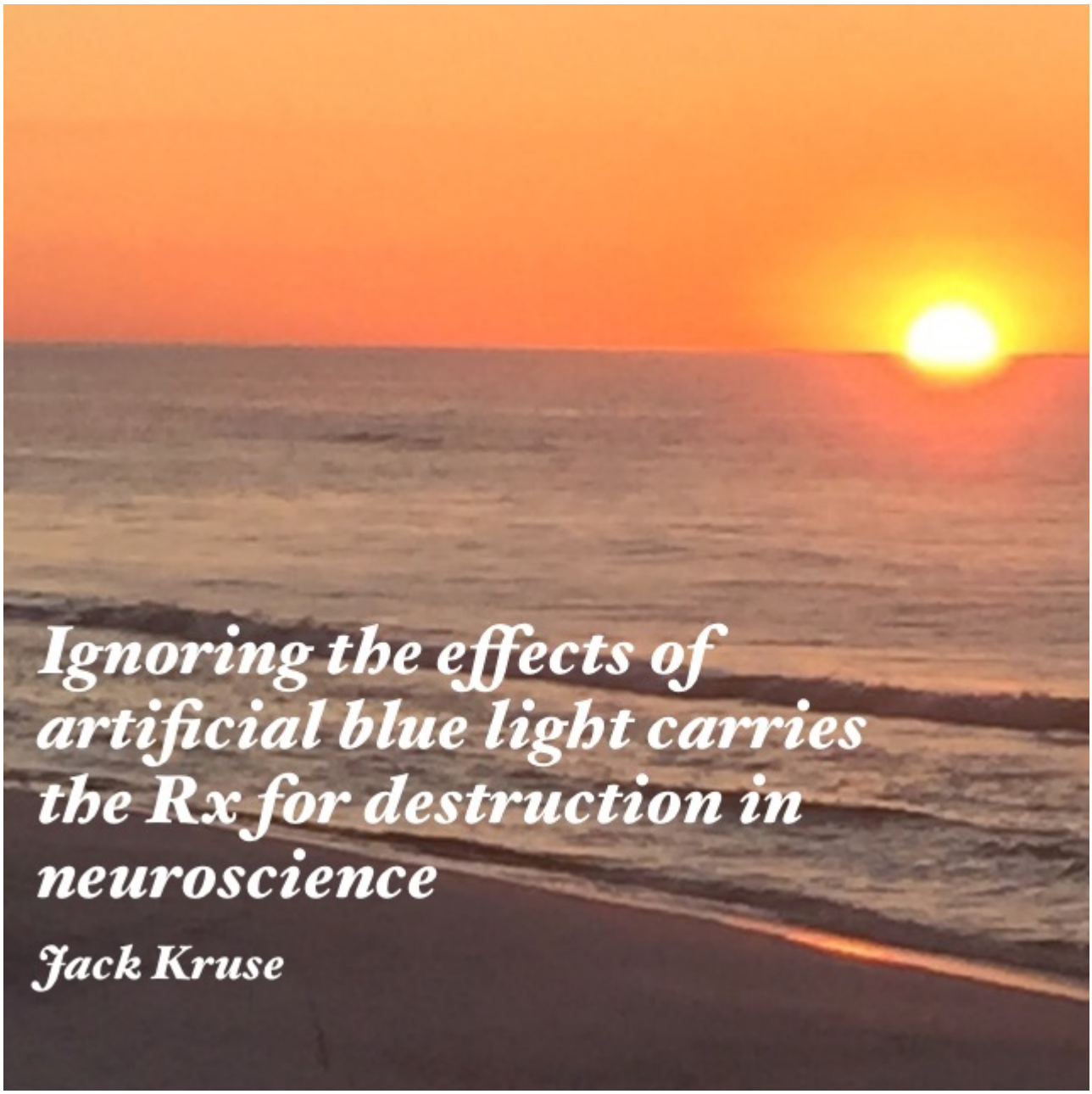
Hormone CPC #1: DHEA

Readers Summary

1. What is the state of affairs of DHEA in medicine today?
2. How should you handle DHEA for you since it was reclassified in 1994 as a supplement?
3. Does it work?
4. What does it do in a body?
5. Who might it help? Who might it hurt? Should I talk to my doctor about it?

This blog post was created for my members who just heard my webinar on bioidentical and synthetic hormone replacement. It is specifically designed to further our discussions in that talk.

DHEA has been an enigma to the public and to most physicians. I never once heard about this hormone in four years of medical school, seven years of residency or in any endocrinology lecture from my training. The general public did not learn about DHEA until 1996, when its benefits were mentioned in the media and several popular books that showed up on daytime TV shows. Most in mainstream medicine continued to ignore the science these books contained because they were not found in the usual ways via journals and continuing education classes. You actually had to be on the lookout for this information. With a busy medical practice, this is no easy task. DHEA became credible to the medical establishment when the New York Academy of Sciences published a book called DHEA and Aging. That book provided scientific validation for the many life-extending effects of DHEA. DHEA is linked to solar exposure by way of Lutenizing Hormone in both sexes.



DHEA Hormone Review

DHEA (dehydroepiandrosterone) is a steroid hormone produced by the adrenal glands. It's a precursor to both testosterone and estrogen in the body, although it may play other physiological roles as well. *In my hands, I used DHEA level as a proxy for a person's environment and how it affects their redox potential.* In post menopausal women, the only way they make sex steroid hormones is from adrenal enzymes and the aromatase enzyme in fat cells. There are many studies of oral and IV routes that have given us all conflicting reports of efficacy. Topical

DHEA use may be another story for women, however. Recent studies have demonstrated that intra-vaginal application of DHEA cream could alleviate age and menopause-associated vaginal atrophy. It also can improve sexual function without altering serum hormone levels significantly, and is the most potent way to stimulate sleep when some one is sleep deprived because of its effects on the IL- 6 cytokine.

In 2012, even modern healthcare is beginning to realize that chronic inflammation is linked to just about every neolithic and aging disease known to mankind. Both of these disease processes have rising inflammatory cytokines as the main causes of their progression. These chemicals are destructive to cell membrane signaling, cellular nuclear processessing signaling, and cytosolic signaling. They have particularly devastating affects on the steroid hormone receptors and the receptors of both arms of the immune system. These errors in signaling lead to disease progression. Some examples of these cytokines are TNF-alpha, IL-6, IL1b, and LTB4 on the inflammatory cascade. We have known from Cutolo's 2000 study that most adrenal hormones (like DHEA) are very low prior to development of the full blown disease. This is true in all autoimmune diseases, especially rheumatoid arthritis.

DHEA has been shown to prevent chronic inflammation and it slows the abberant signaling that is commonly found in the immune system when it is turned on by any pathogen, self or foreign. DHEA is particularly helpful in limiting IL-6 and TNF alpha in both disease propagation and in normal human aging.

DHEA has been shown to have dramatic affects on those infected with serious viral illness like HIV and Hepatitis C. Part of the reason for this affect is because in both of these diseases, we see a loss of Type 1 cytokines from cell mediated immunity (gamma Interferon and IL-2) and an excess of Type 2 cytokines like IL-6. This steep rise in Il-6 is fought back by the available DHEA until its production falls and causes dramatic rises in cortisol. The drugs used to treat both

conditions are called protease inhibitors and when they are used in either disease, DHEA levels dramatically rise to help stimulate the immune system. Many physicians are completely unaware of the the effects of the hormone on immunity.

In my practice as a neurosurgeon, I use DHEA replacement often in post trauma cases or post brain tumor cases to improve cognitive function and memory. Replacement of proper DHEA levels actually improves EEG recordings in these patients. A study done at UCSD by Dr. S.S.C. Yen showed the remarkable effect of a low dose of DHEA (50 mgs a day for 6 months) restoring DHEA levels in men and women while dramatically improving their perceived physical and psychological well being for both sexes. I have found in many trauma and brain tumor cases, DHEA was the easiest way to elevate IGF 1 levels to improve growth hormone secretion without expensive replacement. When IGF 1 levels are in the upper quartile, we see massive improvements in lean muscle mass, decreased abdominal fat, improved immune function, and improvement of cognition and memory.

DHEA also improves cardiac function and atherosclerosis. You can review the 1996 journal article Drugs and Aging by Dr. Watson that correlated low DHEA with several human cancers, loss of sleep, decreased sense of well being, and increased feeling of death. DHEA also improved bone cell function, lymphocyte function, improved cardiac function, and helped T2D as well. The study also reported no toxic doses when used to restore humans back to youthful levels and production. The study appeared to show a link between low DHEA and all diseases of aging in humans, poignant because the neolithic disease we are seeing today are occurring earlier. DHEA levels may be a very earlier marker for poor metabolic functioning of many systems. This study caught my eye years ago, inspiring me to test DHEA levels to help me assess patients when I work them up in my clinic.

DHEA is abundant in the human brain, which manufactures it in

high quantities. DHEA levels are a great clinical proxy for depression. The DHEA levels in many of our troops returning from the Middle East's wars are horrendous when tested. It is no wonder we are seeing a massive spike up in PTSD and suicide in these troops. They are the first generation of soldiers feed an exclusively neolithic diet their entire lives before combat. Their risks would be expected to be the highest because they likely had the highest cortisol and lowest DHEA levels before entering the theatre of combat. DHEA and cortisol are the two most common hormones linked to depression in most studies who look at hormones and these diseases (Goodyear et al 1996, and Barrett-Connor in 1999).

DHEA and sunburn protection

Many people in the paleo community talk about how they rarely seem to need sunscreen after changing their diet to an anti-inflammatory, paleolithic diet. This is because their DHEA levels have dramatically risen with the lifestyle change. Burn literature has been telling us for 20 years that if one applies topical DHEA cream to a serious burn, the blood vessels underlying the burn become protected and stimulate healing (Araneo et all, 1995). Many people might remember that I went surfing the day before AHS 2011 in Santa Monica, and I got really pink to red. Several people mentioned that because I was fair, I would likely be sporting a nasty peel soon. I told several of the people at UCLA my little trick for avoiding all sunburn peeling after a bad exposure: topical use of a DHEA cream I had formulated. When you protect the blood vessels below the burn, the DHEA does not allow that skin to undergo apoptosis and it actually saves your dermal stem cells. It actually prevents wrinkling, too! I wish I had known this when I was younger, but that is how the science ball bounces.

Similarly, DHEA can stimulate pro-collagen production and may have beneficial affects on aging skin. All these are very

important indicators for peri- and post-menopausal women. Older women can be incredibly sexy when they find their groove, and DHEA is a big part of why Stella found her groove, in my opinion. In women, DHEA replacement topically decrease TNF alpha in the skin to destroy inflammation locally. If you ever meet my wife, you will see the affect. She does not look her age at all. DHEA will also thicken a woman's skin, too, with time. I use this trick when I am cutting on a woman's head or neck, and some of my plastic surgeon friends have really become enamored with topical DHEA use for peri-operative swelling and recovery. I used DHEA cream to help rid myself of the nasty red stretch marks from being morbidly obese. I do not have one red stretch mark left on my body.

The last four years have produced a torrent of positive research findings concerning DHEA. The results on the immune modulation of this hormone on the cortisol /melatonin/ cell-mediated immunity axis is just amazing. Most HIV patients with doctors who are dialed in can attest to the positive effects of this hormone on many of their functions when conventional medicine has few solutions. DHEA is produced by the adrenals in healthy young adults (usually below 35) , but its levels decline dramatically with advancing age in both sexes, coinciding with the onset of numerous diseases of aging. The one thing that coincides with the destruction of this hormone level is the onset of cellular inflammation.

While DHEA's demonstrated anti-aging benefits have made it a popular adjuvant in the baby boomers, new data supports DHEA's critical role in alleviating depression, enhancing endothelial function, preventing atherosclerosis, increasing bone mass, slowing osteoporosis, improving insulin resistance, and even hastening wound healing in surgical cases. Yes, I do use this supplement a lot in my surgical cases where there is a documented deficiency. It supports recovery by improving sleep quality and quantity.

Despite its list of health benefits, however, DHEA remains

under U.S. Congressional assault. It is often called an “anabolic steroid” and has led some in Washington to call for outlawing DHEA outright. It was banned for sale in 1985 and then 9 years later, reclassified as a supplement.

It has been shown that the serum hormone DHEA often declines by 75–80{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} from peak levels by age 70 or later, leading to hormonal imbalances that can affect one’s quality of life. Peak blood levels of DHEA occur around age 25 when inflammatory levels are low, decreasing progressively thereafter. The marked decline in serum DHEA with age is believed to play a role in health problems associated with aging and loss of immune system functioning. People with autoimmune diseases have some of the lowest DHEA levels I have tested.

DHEA will cause a 20{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} bump up in IGF-1 levels, too, without expensive HGH.

DHEA increases monocyte numbers by 35{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}. These are antigen-presenting cells in our body that improves our immune surveillance.

DHEA increases B Cells by 29{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}, but more importantly, it increase B cell function by 62 {a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}. Anyone with an autoimmune disease might be interested in that.

DHEA increases T cell activity by 40{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}, but the T-cell numbers are not increased as other

immune cells where. It also increase IL-2 by 50{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} and this is what increases T-cell function. Natural killer T-Cells, important in fighting cancer, were increased by 22-37{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} in numbers and their activity was elevated 45{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}. In all of these immune studies, DHEA has never been shown to cause any adverse affects. The pharmaceutical drugs that all act similarly to DHEA cost thousands more, are less effective, and have huge side effect profiles. I'd suggest googling Remicade or Enbrel to make a just comparison.

Since the early 1980s, several hundred studies have been published on DHEA's various benefits, including immunomodulatory properties as well as positive effects on mood, quality of life, and body composition. It has been proposed that restoring the circulating levels of DHEA to those found in young people may improve well-being and sexual function. In a recent, randomized, double-blind, placebo-controlled study, ten months of DHEA replacement therapy has the beneficial effect of increasing muscle mass and strength with the addition of resistance exercise in elderly individuals. The studies of DHEA therapy in women with adrenal insufficiency also suggest beneficial effects on well-being, mood, and sexuality. DHEA benefits the normal aging brain by increasing progesterone, testosterone and estrogen levels to help cognitive function. Some studies have reported DHEA may improve mood and alleviate melancholy. In addition, recent studies in vitro have shown that DHEA has the capacity to improve endothelial function by increasing nitric oxide (NO) synthesis.

In recent randomized, double-blinded, controlled trials, DHEA replacement therapy for one year helped protect hip bone mineral density in older adults and spine bone mineral density

in older women. DHEA has also been shown to support a healthy circulatory system and joint/bone health.

DHEA for osteoporosis

One fairly clear-cut benefit of supplementation of the adrenal-gland hormone DHEA is increased bone density. This is a condition that I treat daily without the normal Rx most physicians use for this condition.

Here’s one study showing very persuasive effects of DHEA supplementation, 50 mg per day for 12 months, on bone density: Effects of Dehydroepiandrosterone Replacement Therapy on Bone Mineral Density in Older Adults: A Randomized, Controlled Trial.

70 men and 70 women were given DHEA 50 mg per day vs. placebo with pre- and post- measures of bone density made. Women made dramatic improvements over the men in this study. Go look at the paper and see the charts for yourself. To achieve these results, women increased DHEA blood levels to 225-300 mcg/dl, while men increased DHEA blood levels to 300-400 mcg/dl.

This study corroborates findings made by a Washington University group and a University of California group that also showed increased bone with DHEA supplementation.

DHEA usage and safety precautions

I have been investigating DHEA for years and I began using it myself when my own levels fell several years ago. DHEA directions for use are specially drafted by your doctor to get you to optimal, and those dosing regimens can often be found online or directly from your doctor. I would suggest you show your levels to your doctor to see if they are correct for you.

The standard blood test to evaluate DHEA status is one that measures DHEA sulfate levels (DHEA-S). The DHEA-S is

calculated in micrograms per deciliter (µ/dL) of blood. A DHEA-S (dehydroepiandrosterone sulfate) blood test may be taken three to six weeks after initiating a DHEA supplementation regimen to help determine optimal dosing. Sun exposure between 8-11 AM can sulfate skin lipids best. When having your blood tested for DHEA, blood should be drawn three to four hours after your last dose. I like AM dosing of this hormone (matches sun exposure), but I also have few problems with salivary testing of this hormone. This is often done with a salivary cortisol level to get an ASI (adrenal stress index) ratio. DHEA testing may save you healthcare dollars for many diseases if you are found deficient on testing. Most Crossfitters I have seen rarely have a normal DHEA.

Because of the overwhelming evidence connecting low levels of DHEA to problems associated with aging, I suggest that all people over age 40 begin DHEA therapy. For most people, the starting dose of DHEA is between 15–200 mgs, taken in one daily dose. Many studies have used a daily dose of 50 mg. Women tend to use the 7-keto DHEA form and men can use the regular DHEA form. WHY? **7-Keto DHEA is not converted into estrogen or testosterone, so it may be safely taken by women with hormone-dependent diseases like breast cancer.**

Scientific studies have shown that 7-Keto can help people burn fat through a process known as “thermogenesis.” Most of you know that I am particular keen on anything tied to **thermogenesis.** This means the body’s metabolic rate is accelerated, generating heat and energy that consumes calories and burns fat. 7-Keto accomplishes this by boosting the levels of three liver enzymes that stimulate fatty acid oxidation.

Ideally, DHEA replacement therapy should begin with blood testing to establish a base range. Since almost everyone over age 35–40 has lower-than-optimal levels of DHEA, most people begin supplementation and test their blood DHEA levels later to make sure they are taking the proper dose. The more technology with blue light people use the lower the DHEA rate

will be. Normal serum reference ranges and ideal ranges of DHEA-S are:

Normal Ideal:
Men 280-640 µ/dL 500-640 µ/dL
Women 65-380 µ/dL 250-380 µ/dL

People over age 40 who do not supplement with DHEA usually have serum levels below 200, and many are below 100, as a steady decline takes place after the third decade in life. There are different precautions for men and women that should be observed.

DHEA precautions for men

Before attempting to restore DHEA to youthful levels, men may want to know their serum PSA (prostate specific antigen) level. Personally, I no longer do this based upon the latest meta analysis from the urology literature on prostate cancer. It appears that PSA is not the gold standard as it was in years past. Many doctors still are not aware of the changes in urologic literature, but you should be. Nothing replaces a doctor visit and a good rectal exam for a prostate screening. I also strongly recommend a ketogenic version of my diet with a large amount of protein from seafood to offset any prostate cancer risk. When I get to Brain Gut 4 and Brain Gut 5 in the current series, I think you will see why. Men with prostate cancer or severe benign prostate disease may need to speak with their urologist before starting DHEA since it can be converted into hormones their doctors may want to monitor.

When taking DHEA, I also recommend taking the following other nutrients:

- Vitamin E (d-tocopheryl succinate) 400 IU daily, Gamma E Tocopherol 200 mg daily
- Selenium 200 mcg daily from one raw brazil nut
- Lycopene from tomatoes daily in sauces

- Consider Saw Palmetto Extract 160 mg twice daily
- Nettle Extract 120 mg twice daily if HS CRP is chronically above 1.0
- Boron 3–10 mg daily (for those with serious osteoporosis)
- Increase seafood intake dramatically

It is important for men over 40 to ask their physician to check their PSA and DHEA-S serum levels every six to twelve months thereafter. Men should also periodically check their blood levels for free testosterone (not just a total) and estrodiol to make sure that DHEA is following a youthful metabolic pathway.

DHEA precautions for women

Women should consider estrogen and testosterone testing when they take their DHEA blood test in order to evaluate DHEA's effect on their blood levels of these hormones.

Women who have been diagnosed with an estrogen-dependent cancer should consult their physicians before beginning the DHEA restoration process. This is controversial for many physicians. I have no controversy in my own mind any longer on this.

When taking DHEA, your doctor may also recommend taking the following other nutrients to maintain a healthy balance:

- Melatonin 300 mcg to 3 mg nightly (I like checking salivary levels first)
- Vitamin E 400–800 IU daily (d-tocopheryl succinate)
- Broccoli extract 400 mg daily (as found in Dual-Action Cruciferous Vegetable Extract)
- Indole-3-carbinol from cruciferous veggies like broccoli, cauliflower, or brussel sprouts
- Vitamin D3 daily (dosage based upon levels)
- Gamma Tocopherol 200 mg daily

- Increase seafood intake

DHEA supplementation:

Look for DHEA supplements that conform to the following specifications:

- Micronized (for maximum absorption and utilization)
- Manufactured under GMP (Good Manufacturing Practice) conditions

Amount Per Serving
Dehydroepiandrosterone (DHEA)

15 mg to 200mgs, depending upon your physician's advice. Do not use a podcast as a dosing guide. Recently, I had to treat someone who got real bad advice from an 'untrained guru' about this very issue.

Other ingredients to watch for: rice flour, wheat, and soy gelatins. Micro RNAs are not good news for our epigenome, in case you did not follow the comments in Brain Gut 2.

DHEA and heart disease: The LPa link its effects on Lipoproteins just recently studied at the University of Pennsylvania. DHEA supplementation is among my favorite ways to deal with the often-difficult lipoprotein(a), Lp(a) that is rarely covered in the blogosphere. Supplementation, however will not work in an environment that is toxic with blue light.

DHEA is a testosterone-like adrenal hormone that declines with age, such that a typical 70-year old has blood levels around 10{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} that of a youthful person. DHEA is responsible for physical vigor, strength, libido, and stamina. It also keeps a lid on Lp(a) levels. I bet you learned something there! If you are "tracking your plaque," you might want to check your DHEA level. Most people with bad vessels and hearts have terribly low DHEA levels, in my experience.

While the effect is modest, DHEA is among the most consistent for obtaining reductions in Lp(a). A typical response would be a drop in Lp(a) from 200 nmol/L to 180 nmol/L, or 50 mg/dl to 42 mg/dl—not big responses, but very consistent responses. While there are plenty of non-responders to, say, testosterone (males), DHEA somehow escapes this inconsistency, so monitor your levels and responses!

Rarely will DHEA be sufficient as a sole treatment for increased Lp(a), however. It is more helpful as an adjunct with a good **Epi Paleo diet** or you can use Krill Oil, high-dose fish oil, refrigerated fish oil, Vitamin K2 in amplified dosing, or niacin. I suggest talking these all over with your doctor before jumping in yourself. These supplements can be helpful for getting off a statin, particularly if you can't tolerate them because of the CoEnQ10 depletion.

For DHEA, the "usual" 50 mg dose can make many people aggressive. You may want to begin with a lower dose and titrate it up for effect with your doctor's blessing. Many people start with 10 mg. One can then increase to higher doses gradually over time, provided the edginess does not rear its ugly head. I can take quite a large dose without any side effects of this hormone, but you must realize not all of us can do that.

The data documenting the Lp(a)-reducing effect of DHEA are limited, such as this University of Pennsylvania study, but in my real-life experience treating many people with elevated Lp(a) levels, I've experienced it lowering your risks.

Personally, I take 150mgs a day, based upon my testing, and it varies by season!

Dosage and Use: The exact number of capsules to be taken should be determined by blood testing and the advice of a healthcare professional. Generally, take one to three capsules in the morning. If your gut is bad, you can do

topical or sublingual dosing

Do not take in the evening, as it could interfere with sleep (note: this is very rare, in my experience).

Caution: Do not use DHEA if you are at risk for or have been diagnosed with any type of hormonal cancer such as prostate or breast cancer on your own without professional advice! Just because it is an over-the-counter medicine does not give you carte blanche to use this adjuvant medication with impunity. Talk to your doctor about it.

For Webinar folks who heard today's lecture, here are the links I promised for the talk we covered:

1. http://www.webmd.boots.com/menopause/news/20120522/hrt-and-breast-cancer-risk-re-assessed
2. http://www.medpagetoday.com/OBGYN/HRT/31394 (destroying the myths of the WHI)
3. http://www.lancet.com/journals/lanonc/article/PIIS1470-2045{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}2812{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}2970110-9/fulltext
4. http://www.pbs.org/newshour/rundown/2012/05/new-online-tool-helps-women-map-their-menopause-symptoms.html
5. http://www.hormone.org/MenopauseMap/ (awesome for all women)
6. http://www.shmirshky.com/menopause-blog/2012/06/11/menopause-mondays-testosterone-therapy-prostate-cancer-with-dr-josh-trutt/ (great info for men and HRT and prostate CA)
7. http://www.latimes.com/health/la-he-estrogen-breast-cancer-20120307,0,1238385.story (estrogen alone therapy)
8. http://www.bloomberg.com/news/2012-03-06/estrogen-only-hormone-therapy-may-protect-against-breast-cancer.html (estrogen alone)
9. http://www.healio.com/endocrinology/hormone-therapy/news/print/endocrine-

today/{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}7B88A0A2F3-D193-4B82-B5F8-2B7A0B16B529{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}7D/HT-safe-during-menopause-when-tailored-to-individual-patients (Menopause Society endorses BHRT now)
10. http://www.drugstorenews.com/article/watson-launches-authorized-generic-menopause-drug?utm_source=GoogleNews&utm_medium=Syndication&utm_campaign=ManualSitemap (prometrium is now generic)
11. http://www.bohrf.org.uk/downloads/Womens_Experience_of_Working_through_the_Menopause-Dec_2010.pdf (working and menopause)
12. http://thechart.blogs.cnn.com/2011/09/23/what-the-yuck-signs-of-perimenopause/ (signs of peri-menopause)
13. http://www.columbiasurgery.org/thyroid/ (menopause and the thyroid)
14. http://www.healthcanal.com/female-reproductive/26633-CBT-effective-treating-menopause-symptoms.html (cognitive and behavioral)
15. http://www.thecompounder.com/alternative-treatments/hormone-imbalance/hormone-faq (hysterectomy FAQ’s)

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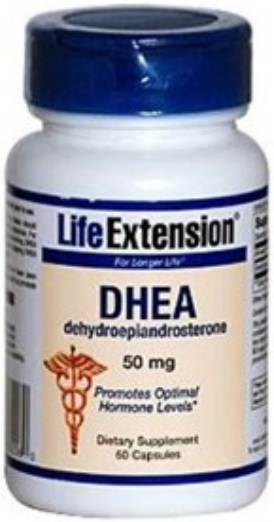
More Support: Webinars by Dr. Kruse

- Hormone Replacement & Finding a Doctor (June 2012) https://jackkruse.com/june-2012-webinar/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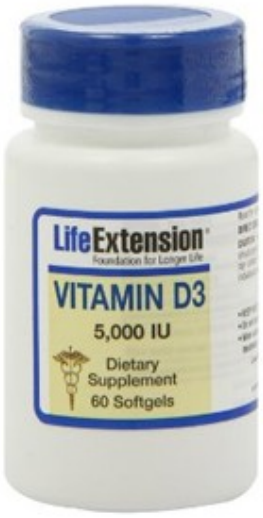
Life Extension Gamma E Tocopherol	NOW Foods Saw Palmetto	Life Extension Boron
		
Life Extension Melatonin 6 Hour Timed Release	Life Extension Vitamin D3	Now Foods Krill Oil

Life Extension Super K with Advanced K2 Complex	Sunfood Super Foods Brazil Nuts	Dehydroepiandrosterone (DHEA) and Aging (Annals of the New York Academy of Sciences)

- View The Epi-Paleo Store

Additional Resources

- Brain Gut 2: Viral Marketing
- Brain Gut 4: What was Homo’s Solution?
- Brain Gut 5: Paradigm Drifts Paradigm Shifts—Epi-Paleo

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