

Casual Friday Series

# Male HRT and Chronic Disease

A Biogenetix Clinical Presentation

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# Disclaimer

- *Information in this presentation is not intended, in itself, to diagnose, treat, reverse, cure, or prevent any disease. While this presentation is based on medical literature, findings, and text, The following statements have not been evaluated by the FDA.*
- *The information provided in this presentation is for your consideration only as a practicing health care provider. Ultimately you are responsible for exercising professional judgment in the care of your own patients.*

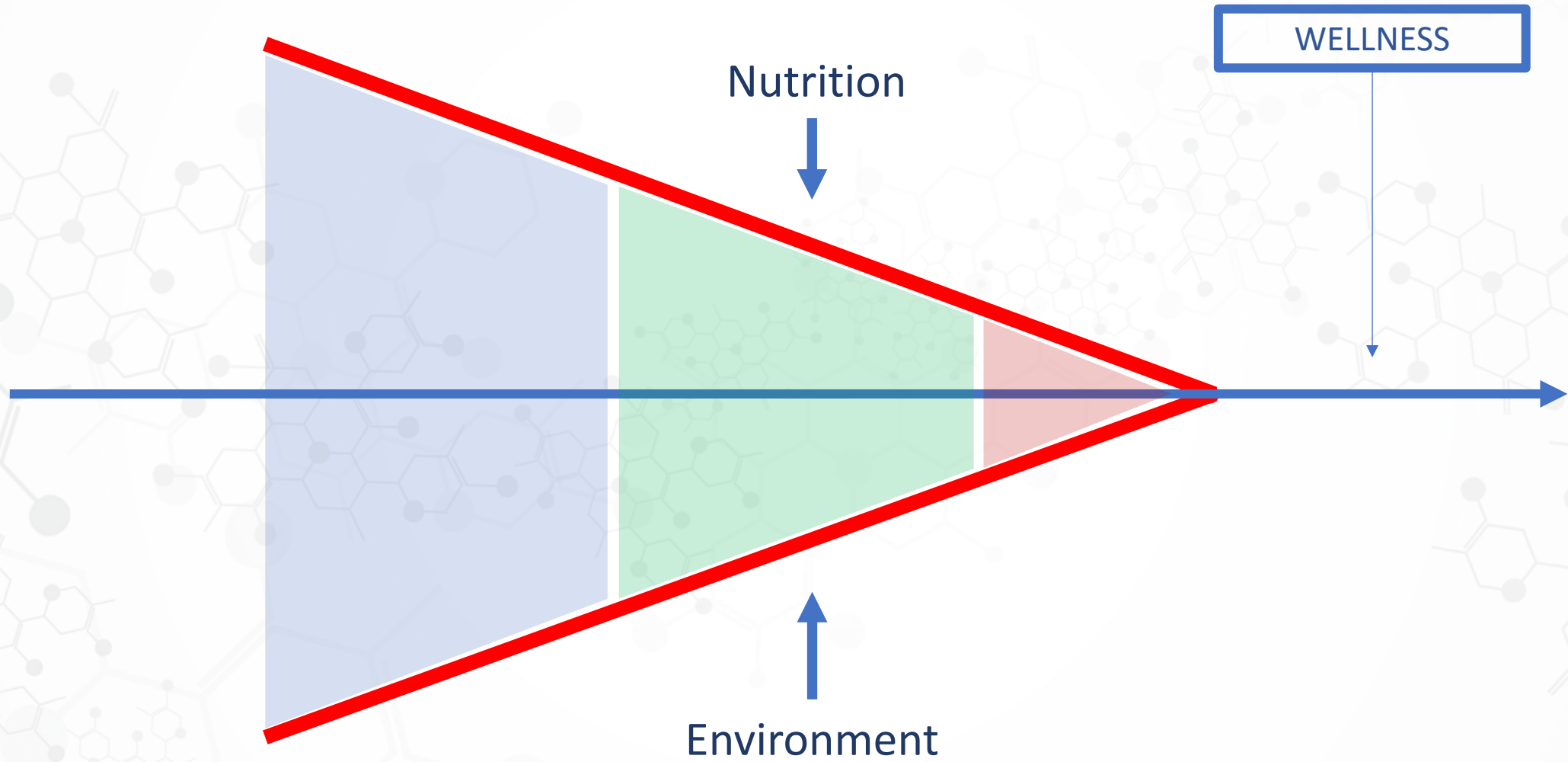


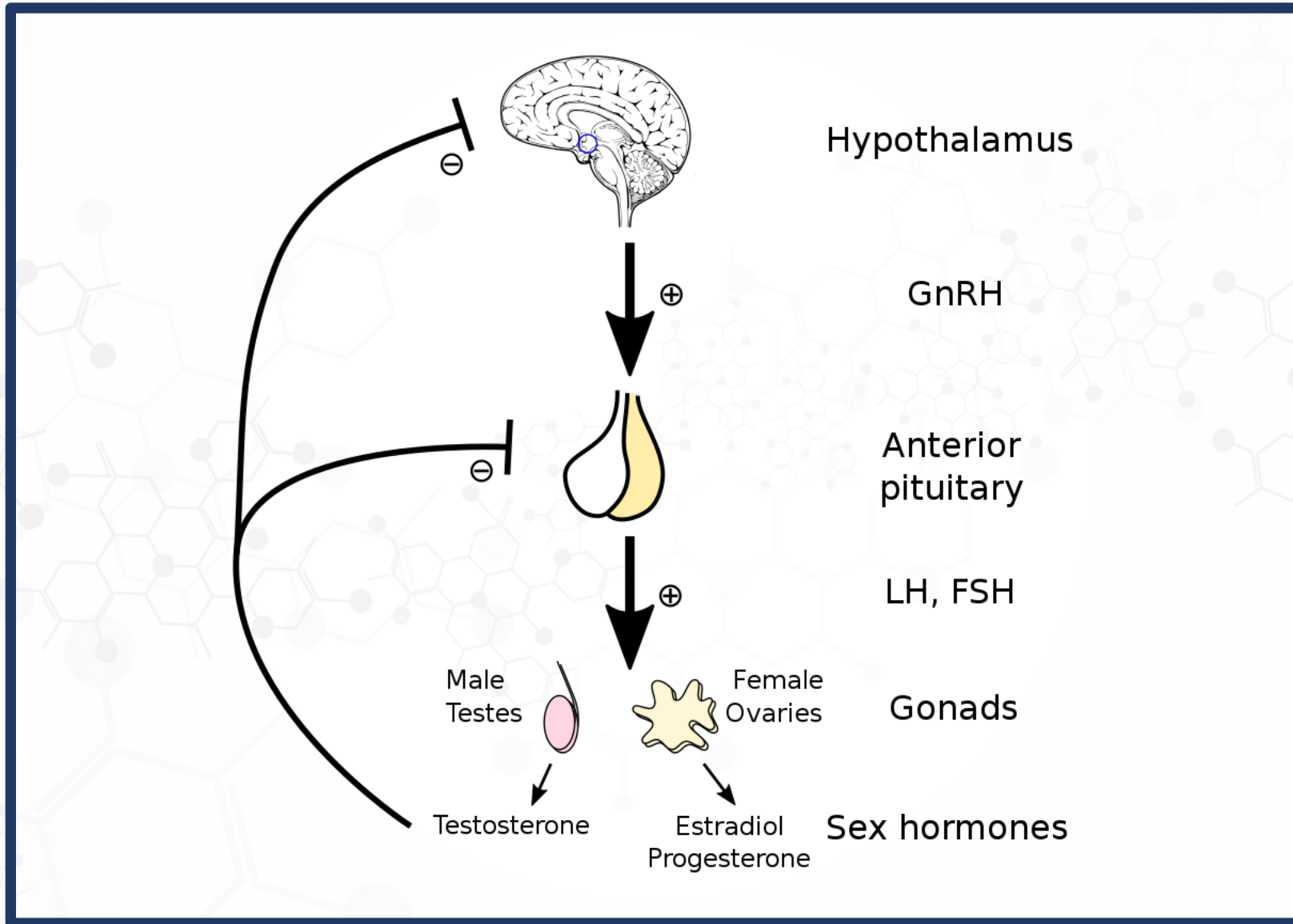


Lifestyle + Genetics = Chronic Health IMPROVEMENT



# Protocols





# Physiology, Testosterone

George N. Nassar; Stephen W. Leslie.

▶ **Author Information**

Last Update: January 9, 2021.

Testosterone is the primary male hormone responsible for regulating sex differentiation, producing male sex characteristics, spermatogenesis, and fertility. Testosterone's effects are first seen in the fetus. During the first 6 weeks of development, the reproductive tissues of males and females are identical. At around week 7 in utero, the SRY (sex-related gene on the Y chromosome) initiates the development of the testicles. Sertoli cells from the testis cords (fetal





# 1 in 4 Men Over 30 Has Low Testosterone

Article By: Dr. Laurie Blanscet, An Optimal You physician | Aug 03, 2015

## What is a normal Testosterone level for a man?

Average testosterone levels have decreased dramatically over the last century. There are some estimates that the average male's Testosterone level today ranges from 270 ng/DL to 700 ng/DL, one hundred years ago the range was 800 to 2000!



**Hormone Replacement Therapy Market to Reach USD 20.76 Billion by 2026; Increasing Cases of Hormone-Related Disorders to Augment Growth, states Fortune Business Insights™**



# Testosterone Therapy in Men with Androgen Deficiency Syndromes: An Endocrine Society

**TABLE 1.**

Symptoms and signs suggestive of androgen deficiency in men

**A. More specific symptoms and signs**

Incomplete or delayed sexual development, eunuchoidism

Reduced sexual desire (libido) and activity

Decreased spontaneous erections

Breast discomfort, gynecomastia

Loss of body (axillary and pubic) hair, reduced shaving

Very small (especially <5 ml) or shrinking testes

Inability to father children, low or zero sperm count

Height loss, low trauma fracture, low bone mineral density

Hot flushes, sweats

**B. Other less specific symptoms and signs**

Decreased energy, motivation, initiative, and self-confidence

Feeling sad or blue, depressed mood, dysthymia

Poor concentration and memory

Sleep disturbance, increased sleepiness

Mild anemia (normochromic, normocytic, in the female range)

Reduced muscle bulk and strength

Increased body fat, body mass index

Diminished physical or work performance



# Testosterone Therapy in Men with Androgen Deficiency Syndromes: An Endocrine Society Clinical Practice Guideline

Shalender Bhasin , Glenn R. Cunningham , Frances J. Hayes ,  
Alvin M. Matsumoto , Peter J. Snyder , Ronald S. Swerdloff , Victor M. Montori 

*The Journal of Clinical Endocrinology & Metabolism*, Volume 95, Issue 6, 1 June 2010,

In men with chronic diseases such as diabetes mellitus, end-stage renal disease, and chronic obstructive lung disease, measurement of testosterone may be indicated by symptoms such as sexual dysfunction, unexplained weight loss, weakness, or mobility limitation. In men with some other conditions, such as a pituitary mass, HIV-associated weight loss, low trauma fracture, or treatment with medications that affect testosterone production, measurement of testosterone may be indicated regardless of symptoms.



# Testosterone Therapy in Men with Androgen Deficiency Syndromes: An Endocrine Society Clinical Practice Guideline

Shalene

Alvin M

The Jour

Classification of hypogonadism: Abnormalities of the hypothalamic-pituitary-testicular axis at the testicular level cause primary testicular failure, whereas central defects of the hypothalamus or pituitary cause secondary testicular failure. Hypogonadism also can reflect dual defects that affect both the testis and the pituitary.

Primary testicular failure results in low testosterone levels, impairment of spermatogenesis, and elevated gonadotropin levels.

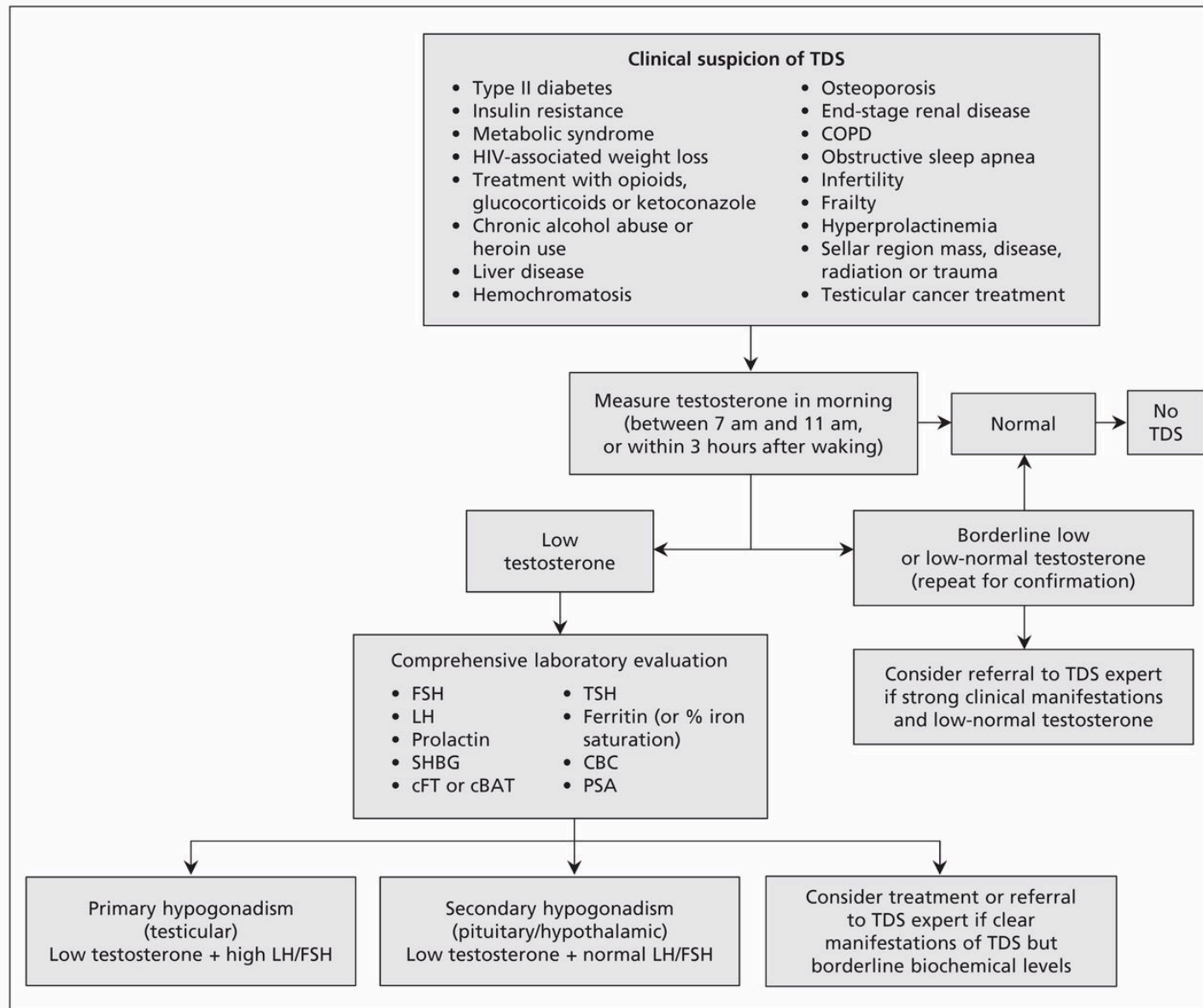
Secondary testicular failure results in low testosterone levels, impairment of spermatogenesis, and low or low-normal gonadotropin levels.

Combined primary and secondary testicular failure results in low testosterone levels, impairment of spermatogenesis, and variable gonadotropin levels, depending on whether primary or secondary testicular failure predominates.

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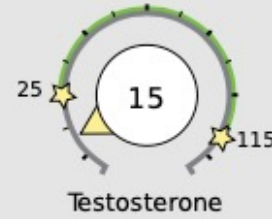
#1 62 yo male, DM2

## Hormone Testing Summary

Key (how to read the results):



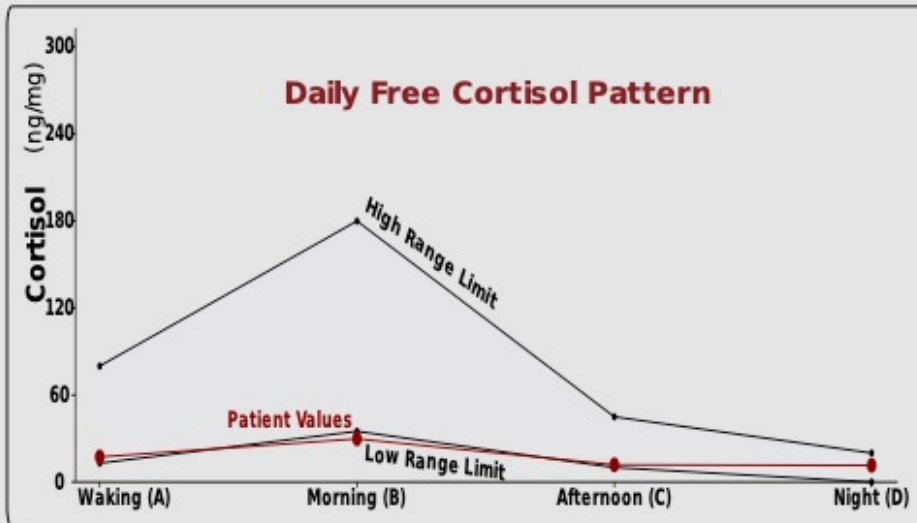
### Sex Hormones



### Testosterone

Age	Range
18-25	50-115
26-40	40-95
41-60	30-80
>60	25-60

### Adrenal Hormones See pages 4 and 5 for a more complete breakdown of adrenal hormones

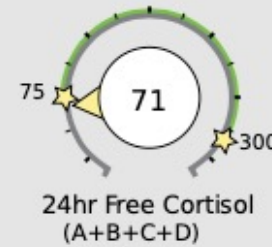


### Total DHEA Production

Age	Range
20-39	3000-5500
40-60	2000-4000
>60	1000-2500



Total DHEA Production  
(DHEAS + Etiocholanolone + Androsterone)



24hr Free Cortisol  
(A+B+C+D)

cortisol  
metabolism



Metabolized Cortisol (THF+THE)  
(Total Cortisol Production)

Free cortisol best reflects tissue levels. Metabolized cortisol best reflects total cortisol production.





62 yo male, DM2

<b>Vitamin B12 Marker (may be deficient if high) - (Urine)</b>				
Methylmalonate (MMA)	Within range	0.7	ug/mg	0 - 3.5
<b>Vitamin B6 Markers (may be deficient if high) - (Urine)</b>				
Xanthurenate	Within range	0.6	ug/mg	0.2 - 1.9
Kynurenate	Within range	4.0	ug/mg	1 - 6.6
<b>Glutathione Marker (may be deficient if low or high) - (Urine)</b>				
Pyroglutamate	Below range	30.6	ug/mg	38 - 83
<b>Neurotransmitter Metabolites</b>				
<b>Dopamine Metabolite - (Urine)</b>				
Homovanillate (HVA)	Below range	1.6	ug/mg	4 - 16
<b>Norepinephrine/Epinephrine Metabolite - (Urine)</b>				
Vanilmandelate (VMA)	Below range	1.8	ug/mg	2.5 - 7.5
<b>Melatonin (*measured as 6-OH-Melatonin-Sulfate) - (Urine)</b>				
Melatonin* (Waking)	Below range	4.6	ng/mg	10 - 85

		0	1	2	3
<b>Men</b>					
Androgen Excess	Increased Sex Drive, Body, or Facial Hair, Aggressive Behavior, Acne	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Androgen Deficiency	Decreased Libido, Erections, or Muscle Size, Increased Belly Fat, Apathy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estrogen Excess	Weight Gain (Breast or Hips), Prostate Problems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



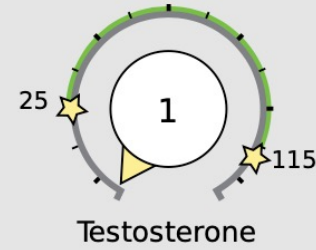
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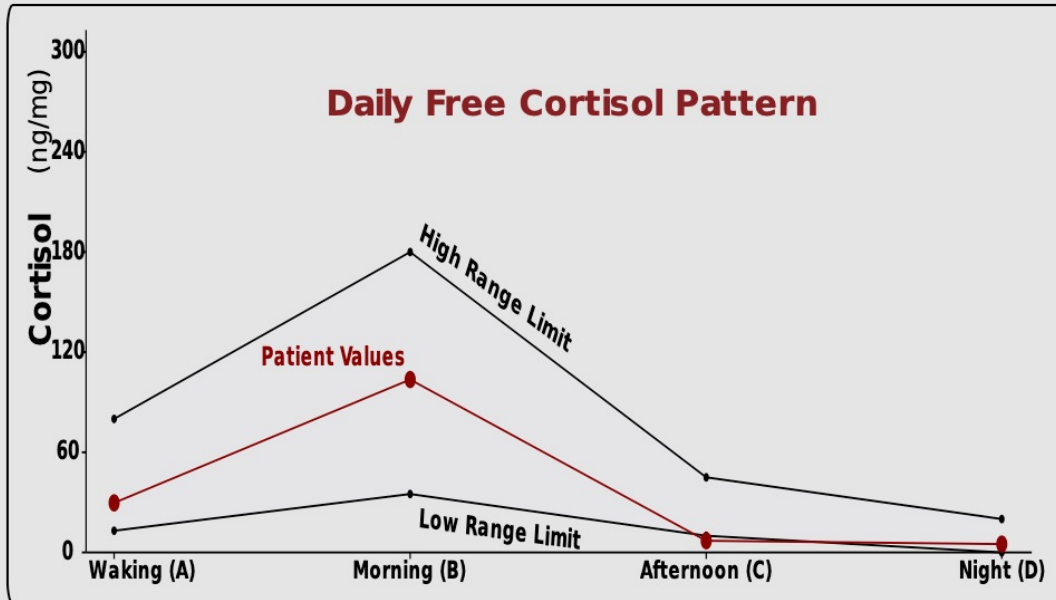
## Sex Hormones



## Testosterone

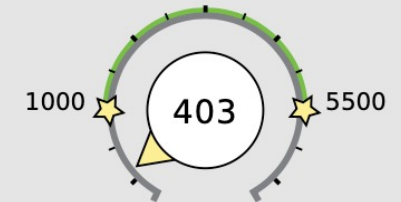
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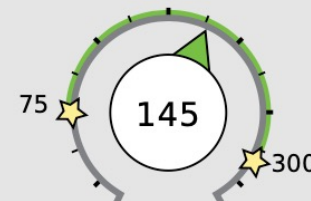


## Total DHEA Production

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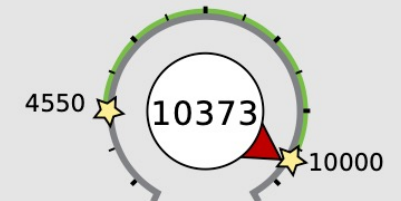


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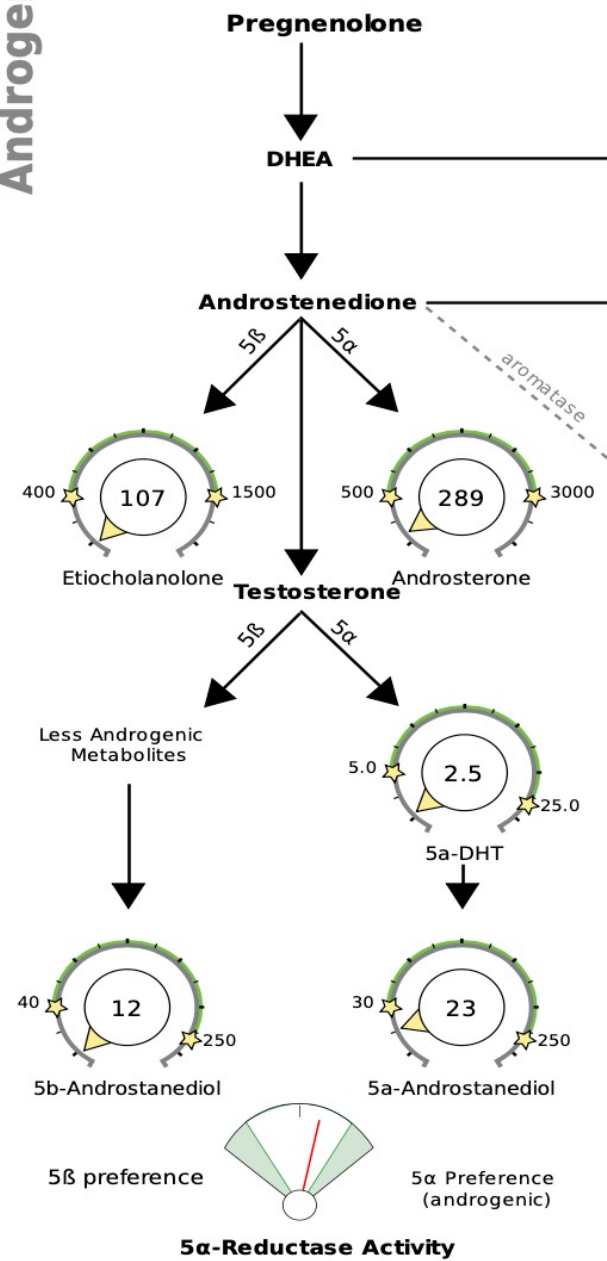


Metabolized Cortisol (THF+THE)  
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67 yo male, DM2

**Androgens**

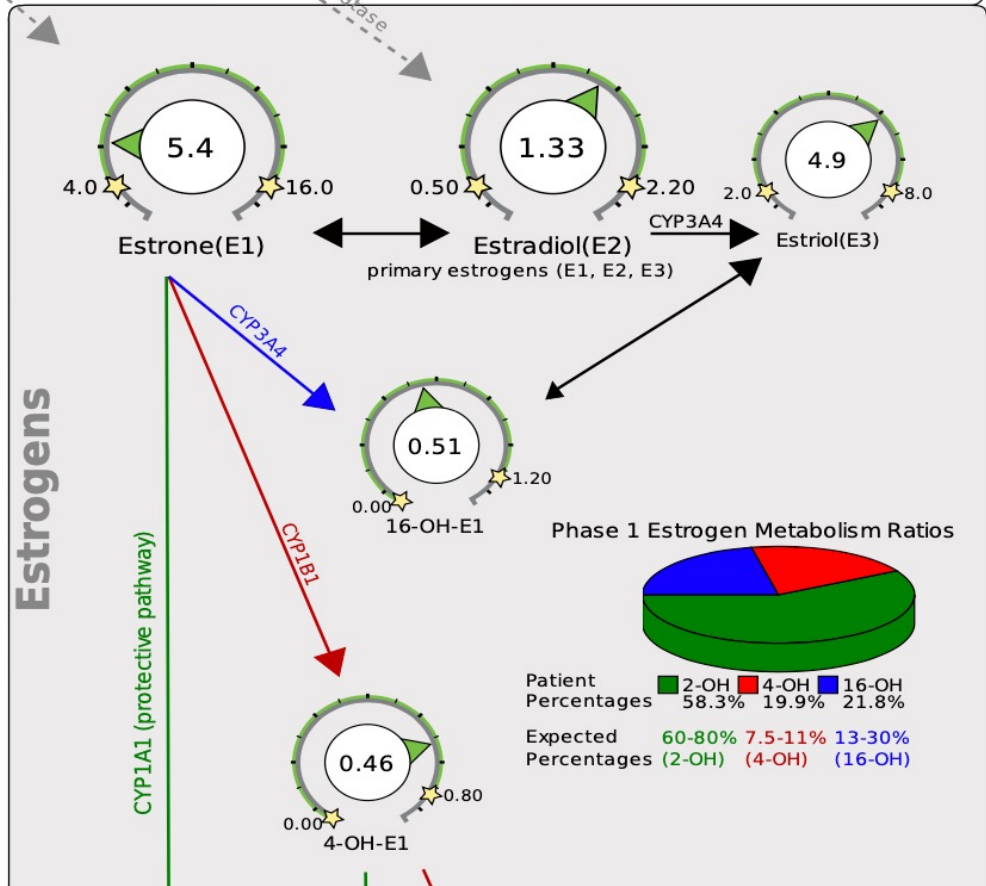


5α-metabolism makes androgens more potent, most notably 5α-DHT is the most potent testosterone metabolite

**Age-Dependent Ranges**

Age	DHEA-S	Etiocholanolone	Androsterone	5β-androstane-3α,17β-diol	5α-androstane-3α,17β-diol	Testosterone	5α-DHT
20-39	150-1500	800-1500	20-39 1500-3000	20-39 70-250	20-39 60-250	18-25 50-115	20-39 9-25
40-60	60-800	600-1200	40-60 1000-2000	40-60 55-210	40-60 50-180	26-40 40-95	40-60 7-20
>60	30-300	400-1000	>60 500-1000	>60 40-150	>60 30-130	41-60 30-80	>60 5-16
>60						25-60	

**Estrogens**





67 yo male, DM2

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> **Nutrition.** 2015 Oct;31(10):1295-8. doi: 10.1016/j.nut.2015.05.019. Epub 2015 Jun 20.

## A glance at...nutritional antioxidants and testosterone secretion

Michael J Glade <sup>1</sup>, Kyl Smith <sup>2</sup>, Michael M Meguid <sup>3</sup>

The mitochondrial electron transfer system supplies the energy that drives testosterone synthesis, exposing Leydig cells to oxidative stress that can inhibit the synthesis and secretion of testosterone. Chronically elevated systemic oxidative stress and “low normal testosterone status” (“Leydig cell impairment,” consistent with a mid-morning serum total testosterone concentration between 7 and 14 nmol/L) are becoming increasingly prevalent, particularly as men exceed middle age [1]. Low normal testosterone status is associated with physiological conditions that may include reductions in energy, motivation, initiative, self-confidence, concentration and memory, sleep quality, muscle bulk and strength, and skeletal integrity; diminished physical or work performance; feeling sad or blue; depressed mood or dysthymia; mild anemia; increased body fat and body mass index; systemic inflammation and oxidative stress; increased risk for developing any form of cardiovascular disease; increased risk for experiencing fatal or nonfatal cardiovascular events; and reduced life expectancy [1].

In contrast, reducing oxidative stress releases Leydig cells from oxidative inhibition and can increase testosterone synthesis in response to luteinizing hormone (LH). Increased consumption of dietary nutrients and phytonutrients with antioxidant properties can contribute safely to both oxidative stress reduction and enhanced androgenic status in otherwise healthy adult men. In this era of “60 is the new 40,” the potential for maintaining healthy testosterone status through dietary

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Leydig cells are exposed to increased levels of oxidative stress during aging (demonstrated through studies of the Brown Norway rat, used extensively as a model for male reproductive aging [2,3]), after exposure to environmental prooxidants such as polychlorinated biphenyl (demonstrated through studies of cultured adult rat Leydig cells [4-6]), and when testosterone synthesis is stimulated in human Leydig cells [7-9] and in Leydig cells harvested from Brown Norway rats [10]. The aging-associated declines in testosterone production and circulating testosterone concentrations are at least in part the con-

sequences of cumulative oxidative stress within Leydig cells [2,3,9,11]. In laboratory rats [2,3,9,11,12] and cultured mouse Leydig cells [13-17], oxidatively damaged Leydig cells and Leydig cells in aged testes experience suppression of antioxidant enzyme activities, reduced intracellular glutathione (GSH) content, accelerated lipid peroxidation and oxidative modification of DNA, and loss of the mitochondrial membrane potential required for testosterone synthesis. They exhibit reduced sensitivity to LH, fewer LH receptors expressed per cell, and impaired LH-induced activation of the steroidogenic acute regulatory protein (a component of a transmembrane multiprotein complex that catalyzes the import of cholesterol from the outer to the inner mitochondrial membrane, a rate-limiting step in steroid hormone synthesis [18]) [16,19-22]. Additionally, the activities of



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Affiliations + expand

PMID: 26254688 DOI: [10.1016/j.nut.2015.05.019](#)

They go on to say...

1. Phosphatidylserine
2. Glutathione
3. Vitamin C
4. Adaptogens

“The Testosterone Switch”  
- Dr. Kyl Smith DC



# Targeted Support Structures:

Phase 2:



**Key (how to read the results):**



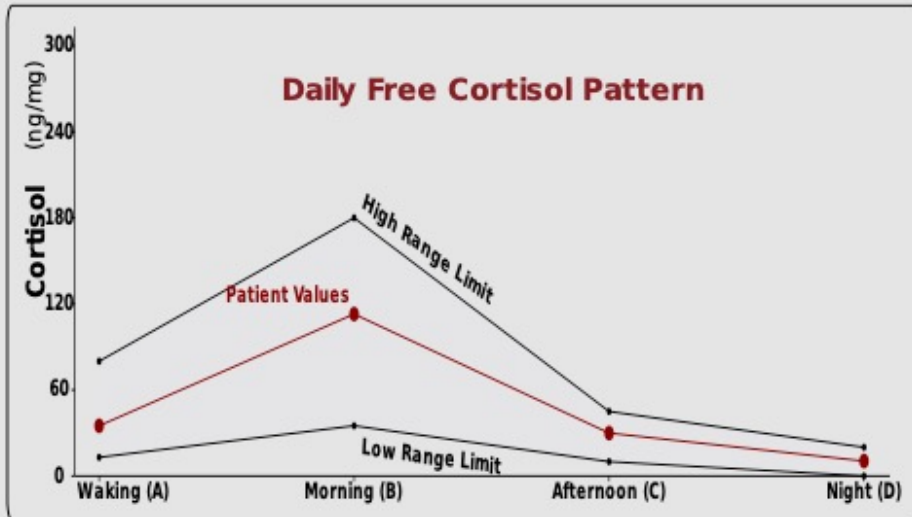
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