

DHEA

Why are *you* interested in DHEA? Anti-aging, anti-disease, to increase energy, body-building – people take DHEA for each of these reasons. Others are sitting on the fence, because one or more of these issues are important to them, but they are concerned about uncertainties regarding long-term effects, appropriate dosages, and/or the consequences of stopping, once they start taking this important hormone. We will address each of the issues briefly, and provide sources you can turn to for more in-depth discussion if you want it. We hope to help you decide whether DHEA might be of benefit to you. We also hope to help you understand why you might want to find out how much DHEA your body has naturally, and whether it is at an optimal level for you.

DHEA is called the “Mother Hormone” because it is the raw material for most steroid hormones produced in the human body. Hormones are messengers in the body’s “chemical nervous system”. They are chemicals secreted by tissues and glands, in response to stimuli, for local or overall body control. There are steroidal and non-steroidal hormones, and DHEA is the most abundant of the 150 or so steroids and their metabolites.

DHEA also has control and feedback influence on *all* the hormones of the body¹ and can stimulate production of the sex hormones in the gonads (or elsewhere).² Through hormones, DHEA can have a profound influence on an incredibly wide range of functions in the body, including energy, aging, libido, immune defenses, and specific disease processes.

So if DHEA is naturally produced in the body and it’s already there, why take supplements? Because our bodies make progressively less of it as we age – and because of stress. DHEA is synthesized from cholesterol, via pregnenolone and other steps, in the cortex (surface tissue) of the adrenal glands, in the astrocyte cells of the brain, and to a lesser degree, in the testicles and ovaries.³

With many steps required for its production, a breakdown anywhere in the production path can reduce supplies. Stress in any form – injury, anger, disease, pollution, etc. – can sharply reduce production of DHEA, for example. Some combination of accumulated stresses and genetics brings average levels of DHEA down from around 3600 nanograms per milliliter of plasma (for men – women’s levels are lower but follow the general path) at around 20 to 30 years of age, to between 800 and 1200 nanograms per milliliter at 60 to 70 years of age. In other words, DHEA falls by 67% to 78%! In fact, for 80 to 90 year olds, it falls by 80% to 90%!^{4,5}

Nearly 4,000 articles in the scientific literature deal with DHEA. DHEA has clearly been linked to most of the conditions associated with both aging and stress. Stress has become almost as universal a fact of life in industrial society as aging – and the two are tightly linked. “80 year olds in good health and with low stress levels have DHEA equivalent to 30 year olds in poor health with high stress.”¹

We have a very clear, vivid picture here, and the scientific research supports it. Low DHEA levels have a causal relationship with poor health and signs of aging. Low DHEA levels are caused by stress and aging, and cause a poor response to stress and aging. DHEA levels can be raised by supplementation. Raising DHEA levels by supplementation leads to people feeling better in many ways, in statistically significant proportions. Leading scientists in the DHEA field (although not all of them) have, after years of research, become committed users

of 25 to 50 mg of DHEA per day in attempts to delay, or even reverse, their own aging and handle the stress of their lives. Testimonials abound:

"DHEA rejuvenation is the single most important discovery in the history of medicine."¹

"Perhaps the most significant biomarker known . . . responsible for the broad balance of host response related to species & individual survival."⁶

"May be the most critical single chemical in the body for predicting disease or health."¹

"Is deficient in every major disease."¹

DHEA and The Health Impacts of Stress

Stressors (including toxins, emotions, pain, nutritional imbalance, etc.) 'signal' the hypothalamus (the body's 'switchboard') to 'take action' to maintain the homeostatic balance of the organism. The hypothalamus then secretes ACTH (adreno-corticotrophic-hormone) through the anterior pituitary gland. ACTH stimulates the adrenal cortex to secrete DHEA and cortisol (the main glucocorticoid, or sugar-cortisol combination in the body) in balanced proportion to each other.

If the stress goes away quickly, the system soon returns to normal. If the stress continues, however, cortisol continues to rise dramatically. "Almost any type of physical or mental stress will cause an immediate and marked increase in cortisol secretion up to 20-fold."^{1,7} DHEA levels then actually decrease, because DHEA is converted to cortisol, and DHEA production is sacrificed, to meet the extreme demand for cortisol.

The result is a high cortisol to DHEA ratio, which can cause any or all of the following:

- Reduced immune response
- Lowered insulin sensitivity
- Loss of appetite
- Indigestion
- Allergies
- Hyperlipidemia
- Mental disorders
- Hypertension
- Lowered glucose utilization
- Gluconeogenesis (appropriation of protein for sugar-fuel)

- Headaches
- Fatigue
- Salt or water retention
- Hyperglycemia
- Excessive hunger
- Insomnia
- Premenstrual Syndrome
- Bone loss

If the stress is not eliminated soon, adrenal fatigue and exhaustion set in. The result is a normal or reduced level of DHEA, and a reduced level of cortisol, with a lower cortisol/DHEA ratio, *and the adrenals are no longer responding*. Among the long-term consequences are a host of degenerative disorders, including cardiovascular disease (stroke, heart disease, atherosclerosis); cancer; diabetes; arthritis; auto-immune disorders; collapse of the immune system with atrophy of the thymus, spleen and lymph nodes; and failing memory and concentration, depression, and other mental disorders.^{8,9,10}

Also, as one ages both the amount of DHEA and the ability to cope with stressors (which were once relatively easy to handle) decline steadily. It is interesting to note that almost all the problems encountered as a result of stress, where the ratio of DHEA to cortisol fell steeply, have been successfully treated with supplemental DHEA (see references). "DHEA is a major modulator of stress reaction in relation to increased gluco-corticoids/cortisol."¹¹

Stabilizing – or Restoring – DHEA Levels

Whether you are being buffeted by the storms of life, or simply feeling the effects of a long life, having the DHEA levels of a 20 or 30-year old can make it easier to handle. To some extent, simply reducing stress and pollution can help:

"DHEA can be increased by a healthy lifestyle including exercise, meditation and caloric restriction." This makes sense, since a healthy lifestyle is known to reduce stress.¹

(Note: "The DHEA level of smokers and heavy drinkers is much less than the level found in non-smokers and heavy drinkers."¹² Tobacco smoke is more stressful than alcohol.)

However, restoring DHEA to the levels of a 20-year old, with the possibility of making a difference in your body's response to a disease, or maximizing resistance to the stresses of life, is likely to require supplementation. As we noted in the beginning, some people are concerned about uncertainties regarding long-term effects, appropriate dosages, and/or the consequences of stopping, once started.

Some uncertainty regarding long-term effects is destined to be with us for another 10 or 20 years, because very few people have taken supplemental DHEA for more than a few years, so far. Nothing has been measured among large groups of people, so nothing is considered proven. Still, many consider the known benefits worth the minimal risk – minimal because some people have taken 25 to 50 mg per day average for as much as 14 years, others have taken about 2 grams a day for two years, and many lab animals have spent their lives on supplemental DHEA without ill effect. Some rats have been fed as much as a gram a day – the equivalent of 200 to 400 grams or more for humans. It appears to be impossible to kill a mammal by feeding it DHEA – and it appears to be highly likely to make it live a longer, healthier life.

Paired questions have been raised about the effect of supplementation on natural production of DHEA, and the consequences of stopping, once started. Regarding the first,

"Although there have been no long-term confirming studies in humans, using moderate doses of DHEA appears to be the exception to the rule that says natural production of hormones decreases if one takes supplemental forms."¹³ Regarding stopping, once started, the only impact appears to be that DHEA usually falls to the levels it was at previously.

Dosage is the next question. Most of the literature recommends testing for current DHEA levels, and taking a dose designed to restore levels to those of a 20-year old. This approach is believed to minimize possible risks, which might rise with dosage. Saliva tests are most accurate,¹⁴ and cost about \$50. There is no evidence of damage from the usual dosages of 12 to 50 mg per day (less for younger or healthier people, more for older or less healthy). Each individual must make his or her own assessment or get

advice from a professional. These amounts appear to restore youthful DHEA levels quickly. *The result?* Taking 50 mg daily for 12 weeks led to an improved sense of well-being for approximately 65% of men and 85% of women of advancing age in one study.¹⁵

Caution: Due to the potential for increased testosterone, estradiol, and other hormone production, "Men with prostate cancer should not be using DHEA, except possibly under strict, experienced, medical supervision, even though some doctors believe that DHEA might be beneficial for metastatic prostate cancer patients. Men should obtain a prostate specific antigen (PSA) test along with a digital rectal examination to make sure they do not have underlying prostate cancer. Also, women with reproductive cancers and/or reproductive pre-cancerous conditions should not use DHEA, except possibly under strict, experienced medical supervision. Women should have their serum estradiol and progesterone levels assessed and have a PAP test to see if there are any abnormal cells in their cervix."¹⁶

Some people recommend taking DHEA in the morning, because cortisol levels are highest then, and because increased energy may not be what one wants shortly before bedtime – sometimes. It does not seem to matter whether it is taken with or between meals.

Some people have recommended using DHEA for 5 days on, 2 days off, or taking it on alternate days, out of concern about the possibility of suppressing natural production if it is taken continually. Others have countered that the blood levels fall close to baseline in 6 hours anyway, so it should not be an issue. No one really knows.

One good idea is to take DHEA with antioxidants, because of possible oxidative stress on the liver when taken orally, or the potential for oxidation of the product prior to consumption. Possible antioxidant candidates are ascorbyl palmitate (fat-soluble vitamin C), alpha-lipoic acid, vitamin E (at least 400 I.U.), rosemary, and green tea, among others.

References:

1. Norman Shealy: "DHEA – Youth & Health Hormone", 1996, Keats
2. Labrie, F, et al.: ["Intracrinology." *Autonomy and freedom of peripheral tissues*]. *Ann. Endocrinol. Paris*, 1995, 56(1): 23-29
3. *Cell Biol.* 1993, 121(1) 135-