Vitamin A: The Forgotten Bodybuilding Nutrient
By Chris Masterjohn

The dense forest of bodybuilding nutrition contains a paradox: the quantity of information available is abundant, but the wisdom of traditional diets to satisfy the primary concerns of bodybuilders is sparse and hard to find. Typical recommendations include very low-fat diets rich in protein foods like salmon and chicken.

You will search in vain through mainstream men's health magazines to find so much as a mention of the importance of vitamin A to bodybuilding. Yet this nutrient is essential to muscle-building and may be the bodybuilder's most potent weapon. Vitamin A is necessary for the utilization of protein and the production of testosterone and other growth factors. In fact, one human study, discussed below, found the administration of vitamin A and iron to have results equivalent to the administration of testosterone itself. Rather than advocating the consumption of vitamin-A rich foods such as liver and natural food-based supplements such as cod liver oil, mainstream men's health writers are advocating diets very high in protein, which deplete vitamin A reserves, leaving one to wonder whether the athletes who resort to over-the-counter steroid supplements might be able to achieve similar results by consuming a traditional diet, rich in vitamin A.

Vitamin A and Testosterone

Abundant animal research indicates the importance of vitamin A to the production of testosterone. Vitamin A crosses the blood-testis barrier in its alcohol form as retinol, where it is stored in the Sertoli cells and converted as needed to its more biologically active form, retinoic acid. Experiments with rats show that greater concentrations of vitamin A in the testes increase basal testosterone secretion, as well as transferrin, which is responsible for the transport of iron; and a variety of growth factors including IGF-binding protein 4 (which transports IGF), androgen-binding protein (which transports androgens), transforming growth factor-beta (which causes cell growth but suppresses cancer) and steroidogenic acute regulatory protein (which is responsible for the transport of cholesterol into the mitochondria for its conversion to steroids). Vitamin A also decreases estrogen production in the male testes. Rats that are deficient in vitamin A experience decreased testosterone until the accessory sex organs atrophy, indicating that vitamin A not only aids in, but is essential to, testosterone production.[1]

One experiment using guinea pigs, which corroborates the many experiments done with rats, found a decrease in plasma testosterone associated with a deficiency in vitamin A.[2] A human study comparing the dietary intakes of 155 pairs of male twins found a correlation between testosterone levels and vitamin A intake.[3]

The most compelling study is one that assigned 102 teenage boys with short stature and delayed puberty into four groups: a control, a testosterone-supplemented group, a vitamin A- and iron-supplemented group, and a group that received both testosterone and the nutritional supplementation. All treatments were effective in inducing growth and puberty, whereas the control group did not gain weight or begin puberty in the same period of time. What is most amazing is that the degree of growth acceleration was similar in the testosterone-treated group and the vitamin A-treated group. Pubertal onset occurred in 9-12 months in the testosterone group, and by 12 months in the vitamin-A group.[4]

This study suggests two things. The first is that the growth problems these boys experienced could have been avoided if their parents only had known the importance of serving a meal with liver on a weekly basis, as liver is very rich in both vitamin A and iron. The second is that, with equivalent hard work and dedication, athletes and body builders may be able to achieve similar results from their
training by taking high-vitamin cod liver oil and eating foods rich in vitamin A on a regular basis as others receive from the common practice of supplementing with testosterone precursors.

**Vitamin A and Prostate Cancer**

Although some researchers have expressed concern that androgens such as testosterone may be involved in the etiology of prostate cancer, from vitamin A we can expect only more good news. Scientists in one controlled study administered doses of cyproterone acetate, an anti-androgen, and testosterone propionate, to rats, followed by N-methyl-N-nitrosourea, a carcinogen, with one group treated with large doses of vitamin A. The incidence of prostate cancer in the group not treated with vitamin A was 65 percent, while only 18 percent and 20 percent of vitamin A-treated rats experienced dorsolateral and anterior prostate cancer, respectively.[5]

**Vitamin A and Protein Utilization**

The utilization of protein requires vitamin A. Several animal studies have shown that liver reserves of vitamin A are depleted by a high dietary intake of protein, while vitamin A increases in non-liver tissues. One explanation for this is that adequate protein is necessary for vitamin A transport. In one study researchers fed radioactively-labeled vitamin A to rats on low-protein and high-protein diets, using the amount of radioactivity present in exhaled gases, urine and feces as a measure of the metabolism of vitamin A, and found that vitamin A is indeed used at a higher rate on a high-protein diet.[6]

Vitamin A is not only depleted by a high intake of protein, but it is also necessary for the synthesis of new protein, which is the goal of the bodybuilder. Rats fed diets deficient in vitamin A synthesize protein at a lower rate than rats fed adequate vitamin A.[7] Cultured skeletal muscle cells increase the amount of protein per cell when exposed to vitamin A and D, but not when exposed to vitamin D alone.[8]

**Eat Your Liver**

Bodybuilders and other athletes interested in gaining muscle have an interest in boosting their levels of testosterone and other growth factors and maximizing their utilization of protein and its incorporation into muscle cells. Typical recommendations usually include very high amounts of protein, but exclude foods like liver that are high in vitamin A, and low-fat recommendations all but banish vitamin A entirely from the diet by excluding foods such as full-fat milk. The combination of a high-protein diet that depletes vitamin A and a low-fat diet that fails to provide vitamin A is a clear recipe for deficiency of this vital nutrient. Exercises that elicit a high demand for testosterone, such as squats and deadlifts, are often recommended for muscle growth, but without vitamin A the body cannot meet that demand for testosterone. It's high time for athletes to forget the modern mantras and remember the dietary wisdom of the past, achieving a lean, muscular physique through traditional foods such as liver, egg yolks, full-fat milk, butter from grass-fed cows and cod liver oil.

**About the Author**

Chris Masterjohn is the author of several Wise Traditions articles and the creator and maintainer of Cholesterol-And-Health.Com, a website dedicated to extolling the virtues of cholesterol and cholesterol-rich foods. He has authored two items accepted for publication in peer-reviewed journals: a letter in an upcoming issue of the Journal of the American College of Cardiology criticizing the conclusions of a recent study on saturated fat and a full-length feature in an upcoming issue of Medical Hypotheses proposing a molecular mechanism of vitamin D toxicity. Masterjohn holds a
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Editor's Note: Many health conscious individuals avoid cod liver oil and other foods rich in vitamin A because of concerns about vitamin A toxicity. Yet, according to the Merck Manual, vitamin A poisoning is rare. In adults, vitamin A toxicity has been reported in Arctic explorers who developed drowsiness, irritability, headaches and vomiting, with subsequent peeling of the skin, within a few hours of ingesting several million units of vitamin A from polar bear or seal liver. These symptoms cleared up with discontinuation of the vitamin A rich food. Other than this unusual example, however, only vitamin A from "megavitamin tablets containing vitamin A . . . when taken for a long time" has induced acute toxicity, that is, 100,000 IU synthetic vitamin A per day taken for many months. Unless you are an Arctic explorer, it is very difficult to develop vitamin A toxicity from food. The putative toxic dose of 100,000 IU per day would be contained in 3 tablespoons of high vitamin cod liver oil, 6 tablespoons of regular cod liver oil, two-and-one-half 100-gram servings of duck liver, 150 grams of beef liver, seven pounds of butter or 309 egg yolks. Bodybuilders undergoing strenuous exercise can consume even higher amounts without adverse effects.

REFERENCES


http://www.westonaprice.org/men/vitaminabodybuilding.html