

**STEPHEN HARROD BUHNER**

**NATURAL  
REMEDIES  
FOR LOW  
TESTOSTERONE**

**HOW TO ENHANCE  
MALE SEXUAL  
HEALTH AND  
ENERGY**

“One of the most important  
books on men’s health today.”

ROSEMARY GLADSTAR



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# NATURAL REMEDIES FOR LOW TESTOSTERONE

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“Stephen Buhner combines scientific research, traditional knowledge, and personal experience into what may be one of the most important books available on men’s health today. He primarily explores the little-known territory of men’s hormonal changes during midlife—a transition in men’s life that has unfortunately been largely ignored, often denied by modern medicine—and offers simple sensible solutions to help men navigate this important cycle of their lives.”

ROSEMARY GLADSTAR, HERBALIST, FOUNDER OF UNITED PLANT SAVERS, AND AUTHOR  
OF *PLANTING THE FUTURE: SAVING OUR MEDICINAL HERBS*

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# PREFACE TO THE 2016 EDITION

“Thank You, Stephen Buhner!”

I am unsure why it is that noticing the obvious is so difficult, why seeing what is right in front of us is so hard—yet it always has been something I struggle with. For example, I had long known that many plants were useful for helping women moderate their hormone levels during menopause. More specifically, I knew that many plants contained estrogenic compounds. Hops, the most potent of them, contains large quantities of estradiol—for women’s bodies what testosterone is generally considered to be for ours. Nevertheless, for two decades (1983 to 2002), it never occurred to me to ask, “Are there any plants that contain testosterone?” That is, it didn’t occur to me until my body began the movement from young adulthood into middle age, the moment when I first experienced andropause, an experience for men similar to what menopause is for women.

Since adolescence, I had never questioned my sexual vitality. It just *was*, like the sun and the rain. Suddenly, my libido dropped precipitously. Erections became problematic. The male equivalent of hysteria (*testeria*) emerged as a daily companion. (*Hyster* comes from a word root that means “womb,” hence *hysterectomy* meaning womb removal or hysteria—overly excited womb.) So, I began to research what was happening to me. I soon discovered something that a few researchers and doctors were calling andropause. (Many other physicians, of course, insist that there is no such thing, despite the contrary experience of many of their patients. Inevitably this leads me to a number of obvious questions about those doctors, none of which I will share here.) During a man’s shift into middle age the research revealed, the level of *free* (not bound) testosterone in most men’s bodies begins to decline. So, a number of doctors treat the condition by prescribing pharmaceutical testosterone, which does in fact raise testosterone levels and significantly reduces the accompanying problems. It was at that moment, finally, that the obvious question emerged. “Are there any plants that contain testosterone?”

Astonishingly enough, no one in the natural medicine world, prior to that moment, had (apparently) asked that question. Certainly, no one had written anything about it. Nor did anyone seem to know of any plants that would increase testosterone levels similarly to the way pharmaceuticals do. *Everyone*, of course, had written, *ad nauseum*, about ginseng as an important herb for men. Ginseng does contain some androgenic compounds and can *help* during andropause, but it is not suitable for testosterone replacement. It is more of a male tonic herb than a hormone replacement herb. For what I wanted to accomplish, I needed something that contained testosterone itself and enough of it that it would work for hormone replacement. And so the search began.

Inevitably, it turned out that there are indeed many plants that contain testosterone, chemical structures identical to the testosterone in our bodies. The (obvious) reason is that these compounds are ubiquitous in nature as hormone regulators for *all* split gender organisms. This includes plants. (There is a reason why so many plants contain estrogenic compounds. It is just that it never occurred to any of us to ask what the reason was.) These hormonal compounds predate our species’ emergence by hundreds of millions of years. So, yes, testosterone is in plants, it is just that no one in the herb

world, for reasons I cannot fathom, ever thought to look for it.

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Ultimately, it turned out that there was one plant on earth (no doubt there are others) that was loaded with testosterone. In fact, in comparison to our body's natural levels, it contains huge quantities of it. (It contains a number of other potent androgenic compounds as well, again identical to those in our bodies.) That plant is the pine tree, most especially its pollen.

Despite the fact that pine pollen has been used in Asia (primarily Korea, China, and Japan) for thousands of years and despite the eagerness of many American herbalists for using traditional Chinese medicines, no one had ever (apparently) thought to bring that particular plant to our continent. Finding some for my use was a bit difficult, but I was determined so find it I did. Once obtained, I tinctured it and began to use it as medicine. Within a few days, my andropausal symptoms began to decline and ultimately disappeared.

I am a writer (an obsession since childhood), so I began work on a book about natural testosterone and men's health. It was ultimately titled (badly, by the publisher) *Vital Man* (Avery 2003), and, unlike my other books, immediately went out of print. As I always do, before suggesting an herb in something I am writing, I actively tried to find someone who could provide it. Some dear friends in upper New York state, Kate Gilday and Don Babineau, who had a small herb business (Woodland Essence) agreed to collect the pollen from their trees and make it into a tincture for sale to the public. (They also began to grow David's lily, discussed in a moment, but it proved too difficult for the climate.)

Regrettably, due to the book's quick demise, only a few people (which fortunately included some knowledgeable physicians) ever read the thing. The tincture that Kate and Don made was in fact a very good one and did sell moderately well for them—but only in dribbles and bits. Pine pollen tincture, as a testosterone concept, continued to linger in some sort of phyto-purgatory. Then, in 2004 Healing Arts Press agreed to reissue the first five chapters of *Vital Man* as *The Natural Testosterone Plan*. For some reason, known only to small children and puppies, when the book came out, pine pollen just took off. The raw food movement discovered it and people such as Daniel Vitalis began touting its virtues and suddenly everyone seemed to be interested in it. In a short period of time a large number of YouTube videos were uploaded, showing anyone who was interested how to harvest and prepare pine pollen. And suddenly here we were, pine pollen a part of the American pharmacopeia of herbal medicine. Finally.

Over the past decade, I have heard from hundreds of men (and their wives) who have used pine pollen for andropausal problems, including low libido and erectile dysfunction. All have reported how well it works for them. It works as well as, and in my opinion better than, pharmaceutical testosterone. Importantly, it does not possess the same side effects that pharmaceutical testosterone does (also discussed a bit in the book). To be fair, however, despite my continued warnings that the herb is *not* for bodybuilders, or those in their twenties, a number of body builders have insisted on using the tincture in large quantities (an ounce at a time, several times a day) in their fixation on becoming modern-day Hercules. They began to report (on the Internet) testes shrinkage, one of the side effects of pharmaceutical testosterone. So, yes it does work, and no it is *not* for bodybuilders or for use by young men, and no you really should not take it an ounce at a time.

You will notice that I mention another testosterone-containing herb in this book, David's lily. It is a much more difficult herb to grow and to prepare for use; it is still not available. Despite my hope that younger herbalists would begin to take the study of testosterone-containing herbs further, that has not happened. (Perhaps *you* are the one who will.) Still, pine pollen is tremendously abundant. Pine trees make tons of it (literally) every year.

And yes, before you ask, I still take it every day and have since 2002. As I enter the early stages of old age I find my free testosterone levels falling ever lower, necessitating an increase in dosage. Even at this time in my life, it continues to work well, keeping my testosterone levels, and my sexual vitality, high. (Only the tincture works for this by the way, for reasons I discuss in the book.) I am pretty sure that, if you are suffering low testosterone levels, it will help you, too. You don't, however, need to shout out during sex (as one couple recently told me), "Thank you, Stephen Buhner. Thank you!" You can just, quietly, go on with your life, testosterone levels high.



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# HOW TO USE THIS BOOK

This book is intended to help men who are experiencing low androgen levels and the attendant physical and emotional problems that go along with them. It is also intended to introduce to a wide audience the idea of phytoandrogens, that is, plants that contain male hormones. While work on phytoestrogens, plants that contain female hormones, is fairly advanced and widely known, the concept of phytoandrogens is not.

In general, the material in this book is intended for men over 40. Few men under that age need hormone replacement therapy. When men move into their own midlife shift, a shift that is equal in its impacts to the one experienced by women at menopause, the process is often difficult. The difficulty comes from two sources. The first is our culture's lack of recognition of and support for this shift in maleness. The second is the scores to hundreds of chemicals that are present in the environment that act as endocrine disruptors, that is, they affect, often significantly, the hormonal balance in the male body.

The use of plants as foods and medicines can often alleviate many of the problems men experience during the midlife shift. Some of these plants contain testosterone, molecularly identical to that produced in our bodies. Many possess other androgens or androgen analogues; some act through specific mechanisms to keep testosterone levels high.

In each section of the book, in order to facilitate easy access to the information the plant, supplement, and food protocols are usually outlined in a box at the beginning of that chapter. You may use any or all of these protocols to enhance your levels of testosterone. As with all protocols intended to alter physical states, you should pay close attention to your own body and determine just which ones work best for you. You, after all, know yourself better than anyone else ever will. You will know if these things work for you, what dosages are best, and how long you need to take them. What I offer here are guidelines only, the beginning of a dialogue about more natural means to help men through this shift. It is my hope that men will come to explore their own midlife shifting, that wide recognition of the importance and process of that shift occurs, and that each generation of men will eventually be supported in this move into a new kind of maleness.

The information and plants in this book helped me a great deal and it is my hope that they will help you as well.



*“Illegitimi non carborundum”*

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# 1 THE IMPORTANCE OF NATURAL HORMONE SUPPORT FOR MEN

*All of us have two lives: the life we learn with and the life we live with after.*

GLENN CLOSE, IN *THE NATURAL*

One of the more amusing stories about scientific research details the year-long, \$100,000 program to determine why children fall off their tricycles. After several well-designed studies were completed and the highly degreed researchers had compiled and analyzed their data, they found that children fall off their tricycles because they lose their balance.

This story often comes back to me when I read various pronouncements from members of the medical profession, and never more often than when I read that there is no such thing as andropause (male menopause). Essentially, they say that because no study has found it, it does not exist. The comments of millions of men that they just don't feel like themselves and that something is wrong are passed off as psychological—our minds playing tricks on us. This same kind of denial has also occurred when discussing women's reproductive conditions, such as menstruation, pregnancy, and menopause. In response, women have pioneered research and exploration into the changes that occur for them during these times and none more so than those that occur during their passage into menopause. Men are long overdue for their own exploration into this territory because the changes that we experience are just as profound, just as life altering, and just as pervasive as those experienced by women. Although it is true that men, at advanced ages, can still participate in creating children and women cannot, there are significant alterations in men's hormonal chemistries as they age, just as there are with women.

Sudden shifts in body chemistries occur for all of us during the major passages in human life: birth, adolescence, middle age, old age, and death. Most of us can remember our shift into adolescence. Our bodies were changing radically, preparing us for reproduction and independence. At the same time, just as significantly, our minds and spirits were shifting, preparing us for life as adults for love and families of our own, for careers, and our individual and unique destinies.

These shifts had tremendous physical and emotional impacts as we moved into adolescence. Our bodies changed shape, our skin altered, we began growing hair in places it had not grown before, and our voices deepened. In short, our entire appearance changed. And, just as significant, how the world saw us changed. We had to get used to a new "image," a new "face." The person we saw when we looked in mirrors, those at home and those in people's eyes, had changed. The young boy we had been was gone, and a new someone had come to take his place. At the same time, a similar process was occurring in our minds and spirits. New options for life were opening up and the world of sex lay before us, with vast horizons of reproductive options and attractive bodies in endless variation. We were learning new interaction styles and figuring out where we wanted to go, what we wanted to do.

and who we wanted to be as adults. A certain force of personality, an older self, had begun to take over and come into being.

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That new way of being—the physical, emotional, and spiritual processes of an adolescent and young adult that came into being as we moved out of childhood—had a certain life span, a certain arc, a period of growth, development, maturity, and then senescence or ending. A transition process, in many ways similar to adolescence, occurs again when we enter the middle of life. We look in the mirror and notice that someone new is taking the place of that young man we were. Then, one day, we mildly flirt with a young woman, much as we always have done since our movement into adolescence, and instead of the usual response, one we had become used to over long years of social interaction, the response we get is different. Her eyes respond with, “You’re old enough to be my father.” In that moment, the changes that have begun catch up with us. We, whether we want to or not, have entered middle age.

Daily, this new truth is reflected back to us. We look in the eyes of attractive women, and the reflection we see is strange, distorted, and middle-aged. A certain shock runs through our system, and we begin to grapple with our own aging process and the end of an earlier, important period of our life. As with adolescence, there are emotional and spiritual components that are essential aspects of this change as well. We begin to examine our lives, to see what we have done and have not done, to sum up, and to take stock. Our function as a man begins to change. Now it is not so much concerned with the reproduction of children but with something else, something that our society is not so clear about, so it is harder to identify, harder to grasp. This cultural unclarity as so many of us find ourselves makes it harder to resolve this change, this shifting that occurs in midlife. At the same time, we notice our body is older. The impacts of twenty or thirty years of riotous, reproductive living, of raising children, learning our trades, surviving our mistakes have all taken their toll. Parts of our bodies are not working as well as they once did. As with adolescence, our bodies are ready for something else, some other function, a function that our society is not so clear about. And so we struggle with this during this midlife change.

The United States is a young country. In many ways our culture is still an adolescent and, as such, is concerned with adolescent things: sex and reproduction, protection of territory, making money, asserting independence, the freedom to do and say what we want, and being top dog. All these things are integral to the movement into adolescence and young adulthood. However, in middle age something else begins to happen. Because our culture is so unclear about what that is, each of us struggles perhaps more than we should with what we are becoming and the new tasks that lie before us. Many of us begin to realize that although it is true that if you are not top dog the view never changes, if you are top dog, the dogs behind you always see you as one thing. We begin to see that there is something other than the adolescent drives that we have known for so long.

Historically, many cultures have understood this transition much better than we now do. Middle age was recognized for its importance, as were the tasks that lay before the newly awakening middle-aged man. The Jungian analyst James Hillman is one of the few writers struggling to understand the territory of middle and old age and its importance. In his book *The Force of Character and the Lasting Life*, he makes a deeply insightful point when he remarks:

The transition [to middle age] is first of all psychological, and to me it means this: It is not we who are leaving, but a set of attitudes and interpretations regarding the body and the mind that have outlasted their usefulness—and their youthfulness. We are being forced to leave them behind. They can no longer sustain us, not because we are old, but because *they*

Middle age and old age are not simply the wearing out of the body but also the movement into new territories of self, into new tasks as human beings. As Hillman goes on to say, "Aging is not an accident. It is necessary to the human condition, intended by the soul." Emotionally, we are, in fact, coming to terms with our youth, thinking it over. The dreams of who we would become, made during adolescence, are pulled out of the cupboard, dusted off, and examined. We compare them to what we have actually done. Then we look over who we are and what we want to do now. It is common to be less interested in the accumulation of power, reproduction, or making money and more interested in the respect of our peers, intimacy, and developing a new wealth of experience of the world. Often men become more interested in learning, travel, and helping younger generations through their own struggles with young adulthood. We see our children into adulthood and our parents out. We look at who we are and discover important things that we must still accomplish, and often we leave one career and begin another, one more concerned, quite often, with deeper aesthetic values.

After this transition, men remain vital, strong, and possessed of new insights, tasks, skills, and strengths. Yet we *are* different. A new form of man has emerged. There is, in fact, a unique ego state that emerges, one as distinctive as that of the two-year-old, the four-year-old, or the adolescent. Like those other crucial developmental ego states, this one, too, is biologically encoded to emerge at a specific time, for a specific reason.

The lack of understanding in our culture of the importance of this new developmental stage of the self, of what it means, what it is for, and just how to move into it gracefully, makes the transition all the more difficult. We enter new territories of self that must be encountered, explored, and experimented with in order for them to be fully realized and for this new way of being to be integrated and whole. Of necessity, we must grieve the loss of that older self, the young man with whom we have lived so long. Eventually, if the territory is fully entered and fully encountered, its shape, its terrain begins to make sense. We begin to find out who we are now and what we are meant to do. There is a celebration of sorts, and many of us come to know ourselves and our purposes here better than we ever have.

All of this takes work. It takes time, and if we are lucky, we can take that time away from work and family and the responsibilities that we have undertaken over the years of our lives. We can take the time to journey inside ourselves and to do this work in interior time.

This would be challenging enough were it the only thing to be dealt with, but there is another factor that makes it harder still, a factor that interferes with the successful transition into a healthy vital middle age: the pervasiveness of chemicals throughout the ecosystem that mimic the actions of estrogens (female hormones). The powerful and historically unique presence of these chemistries in our ecosystem and on our bodies cannot be overstated. Their daily intake, through our food and water, alters the hormonal balance of our bodies and, during the shift into middle age, exacerbates the normal changes that our bodies are biologically intended to make. This results, quite often, not only in loss of energy and libido, but in a number of disease conditions that commonly plague men in later life: infertility, impotence, heart disease, and so on.

During our shift into middle age, our body chemistry begins to change. Testosterone and other androgen (male hormone) levels start to shift in important ways. Our bodies broaden out, our ears grow bigger and longer, hair, once again, begins to appear in unusual places (and disappear in others). These are normal changes. They and many others are elements of our shift into another kind of maleness. But something is interfering with this natural shift of our bodies. Researchers who study the

endocrine system now realize that environmental estrogenic pollutants and substances are entering our bodies in tremendous quantities. When they do so, they shift the balance from testosterone (and other androgens) toward the estrogen side of the equation. Like women, we do have estrogens in our bodies (just as they have testosterone), we just don't have the same quantities, and we have a great deal more testosterone than they do. What is most important is the ratio of androgens to estrogens. Anything that upsets that balance changes who and what we become. We are not our chemistry, but we certainly are affected by our chemistry. The power of our androgenic chemistry to shape who we are begins when we are still in the womb.

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# 2 ANDROPAUSE

## Hormones and the Male Body

*Although men are accused of not knowing their own weaknesses, yet perhaps as few know their own strength. It is in men as in soils, where sometimes there is a vein of gold which the owner knows not of.*

JONATHAN SWIFT

There are essentially four kinds of hormones in our bodies, and they are typed depending on what kind of molecule they are built from. Sexual hormones such as testosterone are built around a specific type of molecule, a sterol, from which the word *steroid* comes. You are familiar with the name of the particular sterol that is used for sexual hormones—cholesterol. It is, in fact, cholesterol from which all steroid hormones are made.

Adrenaline is another kind of hormone that serves as a source of energy during the flight-or-fight response. It is built around an amino acid called tyrosine (as is the thyroid hormone thyroxine) in the adrenal gland. Another type of hormone, insulin, which is highly important in the body's ability to utilize glucose (a kind of sugar) effectively, is built in the pancreas using complex proteins. Others are built around short-chain amino acids called peptides.

Hormones regulate much of the functioning of our bodies. Through complex biofeedback loops, our bodies determine exactly what their needs are at any one moment in time and either make or release hormones to shift their functioning in the direction it needs to go. As an example of this kind of generalized biofeedback, there is no central thermostat in our bodies that keeps them at a certain temperature. Despite the famous 98.6° redlined on so many thermometers, the temperature of the body shifts constantly; it is always in flux. The various systems of the body compare notes as it were and together, in some manner not understood by scientists, come to a conclusion about how temperature needs to shift and then shift it. We are more a collection of cooperating parts, each with its own innate intelligence, than a mechanical system with the brain acting as intelligent overseer. Our hormone levels are, as well, constantly in flux. Our bodies make and release hormones as we need them to remain vital and healthy. Part of this process includes the making and releasing of sexual hormones. In middle age, the amount of testosterone in male bodies naturally shifts, as does the balance between androgens and estrogens. It is the movement toward excess levels of estrogen and the overreduction of testosterone that produces a great many of the problems that men face as they age.

## THE SEXUAL HORMONES

Women's sexual hormones are collectively known as estrogens, the main ones being estradiol, estrone, estriol, and 16 $\alpha$ -hydroxyestrone. Estradiol is the most pervasive and the strongest in its effects, much like testosterone in males. Progesterone, not usually considered an estrogen, is another female steroid hormone that most people have heard of.

Men's sexual hormones are collectively known as androgens, the primary ones being testosterone, androstenedione (andro), androstenediol, dihydrotestosterone (DHT), dehydroepiandrosterone (DHEA), and dehydroepiandrosterone sulfate (DHEAS), a slightly more complex form of DHEA.

The precursor to all these hormones is cholesterol, which is converted, in sequence, into the steroid hormones pregnenolone and 17 $\alpha$ -hydroxypregnenolone. Essentially, pregnenolone is the primary steroid hormone that is converted, or metabolized, into all the other steroid hormones in both women and men; for this reason, it is sometimes referred to as a prohormone. Other people sometimes refer to it as the "mother" steroid, which I guess would make cholesterol the "grandmother." And just as women have some androgens, all men have some estrogens. Each is important in the healthy functioning of our bodies.

In women, estrogens are made in the ovaries, adrenal glands (which sit on top of the kidneys) and brain. Increasingly, research is revealing that both androgens and estrogens also act as potent neurohormones that strongly affect central nervous system activity, which is why both estrogens and androgens are produced in the brain and central nervous system.

Androgens are made in men's testicles, adrenal glands, brain, and peripheral tissues and cells—that is, any muscle tissue or any other cell or organ in the body that needs androgens for a particular function at a specific time. About 95 percent of testosterone is made in a man's testes, most of the rest is made in the adrenal glands, and a small amount is made in peripheral tissues and cells. Other androgens (such as DHEA and DHEAS) are made in the brain from precursors or prohormones like pregnenolone. The two sexual hormones that seem to be the most important, at least on the surface, are estradiol in women and testosterone in men.

Everyone knows that testosterone makes a man a man. Its presence in our bodies literally does make us men. Testosterone peaks three times in our lives. During the second trimester of fetal development, blood levels of testosterone increase from nearly zero to about 4.0 nanograms per milliliter (ng/mL). (A nanogram is a billionth of a gram, and a milliliter is 0.034 of an ounce.) This is a tremendously tiny amount, yet it causes the fetus to develop as male. Then after birth, testosterone begins to rise again, peaks around six months of age at about 2.5 ng/mL, and drops slowly back to nearly zero by age one. Part of the purpose of this surge in testosterone after birth is to initiate the formation of the prostate gland. Still, the gland remains tiny, weighing only 1 to 2 grams. The final rise in testosterone begins between ages ten and eleven and rises slowly to a peak of about 5.0 ng/mL around the age of eighteen. Then it holds relatively steady until sometime around the age of forty-five, when it very slowly declines throughout the rest of life. During this last rise of testosterone in adolescence, the penis, scrotum, and prostate gland all enlarge, the voice deepens, facial and body hair begins to grow, sperm production begins, the bones lengthen and grow more massive, and the body expands rapidly to a much larger size.

Because the overall testosterone levels in the body that physicians usually test for (as opposed to free testosterone, which is something I will talk about later) remain roughly the same after age forty-five, because men can still father children after that age, and because there is not a sudden, comparable, shift in body functions similar to that which women experience during the cessation of menstruation, many physicians and researchers have insisted that there is no such thing as a male

menopause and that, in spite of so many men experiencing it, it is all in our heads. Other researchers who do not accept this perspective, however, have found two interesting things. The first is that while the overall levels of total testosterone remain relatively constant, *free* testosterone levels do change considerably. The second is that the androgen/estrogen ratio shifts significantly as well.

Of the testosterone in the male body, 70 to 80 percent is bound to a protein—sex hormone binding globulin (SHBG). Another 20 percent or so is bound to a different protein—albumin. Bound testosterone is used up, not available, doing something else. Only free testosterone, which makes up only 3 percent of the body's total testosterone level, is completely biologically available and active at the receptor sites of testosterone target cells. As we age, the amounts of these testosterone types alter considerably, which contributes to the alterations men experience in middle age. SHBG bound testosterone increases nearly 80 percent by age ninety. By age 100, free testosterone will usually disappear entirely. The Massachusetts Male Aging Study, conducted at the New England Research Institute in Watertown, MA, found that, in general, in healthy men the amount of free testosterone declines an average of 1.2 percent per year between the ages of thirty-nine and seventy.<sup>1</sup> During the same period, albumin-bound testosterone declines around 1.0 percent per year, while SHBG-bound testosterone and body levels of SHBG increase 1.2 percent per year. But, bound testosterone is only part of the story. During the same time period, the quantity of testosterone that is converted to other substances increases as well.

Testosterone itself is not an end product. It gets converted into other substances that the body needs. For instance, an enzyme called aromatase converts testosterone to the estrogen estradiol, and another enzyme, 5-alpha reductase, converts testosterone to DHT, which many people consider the most potent androgenic substance of all (and the actual hormone that does what testosterone has long been thought to do). DHT is a potent androgen, while estradiol is a potent estrogen. In many respects estradiol can be considered the substance that makes women women. So, the substance that testosterone is converted into (DHT or estradiol) has tremendous impacts on male health and well-being.

In small amounts, estradiol in men is crucial in supporting the health and growth of the neuronal filaments in the brain, which connect brain cells to each other. Estradiol is also crucial in the creation and maintenance of the essential brain neurotransmitter acetylcholine. Estradiol and other estrogens in the male body also support healthy sexual functioning, blood and arterial flow, skin health, and so on. During the middle-age shift, male bodies naturally begin to have a bit more estradiol than they do when younger. This contributes to some of the changes we experience. But, if too much testosterone is converted to estradiol, the androgen/estrogen balance is significantly altered and this can have tremendous impacts on how we feel as men. It can affect our levels of health as well.

The increasing loss of free testosterone over time creates significant alterations in our bodies and our experiences of ourselves. (Remember, we are male simply from exposure to tiny nanogram quantities of testosterone while we were in the womb.) And, at the same time, we are experiencing *more* estrogenic hormones which, at the same tiny nanogram levels, make women who they are. It is no wonder that so many men's experience of themselves and their lives change so much as they begin entering their forties and fifties.

It is this shift in free testosterone levels and the changing androgen/estrogen ratio together that signals our movement into middle age. Hormonal shifting as we move into new stages of life is something that our bodies naturally do, much as when, as infants in the womb, we released the chemicals that began our mother's contractions leading to our birth. These hormonal shifts occur at different ages for every man and no one can predict why, how, or when they will naturally occur. It



an expression of our unique selves: genetic history, body chemistry, environment, beliefs, stresses, fears, hopes, dreams, aspirations, losses, grievings, loves, and destiny. It is a natural occurrence, not an inevitable *decline*, not a disease. It simply is a shift into a new way of being, a new expression of maleness.

Unfortunately, this is where environmental pollutants become a problem. Industrial substances in the millions of tons are entering the environment each year and having tremendous impacts on male sexual health. They are exacerbating the movement into middle age that men naturally experience. Researchers have found that some of these substances cause more testosterone to be converted to estradiol, others actually interfere with the production of testosterone, and still others are potent estrogens that, as they are taken into our bodies, seriously disrupt the androgen/estrogen balance. For many of us, androgen levels are so profoundly affected that sexual vitality and quality of life are significantly reduced.

# 3

## ENVIRONMENTAL POLLUTANT IMPACTS ON TESTOSTERONE

*It is not a debate about whether [endocrine disruption] is happening or not. It is happening. We just have to decide to what degree we want to let it continue to happen.*

LOUIS GUILLETTE

There is significant evidence that scores of substances, usually synthetic chemicals that either are estrogens or mimic estrogens, are entering men's bodies and significantly altering the androgen/estrogen ratio far beyond the normal range that men have historically experienced. Some of these environmental pollutants also have the capacity to bind free testosterone and to interfere with its creation or its proper levels in our bodies. This is affecting younger males, often through estrogen impacts in the womb prior to their birth, as well as older men. Some of the impacts are extremely sobering. As a result of these external (or exogenous) estrogens, Peter Montague of *Rachel's Environment and Health Weekly* (now *Rachel's Democracy and Health News*) observed:

Each year more men in the industrialized world are getting cancer of the testicles [and prostate], birth defects affecting the penis, lowered sperm count, lowered sperm quality, and undescended testicles.<sup>1</sup>

The degree of this shift in male androgen levels is a relatively new occurrence. It began in a very mild way in Europe in 1516 with the passage of the German Beer Purity Act (see the section on hops in chapter 7), spread very slowly for three hundred years, and then began escalating with the discovery and production of synthetic chemicals in industry. Researchers have found that the shifts in male androgen levels and ratios we are now seeing come from hundreds of synthetically produced estrogenic chemicals (estrogen mimics) as well as androgen antagonists or antiandrogens that directly deactivate androgens in our bodies. The past sixty years have seen an evolutionarily unprecedented proliferation of these kinds of synthetic chemicals. One-third of American men, about thirty million of us, are estimated to be experiencing some form of erectile dysfunction or impotence. But, the males of every species, not just humans, are paying the price of these estrogenic pollutants.

### THE EFFECTS OF ESTROGEN MIMICS AND ANDROGEN ANTAGONISTS ON MALE HEALTH

Over the past fifty years, scientists have recorded a frightening shift in men's reproductive health. Sperm counts are showing a significant decline worldwide, testicular cancer has grown

approximately 2 to 4 percent per year in men under fifty years of age, a general increase in cryptorchidism (undescended testes) has occurred in young men, and general increases in hypospadias (penile deformities) have been seen.<sup>2</sup> The increases in testicular cancer, for instance, parallel almost exactly the historical rise in production of synthetic chemicals—industrial, agrochemical, and pharmaceutical. From 1880 to 1920, there was virtually no change in testicular cancer rates. After 1920, they began to rise steadily in direct proportion to the amount of synthetic chemicals that were being produced worldwide.<sup>3</sup>

## Estrogenic Pollution

These kinds of reproductive problems are being seen in the males of scores of species throughout the world: panthers, birds, fish, alligators, frogs, bats, turtles, and many more. Louis Guillette, a reproductive endocrinologist and professor of zoology at the University of Florida, is an expert on the study of endocrine-disrupting chemicals in the environment. He has spent years studying the effects of environmental endocrine disruptors (chemicals that interfere with the activity of sexual hormones). His research on male alligators, he notes, has consistently shown that androgen levels, androgen-to-estrogen ratios, and free testosterone levels are all significantly altered by environmental pollutants and have been for some time. “In males,” Guillette writes, “this abnormality in testosterone persists, so there is a dramatic change in circulating levels of testosterone. DHT is altered as well, and some males have elevated levels of estrogens. So there are feminized males.”<sup>4</sup> He comments that the levels of chemicals needed to produce such changes are incredibly tiny. “We did not [test] one part per trillion for the contaminant, as we assumed that was too low. Well, we were wrong. It ends up that everything from a hundred parts per trillion to ten parts per million are ecologically relevant . . . at these levels there is sex reversal . . . [And our research] shows that the highest dose does not always give the greatest response. That has been a very disturbing issue for many people trying to do risk assessments in toxicology.”<sup>5</sup>

Pharmaceutical-quality steroids are in fact extremely pervasive in world ecosystems. They are entering soil, air, and water in the millions of tons from farming and the heavy use of estrogenic pharmaceuticals by women worldwide. Birth control pills and menopausal hormone replacement therapies are especially pervasive sources of estrogenic pollution. The synthetic estrogen Premarin, for example, is the most widely prescribed pharmaceutical in the United States. Pharmaceuticals such as these are excreted out of the human body and enter the environment, where they continue to be active as steroidal chemicals. Researchers commonly find synthetic estradiol, the most potent estrogen, and another estrogen, estrone, in wastewater coming from sewage plants. They have regularly found concentrations of estradiol at 14 parts per trillion (ppt) and estrone at 400 ppt. All of the male fish downstream from such concentrations of estrogen pollution have been found to exhibit sexual reproductive problems, many of them becoming female. Researchers testing the potency of these estrogens found that sex changes begin at the incredibly tiny levels of 0.1 ppt of estradiol and 1 ppt of estrone.<sup>6</sup>

## DDT and Other Chemicals

Other chemicals such as dichlorodiphenyltrichloroethane (DDT), organochlorines, polychlorinated biphenyls (PCBs), and their metabolites (the chemicals they are metabolized into) are strongly active as estrogen mimics and are prevalent throughout the world's soils, water, and air. Millions of tons of these estrogen mimics are used as pesticides on farms throughout the world. Especially impactful are

huge agribusiness operations, which use these kinds of chemicals in tremendous quantities to increase animal growth.

Although people in the United States think that DDT is ancient history, it is not. Although it is not used in the United States, it is still common in other parts of the world. In fact, in 1995 more DDT was used than at any previous time in history.<sup>7</sup> The United States is not an ecologically isolated country, and chemicals such as DDT circulate in the atmosphere and oceans, so there are still measurable amounts of DDT throughout the soil and water of the United States. DDT is, in fact, a globally pervasive chemical. Recent studies have regularly found DDT in the blood of North American wildlife at average concentrations of 1 nanogram per milliliter. This is about 1,000 times higher than the normal blood levels of free estradiol (which DDT mimics) that should be found in wildlife.<sup>8</sup> And p,p'-DDE, a breakdown byproduct of DDT, has been found to be a powerful androgen antagonist, strongly interfering with male androgen balances and levels in all male species that encounter it.<sup>9</sup> The common pesticide vinclozolin, used on agricultural products such as cucumbers, grapes, lettuce, onions, bell peppers, raspberries, strawberries, and tomatoes, is also a powerful androgen antagonist. Sold under the trade names Ronilan, Ornalin, Curalan, and Voralan and mixed as a part of products such as Hitrun, Kinker, Ronilan M, Ronilan T Combi, Silbos, and Fungo50, it is widely available for agricultural and gardening use. One of its breakdown byproducts (a metabolite) has been found to be 100 times more powerful than vinclozolin as an androgen antagonist.<sup>10</sup> Some of the environmental pollutants, such as the fungicide propiconazole, are so strong that numerous researchers have begun exploring the use of their active chemicals (imidazole derivatives) as male contraceptives.<sup>11</sup> Pyrimidine carbinol fungicides are so potent that they can actually inhibit androgen hormone production. They completely block the synthesis of sterols, including cholesterol, from which all steroid hormones are made.<sup>12</sup>

Phthalates, used widely in medicine to make plastics flexible, have also been found to significantly affect androgen-dependent tissues.<sup>13</sup> Health Care Without Harm, an organization trying to help minimize the negative health impacts from hospitals and medical technology, notes that although some phthalates act as estrogen mimics, others are powerful androgen antagonists. One phthalate, DEHP (Di-[2-ethylhexyl] phthalate), and its metabolite, MEHP (mono-[2-ethylhexyl] phthalate), show significant testicular toxicity, especially to the testes' Sertoli cells. The Sertoli cells nurse immature sperm to maturity, and phthalate-related chemical toxicity results in decreased sperm production. Simply using medical devices (such as plasma bags or tubing) that contain DEHP can result in significant drops in sperm health because the phthalates readily leach out of the plastic and into the human body.<sup>14</sup> Dioxins and plastics that contain polyvinyl chloride (PVC) produce similar kinds of impacts on male health.

## Concerns of Environmental Groups

The environmental group Greenpeace has raised concern about just a few of the synthetic chemicals that are known to be hormone disruptors, including the following:

- Eleven common pesticides and their metabolites
- PCBs (still environmentally present although no longer produced)
- Dioxins and furans (by-products of chlorine production and the chlorinated plastic PVC)
- Bisphenol A (an ingredient used in dental fillings and to coat the inside of tin cans and reusable

milk bottles)

- Phthalates (used to make plastic flexible in such things as checkbook covers, medical tubing, baby teething rings)
- Butylated hydroxyanisole (BHA), a food additive<sup>15</sup>

Increasingly, these substances are being found to have direct impacts on male reproductive health. As the authors of *Our Stolen Future* report, “Several studies report that infertile men have higher levels of PCBs and other synthetic chemicals in their blood or semen, and one analysis found a correlation between the swimming ability of a man’s sperm and the concentration of [PCBs] found in his semen.”<sup>16</sup>

It is not only environmental groups that are concerned. Scientific organizations and environmental agencies in countries throughout the world have come to the inescapable conclusion that male health in every species on Earth is being negatively affected by these synthetic chemicals.

As only one example, the Danish Environmental Protection Agency released a report in 1995 titled “Male Reproductive Health and Environmental Chemicals with Estrogenic Effects.” The 170-page report identified numerous consumer products that contain known hormone-disrupting chemicals such as “pesticides, detergents, cosmetics, paints, and packaging materials including plastic containers and food wraps.”<sup>17</sup> Ten classes of chemicals containing hundreds of different types of products were listed as agents of concern.

Peter Montague reflects that the report makes clear that “in contrast [to natural hormones] many industrial chemicals that enter the body are not readily broken down so they circulate in the blood for long periods—in some cases many years—mimicking natural hormones.”<sup>18</sup> What is worse, these hormonally active substances can combine with each other in ways that are not understood, are not predictable, and have never been studied.

## Effects of Pollutants

The impacts of these kinds of chemicals on our lives and our movements through the stages of our lives as men cannot be overstated. It is tremendously important to recognize that many of the contemporary difficulties that men are experiencing in middle age or even as young adults are the result of the pervasive intake of nanogram-sized quantities of these chemicals. Prostate problems, erectile dysfunction, sterility, sperm motility problems, loss of energy, libido, and even atherosclerosis (fat-clogged arteries), heart disease, and many more common physical problems can be tied to the disruption of the androgen/estrogen balance and the dropping levels of free testosterone in our bodies. In 1920, men in the United States had the same life expectancy as women. As increasing numbers of estrogenic-like substances entered the environment and our bodies, our life expectancy has dropped until we now lag eight years behind women.

The pervasive problem of these chemicals is being compounded by the significant shift in the foods we eat. Over the million years of our evolutionary history, human beings lived as a part of the forest and savanna homes. Normally, they ate several hundred to several thousand kinds of plants each year as a regular part of their diet. Our human bodies have been used to that kind of food intake for millions of years; they expect it and need it. The majority of these plants are filled with hundreds of thousands of potent natural chemicals that we need to remain healthy. On average, people in the industrialized nations now eat from five to twelve vegetables per year. Most of the vegetables have

been modified for taste, which has reduced or eliminated many of their most potent chemical components.

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The combination of these converging historical events is ensuring that men do not enter middle age in vital health as we historically have done. This is why it becomes important for many of us to actively work in some fashion to restore our natural levels and ratios of androgens.

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# 4 PHYTOANDROGENS

## Natural Hormone Replacement Therapy for Men

*As they fell from heaven, the plants said, “whichever living soul we pervade, that man will suffer no harm.”*

THE RIG-VEDA

While it is true that for many of us our hormonal balance has been disturbed and our levels of free testosterone have been falling, it is possible to reverse this process by regularly supplementing the diet with plants high in androgens, natural steroidal supplements and vitamins, and androgen-stimulating foods. Incorporating these as a regular part of your diet, for two weeks to one year, can enhance free testosterone levels and positively alter the androgen/estrogen ratio. The rest of this book will look at the most important plants, supplements, and foods that can be used to increase testosterone levels and alter the androgen/estrogen balance toward the androgen side of the equation. This chapter will look at a unique class of plant medicines—phytoandrogens.

## PHYTOANDROGENS AND HEALTH IN MIDDLE-AGED MEN

The concept of phytoandrogens, meaning plants that contain androgens or those that stimulate androgenic activity in men, is relatively new. Phytoestrogens have a much deeper history, and most clinicians and many people have at least some idea of their existence. Phytoandrogens do the same things that phytoestrogens do, except they do it for men and they do not supply estrogens, they provide androgens. Phytoandrogens increase the body’s levels of free testosterone, and they shift the androgen/estrogen balance more toward the androgen side of the equation.

Plants do this by directly supplying androgens such as testosterone, stimulating the body’s production of androgens, or by interfering with the breakdown (or conversion) of androgens into estrogens or their binding to SHBG (see chapter 2) or albumin. Pine pollen is an example of a plant that supplies significant quantities of testosterone and other androgens. The ginsengs (asian, tienchi, eleutherococcus) and tribulus are examples of plants that stimulate the production of androgens in the body. Nettle root is an example of a plant that prevents the conversion of testosterone into estrogen and interferes with its binding to inert substances in the body.

Plants that contain testosterone are ubiquitous in the environment, but very little research has been done on them. Hopefully, as knowledge of phytoandrogens becomes more widespread, research will follow along. There are a great many plants out there that contain testosterone or other androgens—it’s just that no one has been looking for them.

The following herbs are some of the most powerful phytoandrogens known so far. The plant that contains the most testosterone (and other androgens) is, at this point, pine, especially its pollen. Over the past ten years, I have experienced a great deal of benefit from it, as have a great many men from whom I have heard. David's lily also contains substantial amounts, but at this time it is not commercially available. My own experience is that it is not as strong as pine pollen, perhaps because it must be harvested within a tiny window of time when it reaches peak testosterone production, something that is not always possible. It is included here in the hope that the information on it will stimulate commercial growers to make it available. All the other herbs are easy to find. Sources for all herbs, except David's lily, are listed in the resource section at the end of the book.

The combination protocol outlined here will reliably act to increase testosterone levels, generate energy levels, and overall sense of well-being.

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### Natural Testosterone Enhancement Protocol

**Pine pollen tincture:**  $\frac{3}{8}$  tsp. three times per day

**Nettle root:** 1200 mg per day

**Tribulus:** 500 mg three times per day

**Panax ginseng:**  $\frac{1}{4}$  tsp. daily

**Tienchi ginseng:**  $\frac{1}{3}$  tsp. three times per day

**Eleuthero:** 1 tsp. twice a day

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### Pine (*Pinus spp.*) and Pine Pollen (*Pollen pini*)

**Family:** Pinaceae

**Common Names:** Pine. Specific species have different names: Scots or Scotch pine (*Pinus sylvestris*), black pine (*Pinus nigra*), Korean pine (*Pinus koraiensis*), masson pine (*Pinus massonia*), Chinese pine, aka Chinese oil pine, aka Chinese red pine (*Pinus tabulaeformis*).

**Primary Species Used:** Although all pine pollens contain testosterone, the primary species of trees used for their pollen are *P. sylvestris* and *P. nigra* in the United States, *P. koraiensis* in Korea, and *massonia* and *P. tabulaeformis* in China. Any species, however, will do.

**Parts Used:** All parts of the pine are used for medicine: the pollen, bark, seeds, and needles. To increase testosterone in the body and balance the androgen/estrogen ratio, the pollen is the primary part used. It is very high in testosterone. To a lesser extent, the seeds may also be used for this purpose, with some caveats (see chapter 6). Although the bark is excellent for many things, it normally does not contain enough testosterone and other androgens to be of use for this purpose.



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