911 BIOCARE


# Men's Guide to Hormone Replacement

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## About 911BioCare

Our approach to HRT can best be described as “Precision Medicine”: each patient deserves a comprehensive evaluation and an individually- tailored treatment regimen that must be continually optimized. We don’t subscribe to the “One size fits all” philosophy followed by most physicians when treating hormonal imbalance. Every patient is different and everybody responds differently to the same dosage. We believe the path to optimized health consists of balanced bioidentical hormone replacement, anti-oxidant therapy and proper nutrition & exercise.

## I. Testosterone Replacement Therapy (TRT)

### The Decline of Hormones with Aging

For more than 50 years women have been receiving estrogen replacement therapy for the abrupt cessation of hormone production known as menopause. Researchers looking for the clues to aging have documented the decline of other important hormones, though such decline is less abrupt and universal than menopause. Many people are not aware that in men, testosterone and other hormones also decline. This ‘male menopause’ is called the andropause. In the next few sections we will discuss these hormones, their effects, and the rationale behind their use as anti- aging therapies.

### Testosterone in Men

Over the past few years, many reports have appeared in the lay press about testosterone replacement therapy (TRT) in healthy aging men. With the arrival of Viagra, many men are now trying testosterone to help their flagging libidos keep up with their new found ability to maintain adolescent quality erections. And from the medical literature stories continue to appear exalting the muscle boosting, fat busting effects of TRT, not only in athletes, but also in sedentary healthy older men. In the face of all this positive publicity, there are an equal number of naysayers— mainly from academic centers and in health newsletters, not to mention your own doctor—who warn of the dangers of mucking around with your hormones and say that we don’t yet have enough long term studies to prove the safety and effectiveness of TRT. So what’s the buzz about? And how, you probably are asking, can one separate the hype from reality?

The decision to start TRT is a complex and personal decision. There are many well documented beneficial effects of maintaining a youthful level of testosterone, and we believe that the preponderance of evidence supports its use in most aging men. But our knowledge is incomplete—as it often is in clinical medicine—and so one must understand the many variables that factor into the decision to start TRT. The following sections present the factors that we believe every man must understand before he can make a truly informed decision.

**What is Testosterone?**

Testosterone is a member of the steroid family of hormones. Interestingly, this family is derived through chemical conversion from the steroid ring-structure of cholesterol. (You probably thought that cholesterol was bad for you, and the lower the blood level the better, but in reality cholesterol is one of the most important molecules in your body, not the least because it is a precursor to these important hormones.) In fact, there are only minor adjustments to this ring structure (additions or deletions of side chains or electrons) that differentiate molecules with such profoundly different effects as estrogen, progesterone, DHEA, cortisone, and androstenedione, to name a few of the more familiar ones. They are small molecules, which becomes important when we look at what routes of administration are available.

Ninety five percent of circulating testosterone is produced in the testicles under the influence of a hormone released from the pituitary gland called luteinizing hormone (LH). Throughout the day, LH is released in spurts that stimulate the release of testosterone from the testicles. The signals are particularly strong in the early morning which accounts for the higher testosterone levels and thence the spontaneous morning erections and increased libido. By the late evening the levels of testosterone can fall by 50 percent, which then signals the pituitary to rev up its production of LH to start the cycle all over again.

When discussing testosterone levels, we must be sure to distinguish between the total and free fractions found in the blood. The vast majority (between 97 and 99 percent) of testosterone secreted in to the bloodstream is attached (scientists use the term 'bound') to a protein ingeniously called 'sex hormone binding globulin' (SHBG). It serves to keep the testosterone from being too quickly removed by the kidneys into the urine, thereby maintaining a steady supply for the tissues. The free testosterone is the biologically more important fraction because only it is able to diffuse into the target tissues and alter physiological function.

In addition to the testicular production, which accounts for the vast majority of circulating testosterone, a smaller amount can be created by the conversion of precursor steroid hormones such as androstenedione and androstenediol. These hormones achieved notoriety when home run king Mark McGwire admitted to using them; you can buy them over the counter under such names as Andro-this or that. Unfortunately for McGwire, a number of recent studies have demonstrated that a greater portion of the androstenedione gets converted into estrogens rather than testosterone and therefore there is not a sustained muscle enhancing effect. The estrogens, in contrast, stay elevated for a longer period of time and can cause gynecomastia—enlargement of the male breast tissue. Far from causing an increase in muscle and masculine features, supplementing with these hormone formulations often results in feminization of the user. McGwire has since discontinued using them, and we

can assure you that neither his muscularity nor his awesome hitting power derives from his previous use.

Before we move on, we want to clarify some misconceptions about what testosterone is and is not. While testosterone is a member of the group of compounds known as 'anabolic steroids,' the muscle and bone building molecules, it is different from the kind this term often denotes—the kind that have been abused by body builders and professional athletes. These include decadurabolin, oxandrolone, and methyltestosterone which are different from testosterone in their molecular structure and not normally found in the human body. These are potent anabolic hormones, but they can have adverse effects on other organ systems, such as the brain and liver, because of this changed structure; therefore, while they have similar muscle building effects, the side effect profiles are not comparable. Because unscrupulous doctors and black marketers sold these drugs in high doses to young men and professional athletes, they—and testosterone along with them—became regulated as schedule III substances like morphine and other narcotics. This has tarnished testosterone's image amongst doctors and the public to the detriment of many who would benefit from responsible well-monitored TRT.

**What are the effects of a low testosterone level?**

An obvious first question to ask when confronting the decision to start TRT—even before determining if your level is relatively low—is, Are there detrimental effects of a low testosterone level? This question has been definitively answered and it is standard practice to treat a low testosterone level—the disease state called 'hypogonadism'—because the deleterious effects of long term untreated hypogonadism are well documented.

Hypogonadism affects many organ systems. It causes decreased lean muscle mass, strength, and bone density. When you see an older man who is stooped over and cannot hold his head up, this is most likely caused by osteoporosis directly resulting from low testosterone levels. In addition, a low testosterone level causes increased body fat, especially around the waist, both subcutaneous and visceral (clinging to the internal organs, such as the intestines and liver—the cause of the proverbial pot belly). This increase in abdominal fat starts a vicious cycle for its accumulation further suppresses testosterone production causing further accumulation of abdominal fat.

This increased visceral fat is not just an aesthetic concern. A growing body of evidence supports the theory that the accumulation of visceral fat causes a number of metabolic derangement's which over time can greatly increase the risk of diabetes and cardiovascular disease.

Just as with estrogen, testosterone has equally potent effects above the neck as below. There are numerous receptors for testosterone in the brain. Not surprisingly, therefore, hypogonadism is associated with depression, a tendency toward social

isolation, low libido, decreased spatial memory, and decreased sense of well-being and assertiveness.

Impotence is generally not caused primarily by hypogonadism. A more important cause of this is vascular and nerve damage; however, as stated above, low testosterone levels can increase vascular damage—including the vessels that are necessary for maintaining an erection. Through a direct effect, though, about five to ten percent of impotence is caused by a low testosterone level. This is not to say, however, that the decreased fullness of erection and the longer time necessary between ejaculations (called the 'refractory period') is not a result of waning testosterone levels with aging. Many men notice that these mild symptoms improve with TRT. Finally, a low testosterone level can also affect a man's ability to maintain a normal red blood cell count.

**What is a low testosterone level?**

All of these deleterious effects have prompted the FDA to approve testosterone for the treatment of hypogonadism. The next important question is, what testosterone level constitutes hypogonadism? On the face of it this seems to be a very straight forward question. After all, it's is just a number for which one is looking, right? Not exactly.

Testosterone, depending on the laboratory, is measured in nanograms per deciliter (ng/dl)—the number of billionths of a gram found in 100 milliliters of blood serum. The "normal range" usually reported on a laboratory report runs from about 290 to 900 ng/dl. The problem with this "normal range" is that it is determined by using a standard Gaussian distribution (bell-shaped curve) of all of the patients who, at one time or another, for various reasons have had their blood tested for testosterone. The lower number is equal to two standard deviations below the average and the higher number two above it. Two standard deviations means that if you are below the 290, then your testosterone level is in the bottom 2.5 percent of all male testosterone levels. Unfortunately, most doctors think that if the test value falls in the "normal" range, then there is no problem. What they don't understand is that the groups of men that form the basis of this normal range at most laboratories are not homogeneous. They can be 80 years old, or 20 years old; they can be chronically ill, or very healthy; they can be obese or thin; and they can be under a great deal of stress or stress free. All of these conditions can profoundly alter a man's testosterone level.

The medical definition of hypogonadism generally uses a level below 300 ng/dl because virtually all men below this range exhibit the signs and symptoms discussed above. But what about a level of 350 or 450 ng/dl? The difference between a man with this level and a man who meets the cut off for "hypogonadism" is less than between him and a man with a level of 800 ng/dl. And what about the average level of about 600; is it adequate or does a man with a level of 900 feel better, have denser bones, stronger muscles, and greater sexual potency? A clue to the answer is thinking back to how you felt when you were 18 years old, a time when testosterone levels run between

about 800 and 1500. A more scientific clue is the number of studies that have shown improvements in strength, muscle, and libido when middle aged men with "normal" testosterone levels have those levels boosted with TRT to the high end of normal or even above that. Why then should a man be denied treatment if his testosterone level is 500 ng/dl and has only a mild degree of decreased libido and only slightly reduced musculature? This gets us to the heart of the issue when debating the use of testosterone as an anti-aging therapy. Before we begin this debate, however, let's discuss what happens—on average—to a man's testosterone level as he ages.

**At what time or testosterone level should I start TRT?**

As we mentioned above, there is extensive evidence that replacing testosterone in 'hypogonadism' is warranted and is FDA approved. At sometime during his life a man will begin to experience a decline in testosterone levels, both free and total. It may be in his mid thirties, forties, or not until his fifties; eventually, however, it will drop to a lower level than when he was twenty. If it drops below 300 (assuming he is lucky enough to get his doctor to check it), then there is no controversy—it should be treated. But what about the 50 year old otherwise healthy male with a total testosterone of 500 ng/dl and a free testosterone level of 9 ng/dl who may have had a level of 800 when he was in his early twenties? Should he wait until he reaches the "magic" number of 300 for his total testosterone level before he starts TRT? Or is it sufficient that his level has already dropped more than 30 % he notices he has been having trouble making progress at the gym, and he notices that it is tougher to keep the weight off of his waist? Herein lies the crux of the controversy.

Two questions immediately come to mind when pondering this controversy. First, are there benefits to be had from raising a testosterone level from 500 to 800 ng/dl? If there are, are there any significant risks—both short and long term—to maintaining this level of testosterone with therapy? The first is the "Where's the beef?" question; the second is the "There's no free lunch" healthy skepticism question. Many studies have been done in healthy young men in which doses of testosterone have been given that raise their levels into the high adolescent range—1000 to 2000 ng/dl. In all of these studies, lean muscle mass has increased and fat mass has decreased. Similar studies with lower doses have been done in moderately obese men; again, lean mass increases and fat decreases even more. Moreover, insulin resistance (a pre-diabetic state) has improved, triglycerides have decreased, and energy has increased. In case you're wondering, none of these studies noted any increase in aggressive behavior that many people expect might happen with high doses of testosterone.

Many more studies have been published showing similar effects in older men (over 65) with mildly low testosterone levels. The NIA has published the results of studies of TRT on body composition (lean muscle and fat ratios) in 108 men which demonstrated a 6 lb. fat loss and 5 lb. lean muscle gain when the testosterone level was raised from an average of 370 to 640 ng/dl for

36 months. The same men had an increase in bone density if they started out with a low bone density. The accumulating evidence shows that whenever you raise the testosterone level—no matter what the starting level—you get benefits in body composition. We think that the dose of testosterone used in this study was too low and that if higher dose had been used even more impressive results would have been demonstrated, without any significant increase in adverse effects.

**What are the risks of TRT?**

What about that free lunch question? Short term risks, what we call side effects, are few. If a man had a propensity to develop acne as a teenager, this may be reactivated when the testosterone levels get raised back to adolescent levels. This can be treated with topical or oral medications quite effectively. The tendency to lose scalp hair can be exacerbated as well, but this too can be effectively treated with a medication that inhibits the conversion of testosterone to dihydrotestosterone called finasteride or Propecia. The main concern that men have with regard to long term TRT is whether it will increase the risk of prostate cancer, BPH, and cardiovascular disease. At physiologic replacement levels—the range we keep our patients within—there is no evidence of any increase risk of prostate cancer or enlargement of the prostate to the point of symptoms. It is true that the longest prospective study is the three year NIA study—which didn't show any prostate problems—but the overwhelming majority of case-controlled, retrospective, epidemiological studies following men for many years show no increased risk in men whose testosterone levels are higher than average. The concern about TRT increasing the risk of prostate cancer stems from the well documented fact that prostate cancers shrink if you deprive them of testosterone; however, as with breast cancer, this does not prove a causal or initiating role. If one does have an occult (as yet undetected ) cancer, then it may cause it to grow, but we screen all our patients with a total PSA and the newer free PSA ( a more specific test) before starting TRT and we continue to monitor it twice yearly.

The concern about a link between testosterone and heart disease comes from the following line of reasoning: men have a higher incidence of heart disease than women; men have higher testosterone levels than women; therefore, higher testosterone levels may cause a greater incidence of heart disease. This is another example of the fallacious reasoning that plagues the field of hormone replacement therapy. Because two conditions are found in the same population, it does not necessarily follow that the one causes the other. For these two conditions—testosterone levels and heart disease—we, in fact, have the results of many studies that show just the opposite. This has been studied extensively and there is a greater incidence of heart disease in men with low testosterone levels than those with high levels. More dramatic evidence comes from the fact that giving testosterone intravenously during angina results in improvement in symptoms. Other studies have looked at the effect of TRT on cholesterol levels and have universally found a decrease in total cholesterol, LDL, and triglycerides, and no change or only a slight decrease in

HDL. And, as mentioned above, restoring youthful testosterone levels can reverse the metabolic syndrome that can increase the risk of cardiovascular disease. So much for the prevailing wisdom!

**How do I start TRT?**

The first step is to get your levels of total testosterone, free testosterone, SHBG, estradiol, and PSA checked. The next step is to come in for a complete history and physical exam so that the treatment can be started in the context of your overall medical condition.

To keep the conversion of testosterone to DHT low within the prostate, we often add saw palmetto and pygeum to the regimen to further reduce the likelihood of prostate enlargement. We also make sure that you have adequate zinc levels and that your conversion of testosterone to estradiol is not too high. Estradiol is important for the health of a man's brain, bones, skin, and vascular system, but too high levels can cause worsening moods, breast development, and over stimulation of the prostate. With close monitoring, most of these adverse effects can be avoided.

**DHEA**

There has been a great deal written about DHEA in the lay press. Much is true, even more is false. You no doubt have heard it referred to as a "fountain of youth in a pill" in health magazines, or read that it can cause prostate or breast cancer. The truth is that it is just one of the important hormones in an overall hormone replacement therapy program; that its blood level declines continuously and sharply from adolescence to old age; that this decline has been correlated with an increased risk of cardiovascular disease in men, decreased immune system function in both sexes, decreased insulin sensitivity, and decreased IGF-I levels.

Human studies in which the level of DHEAS (the form found circulating in the blood) was replaced back to the levels of a 20 year old have shown impressive results in older adults and in various disease states in which the level is lower than expected for the age group. Yen and Morales administered 50 mg of DHEA for six months to 13 men and 17 women aged 40 to 70 years. These patients experienced an increase in lean muscle mass and a decrease in fat mass, although the latter only in the men. In addition, they had a remarkable increase in their perception of their psychological and physical well being.

These same researchers did a similar study to assess the effect of DHEA on immune function and found that there was an increase in natural killer cell function, the white blood cell responsible for killing viruses and tumor cells before they grow into cancers. Many other studies have been done documenting the beneficial effect of bringing the DHEAS level back to younger adult levels in lupus, diabetes, heart disease, obesity, and prior to vaccination.

We check our patients' DHEA-S level and supplement it with a dose of DHEA designed to bring it back to the level of a 20 year old; this level is rechecked once a patient is on therapy and is monitored regularly thereafter.

DHEA is so safe and relatively free of side effects that the FDA does not require a prescription for its sale. There is no evidence that its use causes an increased risk of breast or prostate cancer, but if one already has either of these cancers it can cause increased growth of the tumor. Because of this we screen for breast cancer with a mammogram and a breast exam prior to starting therapy. The only side effects of DHEA in the doses we use are a slight increase in acne in patients predisposed to it and in some women increased hair growth.

**Thyroid Hormones**

Thyroid hormones (TSH, T3 and T4) stimulate and maintain metabolic processes by modulating the synthesis and degradation of proteins and fatty acids in many tissues. Thyroid hormone replacement therapy is one of the unabashed successes of modern clinical medicine. It is standard medical therapy to replace thyroid hormone in anyone exhibiting fatigue, thickened skin, constipation, decreased reflexes, and weight gain if he or she has low thyroid hormone levels as well. Hashimoto's disease, the most common cause of low thyroid levels, is an autoimmune disorder in which the immune system attacks the thyroid gland making it unable to produce adequate levels of thyroid hormones. This is a very common disorder (you probably know someone with it), which can occur at any age, but its incidence increases with age. It is estimated that as many as 10 % of adults over 65 have the disorder. We routinely check blood levels of thyroid hormones in all our patients and treat as necessary. Treatment consists of a combination of T3 and T4, individually tailored to each patient's needs based on thyroid function tests.

**Melatonin**

If there is a "biological clock" that governs the decline in hormone production, then melatonin is the leading candidate. Melatonin is produced in the pineal gland at the center of the brain. This gland receives direct input from the eyes so that it knows what the day and night cycles are. Melatonin is released in spurts at night to initiate sleep; because of this by taking it in a pill at bedtime it can be effective in resetting the clock of a person who changes time zones, thereby alleviating "jet lag."

To test the theory that the pineal gland controls aging and the rhythms of our lives, Walter Pierpaoli, MD, PhD, in Italy transplanted the pineal glands of old mice into young mice and caused them to age much faster. When he did the reverse experiment, he caused rejuvenation of old mice. Finally, he has shown that by supplementing their diet with melatonin, mice can live up to 25 % longer.

It is well documented that humans produce less and less melatonin as they age. By age 60, most people produce less than 50 % of the melatonin they did at 20. Melatonin is also a strong anti- oxidant and cancer fighter (it has been shown that solid tumors partially regress with melatonin treatment). Because of these benefits and its safety in even very high doses, we recommend that patients take melatonin regularly at bedtime starting at age 40 and increasing the dose as they get older.

**Growth Hormone**

Before we discuss the story of human growth hormone (hGH) as an anti-aging therapy, we think it would be helpful to review some physiology. hGH is produced in the pituitary gland by the somatotroph cells (hGH's medical name is somatotropin). Under the influence of the hypothalamus (the part of the brain concerned with the more primitive bodily functions), hGH is released in four or five short spurts, predominantly at night during the third and fourth stages of deep sleep. As it circulates through the blood, hGH stimulates the liver to produce "insulin-like growth factor I" (IGF-I). Because it is released in spurts, hGH is difficult to measure except in a research setting where blood can be drawn every 10 minutes. The blood level of IGF-I, in contrast, is more constant, and therefore, except under certain circumstances, it serves as a reliable surrogate measure of hGH production.

Interestingly, the use of growth hormone as an anti-aging therapy resulted from research on its use in two disease states. Lack of hGH causes dwarfism or short-stature in children. In 1957, hGH isolated from human cadavers was injected into these children and normal growth ensued without significant side effects. However, when these children reached normal adult height, the hGH was discontinued because of its expense and scarcity (it took many human pituitary glands to make a few drops of the substance).

The other cause of hGH deficiency occurs when a person has had damage to his pituitary gland, either from surgery for a tumor of the gland or trauma. If this occurs when he is young, the patient will be growth retarded just as the children mentioned above. If it occurs when he is past adolescence, he will have already grown to normal height, but usually will have other endocrine abnormalities such as cortisone, thyroid hormone, and sex steroid deficiencies. These latter hormones routinely have been replaced because their deficiencies can be immediately life threatening or at least decrease the quality of life in the short term; but since hGH was not thought to have any important physiologic role, other than causing growth in children, it was not routinely replaced.

In 1986, the advent of recombinant DNA technology (gene cloning) enabled scientists to produce large quantities of pure, uncontaminated human growth hormone from bacteria. This development set in motion renewed interest in the other physiologic roles of hGH because of its availability for clinical research.

When researchers looked back at records of adults who had been treated with hGH as children or those who had become growth hormone deficient as a result of trauma or tumors, they found that they were not doing very well. They had two times the rate of death from cardiovascular disease compared with age-matched controls; increased abdominal fat; decreased muscle mass and strength; increased fatigue, social isolation and depression; and poor performance at work. These patients appeared to be suffering from premature aging. Bengt Bengtsson, MD and his group in Sweden decided to study the effect of the now more available recombinant hGH on these patients. He found that virtually all of these aspects of premature aging were reversed with one year of treatment, and that they returned to baseline with cessation of therapy. This research led to the FDA approval of hGH replacement therapy in growth hormone deficient adults (GHDA) in August of 1996.

At about the same time, Daniel Rudman, MD, at the University of Wisconsin, was approaching this from a slightly different angle. He had documented the continuous decline in growth hormone secretion beginning in the third decade of life and wondered if it was responsible for the well-known body composition changes associated with aging such as decreased muscle tone, increased abdominal fat, and thinning skin. In 1990, he published a seminal article in The New England Journal of Medicine in which he reported the spectacular age reversing effects of hGH replacement in 21 men between the ages of 61 and 81. After six months of therapy, these men had gained on average 8.8% lean body mass and lost 14% fat mass, predominately around the waist; had increased their skin thickness by 7% (your skin is thicker and more elastic when you're young); had increased bone density 1.4%; and felt a greater sense of well-being. In the conclusion, Rudman wrote that these changes in body composition are "equivalent in magnitude to the changes incurred during 10 to 20 years of aging."

The results of this study triggered immense interest in hGH as an anti-aging therapy. The National Institutes on Aging (NIA), a branch of the National Institutes of Health, initiated nine large clinical trials to test the effect of hormone replacement with hGH and sex steroids on healthy adults 65 and older. This is likely because they recognize that fully 40 % of adults over 60 have IGF-I levels the same as growth stunted children or individuals suffering from pituitary damage. The studies began in 1992 and ended in June of 1997. The preliminary results were presented at the June 1999 annual international meeting of endocrinologists called ENDO '99. During our discussions with the principal investigators of the studies, it became clear that the beneficial results of Dr. Rudman's study were confirmed and many more benefits with regard to psychological well-being have been published since then.

**What to Expect from hGH Therapy**

The amount of hGH we prescribe and the benefits you can expect depend on your starting level of IGF-I. Most people over the age of 35 will have a level less than the optimal level of 350 to 400 ng/ml and therefore will benefit from supplementation.

Once on therapy, the benefits you can expect are as follows:

- Decreased fat mass, 10 to 14 percent after approximately 6 months, predominantly around the waist, without change in diet and exercise
- Increased lean muscle mass of approximately 7 to 10 percent in the first six months of therapy
- Improved bone density after one year of therapy, percentage increase depending on how deficient it was to start with
- Improved cardiac and lung function, lowered blood pressure
- Increased physical and mental energy level
- Increased hydration of the skin with reduced propensity to develop wrinkles
- Accelerated wound healing
- Increased immune system functioning, including re-growth of the thymus (the gland important in the function of T-cells)
- Decreased total and LDL cholesterol levels, and increased HDL levels
- Improved sleep
- Improved vision
- Improved mood

The degree to which you see these improvements will depend on your level of growth hormone deficiency as measured by your IGF-I level and clinical exam. If your level is below 100 ng/ml, you will likely see significant changes in body composition in the first six months. If you have a higher level, the effect of the supplementation will be to prevent these age-related changes from occurring.

**Safety of hGH Replacement Therapy**

There is ample evidence to support the safety of growth hormone replacement therapy in growth hormone deficient adults (GHDA). In fact, Dr. Bengtsson has said, "When one does not abuse or overdose human growth hormone, there is simply NO evidence suggesting that human growth hormone replacement therapy causes ANY LONG TERM

side effects." (Hormone Research, 43,p 93-99, 1995, emphasis added) Therefore, in August of 1996, the FDA approved the use of hGH in growth hormone deficient adults. Because the body composition changes and IGF-I levels are similar in a GHDA and an older adult, we believe that the same safety profile pertains. Moreover, none of the NIA long-term studies of growth hormone replacement in older adults were stopped because of adverse effects. Finally, data was presented at the ENDO '99 meeting showing no adverse effects in a small number of growth hormone deficient adults on therapy for 10 years.

**Oxidative Stress: The Rust of Mother Nature**

Free radicals are very reactive by-products of normal metabolism that are constantly being produced by your cells. A major cause of age-related decline, free radicals can damage the DNA in cells and cause cancer as well as abnormal function. Diet, lifestyle, and inheritance can affect your levels of free radical production. For example, some people inherit a propensity to produce high levels of homocysteine. Abnormally high levels of this amino acid are as much a risk factor for heart disease as are smoking and high cholesterol.

In addition to restoring your key hormone levels to a youthful level, we analyze the degree to which your body is susceptible to damage from free radicals. For instance, after detecting a high homocysteine level in a patient, we add specific antioxidant supplements that reduce the homocysteine level and thus greatly reduce the likelihood of a heart attack. Antioxidants such as vitamins B & C are very effective molecules in your body for neutralizing these free radicals before they can do you harm. Other antioxidants that we assess & replenish are vitamin E, coenzyme Q10, glutathione, etc., all of which can help to reduce stiffening of the arteries and heart while decreasing wrinkling of the skin.

**The Importance of Nutrition and Exercise**

Research in nutrition and medicine over the past few decades increasingly has born out the truth of the old adage, "You are what you eat." We strongly believe that there is now enough scientific evidence to prescribe a youth-preserving and disease-fighting diet. Much research shows a link between diet and key hormones such as insulin and anti-oxidants such as glutathione. For these reasons, we closely monitor your dietary habits and prescribe changes to optimize body composition and energy levels. Our on-staff nutritionist is available for an in-depth consultation at your request.

We encourage our patients to exercise regularly. This promotes enhanced effects of the hormones and possibly to decreased doses necessary to achieve optimal effects. For example, short bouts of high intensity exercise cause release of growth hormone from the pituitary gland, further intensifying the fat-dissolving effects of externally

administered GH. It is also well- documented that weight-bearing exercise helps to maintain good bone density.

**What are the side-effects?**

Side-effects are often minimal and manageable when restoring hormones to physiological levels (levels your body has seen before). Some patients report breast tenderness or swollen joints when first starting bioidentical hormone replacement therapy; these and other adverse reactions can be remedied by reducing the dosage until symptoms resolve, then gradually resuming.

**How long do I need to stay on the program?**

You should continue treatment as long as you wish to see results.

What happens if I stop the program? Will my body stop producing hormones on its own? Will my hormone levels decrease? Will I lose my gains?

In general, supplementation by exogenous (external) hormones will result in decreased endogenous (internal) production. However, the body tends to restore hormones to pre-treatment levels after cessation of treatment. If your own hormone production was low before treatment, it will most likely return to the same levels after treatment. As a result, most of the physical changes enabled by the program will gradually revert back to "normal".

## How To Begin Your Treatment Program

**Step 1: Contact 911BioCare at (855) 901-0911** to schedule an appointment and laboratory evaluation

Before you visit our offices, we will prepare a requisition that you can take to any draw site to undergo the following tests:

Hormones of aging

- Insulin-like growth factor-I (IGF-I)
- Insulin-like growth factor binding protein-3 (IGFBP-3)
- Free and total testosterone
- Estradiol and estrone
- Sex hormone binding globulin (SHBG)
- Progesterone
- Fasting insulin

- DHEA-S
- TSH, free T3, & T4

**Step 2: Initial Consultation**

Before your initial consultation you will fill out a questionnaire designed to detect any underlying conditions that need to be addressed. This will also establish a baseline of aging against which to compare your progress. You will then meet with your physician to discuss your medical history and undergo a physical exam. Your laboratory results, history, and exam will be used to design a precision-tailored program specifically for you. You will discuss the expected benefits and risks of your program as well as its administration. The physician will write you a pharmacy prescription to take with you when you leave the consultation.

**Consultation Fees**

Precision Medicine involves frequent assessment and adjustment of hormone levels until a stable regimen is achieved. This methodology requires lab tests and subsequent follow-up visits 2-3 times during the first year, then twice-a-year thereafter. For patients who are not able to visit the office, telephone consultations are available. The fee for the initial evaluation and consultation is $499 and $199 for follow-up consultations every 60 to 90 days. Whereas we do not accept insurance for payment, we will provide you with properly coded invoices that you may submit to your insurance provider for reimbursement. Office visits are generally covered by indemnity insurance plans according to your out-of-network provider schedule.

**FREQUENTLY ASKED QUESTIONS**

How do I begin? What does the program involve?

**STEP 1:** Contact Us

Contact 911BioCare at (855) 901-0911 to schedule an appointment.

**STEP 2:** Blood Test

You are required to get a blood test before your visit. We will send you a lab requisition that you can take to any draw lab. No appointment is necessary for your lab test. You must be fasting for 8-12 hours before the test is performed - nothing to eat or drink except water. Most labs open before 8AM. The results will be sent to our office 3 days later.

**STEP 3:** Treatment

At the end of your initial consultation, you and your physician will determine the course of treatment. A prescription for custom-compounded medications will be written for you by the physician.

**STEP 5:** Follow-Up

After 6 weeks of treatment, you will have your first follow-up consultation with your physician. You will need to get a follow-up blood test 7 days before your consultation. Your physician will discuss the effects of the program and adjust your dosages accordingly. You will repeat this process after 2-3 months and again every 6 months thereafter, depending on the situation.

**What are the costs involved?**

The fee for the initial consultation and is $499. New patients will need two or three follow-ups during the first year of treatment while the proper dosages are determined. Follow-up visits are $199.

**Does your office accept health insurance?**

Our office does not accept insurance for payment. However, this does not rule out the possibility of reimbursement by your insurance provider. We will be glad to provide you with properly coded invoices that you may submit for reimbursement. Many insurance plans will cover the cost of office visits according to their out-of-network provider schedule. You may be subject to an annual deductible and a co-pay, depending on your coverage. Please contact your provider for more details on coverage.

**Will my insurance cover the cost of prescriptions?**

Most insurance companies do not cover the cost of compounded medications. For this reason 911BioCare does not accept insurance for direct payment. However, we will provide you with properly coded invoices that you may submit to your insurance carrier for reimbursement.

**Will my insurance cover the cost of lab tests?**

Insurance plans will sometimes cover the cost of lab tests. Speak with your insurance carrier for more details.

**Will my FSA cover your treatment?**

Many employers offer a Flexible Spending Account (FSA) to their employees. These arrangements permit the employee to stow a portion of their pre-tax earnings in a special account for use on health-related expenses NOT covered by primary health

insurance. Depending on the type of FSA, these arrangements may cover the portion of your treatment not covered by your primary health insurance, including medications, office visits, co-pays, program fees, vitamins & supplements

**Can I use my own pharmacy?**

We are better able to manage your hormone levels with precise accuracy if all medications come from the same pharmacy. Bioidentical hormone modulation is very different from prescribing "one-size-fits-all" drugs like Premarin. Every treatment regimen is custom-tailored to the individual based on the results of blood tests, medical history, physical exam, and symptoms presented. With compounded medications, hormone powders are mixed with a cream base or loaded into capsules. There are many variables such as the absorption level of the cream base or the particle size of the powder. By standardizing with one pharmacy, we are better able to predict a patient's response to a certain dosage and properly adjust the dosage in response to symptoms. If a patient obtains their hormones or supplements elsewhere, we can never be sure exactly what they are taking. Consequently, this makes it much harder for your physician to keep your hormones at optimal levels. We may charge an additional fee to compensate for the commensurate clinical burden associated with the use of another pharmacy.