

Hormones, Aging and the Female Sex

Hormones are the most powerful molecules in biology.
Hormones control the function of every tissue and organ in the body.
We require optimal hormone levels/effects for optimal quality of life and health.
Hormone loss with aging is deleterious, not adaptive.
Menopause is the complete failure of endocrine glands and must be treated.
Women suffer from cortisol and thyroid deficiencies much more than men do.
Hormone restoration to more youthful levels is both beneficial and safe.

1 The Endocrine System

There are hundreds, perhaps thousands of signaling molecules in our bodies that that can be called hormones, however most of them have only limited or local effects. Only a few are secreted into the blood stream in large amounts by specialized glands. These major hormones include cortisol, T3, estradiol, progesterone, testosterone, DHEA and growth hormone. They are the most powerful molecules in biology—controlling the metabolism, growth, reproduction, and repair of every cell, tissue and organ. Each also has precursors and metabolites that have effects. Each is activated, deactivated, or transformed into other hormones within the tissues and cells of the body. For genetic and other reasons, persons vary in their sensitivity to and their need for the various hormones. The amount of hormone in the blood only indicates the hormone's availability; it is not a measure of its effects in the tissues. Because of the complexity of hormonal systems, the only true measures of hormone effect are the end results: the patient's signs and symptoms, and some measurable metabolic parameters.

These major hormones affect our health and quality of life in more ways than we know. Each has many different effects in the various tissues of the body. They also have many interactions—each directly or indirectly affects every other hormone's levels and/or effects. The endocrine system is truly a complex symphony that we are only beginning to understand. T3 and cortisol are the most powerful hormones; they determine our ability to function, mentally and physically, under normal circumstances and under stress. T3 determines the amount of energy production in every cell; and thereby the growth and function of every tissue and organ. Cortisol is our primary stress-coping hormone—necessary to mobilize the body's resources in order to cope with both the normal and the excessive stresses of life. The "sex hormones", estradiol, progesterone and testosterone, are not just for reproduction; they are necessary to maintain our brains, muscles, blood vessels, skin and bones. DHEA is the most abundant steroid hormone in the body, yet virtually ignored by conventional endocrinology. It is co-secreted with cortisol to counteract and balance cortisol's deleterious effects in the body. It is a precursor of estradiol and testosterone and is converted into these hormones within our cells. DHEA produces a large proportion of the total androgen (testosterone-like) effect in women's bodies. It in anabolic builds and maintains our tissues and our immune system. Growth hormone stimulates growth when we are young

and stimulates tissue repair when we are old. All these hormones work together to produce health and well-being. We need all of them and in sufficient, and even better, in optimal amounts. They must also be in balance with one another. No hormone deficiency can be considered or treated in isolation from the other hormones or from the individual's unique physiology and medical state.

In recent decades we have come to understand that these major hormones are vital parts of the integrated neuro-endocrine-immune system that maintains our homeostasis—our ability to adapt to the changing demands of life. They maintain not only our health but our ability to function under various circumstances. They affect our energy, calorie consumption, muscle strength, stamina, mood, mental function, digestion, sleep, sexual function, pain level and immune function. Just as we require optimal levels of essential vitamins, minerals and nutrients, we require optimal levels of each of these hormones throughout our lives in order to feel and function as well as possible. A partial deficiency of one of these hormones reduces our quality of life and degrades our long-term health. This is particularly true of T3 and cortisol. Fortunately, we now have the ability to replace every one of these hormones and thereby optimize their levels and effects and their balance with one other.

The hormones that I will discuss in this book are made in these glands:

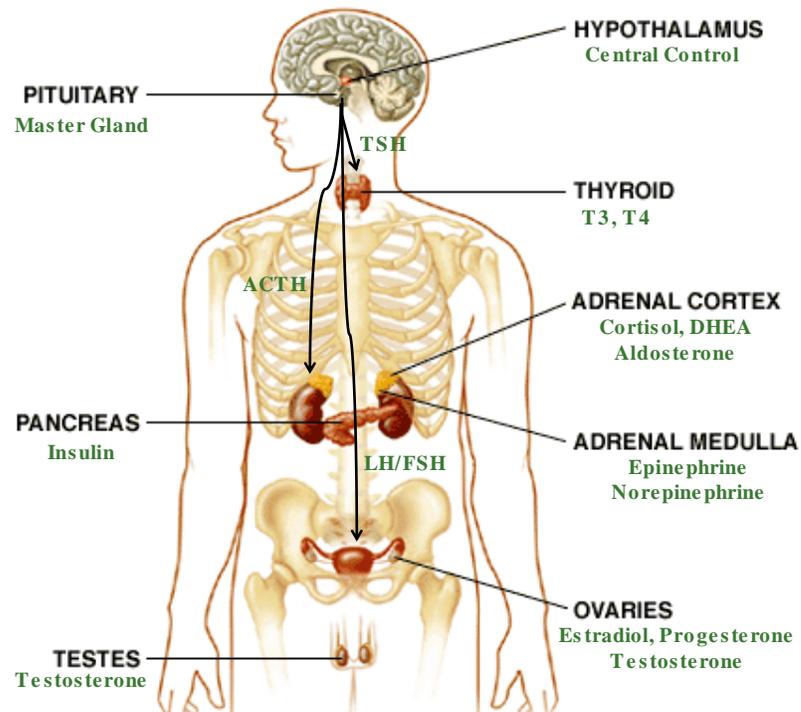
Adrenal Cortex: cortisol, DHEA and aldosterone

Thyroid: inactive thyroxine (T4) and active triiodothyronine (T3)

Ovaries: estradiol, progesterone and testosterone

Testes: testosterone

Anterior Pituitary: growth hormone



The anatomy of the hormonal system
Altered from original illustration [Website](#)

These hormones have precursors and metabolites that I will discuss as needed. The ultimate controller of the endocrine system is the hypothalamus. It is a small but highly complex neural system located at the base of the brain. It is part of the brain and is affected by connections to other parts of the brain. The hypothalamus senses the amounts of the various hormones in the blood and integrates this data with many other physiological inputs. To increase or decrease the level of a hormone, the hypothalamus secretes more or less of several releasing hormones. These travel in small blood vessels to the pituitary gland that hangs from its base. These hypothalamic hormones cause the pituitary to make and release other hormones, including the hormones that stimulate the major endocrine glands. The pituitary is rightly called the “master gland” because it secretes:

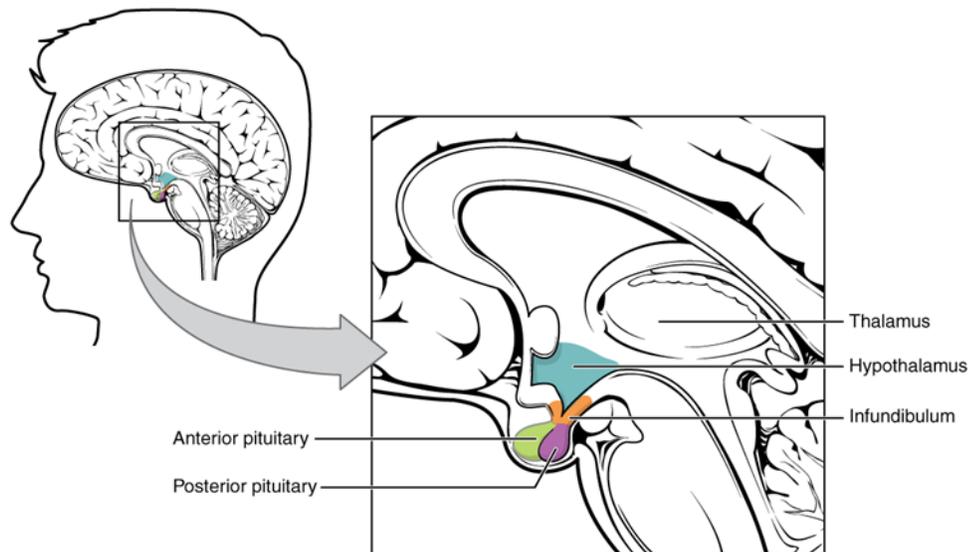
Adrenocorticotropic hormone (ACTH): stimulates the adrenal cortex to release cortisol, DHEA and aldosterone

Thyroid stimulating hormone (TSH): stimulates the thyroid gland to make and release T4 and T3 and stimulates the conversion of T4 to T3 throughout the body

Follicle stimulating hormone (FSH): in females it stimulates the egg follicles in the ovaries to mature and to produce estradiol; in males it stimulates the production of sperm in the testes

Luteinizing hormone (LH): in females it stimulates ovulation and the production of progesterone by the ovaries; in males it stimulates the production of testosterone in the testes

Growth hormone (GH): has direct hormonal functions and stimulates the liver to make insulin-like growth factor-1 (IGF-1) which promotes growth and repair.



The hypothalamic-pituitary system
OpenStax College - Anatomy & Physiology, Connexions [Website](#)

The pituitary produces a few other hormones that I will not discuss in this book: prolactin, anti-diuretic hormone and oxytocin. The pituitary's hormone secretion is controlled by feedback loops at

both the hypothalamic and pituitary levels. Both organs sense the amount of hormone in the blood and adjust their output accordingly. They are referred to collectively as the hypothalamic-pituitary (HP) system. The HP system is highly complex and also affected by other influences—by various neurotransmitters, hormones, nutrients and toxins. The HP system is part of our brain; so it is ultimately our brain that controls our hormones. Due to its complexity and vulnerability, and its deterioration with age, dysfunction of the brain-HP system is the cause of most relative or partial hormone deficiencies. Hormone deficiencies are categorized according to their cause:

Primary Hormone Deficiency: Dysfunction/disease/damage affecting the hormone-producing gland

Secondary Hormone Deficiency: Dysfunction/disease/damage affecting the pituitary gland

Tertiary Hormone Deficiency: Dysfunction/disease/damage affecting the hypothalamus

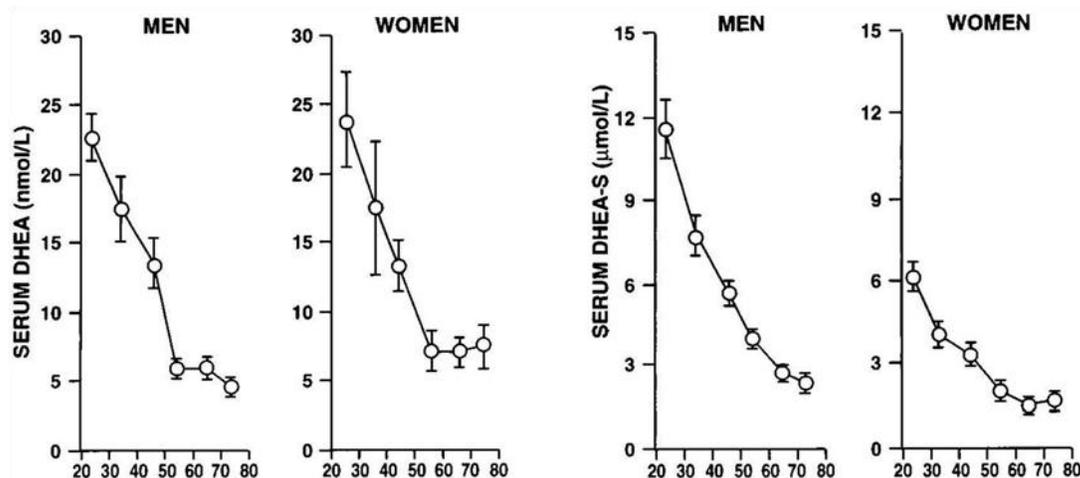
Central Hormone Deficiency: Dysfunction/disease/damage affecting the HP system (unspecified)

Hormone Resistance: Inadequate hormone effect in spite of sufficient blood levels.

One will also find the term “secondary” to refer to a hormone deficiency due to some obvious cause. It is frequently used to refer to a hormone deficiency caused by taking the hormone for some time and thereby temporarily suppressing one’s ability to make the hormone.

2 Hormone Loss with Aging: Good or Bad?

The neuro-endocrine-immune system deteriorates with age as does the rest of the body. The brain, HP system and endocrine glands gradually become less functional. As a result the levels of most of the major hormones decline with age. So one of the fundamental questions in endocrinology is: What does this hormone loss with age mean for our health and well-being? Is it adaptive—good for us? Does it help us to live longer, healthier, more productive lives? Are the higher hormone levels in our youth necessary for reproduction and for greater physical strength and stamina, but deleterious for our long-



The decline in adrenal DHEA and DHEA(S) with age

[Labrie F... J Clin Endocrinol Metab. 1997 Aug;82\(8\):2396-402](#)

term health? Is Nature helping us to live longer by reducing our hormone levels after our reproductive

years? If so, then the faster our hormone levels decline to some undetermined lower level, the better for us. Maybe we will live longer if we have lower levels in our youth also? Maybe menopause and/or the surgical removal of our ovaries or testes at any age is good for us. If this view of hormones and aging is true, then we should never restore any hormones to more youthful levels.

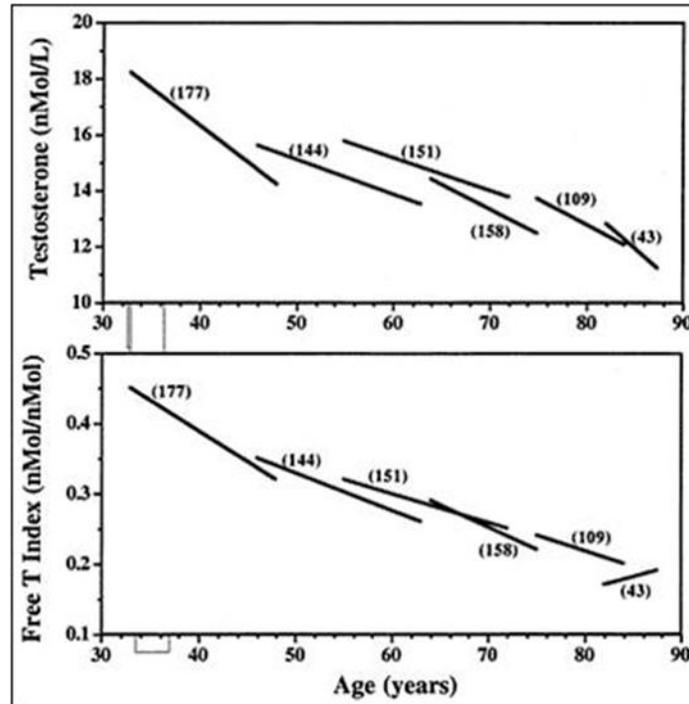
This is the view of conventional endocrinology. It assumes that age-related declines in hormone levels natural and therefore adaptive (good for us). So it assumes that hormones lost to aging should not be restored. Therefore it assumes that hormones are dangerous and their replacement deleterious for our health. Therefore it concludes that we shouldn't diagnose or treat any hormone deficiencies unless they are nearly complete and have been proven to have negative health consequences. Endocrinology considers hormones to be drugs; harmful until proven otherwise by long-term randomized trials. These beliefs are unstated, and therefore not openly debated. They are unstated because they would not survive scrutiny. This fundamental misunderstanding of hormones is what causes endocrinologists to view menopause, the near-total loss of estradiol, progesterone and testosterone caused by ovarian failure, as "normal" and not requiring hormone replacement. They are actually convinced that it's dangerous to replace these hormones due the problems caused by the [PremPro®](#). Even when a younger woman's ovaries fail or are removed, physicians often won't replace her estradiol, progesterone and testosterone. At most, they will give her a little "estrogen" and only until she reaches the age of menopause—when Nature dictates "No more hormones for you".

2.1 Aging is Pre-Programmed Obsolescence

This conventional position on aging and hormones is inconsistent with what we know about evolutionary biology and with all other scientific evidence. Indeed, the evidence indicates that hormone loss with aging is destructive—it contributes to our deterioration and death. Studies consistently show that having lower hormone levels compared to others, both in our youth and our old age, is associated with reduced functionality and with greater incidences of the disorders and diseases that affect us as we age. (See later chapters) To sort through this controversy, we have to think about the known biomolecular and clinical effects of these hormones and about the causes of their decline. We must first consider the evolution of life.

Since Charles Darwin explained the origin and alteration of the species by natural selection, we have understood that complex species have limited life spans for a reason—so that they can evolve. A species must change in order to adapt to a changing environment. Species that do not adapt when required become extinct. In recent decades we have learned that the chief mechanism of evolutionary change is genetic: gene mutations and sexual recombination. We are beginning to understand that there are also epigenetic changes that can be passed on from one generation to the next, involving the proteins that regulate gene expression. If every individual could potentially live forever a species would change very slowly if at all. On the contrary, the shorter the lifespan, the more generations are produced, the faster the species can adapt. We *homo sapiens* owe our unique intelligence and linguistic faculty to the limited lifespans of our mammalian, primate and humanoid ancestors. Seen in the light of evolution, aging is

adaptive for the species, but is not good for the individual. What we call “aging” is actually Nature’s way of killing the individual for the greater good of the species and the biome in general. Aging is a pre-programmed process of destruction—the purpose of which is to remove us from the gene pool.

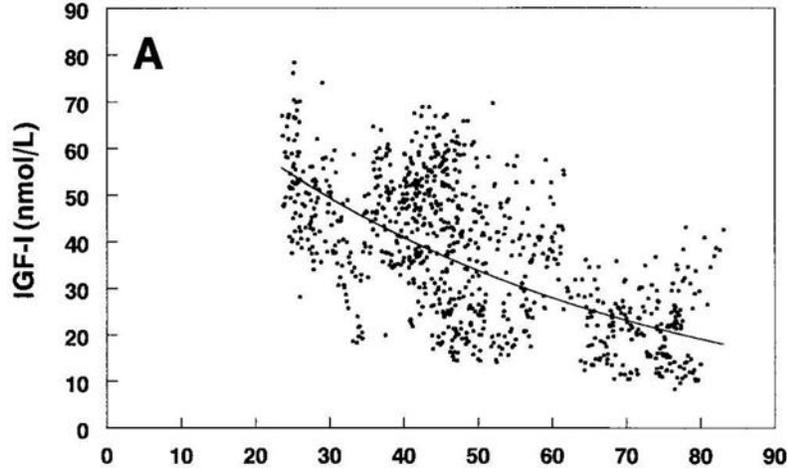


The decline in men’s testosterone levels with age
Baltimore Longitudinal Study of Aging

[Harman SM... J Clin Endocrinol Metab. 2001 Feb;86\(2\):724-31](#)

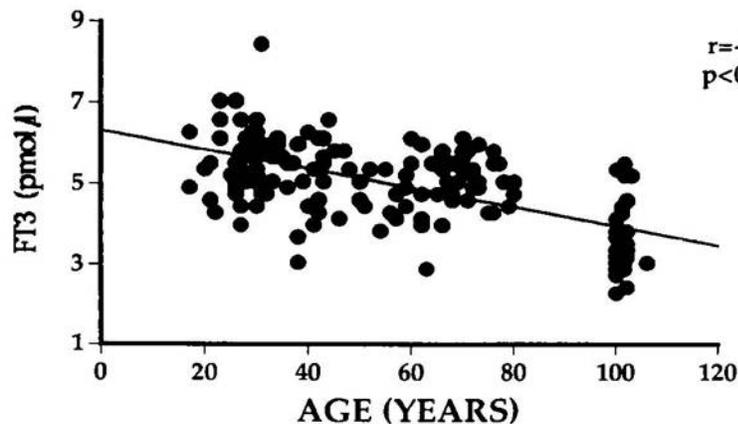
Consider the human lifespan. Our species differs from other primates due to the much larger role of intelligence in our survival. Human children require the longest period of nurturing and support of any species. Our complex brains do not become mature, fully capable of abstract thought, until 14-16 years of age.¹ Only then are we fully capable of surviving on our own. So adults generally remain healthy and strong only long enough to produce numerous children and then to be able to assure their survival until they can be independent. Women run out of viable eggs (oocytes) by age 52 (menopause) and can no longer become pregnant. This too is adaptive for the species—for if a woman could continue to conceive throughout her entire life she would become incapable of caring for her prior offspring. Her later babies would also die before and after her death. After menopause, with no remaining eggs, her ovaries can no longer make estradiol, progesterone or testosterone. The loss of these hormones is accidental to the cessation of fertility. The hormone loss is relatively neutral for the species, but highly deleterious for the woman.

¹Inhelder B, Piaget J. *The Growth of Logical Thinking from Childhood to Adolescence*, trans. by Parsons A, Milgram S, Basic Books, New York, 1958.



The decline in IGF-1 with age due to the decline in growth hormone secretion
[Borofsky ND... Clin Chem. 2002 Dec;48\(12\):2248-51](#)

In order to kill us by age 80 to 90, Nature must begin to degrade our health much earlier. Indeed, our health and our hormone levels are optimal only in our youthful years—in our twenties—and begin to decline thereafter. Aging's deleterious effects begin much earlier than we would like to admit. After age 25 we begin to lose the hormones that maintain our tissues and support our health and vitality: testosterone, estradiol, progesterone, thyroid, DHEA and growth hormone. After age 25 we are deteriorating biomolecular machines. This fact is obvious in athletic competition. A 30 yr-old athlete is

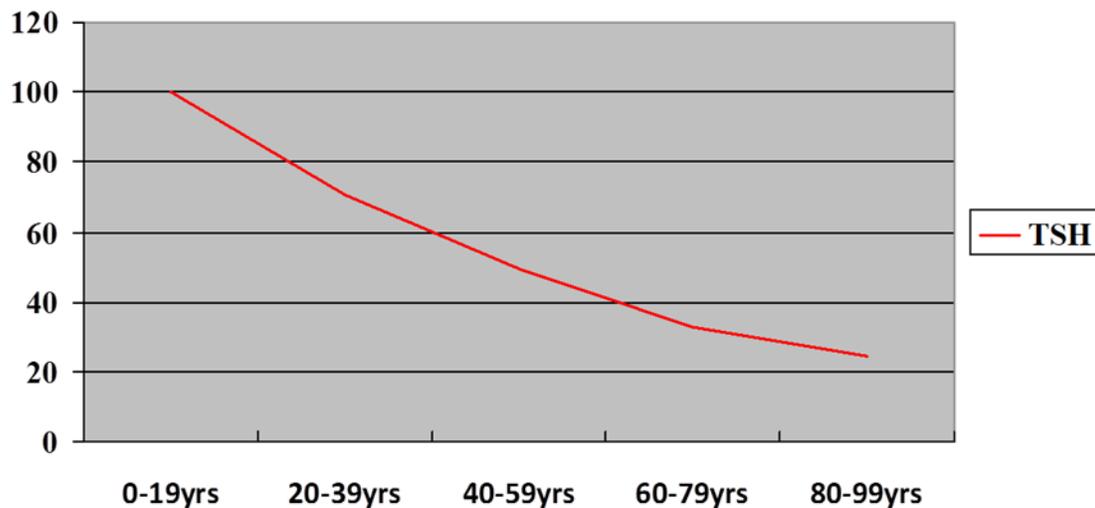


The decline in T3, the active thyroid hormone, with age
[Mariotti S... Endocr Rev. 1995 Dec;16\(6\):686-715](#)

over-the-hill and very few 35 yr-olds can compete with younger persons. It is also true in other aspects of life. We learn most quickly and are most creative in our teens and twenties. A woman's fertility peaks in her mid-20s. After age 35 pregnancy is less likely and more risky (spontaneous abortions, genetic abnormalities, hypertension, diabetes, etc.). Women start to lose bone mass at age 30. By age 50 both

men and women have been suffering from hormone deficiencies for more than 20 years. By the time a man reaches 80 his testosterone, DHEA and growth hormone levels are one-third to one-quarter of what they were in his youth. Thyroid hormone (T3) levels also decline with age in both sexes, slowing our metabolism. It is true that eating right and exercising can help to keep testosterone, DHEA and growth hormone levels higher than they otherwise would be, but even the healthiest lifestyle cannot stop age-related hormone loss.

What causes hormone levels to decline? It is probably the same process of degradation that affects every cell, tissue and organ in our bodies. Age-related cellular degradation causes the gradual deterioration of both the HP system and primary glands. The hypothalamus loses stem cells and this loss has been associated with aging in mice.² Injection of new stem cells into the hypothalamus retards the aging process.³ The hypothalamus largely controls pituitary hormone secretion, so age-related HP dysfunction results in lower HP sensitivity and output, and therefore reduced production of the various stimulating hormones and of growth hormone. The primary glands also function less well. They become less sensitive to the stimulating hormones and less efficient; they produce less hormone with the same stimulus.



The HP system's declining TSH response to low FT4 levels with age.

[Carlé A... Thyroid. 2007 Feb;17\(2\):139-44](#)

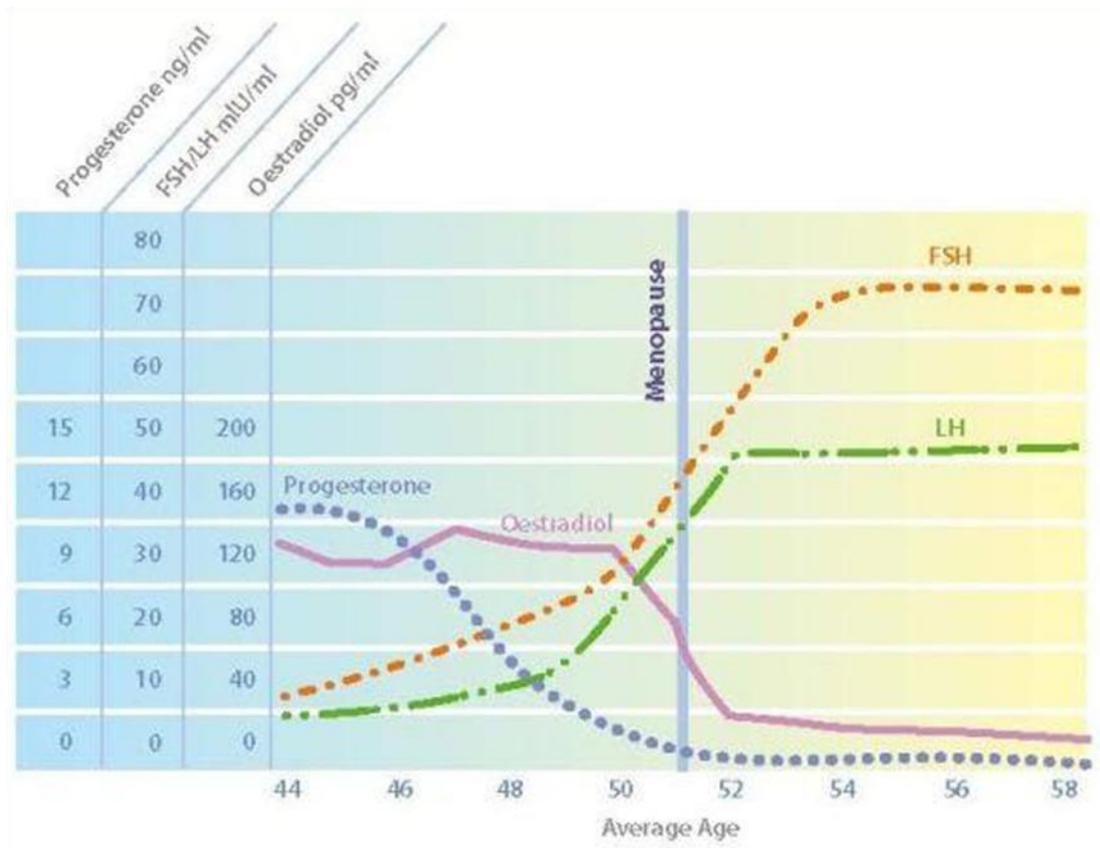
Aging therefore causes mixed central-primary hormone deficiencies. A straightforward example is the decline in testosterone levels in men with age. A man with a low-in-range or below-range testosterone level for age usually has a normal LH level. Therefore his HP system is dysfunctional—it is failing to increase LH secretion to compensate for the less efficient production of testosterone by the aging testes. The testes are also dysfunctional as they are failing to produce sufficient testosterone with “normal” amounts of LH stimulation. The thyroidal system is similarly affected by aging. The sensitivity

² Zhang G... Hypothalamic programming of systemic ageing involving IKK- β , NF- κ B and GnRH Nature. 2013 May 9;497(7448):211-6. [PubMed](#).

³ Zhang Y... Hypothalamic stem cells control ageing speed partly through exosomal miRNAs. Nature. 2017 Aug 3;548(7665):52-57. [PubMed](#)

of the HP system to lower FT4 levels declines with time (see figure above), leading to lower TSH production and lower FT3 levels with aging.

Menopause is unique among age-related hormone losses as the primary glands (the ovaries) fail completely before death. Interestingly, her FSH and LH levels rise and stay high for the rest of a woman's life. The HP system never stops trying to get the ovaries to work again, just as it responds to the complete failure of any other gland. The brain was not "informed" that menopausal ovarian failure is normal or good. As far as the HP system is concerned, menopause is a disaster. Menopause is natural, but it is not good for women. It is an evolutionary compromise. It was also rare for our distant ancestors to survive to age 80 or 90 as we often do now. There was no evolutionary pressure for hominid and then human females to maintain their health and quality of life for very long after age 51, the average age of the onset of menopause. Evolution "cares" only about the species, not the individual.



The decline estradiol and progesterone in perimenopause along with the rise in LH and FSH.
No longer found at its [original site](#).

2.2 Hormone Loss Hastens Aging

The bulk of existing medical evidence indicates that age-related hormone loss is not adaptive; it is not good for us and does not help us live longer. In later chapters I'll review the literature regarding each hormone in detail—the deleterious effects of lower compared to higher levels in general and with aging.

It is obvious that the gradual decline in our hormone levels with aging slowly degrades our quality of life and our long-term health. Aging and hormone loss go hand-in-hand: aging causes hormone loss and hormone loss hastens aging. It is a vicious cycle. Age-related hormone loss contributes to insomnia,

Aging and Hormones

Hormone levels are optimal at ages 20-25.

Aging causes hormone loss.

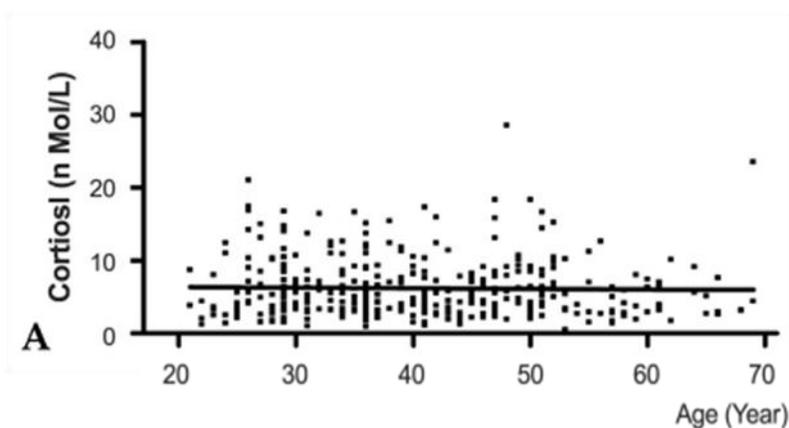
Hormone loss contributes to aging.

Hormone restoration improves well-being and health.

fatigue, muscle weakness, sexual dysfunction, depression and reduced cognitive function. Hormone loss also contributes to many of the common disorders and diseases that we suffer as we age—diabetes, hypertension, heart

attacks, inflammation, osteoporosis, dementia, frailty and some cancers. Notice that these problems are all rare in our youth and become prevalent many years after hormone levels have begun to decline. They continue to increase with age as hormone levels decline. Persons with lower levels of the major hormones are more likely to suffer from aging-related symptoms, disorders and diseases. The rate of age-related hormone loss differs among persons—some have far greater age-related losses than others.

Women's universal, near-total loss of estradiol, progesterone and testosterone at menopause degrades their quality of life and their long-term health. In addition to the hot flashes, insomnia, depression and memory problems, it causes osteoporosis, heart disease, and dementia. Men's partial loss of testosterone with age reduces their mood, motivation, energy, mental function, libido and muscle strength. It also promotes atherosclerotic heart disease, strokes and diabetes. Men who have greater age-related declines in testosterone, DHEAS and growth hormone have a 2.5-fold greater risk of death.⁴ Lower growth hormone production reduces a person's mood and sleep quality, and muscle and bone strength. It promotes diabetes, high cholesterol levels and atherosclerosis. Lower DHEAS levels with aging promote atherosclerosis, diabetes, bone loss and susceptibility to infections. Lower thyroid



In general, saliva cortisol levels do not decline significantly with age.

[Ahn RS... Yonsei Med J. 2007 Jun 30;48\(3\):379-88.](#)

⁴ Maggio M... Relationship between low levels of anabolic hormones and 6-year mortality in older men: the aging in the Chianti Area (InCHIANTI) study. Arch Intern Med. 2007 Nov 12;167(20):2249-54. [PubMed](#)

levels/effects reduce the functionality and health of every tissue and organ in the body. The relative hypothyroidism of aging causes higher cholesterol levels, higher blood pressure and atherosclerosis. The slower metabolism promotes weight gain which leads to insulin resistance, diabetes and hypertension.

Cortisol is unique in many ways due to its vital role in stress-adaptation. Sufficient cortisol is essential to respond to the demands of life. Cortisol is unique among these hormones in that it does not typically decline with age. (See figure above.) However, all of the hormones that counteract and balance cortisol do decline with age: DHEA, estradiol, thyroid, testosterone, progesterone and growth hormone. This produces a relative excess of cortisol effect in cortisol-sufficient persons with aging, especially among men. They develop a sort of mild Cushing's Syndrome. This is seen in their puffy faces, tendency to weight gain, abdominal obesity, higher blood pressures and higher blood sugar levels. Persons with lower cortisol levels exhibit less of these changes---they tend to remain thin, have flat bellies and a low blood pressure. Cortisol is catabolic—it breaks down our body's tissues in order to produce glucose so that we can respond to stress. So having the same youthful cortisol levels as we age but less of the anabolic (tissue-building) hormones causes a loss of muscle mass, bone mass and skin thickness. We develop insulin resistance, atherosclerosis and reduced immunity.⁵ This relative cortisol excess shortens our lives. It is corrected by restoring the hormones that counteract and balance cortisol's effects.

3 Hormone Restoration is both Safe and Beneficial

The conventional wisdom is that the obvious improvements in quality of life and mental/physical function with hormone replacement come with a cost: damage to one's health. Most physicians believe that restoring sex hormones in women and men increases the risk of heart attacks, strokes and sex-organ cancers. Consider that even if this were true it remains the individual's right to decide between higher quality of life and longer length of life. Many patients have told me that they feel and function so much better with hormone replacement that they would continue the therapy even if they knew it would shorten their lives. They would rather have better mood, energy, and mental-physical function now and for as long as possible, instead of suffering every day in order to live a longer life. I think that most persons would choose quality over quantity if they had to. Fortunately, the evidence indicates that we do not have to make that choice. Hormone restoration not only improves our quality of life but our long-term health as well. Careful, individualized hormone restoration is a win-win intervention. It prevents, delays, or mitigates the age-related problems listed above. More youthful hormone levels and balance help to maintain our vitality and health as we age.⁶

Of course, hormone restoration cannot stop the aging process. What it does is to slow some of the ravages of aging. Consider that natural interventions like hormone and nutrient optimization that make us feel and function better must do so by improving our physiology. Better physiological function should logically lead to better long-term health. This is obvious; however there are many sources of confusion about hormone replacement. One of them is the long history of misguided attempts at "hormone

⁵ Chahal HS... The endocrine system and ageing. *J Pathol.* 2007 Jan;211(2):173-80. [PubMed](#)

⁶ Schwartz E... Hormone replacement therapy in the geriatric patient: current state of the evidence and questions for the future. Estrogen, progesterone, testosterone, and thyroid hormone augmentation in geriatric clinical practice: part 1. *Clin Geriatr Med.* 2011 Nov;27(4):541-59. [PubMed](#)

replacement therapy” by the medical profession. Doctors have caused problems by using the wrong molecules or wrong routes of delivery, or by creating imbalances among the hormones. Much of what has been called “hormone replacement therapy” has not even involved human hormones. The [PremPro® disaster](#) is one case in point. In fact, the problems caused by hormone-like drugs have not been seen in studies of properly-delivered and properly-balanced human hormone replacement. (See later chapters.)

Hormone restoration is a new science, and all hormone therapies must be individualized. The physician must try to produce the “symphony” that is right for each person. Hormone restoration is also an art. We don’t need to exactly mimic youth. For instance, in menopause, women don’t need to replicate the estradiol and progesterone peaks and troughs of the menstrual cycle. That cycle existed to make babies, not for women’s health per se. Persons with certain disorders or diseases also cannot tolerate youthful levels of certain hormones. Youthful hormone levels may cause problems in some aged or diseased tissues or organs. The heart, for instance, is more prone to arrhythmias with age and may not tolerate the stimulatory effect of youthful thyroid hormone levels. In addition, youthful levels of one hormone may be deleterious if the hormones that are needed to counteract and balance its effects are deficient. Hormone restoration must always be done with attention to the individual’s medical condition and with the goal of achieving a physiological balance among all the hormones.

4 The Female Problem with Hormones

It is the fashion now to try to minimize the physiological differences between men and women. This actually does women a great disservice as it diverts attention from the real source of many of their problems. Women suffer disproportionately from endocrine disorders for the simple reason that they bear the burden of reproduction. Their complex endocrine system did not evolve to give them optimal strength and vitality at all times—as it did in men. It evolved to produce, breastfeed, and care for babies. Thus a woman’s endocrine system functions for her children’s benefit, not her own. Indeed, our species has much more sexual dimorphism than other species—our sexes are more highly differentiated to perform different tasks—there is a greater division of labor. In modern societies we have lost sight of what was normal for women throughout history. In hunter-gatherer societies, without birth control or cultural restrictions on sexual intercourse, women between ages 15 and 50 were usually pregnant or breastfeeding. They had ovulatory menstrual cycles only for around 4 years of their lives. Today women have ovulatory menstrual cycles for 20 to 40 years. With ovulatory cycles, estradiol and progesterone levels fluctuate greatly, producing symptoms that range from mild to disabling. Under stress, even the moderate stress of regular vigorous exercise, women’s ovaries shut down. Women cannot exercise as vigorously as men without losing vital hormones. Ovulation ceases in order to prevent pregnancy during famine or flight. This protective mechanism deprives women of the estradiol, progesterone and testosterone that they need to maintain their health.

Pregnancy involves large changes in a woman’s endocrine system; not only in estrogen and progesterone levels. During pregnancy her own thyroid and cortisol production systems are suppressed

by hormones made by the placenta—pregnancy literally takes over a woman’s endocrine system to assure the survival of the fetus. Thus women with thyroid and/or cortisol deficiencies will often feel much better when pregnant. After delivery, a woman’s endocrine system has to recover its pre-pregnancy functionality. Sometimes it fails to do so and she is left with a temporary or permanent cortisol or thyroid deficiency. Thus many women report that their fatigue, depression or anxiety began after delivering a child. While breastfeeding, estradiol and progesterone remain low for months or years until menstrual cycles resume. At menopause ovarian function ceases permanently, leaving them in a state of severe sex-steroid deficiency—for the rest of their lives.

In contrast, the testosterone-dominant male hormonal system evolved to optimize men’s performance throughout life—enabling them to hunt, fight and build. Men suffer no hormone fluctuations or losses that impair their function. Men have 20 times more testosterone than females do, giving them much greater muscle mass and strength, greater physical stamina and less fearfulness. Men’s testosterone-dominant system also gives them higher cortisol levels/effects than women, and

Female Endocrine Problems

Optimized for childbearing and feeding
 Very low testosterone levels = weakness
 Lower cortisol levels/effects = less stamina
 Large monthly swings in hormone levels
 Higher estradiol levels counteract cortisol
 Endocrine dysfunction after pregnancies
 Gonadal failure at age 45-55

thus greater physical and mental stamina under prolonged stress. Testosterone also reduces anxiety, make men more comfortable taking risks, making difficult decisions, etc. Women’s lower cortisol levels/effects cause them to suffer more from fatigue, anxiety, cognitive dysfunction and pain. Their relative hypocortisolism explains the much higher female incidence of allergies and autoimmune diseases.

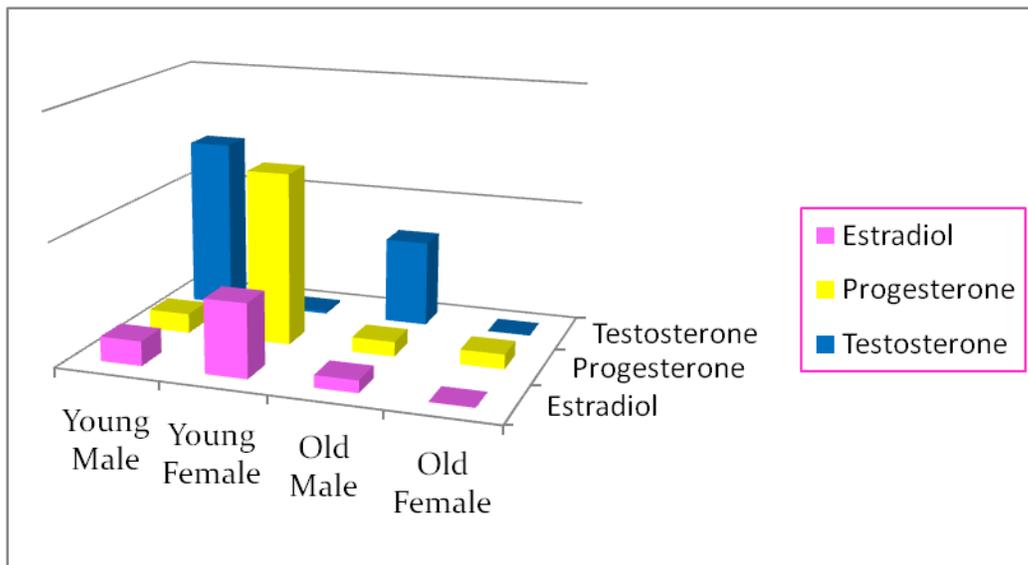
Hypocortisolism predisposes women them to a large number of psychological and physical disorders. It is also why women do not become as Cushingoid as men do with age. A relative hypocortisolism is an aspect of the female condition. A significant percentage of women need cortisol supplementation in order to feel and function well. This fact is completely unknown to conventional endocrinology. These women are left to suffer. Usually they are given multiple medications that do not correct their underlying problem and that dull their emotions and/or sedate them.

Before menopause, women’s lower testosterone and cortisol levels/effects are the main factors that make them the “weaker sex”. There are probably some other sex-related factors that reduce their performance relative to men as some differences appear even in childhood. However, these relative hormone deficiencies are sufficient to explain most of their inability to compete with men in athletics and also demanding careers. Even careers that don’t require physical size or strength often require a great deal of mental/emotional stamina. Worse, while women are hormonally less capable of handling prolonged stress, they often experience higher stress than men. They usually work outside the home while still doing most of the domestic chores including child care, food preparation and housework. If raising children without the help of a man in the home they are much more stressed. They also usually shoulder most of the burden of caring for grandchildren and for aging parents. Their jobs are often more emotionally stressful than men’s jobs. Compare nursing, teaching and many office jobs, for instance, to truck driving, plumbing and construction work. This combination of higher stress and lower cortisol and

testosterone levels/effects causes them to frequently break down, physically and mentally, to the point that they can no longer function. They develop chronic fatigue, depression, anxiety, and/or widespread achiness (fibromyalgia).

Women's reproductive system also puts them at risk for other endocrine problems. They have more hypothyroidism than men due both to HP dysfunction and Hashimoto's thyroiditis. They have more hyperthyroidism than men due to Grave's disease. Both Hashimoto's and Graves' diseases are autoimmune disorders, and hypocortisolism contributes to the risk of developing autoimmune disease. Indeed, almost all the problems and disorders that afflict women more than men are endocrine in origin, as one would expect. Women thus suffer much more than men from the current endocrine ignorance—from the general failure to diagnose and effectively treat cortisol, thyroid and sex hormone deficiencies.

Even if they function well enough until age 50, women then suffer the complete failure of their ovaries. For men, it would be like having their testes removed, only in the men the results would be more dramatic. "Menopause" is simply a euphemism for ovarian failure. Ovarian function actually begins to deteriorate long before menopause. Progesterone production begins to decline at age 30 and essentially disappears when periods start to become irregular in perimenopause. Since progesterone counteracts estradiol in the breasts and uterus; deficient progesterone allows excessive proliferation in these tissues and promotes the growth of breast and uterine cancers. High estradiol levels combined with low progesterone levels cause moodiness, fluid retention, breast tenderness and heavy menstrual bleeding. In perimenopause, estradiol levels can swing from very high to very low, causing symptoms that can be disabling at times. At menopause, estradiol levels drop by over 90%, to levels much lower



Menopausal Sex Steroid Deficiency

Post-menopausal females have less estrogen than men of the same age.

than in men of the same age. (See figure.) Yes, after menopause, women have much less estrogen than men! Men's estradiol levels are maintained throughout life by the conversion of their abundant testosterone into estradiol. Postmenopausal women have the same low progesterone levels as men, but almost no testosterone. (See graph.) The result of women's combined estradiol, progesterone and testosterone deficiencies in menopause is devastating—physically, mentally and emotionally. The nearly complete loss of estradiol causes hot flashes, vaginal dryness/atrophy, depression, irritability, and insomnia. It promotes diabetes, osteoporosis, atherosclerosis and cognitive dysfunction. After age 77 women have more heart attacks than men. After age 80 women have much more Alzheimer's dementia than men. (See later chapter.) It is probably the combination of lower cortisol and higher premenopausal estradiol levels that allow women to live longer than men, but the cost is a lifetime of lower functionality, ended by several decades of greater disability and suffering.

I believe that women's endocrine disadvantages are why, after so many decades of societal efforts to give women the same educational and career opportunities as men, even to give them preference, they continue to underperform. Women simply do not have an endocrine system that allows them to function as well as most men—at high levels, physically and mentally, for decades. As a sentient species, we must acknowledge this fact, not run from it. We must decide what to do about it.

The human species has, by its acquisition of language, taken over the planet. Because of our technologies, we are no longer subject to evolutionary pressure or change. We manipulate everything, including our hormones, for our purposes. People now take sex hormones to change their bodies and minds to be more like the opposite sex. Most women now take birth control pills at some time during their lives. These estradiol- and progesterone-like drugs shut off their own ovaries and greatly reduce their testosterone levels. For certain, most women do not need, and do not want to be baby-making machines from age 15 to 50 as Nature intended. As a species we do not need to keep producing so many children. More and more women are not content to be housewives and caregivers. They want to have the same capabilities and choices that men do. They want to be able to compete with men in every pursuit and every career. However, Nature has put them at a disadvantage. Their problem is endocrine and the solution is at least partly endocrine. To help women, the medical profession must first of all become adept at diagnosing and treating their hormone deficiencies, including sex steroid, thyroid and cortisol deficiencies. I have found that many women require cortisol supplementation in order to remain highly active in stressful careers. However, women need additional endocrine solutions in order to achieve their ambitions.

Women don't want and don't need to have menstrual cycles when they are not trying to get pregnant. Birth control pills are not the solution. We should develop convenient delivery systems for

Free Testosterone**Female:** 0.1 to 6.4 pg/ml**Male:** 35 to 155 pg/ml

estradiol, progesterone and testosterone supplementation to stop ovulation and yet provide optimal hormone levels. In order to improve their physical and mental strength and vitality and their libido, women should be free to supplement testosterone to higher-than-female levels if they choose. Most can do so without excessive virilization. Consider that the upper limit of the population range for women's

testosterone level is just 1/5th the lower limit for men (See insert.) Therefore if a woman supplements testosterone to 3 times the female upper-limit for free testosterone (20pg/ml) she is still well below the lowest male levels. Sufficiently high testosterone levels in females will stop ovulation, thereby providing birth control. Testosterone supplementation to higher-than-female levels causes no health problems. We know this from the extreme case: female-to-male transgender testosterone therapy. Biological females can give themselves male testosterone levels with no increase in any health problems.⁷ More testosterone does produce changes in a woman's body. She will not remain as feminine and therefore may not be as attractive to some men. More testosterone promotes more body hair growth. Some women may develop acne or have some scalp hair loss at the temples. With even higher-than-female testosterone levels, clitoral enlargement can occur. Some women are not concerned about this. However, most women will not have these problems with supplementing to higher-than-normal female testosterone levels, or they will find the changes acceptable. They can choose what higher level is an acceptable compromise for them. They will enjoy having greater vitality, muscle strength and libido. They will enjoy feeling less anxious and more confident. A woman on superphysiological testosterone replacement should take precautions against pregnancy, and should stop supplementation as soon as she becomes pregnant. High testosterone levels in pregnancy will cause the genitals of a female fetus to become masculinized.

We, as a society, must decide what to do about the strong sexual dimorphism that Nature has imposed upon our species. We should investigate what other fetal, endocrine or other factors cause females to function less well than males. We should then, as a society, decide what to do about them.

5 Endocrinology, Sex and Gender

Endocrinology is at the heart of the physiological differences between genetic males and females. Genetic sex and endocrine physiology is completely separate from the issue of a society's gender roles and identity. Gender is a purely cultural construct, and cultures are generally rooted in religious concepts. It is the ancient religions in the Judeo-Christian-Islamic family that have defined women as metaphysically inferior to men and as obligated to obey and serve men. It is this idea-complex, or memplex, that causes parents and other adults to try to make a child fit into an artificial gender role. Many children, quite understandably, do not like certain aspects of their sex-related gender role. They have every right to do so, and they have every right to live as they want and dress as they want. We should, indeed, stop forcing children and other adults into gender roles. We should let others be themselves instead of trying to label or force them to conform to our expectations. Children should be free to determine what and whom they play with, what colors they like, what activities they pursue, etc. They should not be labeled by adults as conforming or not conforming to the male or female gender roles of their culture. Every person is a unique individual and should be allowed to develop their

⁷ Traish AM... Safety of physiological testosterone therapy in women: lessons from female-to-male transsexuals (FMT) treated with pharmacological testosterone therapy. J Sex Med. 2010 Nov;7(11):3758-64.[PubMed](#)

uniqueness without hindrance—without coercion. Coercive, shaming, controlling child-rearing practices are yet another pathology derived from the Judeo-Christian-Islamic memplex.

While many of the problems/concerns that cause people to question their sexual identity are culturally-determined, some are endocrine in origin. Some persons have unusually low or high hormone levels for their genetic sex. For these people, trials of hormone supplementation may help clarify the nature and sources of their concerns. Women who favor male-associated activities may do so because they have higher testosterone levels than other women. Many women understandably reject the omnipresent media's feminine role—i.e. that their "job" is to be sexy and attractive. Some women may choose to supplement testosterone to higher-than-normal levels in order to be more muscular, less anxious, more energetic, etc. Likewise, many men who feel like they are, or should be women, may have a relative testosterone deficiency. They may agree to a trial of testosterone optimization to see how it affects them. Some may feel much more comfortable with being male when they experience the effects of optimal testosterone levels. Generally men will suffer a loss of mental and physical stamina if they supplement their estradiol levels to those of women. Sufficient estradiol supplementation—which should be transdermal—will shut off the testicular production of testosterone. Any person, male or female, who is supplementing estradiol to higher levels should also supplement progesterone to luteal phase levels.

All persons should be made aware of the man-made nature of gender roles. All persons should be free to dress and live as they wish. All persons should have endocrine freedom (See appendix.), free to supplement with sex steroids as they wish. In such a rational and free environment, far fewer persons would feel it necessary to resort to mutilating surgery.