

Safe, Effective Treatment Helps Restore Growth Hormone, Promotes Healthy Aging

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Growth hormone, essential to health, declines as we age

Growth hormone (GH) is involved in a wide variety of activities essential to health, including the repair of damaged tissue in bones, organs and muscles; maintaining muscle mass; insulin sensitivity and burning fat; promoting strong immune defenses; and supporting healthy blood vessels, blood pressure and cholesterol levels.

GH is produced by the pituitary gland, which secretes tiny amounts throughout the day and night in a series of pulses. Total daily GH secretion peaks around puberty and begins to decline by age 21, until, by age 60, most adults, despite the fact that their pituitary is still producing GH, have total 24-hour GH secretion rates indistinguishable from those of younger patients with severely compromised pituitary function.¹

Why restore GH secretion to more youthful levels?

Aging adults, even those receiving hormone replacement therapy with DHEA, thyroid, estrogen and/or testosterone, still frequently report fatigue, lethargy, and decreased strength and exercise tolerance. Plus, several recent large population studies show the risk of cardiovascular disease and death is significantly increased in adults whose circulating levels of GH are very low.

Over the last 15 years, a large body of clinical research has shown that Adult Growth Hormone

Deficiency (AGHD) is quite common, plays a key role in virtually all age-associated health complaints, and that treatment that restores circulating GH to mid-normal youthful ranges successfully and safely reverses all of these symptoms of unhealthy aging, dramatically improving health and quality of life.^{2,3,4,5,6,7,8}

What are the clinical signs and symptoms of Adult Growth Hormone Deficiency?

An adult GH deficiency (AGHD) syndrome has been documented, consisting of central obesity (increased fat deposits in the abdominal area), loss of muscle mass, decreased strength and aerobic capacity, decreased bone mineral density, harmful changes in cholesterol levels (increases in LDL(bad) cholesterol and decreases in HDL(good) cholesterol), low energy, and greatly decreased quality of life.⁹

Growth Hormone therapy not only reverses these symptoms, but protects brain cells and improves cognition

GH therapy has been shown to decrease fat mass, increase lean body mass, increase bone mineral density, reduce both LDL and total cholesterol, reduce carotid-artery intimal media thickness (a key indicator of plaque buildup and increased risk of a heart attack), lower C-reactive protein (another cardiovascular risk factor that indicates high levels of inflammation in the circulatory system), increase the number and function of the cells that repair our blood vessel walls, increase our ability

to exercise, and dramatically improve overall vitality and quality of life.^{9,10,11}

Interest in the use of GH to improve quality of life in aging adults has also increased as a result of research reporting that GH has protective and stimulating effects on brain cells, improving cognition and memory in the aging brain in both men and women.

An evaluation of 460 U.S. male doctors (average age 57) participating in the Physicians' Health Study II found that those with higher midlife levels of GH had significantly better late-life cognitive performance.¹² Similar results were found in a study involving 590 American women aged 60-68 years, and an Italian study of 353 elders 80 years or older, in whom lower levels of GH were strongly associated with poor cognitive performance.^{13,14} In a placebo-controlled trial, 6 months' of treatment with daily growth hormone releasing hormone (GHRH) greatly improved cognition in healthy older (average age 68) adults.¹⁵

The blood vessels that supply the brain with oxygen and nutrients also deliver it's GH. As we age, however, the number of tiny blood vessels on the brain's surface decreases, largely because the cells responsible for repairing and maintaining these blood vessels (called endothelial progenitor cells) stop working properly. Treatment that restores GH to youthful levels reverses this process, which protects not only the blood vessels serving the brain, but blood vessels throughout the body, including those that deliver blood to the heart.¹⁶ GH's renewing effects on blood vessels is thought to be a key reason GH therapy enhances thinking abilities, including memory.

Other recent studies also show that treatment with GH secretagogues (supplements that promote

the secretion of GH) also causes improvement in the ability of brain cells to communicate with one another.^{17,18}

Could GH Therapy Increase Your Risk of Cancer or Diabetes?

It has been questioned whether the age-related decline in GH secretion may be a protective mechanism against the development of cancer and insulin resistance.¹⁹

GH is involved in the regulation of cell growth, so it has been hypothesized that GH therapy might promote the survival of pre-cancerous cells—a fear that has not been supported by the research.

Numerous studies have now shown that, when levels of GH are kept in the low to normal range, no increase in cancer risk is seen. A recent meta-analysis that included 21 studies found no association between GH levels in the lower 3/4th of the normal range and any type of cancer. High levels of GH (levels in the highest quartile or top 1/4th of the normal range) were found to increase risk for prostate and premenopausal breast cancers, but no association was noted, even for those with GH levels in the highest quartile, for lung, colorectal or postmenopausal breast cancers.²⁰

Extensive studies of two groups in which GH therapy might be thought to increase cancer risk—cancer survivors, including childhood cancer survivors, and other children and adults treated with GH replacement—have shown no evidence of an increase in cancer risk.^{21,22}

Could GH therapy cause insulin resistance?

Although *chronic elevation* of GH has been found to produce insulin resistance in humans, which suggests daily dosing with GH should be avoided, less frequent dosing actually *improves* sensitivity to insulin and is just as effective.²³

In individuals with Adult Growth Hormone Deficiency, GH replacement therapy given 3 times weekly, in doses that produced GH levels in the mid-normal range for adults ranging in age from 25-35, was found to be as effective as daily dosing

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in improving cholesterol levels, cardiovascular health, muscle mass, fat loss, and bone mass.^{24,25}

It is well recognized that belly fat (visceral adiposity) causes insulin resistance. A number of clinical trials have demonstrated that GH therapy improves insulin sensitivity and lessens high blood sugar levels in patients suffering from not only severe insulin resistance, but type 1 and type 2 diabetes.²⁶ Thus, while it is possible that chronic, daily GH injections could promote insulin resistance, the use of GH releasing agents, or even injections of GH, several times a week should improve, not reduce, sensitivity to insulin.

Are Oral GH Releasing Agents Effective?

Oral GH-releasing agents are certainly more convenient and much less expensive, but are they effective? Yes, a number of studies have conclusively shown that oral supplementation with amino acids (primarily a combination of arginine and lysine) naturally stimulates GH release:²⁷

- ⇒ In young men given 1.5 gm of arginine plus 1.5 gm of lysine, blood levels of GH increased 2.7-fold one hour later.²⁸
- ⇒ Similarly, in young men given 1.2 gm of arginine plus 1.2 gm of lysine, blood levels of GH increased nearly 8-fold within 90 minutes. This rise in GH was reproducible, but only when the men took both arginine and lysine. When used singly, neither arginine (1.2 or 2.4 gm), nor lysine (1.2 gm) affected blood levels of GH.²⁹

In another study involving adults aged 32 to 64 years, consumption of 2 gm of glutamine after a light breakfast caused blood levels of GH to increase 4.3-fold 90 minutes after consumption. What is especially interesting about this study is that the conditions chosen were those expected to result in very little GH secretion. Not only were the participants older (and thus more likely to secrete less GH), but they were given glutamine after eating (digestion typically lessens GH secretion). The researchers were able to reproduce these positive results. They hypothesized that glutamine indirectly caused GH secretion because our bodies

convert glutamine into citrulline in the small intestine, and citrulline is then used in the kidney to synthesize arginine. Arginine synthesis is a well recognized stimulus for GH secretion.³⁰

In research conducted in Italy, an oral arginine-lysine supplement given to elderly individuals and cancer patients has been shown to improve immune function by increasing the synthesis and/or release of thymulin (the hormone produced by the thymus gland, the master gland of the immune system) to levels normal for young, healthy subjects. The immune-boosting effect of the arginine-lysine combination was due to its ability to promote the release of GH, which then improved immune function.^{31,32}

Women may need higher doses of GH than men

In some studies, the beneficial effects of GH therapy have been more pronounced in men than in women. It turns out that women on estrogen replacement therapy are somewhat resistant to GH and may require higher doses to raise GH levels to those producing beneficial effects in men.⁹

Summary

Over the last fifteen years, a large number of clinical trials have confirmed that Adult Growth Hormone Deficiency plays a key role in unhealthy aging and can be safely and effectively treated without increasing risk of cancer, insulin resistance, or diabetes.

Treatment that restores GH levels to a mid-normal range improves body composition, decreasing fat mass while increasing lean body mass and bone mineral density; promotes cardiovascular health by reducing LDL, total cholesterol and atherosclerosis; increases older individuals' ability to exercise tolerance; protects brain health and improves cognition, dramatically improving overall quality of life.

Your doctor can help you develop a treatment program, tailored to your unique physiology and needs, which will restore your GH to health-promoting levels. **SP**

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