

James L. Holly, M.D.

Aging Well - Part V

Hormone Modulation -- Growth Hormone and Testosterone

By: James L. Holly, MD

(The Your Life Your Health article published in the December 4th *Examiner* was a first draft. It was sent to the *Examiner* by the author in error. This is the final draft of the article which should have appeared in the paper. I apologize for the inconvenience.)

Aging well requires attention to:

1. The prevention of disease,
2. The slowing the aging process, and
3. The enhancing of health.

Before any benefit can be expected from medications which help retard the aging process, you must make the lifestyle modifications, adopt the sound nutritional practices and begin the activity levels which we have been discussing. There is no "magic pill," "magic shot" or "magic elixir" which can make you young , or which can substitute for self-discipline in your diet and exercise. In addition, without careful monitoring of your health for signs and symptoms of serious illness, all of the pills and shots in the world will not help you achieve a goal of "aging well."

However, once you have implemented these changes, you are prepared to realize the maximum benefit from "hormone modulation." Hormone modulation first involves the control of insulin (see Your Life Your Health, *The Examiner* May 29th and June 5th, 2003 at www.jameslhollymd.com) and cortisol, and the keeping of these hormones at normal levels through constant lifestyle coaching. In excessive amounts, both of these hormones are damaging, yet both are required at proper levels for optimal health. Generally, insulin levels are controlled by diet and

the kinds of foods you eat and cortisol levels are improved by eliminating stress from your life.

Endocrine glands produce hormones which affect the functions of specific receptor organs or tissue when transported to them by body fluids. The most common hormones such as thyroid, insulin, testosterone, estrogen, etc are produced by endocrine glands. One of the reasons hormones are so important in discussions of aging is that all of the hormones begin to decrease as we get older. Conditions such as:

- **menopause**, which is caused by the decrease in estrogen and progesterone secretion in women,
- **andropause**, which is caused by the decrease in testosterone in men,
- **somatopause**, which is caused by the decrease in growth hormone in both men and women and
- **thyropause** which is caused by the decrease in thyroid hormone in both men and women,

appear to contribute directly to the aging process. Hormone modulation is the science of replacing these hormones to natural physiological levels with benefits in health, well-being and the slowing of the aging process.

Certain hormones which are commonly called "sex hormones" -- pituitary gonadotropins, gonadal sex steroids, and adrenal sex steroids -- have far more importance than just sexual function. As a group, they are involved in:

- Optimal immune function,
- Mood,
- Energy levels,
- Strength,
- Body fat,
- Muscle mass and
- General well being.

The replacement of hormones which have been decreased by age requires careful monitoring, not only of blood levels of the hormones, but also of symptoms and physical changes. For instance, evaluation of the thyroid is extremely important, but cannot be done simply by looking at blood test results. The blood tests results must be correlated with the patient's clinical condition, including the presence or absence of symptoms of cold hands and feet, cold intolerance, fatigue, dry skin, constipation and thinning hair.

As mentioned, somatopause is the decline in growth hormone levels that occurs gradually from young adulthood throughout life, and it occurs in both sexes at roughly the same rate. This decline in growth hormone leads to a decline in IGF-1, the hormone that is made in the liver in response to growth hormone. The decline

in IGF-1 also parallels the decline of all the attributes mentioned above under testosterone. In addition, with lower IGF-1 levels, we also see a decrease in:

- skin thickness,
- bone density,
- aerobic capacity, and
- the healing rate of wounds.

On the other hand, some things go up as growth hormone (and IGF-1) go down; these are:

- body fat,
- waistline,
- waist to hip ratio (an indicator for risk of heart attack),
- LDL cholesterol,
- average days of illness, and
- hospitalization rate.

Evaluation of growth hormone status is best done by examining serum levels of the hormone IGF-1. IGF-1 is also the hormone that carries out the benefits that we attribute to growth hormone.

Andropause is the result of the decline of testosterone levels in men. This decline is gradual, starting from approximately age 30, and continues throughout life. In women, testosterone levels decline precipitously at menopause, along with estrogens and progesterone. In both sexes, along with this decline in testosterone, comes a decrease in:

- libido,
- lean body mass,
- strength,
- energy,
- mood,
- sexual performance and
- mental acuity.

Given the similarity of problems associated with the drop in both of these hormones, one might ask: is it the decrease in testosterone or growth hormone (IGF-1) that results in state of decline in body composition and functional capacity associated with aging?

This is the question undertaken by the National Institute on Aging, under the guidance of Marc Blackman M.D. of Johns Hopkins University in 1994. They initiated a study of men and women, aged 61 to 84, who were in somatopause, as well as either andropause (for men) or menopause (for women). The objective was to determine whether the supplementation of growth hormone, estrogen plus progesterone, or testosterone, had any affect above placebo in the restoration of body composition and functional capacity in the

aging population; and if so, which hormones were responsible for which benefits, and to what degree relative to one another.

The study was double blind, which means neither the practitioner nor the patient knew whether they were receiving the real hormone or placebo. Enrollees in the study were randomly distributed to either the placebo or the hormone group. The men were divided into four groups to be administered the following:

1. Growth hormone plus placebo
2. Testosterone plus placebo
3. Growth hormone plus testosterone
4. Placebo plus placebo

Women were divided into four similar groups, the only difference being that estrogen plus progesterone was administered to women instead of testosterone.

Effects of Growth Hormone, Testosterone and Estrogen Modulation

The outcomes of the study (results) can be summarized as follows:

- 1 Total body weight did not change in any of the groups.
- 2, Lean body mass increased in both men and women who were on sex hormones alone (Testosterone in men, estrogen plus progesterone in women), or growth hormone alone, or both sex hormones and growth hormone. Lean body mass increased more in men on growth hormone plus testosterone, than on men who were on either of those hormones alone.
3. Strength was increased primarily by testosterone. Growth hormone had little or no effect on strength by itself, and estrogen plus progesterone had no effect on strength in women.
4. Aerobic capacity was primarily boosted by growth hormone. Testosterone improved aerobic capacity ever so slightly, but growth hormone improved it substantially. Interestingly, the combination of growth hormone and testosterone were again additive, meaning those on both hormones did better than those on either hormone alone.
5. Women on estrogen and progesterone did not reduce body fat. Men on testosterone reduced body fat by 3-5%. Men and Women on growth hormone reduced body fat by 14%. Once again, testosterone and growth hormone were additive. Men on both of these hormones decreased body fat by 17-18%.
6. LDL (bad cholesterol) was reduced in those on growth hormone. Total cholesterol also came down in the growth hormone groups, and the ratio of total cholesterol to HDL (coronary risk ratio) also declined, indicating less risk for heart attack.

7. No benefit of testosterone on cholesterol levels was mentioned on the report in this study. However, many other studies in the literature point to the fact that in men, testosterone lowers triglycerides and raises HDL cholesterol, both of which reduce risk for heart attack. In some studies on women, testosterone is shown to lower HDL (good cholesterol), indicating a potentially increased risk for heart attack. We approach this by monitoring the HDL carefully in women on testosterone. We have found that in some women the HDL goes down, and in others it does not. When it does go down we have several options:

- a) We can reduce the testosterone dose or stop it all together;
- b) We can use another agent to raise HDL cholesterol, such as Niacin (Vitamin B3);
- c) Or we can use another agent for cholesterol control so that we bring the coronary risk ratio down where it should be.

The most important task is to continually monitor the testosterone and HDL level going forward so that we are able to learn how each individual's physiology is affected by the various interventions, arriving at the best possible benefit with the least possible risk.

8. Blood pressure did not change in any of the groups except one: those men on growth hormone and testosterone experienced a statistically significant decrease in diastolic blood pressure.

9. Side effects were non-existent in the testosterone group. The group of women on estrogen plus progesterone experienced some breast swelling and tenderness and rarely some irregular menstrual type bleeding. The patients on growth hormone did experience some fluid retention, although it was minor, and easily controlled by reducing the dose. The symptoms of fluid retention were water weight gain and mild joint discomfort (again, remedied by reducing the dosage).

Testosterone is dosed in women using a vanishing cream that is applied every morning to the skin. Men may use the vanishing cream, but an injectable testosterone is preferable. The patient takes an injection about once a week. Very nearly 100% of patients are able to give themselves injections at home with very little discomfort. It becomes very routine. More importantly, the results of the injectable testosterone seem to be much better than any other method particularly in strength, energy, and libido. The goal for laboratory measuring of our results is to see the testosterone level rise to the upper normal for men, and certainly not beyond that. This is another instance where monitoring the level is critical. The levels are checked at least every three months.

Growth hormone is administered by subcutaneous injection, using a tiny 30-gauge needle that often is not even felt; there is now even a needle-less option. This is done six mornings a week. The dose of growth hormone is based on a patient's age, sex, weight, IGF-1 level, his or her response to therapy, and the affordability. The cost of the growth hormone program can range from \$500 - \$800 per month.

Hormone modulation is not treating blood levels; it is treating patients. Hormones are merely an important tool in providing patients with an enhanced quality of life and a longer potential life span. In January, several SETMA physicians will be prepared to offer evaluations for Life Time Health and Wellness. Look for the announcement.

Remember, it is your life and it is your health.