

Your Weekly Newsletter

by Dr. Nick Sieveking

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What Comes to Mind When You Hear “Growth Hormone Injections”?  
That’s Right!



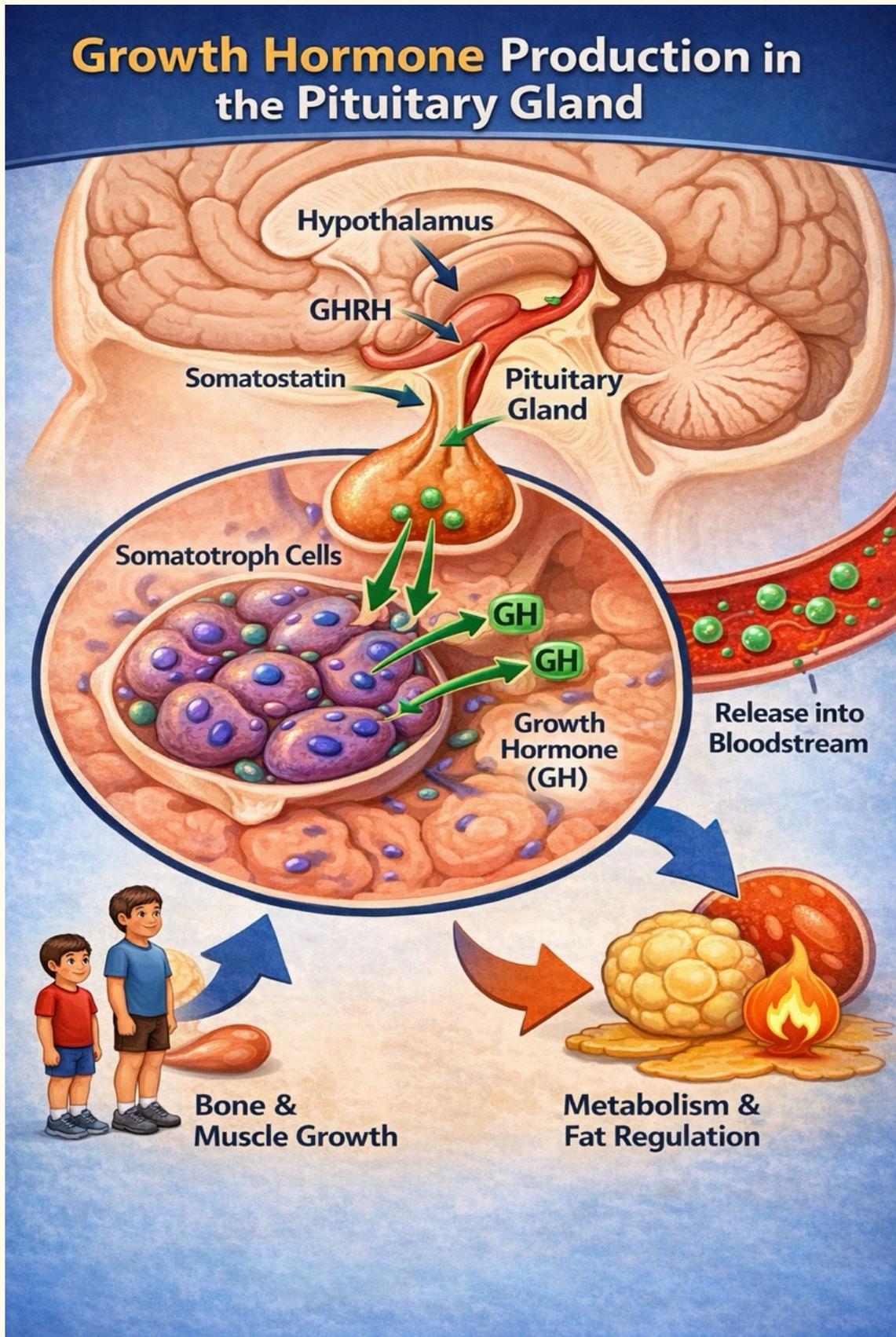
This is not a picture of me...but, I do admit to personally using growth hormone-enhancing therapies (mainly peptides) ... so, if you are curious about Growth Hormone...read on:

### Understanding the Role of Optimized Growth Hormone Levels

Growth hormone (GH) is a naturally occurring hormone produced by the pituitary gland. It plays a critical role in **muscle maintenance**, **fat metabolism**, **tissue repair**, **sleep quality**, and overall **vitality**. While growth hormone levels peak in youth, production gradually declines with age—a normal process that

can contribute to many common symptoms of aging. **But...this decline does not** have to happen!

## The Growth Hormone (GH) Production Process (Normal/Physiological GH Levels)



### Hypothalamus

- In the brain

- Sends **GHRH** (“Growth Hormone Releasing Hormone”) to the Pituitary Gland

### Pituitary Gland

- In the Brain
- **GHRH** stimulates the Release **GH** into the Bloodstream throughout the body
- **GH** is produced by **Somatotroph Cells** within the Pituitary Gland

### GH Receptors Throughout the Body

- **Liver**
- **Skeletal muscle**
- **Adipose tissue**
- **Bone**
- **Heart**
- **Blood vessels**
- **Kidney**
- **Pancreas**
- **Brain**
- **Skin**
- **Immune system**
- **GI tract**
- **Reproductive organs**
- **Lung**
- **Hematopoietic tissues**
- **Eyes**
- **Ears**
- **Everywhere....**

### **Growth Hormone Optimization Improves the Aging Process:**

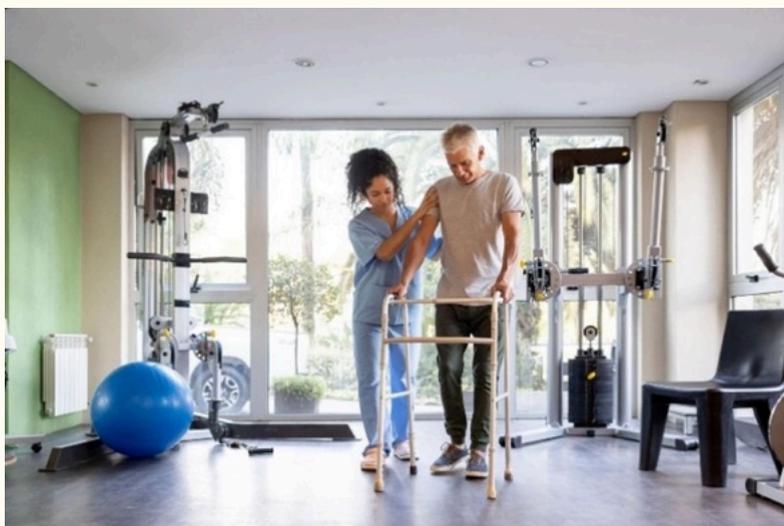
- **Body Composition**-Less fat; More muscle
- **Recovery & Repair**-less injuries & quicker recovery
- **Muscle**-more muscle mass
- **Skin & Connective Tissue** – thicker skin, fewer wrinkles, stronger ligaments and tendons
- **Bone & Structural Health** – enhanced bone density; decreased fall & fracture risk with aging
- **Sleep Quality** - Growth hormone can improve sleep quality by supporting deeper, more restorative slow-wave sleep and reducing nighttime awakenings.
- **Cognitive Function** - Growth hormone can support cognitive function by improving sleep quality, energy, and cerebral metabolism while reducing visceral-fat–driven inflammation that otherwise impairs attention and mental clarity.
- **Mood & Well-Being** - Growth hormone can improve mood and well-being by boosting energy and resilience through better sleep, improved body composition, and reduced inflammation.

- **Cardiovascular Support** - Growth hormone can support cardiovascular health by reducing visceral fat and inflammation and improving lipid patterns and endothelial function, which together can lower overall atherosclerotic risk.
- **Energy & Vitality** - Growth hormone can improve energy and vitality by enhancing tissue repair and sleep quality while shifting body composition toward more lean mass and less visceral fat, leading to better physical stamina and day-to-day drive.
- **Physical Performance** - Growth hormone can improve physical performance by increasing lean mass and connective-tissue repair while accelerating recovery, which supports greater strength, endurance, and training capacity over time
- **Longevity & Healthy Aging** - GH supports longevity and healthy aging by helping preserve lean muscle and bone, reducing visceral fat and inflammation, and improving recovery and metabolic resilience; decreases age-related injuries

### **Question: Am I too Old to Start Growth Hormone or Growth Hormone Enhancing Therapies?**

Answer: No! Patients of virtually any age—including those in the later decades of life—may be appropriate candidates for growth hormone therapy when there is clearly documented adult growth hormone deficiency established through proper biochemical testing and clinical evaluation.

In appropriately screened patients, carefully dosed and closely monitored growth hormone replacement can support improvements in body composition, bone density, metabolic function, physical performance, and overall quality of life, making it a reasonable therapeutic consideration even in the aging population.



**Let's Get This Behind Us so You Can Get Excited About Enhancing Your Growth Hormone Potential:**

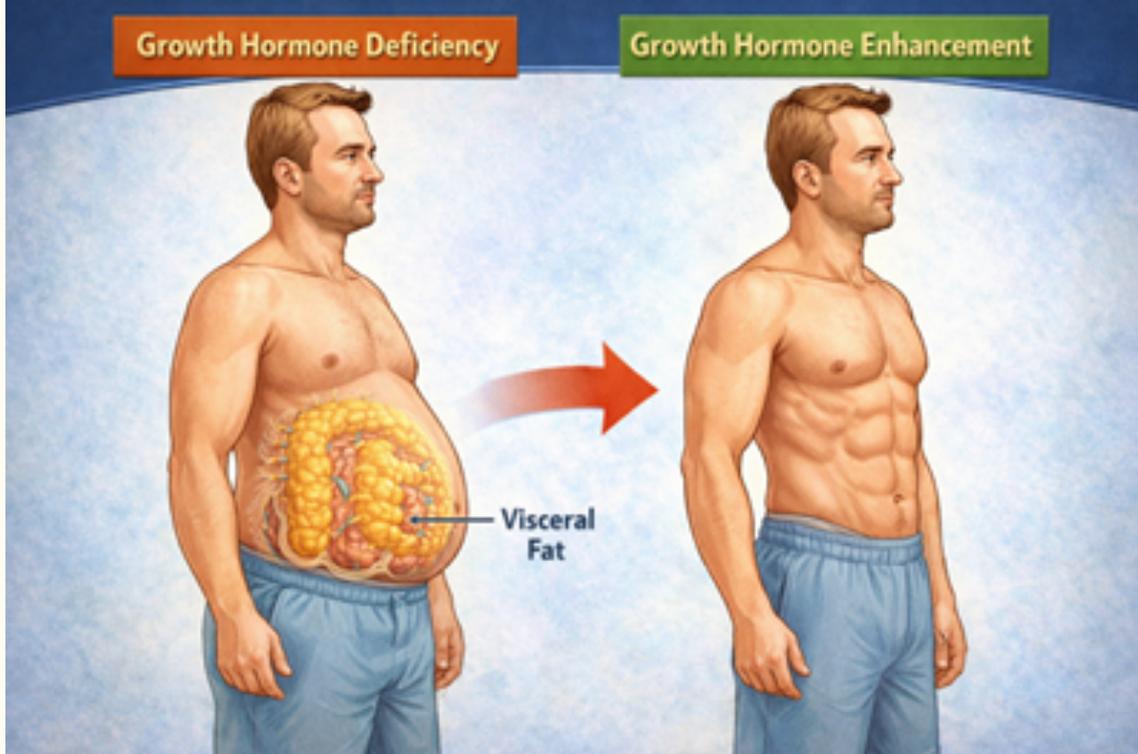
**What are the Risks?**

In appropriately screened patients, carefully dosed and closely monitored growth hormone enhancement therapy is exceedingly safe with very rare side effects. Complications can occur in inappropriately-managed GH therapy and in patients willingly generating supra-physiological levels of Growth Hormone. The rare side effects are listed here:

<p><b>Metabolic / Endocrine</b></p> <ul style="list-style-type: none"> <li>• Insulin resistance</li> <li>• Impaired glucose tolerance</li> </ul>	<p><b>Neurologic</b></p> <ul style="list-style-type: none"> <li>• Headaches</li> <li>• Visual changes</li> </ul>
<p><b>Fluid Retention / Electrolyte</b></p> <ul style="list-style-type: none"> <li>• Peripheral edema (hands, ankles)</li> <li>• Facial puffiness</li> </ul>	<p><b>Sleep / Respiratory</b></p> <ul style="list-style-type: none"> <li>• Worsening obstructive sleep apnea</li> <li>• Snoring exacerbation</li> </ul>
<p><b>Musculoskeletal</b></p> <ul style="list-style-type: none"> <li>• Arthralgias</li> <li>• Myalgias</li> <li>• Hip/knee/hand pain</li> </ul>	<p><b>Hormonal / Endocrine Axis Effects</b></p> <ul style="list-style-type: none"> <li>• Suppression of endogenous GH production</li> <li>• Altered thyroid function</li> <li>• Altered cortisol levels</li> </ul>
<p><b>Cardiovascular</b></p> <ul style="list-style-type: none"> <li>• Hypertension (via fluid retention)</li> <li>• Left ventricular hypertrophy (with supraphysiologic dosing)</li> <li>• Edema-related cardiac strain in susceptible patients</li> </ul>	<p><b>**Again---Abuse/Supraphysiologic dosing such as in bodybuilding can cause problems:</b></p> <ul style="list-style-type: none"> <li>• Cardiomyopathy (extreme misuse)</li> <li>• Diabetes</li> <li>• High Blood Pressure</li> <li>• Headaches</li> <li>• Joint Pain</li> </ul>
<p><b>Oncologic / Proliferative Concerns</b></p> <ul style="list-style-type: none"> <li>• Potential acceleration of existing malignancy =&gt; DOES NOT CAUSE CANCER!</li> <li>• Contraindicated in active cancer</li> </ul>	<p><b>Absolute Contraindications to Growth Hormone Enhancing Therapy</b></p> <ul style="list-style-type: none"> <li>• Active malignancy</li> <li>• Proliferative diabetic retinopathy</li> <li>• Acute critical illness (post-op, trauma, ICU)</li> <li>• Uncontrolled diabetes</li> </ul>

### Spotlight on Body Composition

- GH helps maintain lean muscle mass and strength
- GH supports fat metabolism, particularly reducing visceral (abdominal) fat



- ↓ Fat
- ↑ Muscle

### Spotlight on Skeletal Muscle & Tissue Health

- Supports bone density and skeletal muscle strength
- Plays a role in muscle and tissue repair, shortening recovery time after exercise & injury
- Promotes collagen and elastin production, contributing to healthier skin and hair
  - Thicker skin
  - Fewer wrinkles
  - Thick/dense hair

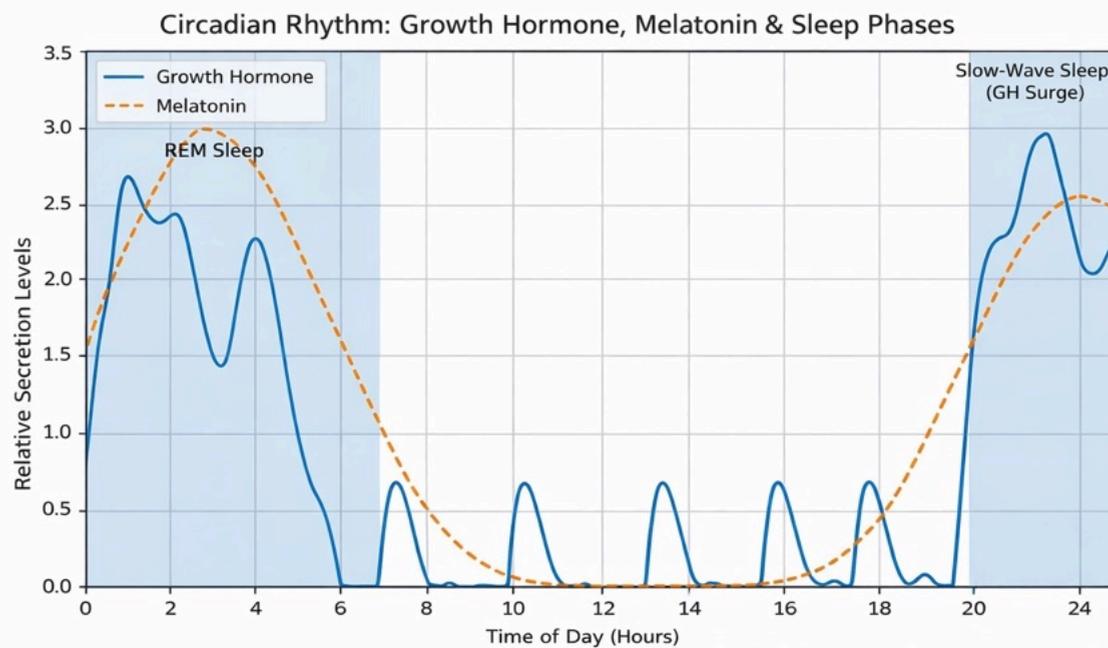


**Pop Quiz:**

Who needs a Growth Hormone Boost in this Marriage?

## Spotlight on Sleep, Energy & Cognitive Health

- Closely tied to deep, restorative sleep
- Supports daytime energy, mood stability, and resilience
- Plays a role in memory, focus, and overall cognitive function



- ✓ Melatonin does not directly cause GH release
- ✓ Darkness and normal Circadian sleep schedules allow **melatonin** to rise (**red**)
- ✓ **↑** Melatonin helps initiate and stabilize “slow-wave” (deep, non-REM) sleep
- ✓ “Slow-wave” (deep, non-REM) is the main trigger for the big GH pulse (**blue**)
  - First 1 to 3 hours of sleep => **biggest GH surge**
  - Follow-up, smaller pulses occur every 2 to 4 hours during sleep

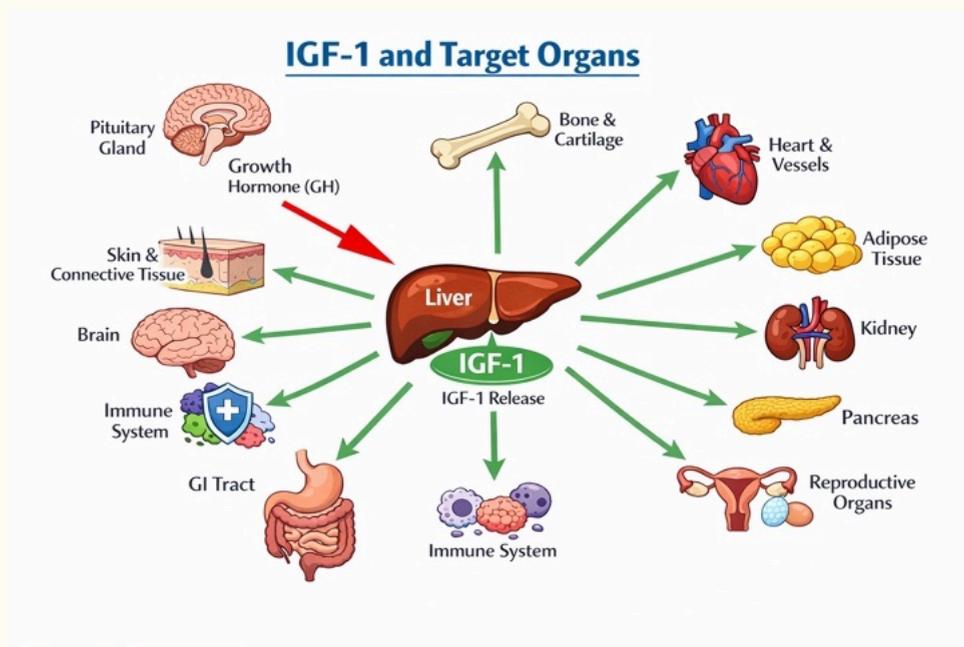
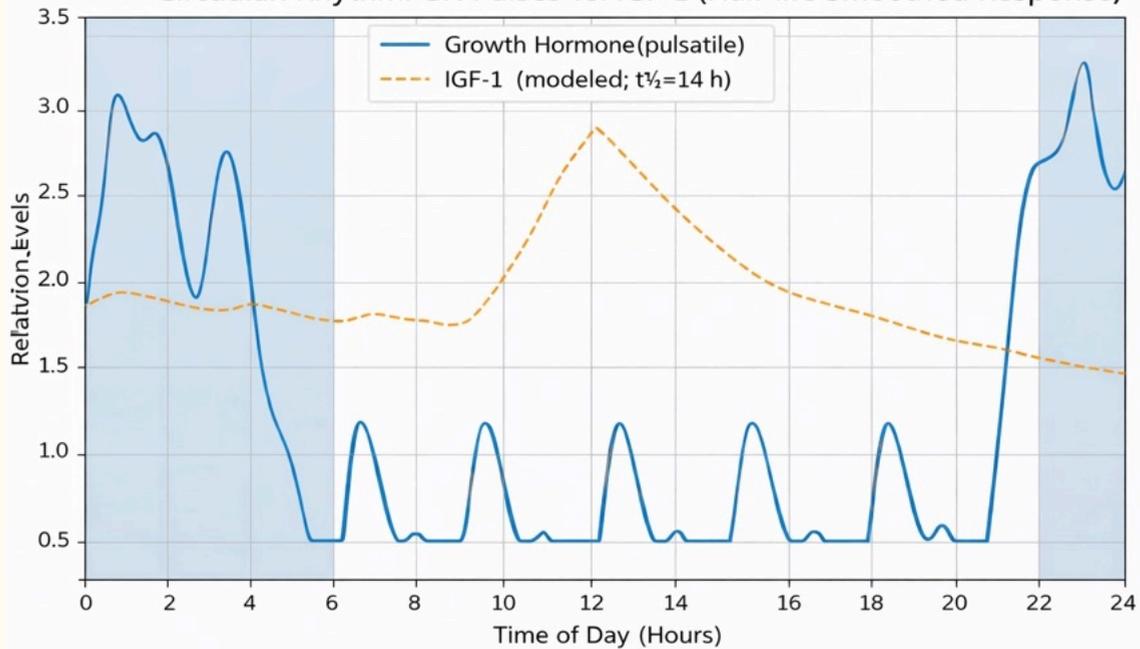
### Sleep Disruption States: Melatonin & Growth Hormone Effects

Condition	Melatonin Effect	GH Impact
Sleep Apnea	Fragmented melatonin rhythm	Blunted GH response
Working the nightshift	Phase mis-alignment	Reduced nocturnal GH
Aging	Decreased melatonin amplitude	Decreased Slow Wave Sleep & decreased GH
Alcohol before bed	Suppresses melatonin & Slow Wave Sleep	Decreased GH
Blue light before bed	Delays melatonin onset	Delays GH pulse

### How to Test for Growth Hormone Deficiency

- Testing Growth hormone levels directly- not clinically reliable; growth hormone is pulsatile and has a very short half-life (less than 30 minutes) => next to impossible to get an accurate level
- IGF-1 (Insulin Growth Factor-1) Levels
  - Produced in liver in response to GH secretion=> directly correlated with GH secretion
  - 12-to-24-hour half-life=> easy to get an accurate blood level
  - Pituitary GH → Hepatic GH receptor activation → IGF-1 synthesis → systemic circulation

**Circadian Rhythm: GH Pulses vs. IGF-1 (Half-life Smoothed Response)**



**The Role of IGF-1 (Insulin-Like Growth Factor-1)**

IGF-1 levels rise in response to growth hormone (GH) signaling—so IGF-1 is often used as a practical indirect marker of overall GH activity over time. While GH is released in pulses and is difficult to capture with a single blood draw, IGF-1 is more stable in the bloodstream, making it a useful window into the GH-IGF-1 axis.

Beyond being a marker, IGF-1 is a biologically active growth factor with receptors throughout the body. In normal physiologic ranges, IGF-1 supports tissue maintenance, recovery, and regeneration—helping the body “repair and renew” across multiple organ systems.

**Potential longevity-supporting benefits of maintaining healthy (not excessive) IGF-1 levels include:**

- **Lean tissue support:** helps maintain muscle protein synthesis and reduce age-related muscle loss (sarcopenia)
- **Bone strength:** supports bone formation and remodeling (important for osteopenia/osteoporosis risk)
- **Metabolic resilience:** contributes to healthier body composition and insulin sensitivity in many individuals
- **Exercise recovery:** improves repair after training, supporting function and performance over time
- **Skin and connective tissue:** supports collagen turnover and tissue integrity
- **Brain and cognition:** may support neuronal health, plasticity, and overall cognitive performance
- **Cardiovascular support:** involved in vascular/endothelial function and cardiac muscle maintenance
- **Immune and repair signaling:** participates in immune modulation and wound-healing pathways

Age decade	Normal Physiological IGF-1 Levels
20s	200–300 ng/ml
30s	180–260 ng/ml
40s	160–240 ng/ml
50s	140–220 ng/ml
60s	120–200 ng/ml
70+	100–180 ng/ml

### Who Benefits Most from Optimized Growth Hormone?

- Adults over 40 experiencing age-related changes in body composition, energy, or recovery
- Men and women with central weight gain and metabolic slowdown despite healthy habits
- Individuals with poor or non-restorative sleep or chronic fatigue
- Active adults noticing slower recovery or declining physical performance
- Post-injury or post-surgical patients requiring tissue repair and healing
- Patients focused on healthy aging, longevity, and maintaining function over time

### A Balanced, Individualized Approach

Growth hormone optimization should always be:

- Clinically evaluated
- Individually tailored
- Carefully monitored

### How to Treat Documented Growth Hormone Deficiency

#### 1.) Human Growth Hormone (HGH) Injections

- e.g. *Omnitrope*, *Humatrope*, *Genotropin*, *Norditropin*
- Synthetic & Bio-Identical



- Subcutaneous injections
  - Nightly => usually 5 days on & 2 days off
  - Long-acting/weekly => newer, extended release (e.g. *Somatrogan*)
- Potential Risks (RARE when properly managed):
  - Edema / fluid retention
  - Carpal tunnel syndrome
  - Joint pain / stiffness
  - Muscle aches
  - Insulin resistance
  - Hyperglycemia
  - Prediabetes / Type 2 diabetes
  - Headache
  - Gynecomastia (via ↑ aromatization environment)
  - Libido changes (indirect hormonal shifts)
  - Hypertension (fluid-mediated)
  - Sleep apnea worsening
  - Theoretical tumor growth acceleration (if active malignancy)
- Labs to follow:
  - Efficacy of Treatment—follow IGF-1 levels
  - Liver Safety—follow Liver Enzymes
  - Metabolic Safety—follow insulin levels, glucose, A1c
  - Thyroid Safety—follow TSH & Free T4
- Shuts down the Pituitary GH production =>
  - No endogenous/Native GH production
  - Almost always reversible

## 2.) What Are Peptides?

- Peptides are short chains of amino acids — the building blocks of proteins.
  - Peptides: fewer than 50 amino acids
  - Proteins: more than 50 amino acids

- Insulin is one of the most well-known peptides. It contains 51 amino acids, placing it right on the border between a peptide and a protein.
- Today, more than 200 peptides are under clinical investigation for their therapeutic benefits. Peptides work by mimicking or enhancing natural signaling in the body, activating receptors that regulate metabolism, healing, immunity, and vitality.
- Peptide Therapy, by in large, needs to be subcutaneous or intramuscular injections

### **Metabolic & Anti-Aging Peptides @ Ageless Solutions Nashville**

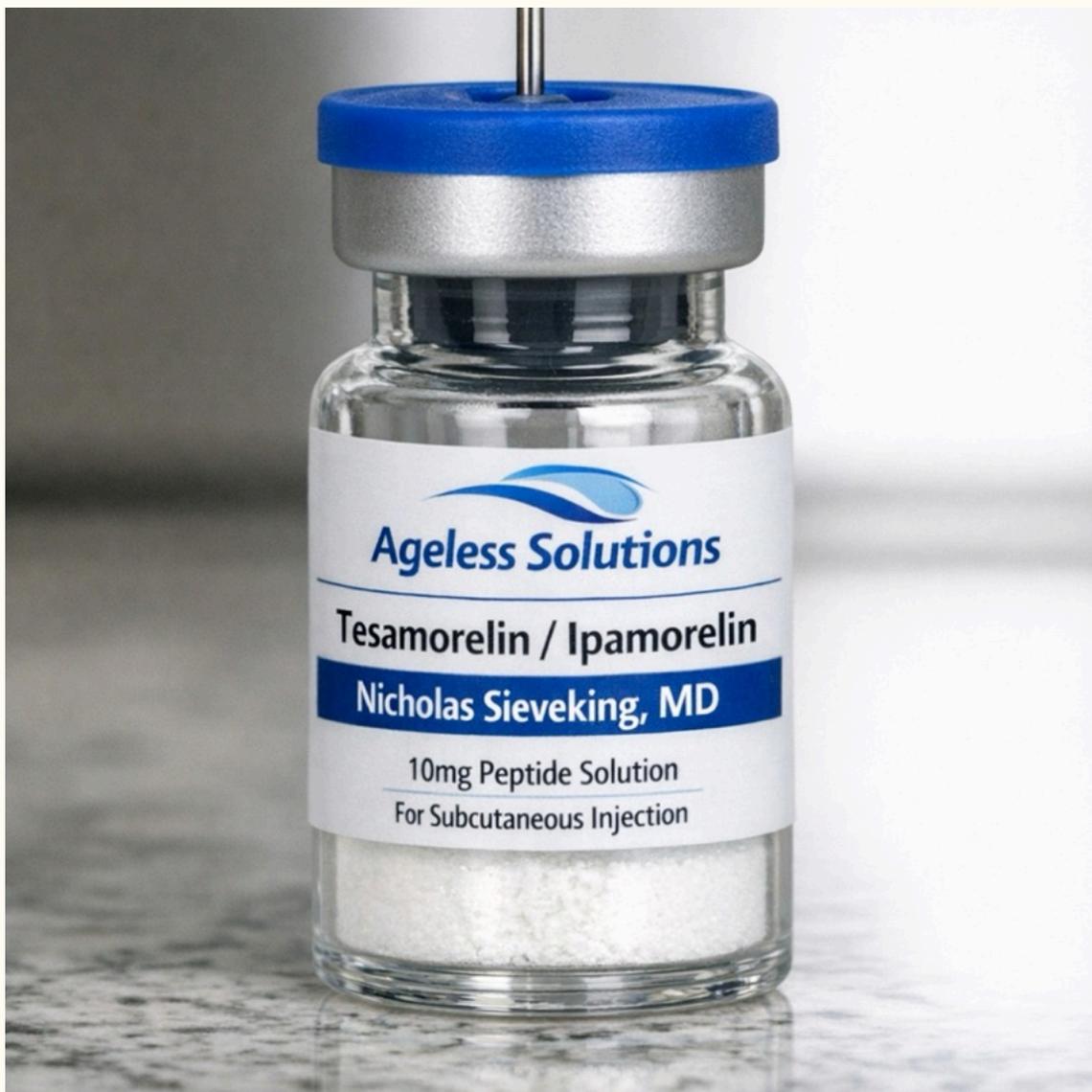
At **Ageless Solutions Nashville**, we utilize injectable peptide therapies known as **growth hormone secretagogues** to stimulate — or “wake up” — the pituitary gland, encouraging it to resume natural (“endogenous”) growth hormone production.

This represents the most physiologic and clinically favorable scenario. The downstream longevity, healing, and regenerative benefits are derived from the patient’s **own biologically regulated growth hormone**, released in normal pulsatile patterns.

Equally important, the pituitary remains active and responsive. It is **not suppressed or “shut down”** — a phenomenon commonly seen with the use of exogenous, manufactured growth hormone injections.

### **GH Secretagogues (Peptides):**

- **Tesamorelin** — Synthetic GHRH analog stimulating natural GH production
- **Ipamorelin** — Ghrelin receptor agonist stimulating pituitary GH pulses
- **CJC-1295** — GHRH analog increasing endogenous GH and downstream IGF-1
- **AOD-9604** — Modified HGH fragment targeting fat metabolism via increased lipolysis and reduced lipogenesis
- Injectable Peptides & Peptide Combinations to increase endogenous GH:
  - **Tesamorelin/Ipamorelin** – Subcutaneous injection: Stimulates natural growth hormone release; supports fat loss, muscle recovery, and anti-aging.
  - **Ipamorelin/CJC** – Subcutaneous injection: Boosts growth hormone secretion; improves sleep, recovery, energy, and body composition.
  - **AOD-9604** (“Anti-Obesity Drug”) – Subcutaneous injection: Promotes fat metabolism and weight management.
  - **Sermorelin** – Subcutaneous injection: Stimulates pituitary growth hormone release; supports lean muscle, energy, and better sleep.



**SPECIAL PROMO:**

**Come in to Ageless Solutions and start your renewal journey. From now until the end of March receive a free IGF-I blood test to determinewhere you stand with your growth hormone levels.**

***Offer expires 3/31/26.***

**Make Appointment**

**STAY TUNED!**

***Be on the lookout for next week's newsletter, "Where You Have Surgery Matters - Inside the Excellence of Grassland Surgery Center"***



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