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On The COVER

Congress Seeks to Ban DHEA

By William Faloon



A bill has been introduced in Congress that would classify DHEA as an “**anabolic steroid drug**” and thus make it illegal for Americans to obtain.

DHEA, however, is not an anabolic steroid drug. It is a natural hormone that declines as people mature past the age of 30.

Low DHEA levels have been related with degenerative conditions associated with aging.¹⁻²⁸ A large volume of published scientific studies reveals that supplemental DHEA can provide unique health benefits.²⁹⁻⁶²

For more than a decade, DHEA has been sold as a dietary supplement. The availability of DHEA supplements has enabled many aging Americans to avoid the risks associated with declining

DHEA levels. It is in the financial interests of pharmaceutical companies to have DHEA banned so that aging people will have to rely instead on expensive prescription drugs.

If Congress is persuaded by drug lobbyists to outlaw DHEA supplements, more Americans will become vulnerable to declining DHEA levels, resulting in an economic bonanza for pharmaceutical companies.

In this report, we expose shocking facts behind this new attack on DHEA so that citizens will be armed with the information they need to dissuade Congress from prohibiting this lifesaving hormone.

On March 5, 2007, legislation was introduced that would add *dehydroepiandrosterone*, or DHEA, to the list of anabolic steroids that are classified as controlled substances under the Anabolic Steroid Control Act.⁶³

DHEA, a natural hormone, does not function like muscle-building anabolic steroid drugs. In fact, no scientific studies indicate that DHEA increases muscle mass in young men with already-adequate DHEA levels.

To frighten the public into thinking that DHEA poses a danger, a blatantly false press release is now circulating in Congress. Here is an excerpt from this press release: “*Like all steroids, DHEA has a number of potential long-term physical and psychological effects, including heart disease, cancer, stroke, liver damage, severe acne, baldness, dramatic mood swings, and aggression.*”⁶⁴

As you will read next, these allegations are totally inconsistent with the scientific literature. Even more disturbing is that a basis for this new attack on DHEA comes from those who have a huge financial interest in turning DHEA into an expensive prescription drug.

DHEA PROTECTS AGAINST HEART DISEASE—IT DOES NOT CAUSE IT!



Drugs to prevent and treat heart disease generate more profit for pharmaceutical companies than any other class of medication. The use of DHEA as a dietary supplement has been increasing as new studies reveal that DHEA might reduce heart attack risk.^{7-10,12,26,27,65-69} Pharmaceutical companies thus face huge economic losses if too many Americans use low-cost DHEA supplements and reduce their reliance on expensive cardiac drugs.

To give you an idea of the magnitude of loss faced by drug companies, a study published in October 2006 showed that higher DHEA levels resulted in improved ejection fractions (a

measurement of the heart's pumping capacity) and lower levels of a blood marker that indicates serious congestive heart failure.²⁶

This same study analyzed the relationship of DHEA, free testosterone, and insulin-like growth factor-1 (IGF-1) to mortality in men suffering from chronic heart failure. The chart below reveals the startling results when these three hormones were correlated with three-year survival:

Hormone Status	Three-Year Survival Rate
High levels of DHEA, testosterone, and IGF-1	83%
Deficiency in one hormone (DHEA, testosterone, or IGF-1)	74%
Deficiency in two hormones (DHEA, testosterone, or IGF-1)	55%
Deficiency in all three hormones (DHEA, testosterone, and IGF-1)	27%

The doctors who conducted this study concluded that a deficiency in any of these hormones is “an independent marker of poor prognosis.”

Based on this one study alone, pharmaceutical companies stand to earn billions of dollars of additional profits from cardiac drugs if Congress bans DHEA supplements.

Pharmaceutical lobbying has already curtailed Americans' access to inexpensive ways to boost testosterone and IGF-1, though certain nutrients have been shown to boost IGF-1 and testosterone in some studies.^{53,68,70}

CARDIAC DANGERS ASSOCIATED WITH LOW DHEA

Epidemiological studies show that low levels of DHEA in men correlate with a higher risk of cardiovascular disease. The **Massachusetts Male Aging Study** followed 1,700 men between the ages of 40 and 70 for nine years. The authors found that men in the lowest quartile of serum DHEA at baseline were **60% more likely** to develop ischemic heart disease, suggesting a valuable role for DHEA in averting the nation's leading cause of death.⁹

Additionally, higher DHEA levels seem to positively affect endothelial cell signaling, which could have important implications for avoiding heart disease. In a subset of men from the **Baltimore Longitudinal Study of Aging**, levels of hormones (including DHEA) were measured and correlated with

arterial stiffness (using ultrasound imaging of the carotid arteries). Men with higher levels of testosterone and DHEA had less stiffness of the arteries, indicating a decreased risk of cardiovascular events such as heart attacks.⁶⁵

A similar link between low serum DHEA levels and greater risk for carotid artery disease was demonstrated last year in a study of young women with polycystic ovary syndrome, a condition associated with an increased risk of cardiovascular disease and metabolic syndrome.⁷¹

SEN. HATCH TO OPPOSE DHEA BAN

Sen. Orrin Hatch (R-UT), who was instrumental in the passage of the 1994 Dietary Supplement and Health Education Act (DSHEA) and remains one of Congress' staunchest advocates of health freedom, told Life Extension that he opposes S. 762 and other efforts to re-classify DHEA as an anabolic steroid.

According to Hatch, the proposed legislation “specifically overturns the exemption we made for DHEA.” The senator notes that DHEA was exempted from the list of banned anabolic steroids under DSHEA because “there is no evidence that DHEA has posed any health problem.”

“In fact, [DHEA] is being used safely by many Americans who recognize its potential,” says Sen. Hatch. “I'll be working to make certain the Senate does not pass this unwise bill.”

A study in animals in 2006 shed further light on how DHEA promotes cardiovascular health.⁶⁶ Researchers fed young and old female mice a daily DHEA supplement. After 60 days of treatment, the investigators measured the stiffness of the test animals' left ventricle, the heart's major pumping chamber. The DHEA-supplemented older mice had decreased left ventricular stiffness compared to the non-supplemented older animals.

The scientists concluded that DHEA supplementation is capable of reversing the left ventricular stiffness that accompanies aging, thus promoting youthful structure and function in the heart's tissues.

Another animal study simulated the depressed cardiovascular function (shock) that follows major trauma.⁷² In response to administration of a DHEA metabolite, the depression of cardiovascular function and organ blood flow induced by shock was

reversed. The dangerous inflammatory cytokine interleukin-6 (IL-6), which had been elevated in the state of simulated shock, was also reduced by this DHEA metabolite. The investigators concluded that treatment with this metabolite could be valuable in restoring cardiovascular function and correcting abnormal cytokine levels.

Furthermore, investigators determined that DHEA injected directly into the coronary arteries of pigs produced acute dilation of the blood vessels, with associated increases in coronary blood flow.⁶⁷

DHEA PROTECTS AGAINST ATHEROGENIC RISK FACTORS

A number of studies indicate that DHEA helps protect aging adults against atherosclerosis and its life-threatening consequences, such as coronary artery disease.^{7-10,26,27,31,32,65,68,69,73-75} Several mechanisms of action may account for these benefits.

In a controlled trial, 24 older men orally ingested 50 mg of DHEA or a placebo at bedtime for two months. The researchers then measured arterial dilation and blood flow. While the placebo-treated subjects had no changes in any of the parameters measured, the DHEA-treated men experienced increased levels of a substance that helps blood vessels to dilate, as well as decreasing levels of a marker for blood clotting. They also had lower levels of artery-clogging low-density lipoprotein (LDL) after treatment than did the controls. Based on the beneficial effects of short-term DHEA treatment, the researchers concluded that long-term DHEA supplementation may prevent atherosclerotic changes caused by falling levels of vessel-dilating biochemicals.⁶⁸

Of the many tactics that can be deployed to increase one's life span, supplementing with DHEA seems particularly beneficial, as new findings imply that higher levels of DHEA are associated with a longer life span.⁴

Scientists recently examined data on nearly 1,000 older Taiwanese adults to determine the relationship between DHEA levels and three-year mortality risk.

At the study's end three years later, the data analysis revealed that participants with lower DHEA levels had a **64% greater risk** of death than did individuals with higher DHEA levels. The study authors concluded that lower levels of DHEA have a notable effect in increasing mortality risk, and that optimal DHEA levels may help to promote longevity.⁴

The press release attacking DHEA that is now circulating in Congress states that DHEA use is associated with heart disease. This is a blatantly false allegation, as can be clearly seen by examining published scientific studies showing that DHEA most likely protects against heart disease.^{7-9, 26,27,65-69}

HIGHER DHEA LEVELS TIED TO LOWER MORTALITY RISK

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DHEA PROTECTS THE BRAIN—IT DOES NOT CAUSE STROKE!

DHEA is especially abundant in the human brain. Many earlier studies reported a protective effect of DHEA against the deterioration of mental function with aging.^{21,51,56-58,76-81} Those stricken with Alzheimer's and other neurodegenerative diseases, for instance, have lower levels of DHEA.^{79,80} A recent Canadian study found that rats implanted with a high dose of DHEA showed significantly less hippocampal damage after stroke was induced (**88%** injured neurons in the placebo group compared to only **60%** in those given DHEA).⁸¹

It has been demonstrated that DHEA markedly inhibits the inflammatory cytokines tumor necrosis factor-alpha (TNF-alpha) and IL-6 in glial cells.⁸² The ability to lower the levels of these inflammatory mediators may be an important part of the neuroprotective mechanism of DHEA.

In addition, DHEA has been shown to protect against the toxicity of the amyloid-beta protein and excess glutamate.⁷⁶ Treatment with glutamate produced a copious increase in the neuronal glucocorticoid receptor. Treatment with DHEA reversed this increase, demonstrating the anti-glucocorticoid action of DHEA.

A study conducted in Cambridge, England, compared DHEA and cortisol levels in clinically depressed patients (categorized as "major depressives") with a matched group of patients in remission from depression and healthy controls.²¹ Both morning and evening levels of DHEA were lowest in depressed patients. Depressed patients showed low DHEA relative to high cortisol levels (similar to the ratio shift seen in aging). The authors point out that DHEA not only protects against harmful effects of excess cortisol, but also may have mood-improving properties and that this may have "significant implications" for the treatment of depression.^{52,83-92}

DHEA's ability to protect the hippocampus and enhance its activity is important in regard to Alzheimer's disease. Studies have generally found increased cortisol and lower DHEA in Alzheimer's disease patients.⁸⁰ Excess cortisol damages the hippocampus and potentiates amyloid-beta toxicity.⁸⁰ DHEA is believed to be able to antagonize the destructive effects of excess cortisol.^{83,93,94}

The authors of a recent study have concluded that dementia is correlated with low DHEA more so than with high cortisol.⁸⁰ Another study also showed that while normal aging results in decreased DHEA levels, victims of dementia have even lower levels of DHEA than do the healthy elderly.⁹⁵

DHEA is protective against a wide range of neurological disorders.^{21,51,52,56-58,76-78,80,81,96-98} DHEA has never been shown to increase stroke risk, as the bogus press release circulating in Congress alleges.

CONGRESS SEEKS TO BAN DHEA: *WHAT YOU NEED TO KNOW*

- A bill recently introduced in Congress would classify the popular supplement dehydroepiandrosterone (DHEA) as an anabolic steroid drug. If the proposed bill becomes law, DHEA would be regulated as a controlled substance and would no longer be readily available as a nutritional supplement.
- DHEA is not an anabolic steroid drug, but rather a natural hormone that is essential for good health. Since DHEA levels in the human body decline after the age of 30, many people rely on DHEA supplements to combat diseases associated with aging. A wealth of research demonstrates that optimal DHEA levels can help protect against heart disease, cognitive decline, and premature death.
- Those seeking to ban DHEA claim that it causes many adverse effects in the body, including mood swings and liver toxicity. However, no substantial scientific evidence exists to support these claims; in fact, in the more than 10 years that DHEA has been available as a dietary supplement, there have been no reports of serious adverse health effects related to DHEA.
- If DHEA becomes a controlled substance, Americans will have lost a valuable weapon for averting the diseases of aging. To preserve your freedom to use DHEA and other dietary supplements, contact your Senators and Representative and urge them to vote against Senate bill S.762 and House bill H.R.1249.



Congress Seeks to Ban DHEA

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ANIMAL STUDY DATA MISUSED TO DISCREDIT DHEA'S WELL-ESTABLISHED SAFETY PROFILE

One way scientists evaluate for toxicity is to have animals consume large amounts of a compound and then carefully assess them for organ damage. However, different animal models need to be used in different situations—a “one-size-fits-all” approach makes for bad science.



One such example is the use of animal models to assess for liver toxicity with compounds that are peroxisome proliferators. Peroxisome proliferators are potent rat carcinogens in the liver. However, this experimental model is not valid to assess human liver toxicity for these types of compounds.

There are significant species differences in response to peroxisome proliferators. Rats and mice are very sensitive to the toxic effects of these compounds, but peroxisome proliferators do not produce toxicity in species like guinea pigs, monkeys, and humans at dose levels that produce a dramatic toxic response in rodents.⁹⁹

Scientists have published research papers indicating that peroxisome proliferators do not pose a liver toxicity risk to human beings. One researcher noted, “it is reasonable to conclude that the encountered levels of exposure to these non-genotoxic agents (peroxisome proliferators) do not

present a hepatocarcinogenic hazard to humans.”¹⁰⁰

Since DHEA is a peroxisome proliferator, it comes as no surprise that liver damage occurred when scientists administered huge doses of a well-known carcinogen, N-nitrosomorpholine, and huge doses of DHEA in the diets of lab rats, roughly the human equivalent of 6774 mg of DHEA daily! Contrast this enormous amount of DHEA with the typical 15-75 mg per day of DHEA used by healthy aging humans.¹⁰¹

Valid animal models that have been used to assess the liver toxicity risk of DHEA in humans have found no evidence of liver injury or toxicity. For example, a study showed that rats and mice given large amounts of DHEA in the diet displayed increased liver enzyme levels associated with lipid accumulation in rodent liver, but no such increase was shown in guinea pigs.¹⁰² Another study showed evidence of increased liver enzyme levels when DHEA was administered to mice at a human-equivalent dose of about 1700 mg per day of DHEA. However, in guinea pigs, a valid animal species for comparison to humans in this context, there was no evidence of toxicity at a human-equivalent dose of over 4500 mg per day of DHEA.¹⁰³



Even ignoring the fact that rats and mice are invalid models to assess for liver toxicity risk in humans with supplements like DHEA, and ignoring the fact that appropriate animal models for extrapolation to humans do not show any evidence of liver injury risk with DHEA, the rat-mouse DHEA studies on liver toxicity use enormous amounts of DHEA—doses equivalent to 130 times the average 50 mg of DHEA per day used by healthy adults.

It is ludicrous to suggest that DHEA be banned on the basis of invalid animal models that use human-equivalent doses of DHEA that are more than 100 times greater than those used by healthy adults. An important study in JAMA in 2006 showed signs of liver damage in patients who consumed 4 grams daily of Tylenol® (acetaminophen) for two weeks.¹⁰⁴ This means that taking two Extra Strength Tylenol® caplets, four times daily, can generate evidence of liver damage. Yet the misleading press release being circulated in Congress suggests that DHEA should be outlawed because it causes “liver damage.” This is an egregious distortion of the facts—especially when there are no reported human cases of liver damage caused by DHEA in the scientific literature.

DHEA CAN CAUSE ACNE IN WOMEN— *WHEN THE DOSE IS TOO HIGH*

Women tend to require less DHEA than men. When a woman takes too much DHEA, acne can result, but this dissipates when

the DHEA dose is lowered.

We at Life Extension have never heard of “severe acne” being caused by DHEA, as the biased press release being circulated in Congress asserts. If the worst that can happen to women is temporary acne in response to excessive intake of DHEA, this would appear to be a small price to pay in relation to the multiple health benefits DHEA has been shown to confer.

The potential acne effect of DHEA on women has been long known, and women usually stay at moderate 15-50 mg/day DHEA doses and avoid acne altogether.

DHEA DOES NOT CAUSE HAIR LOSS

We could find no reports that DHEA causes hair loss. While one could propose a theoretical basis that somehow orally ingested DHEA would increase dihydrotestosterone (DHT) enough to promote hair loss, there is no evidence to show that this has ever actually happened.

If DHEA were to increase dihydrotestosterone, the solution would be to take a 5-alpha reductase inhibitor (like low-dose Proscar®) or possibly saw palmetto extract to block this effect.

DHEA DOES NOT CAUSE “WILD MOOD SWINGS AND AGGRESSIVENESS”

DHEA’s role as an antidepressant has been rigorously examined for years. During these many trials, researchers routinely found that when taken daily, DHEA supplements effectively reduced depressive episodes and enhanced mood. In fact, according to one major study in the UK, as many as **67%** of men and **82%** of women reported a noticeable decrease in their depressive symptoms while taking as little as 25 mg per day of DHEA.⁶⁵ In addition, women suffering from adrenal insufficiency have reported an improved sense of well-being and an associated increase in both sexual interest and sexual satisfaction while taking DHEA.⁵⁰

Sexual function is closely linked with emotional health and well-being, and scientists now know that DHEA levels are strongly associated with healthy sexual function. Two recent studies found that sexual function¹⁰⁵ and overall self-reported health and functional status¹⁰⁶ were better among women with relatively high levels of DHEA. Even low-dose DHEA supplementation may be effective in providing these benefits. For example, in a group of women with systemic lupus erythematosus, daily doses of DHEA as low as 20-30 mg improved health-related quality of life and sexual interest and activity compared to placebo.⁶¹ Other researchers have reported notable improvements in libido and mood in women who supplemented with DHEA.^{107,108}

Even more promising are studies suggesting that, in addition to its positive impact on depression and sexual function, DHEA may help to manage symptoms of schizophrenia. Based on their preliminary findings demonstrating DHEA’s efficacy in reducing symptoms of schizophrenia,⁸⁴ researchers further noted improvement in illness severity and anxiety in a group of schizophrenic patients who received DHEA in addition to their anti-psychotic medications.⁹⁷ The study authors attributed this specific anxiety-reducing effect to DHEA’s influence on the brain’s GABA receptors, which are central to regulating mood.⁹⁷

To characterize DHEA as causing “wild mood swings and aggressiveness,” as was done in the press release circulating in Congress, is the exact opposite of the beneficial psychological effects that DHEA exerts on the body.



DHEA AND CANCER

No human study in which DHEA was administered as a supplement or drug has ever shown that it causes cancer. Petri dish and live animal studies show that DHEA may protect against certain cancers.^{41-46,109-145} Human studies that measure DHEA blood levels and correlate them to future cancer risk are contradictory and not representative of the DHEA protocols used by health-conscious people today.

WHY LAYPEOPLE CONFUSE DHEA WITH SYNTHETIC STEROID DRUGS

DHEA is produced mainly in the adrenal glands and serves as a natural precursor and balancer to many hormones in the body. While DHEA is defined as a “steroidal hormone,” that does not equate to an “**anabolic steroid drug**.”

By way of example, the bioactive form of vitamin D in the blood (calcitriol) is a “steroid hormone,” but no one is yet suggesting that vitamin D be banned. In fact, both vitamin D and DHEA are synthesized from cholesterol, the most common sterol found in the body.

DHEA exerts very weak androgenic (testosterone-like) and estrogenic (estrogen-like) activity, and can be converted into metabolites, depending on the body’s need and hormone balance.¹⁴⁶ Under normal conditions, the conversion of DHEA to

testosterone is tightly controlled by the body. DHEA has been consistently shown to not influence testosterone levels in young men.¹⁴⁷⁻¹⁴⁹

If DHEA did function as an anabolic androgenic steroid, then aging men would not be seeking prescription testosterone drugs to reverse certain symptoms of aging.

Since medical science defines DHEA as a “steroidal hormone,” some lawmakers in Congress now think it should be classified as a “controlled substance” and removed from the marketplace. This is quite an allegation when one considers that DHEA has been freely sold in the United States for over 10 years, with no reports of serious adverse events.

The problem is that members of Congress are not scientists, and they are unable to differentiate between natural steroidal substances in the body (such as cholesterol, vitamin D, and DHEA) and the synthetic anabolic steroid drugs that are abused by some bodybuilders.

WHAT IS AN “ANABOLIC STEROID DRUG”?

According to the United States government’s own Medline Medical Dictionary, an anabolic steroid is defined as:

“Any of a group of usually synthetic hormones that are derivatives of testosterone, are used medically especially to promote tissue growth, and are sometimes abused by athletes to increase the size and strength of their muscles and improve endurance.” (Medline-March 12, 2007)¹⁵⁰

Based on the government’s own definition of “anabolic steroid,” DHEA does not fit into this category. Controlled clinical trials indicate that its use in young adults does not result in performance-related gains, and it is not associated with the myriad side effects that accompany anabolic steroid abuse.^{147-149,151-153} DHEA is sold as a natural (not synthetic) hormone and is not a derivative of testosterone.¹⁵⁴

Anabolic steroid drug abuse is purported to result in cardiovascular conditions such as hypertension, atherosclerosis, and blood clotting, liver conditions such as jaundice and hepatic carcinoma, tendon damage, reduced fertility and breast enlargement (in males), and adverse psychological and behavioral effects. DHEA does not exert these effects.^{155,156}

Moreover, surveys of weightlifters and other athletes conducted by Harvard University researchers show that DHEA is rarely used to increase muscle size or strength or to improve endurance.¹⁵⁷ Therefore, the notion that DHEA is in any way comparable to controlled anabolic steroid drugs is scientifically unfounded and legally invalid.

LET YOUR VOICE BE HEARD ON CAPITOL HILL

There is at least one pharmaceutical company lobbyist for each member of Congress. Drug lobbyists function solely to persuade Congress to enact laws that make pharmaceutical companies more money. They have no interest in protecting the American public’s health.

If DHEA is classified as a “controlled substance,” pharmaceutical companies stand to earn enormous profits from the drugs Americans will need to treat disorders as diverse as:

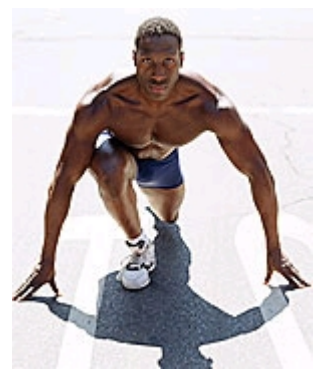
- **Type II diabetes**
- **Hypertension**
- **Depression**
- **Coronary and systemic atherosclerosis**
- **Osteoporosis**
- **Chronic inflammation.**

Members of Congress have been victimized by a misinformation campaign designed to disparage DHEA for the purpose of having it reclassified as an “**anabolic steroid drug**.” Consumers must rally to overcome this deceptive attempt to deny Americans continued access to this scientifically validated supplement safely used by millions of Americans each day.

Another troublesome aspect about this charade to discredit DHEA is that it could provide a springboard for pharmaceutical companies to attack other supplements that compete against their drug sales. So whether you use DHEA or not, the hoax being perpetrated in Congress is a genuine threat to health freedom across the board.

The Senate bill that seeks to ban DHEA is **S.762**. The companion House bill is **H.R.1249**. To register your opposition to these bills, call **1-202-224-3121**.

To write your Senators and Representative, use the form letter on page 35 following the scientific references for this article, or log on to www.lef.org/lac to conveniently send this letter via email to your members of Congress.



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