

[IMAGE]

## **K<sub>2</sub> : The Anti-Aging Nutrient**

By Tom Bayne, DC

While aging as a whole is inevitable, some aspects of aging may actually be caused by a simple vitamin deficiency. That's right – wrinkles, stiff muscles and decreased athletic performance can all be symptoms of just one micronutrient deficiency: vitamin K<sub>2</sub>.

Although K<sub>2</sub> was discovered about 80 years ago, scientists are just now beginning to understand the major role this vitamin plays in the body. Some of the main benefits include improved heart and bone health, as vitamin K<sub>2</sub> is responsible for removing calcium from the tissues and shuttling it back into the bone. As a result, vitamin K<sub>2</sub> has been shown to be incredibly useful for conditions like atherosclerosis, vascular calcification and osteoporosis.<sup>1</sup>

However, some of the more recent discoveries demonstrate that vitamin K<sub>2</sub> can play a role in the treatment and prevention of wrinkles, varicose veins, diabetes, and even prostate, breast and liver cancers.<sup>2</sup>

### **Healthy Skin**

To maintain youthful, healthy skin, the body needs a plentiful supply of collagen and elastin. Collagen is the protein responsible for skin's firm and supple nature, although it also plays a role in connecting the tissues found in bone, muscles, tendons, cartilage and organs. Elastin is the protein that gives structure to the skin and organs, allowing the skin to resume its original shape after stretching. Together, these proteins help maintain skin that is firm, yet elastic.

Anti-Aging - Copyright â Stock Photo / Register Mark However, by age 20, collagen stores begin to decline by 10 percent every decade, which can have negative effects on the skin as well as the bones.<sup>3-4</sup> In fact, some studies show that the severity of a woman's facial wrinkles after menopause can actually predict her risk of osteoporosis, mostly due to the fact that collagen loss in the skin occurs at the same rate as collagen loss in the bone.<sup>5</sup>

Until now, creams and lotions have led the anti-aging movement in an attempt to replace collagen stores, but research now indicates that excessive skin wrinkling may actually be a sign of vitamin K<sub>2</sub> deficiency.

In population studies, Japanese women appear to have fewer wrinkles and more supple skin than women of the same age living in North America.<sup>5</sup> Some people attribute this youthful skin to Asian genetics, but even when compared to women from Shanghai and Bangkok, Japanese women appear to show the least visible signs of aging. Interestingly, the women from these three Asian groups share many similar diet and lifestyle factors, with one exception – the Japanese women have a much higher consumption of natto.

Natto, or fermented soybean, is considered a staple of Japanese cuisine and happens to be the richest food source of vitamin K<sub>2</sub>. As a result, Japanese women have much higher circulating levels of this vitamin than any other Asian population, which may account for their more youthful complexions.

### **Athletic Performance**

One of the main reasons aerobic athletic performance declines with age is that the body becomes less effective at utilizing oxygen. The maximal ability to utilize oxygen can be measured by VO<sub>2</sub> max, an assessment of how much oxygen your body can use per kilogram of body weight. As a result, a high VO<sub>2</sub> max will indicate that a person can effectively utilize oxygen, which is often seen in well-trained endurance athletes.

Unfortunately, after the age of 30, VO<sub>2</sub> max will begin to decline. For non-athletes, VO<sub>2</sub> max tends to decline by about 10 percent every decade. However, athletes who continue their rigorous training can reduce the decline to only 5 percent every decade.<sup>6</sup> The main reason that VO<sub>2</sub> max declines with age is because the maximal heart rate (max HR) decreases as well.

Because cardiac output is the product of stroke volume and maximal heart rate (*cardiac output = stroke volume x maximal heart rate*), a decrease in max HR will directly decrease cardiac output and, in turn, oxygen delivery to the muscles. This translates to a lower VO<sub>2</sub> max and decreased athletic endurance with age.

Fortunately, vitamin K<sub>2</sub> appears to increase cardiac output by improving mitochondrial function. In fact, a recent study conducted at the University of North Texas found that only eight weeks of high-dose supplementation with vitamin K<sub>2</sub> (MK-4) was associated with a whopping 12 percent increase in maximal

cardiac output in aerobically trained athletes.<sup>7</sup> Interestingly, it's estimated to take 6-9 months of high-intensity training without K<sub>2</sub> supplementation to achieve the same increase in cardiac output.

Researchers also reported slight increases in stroke volume and maximal heart rate in the test group, which may help explain the significant increase in cardiac output.

### **The Vitamin K<sub>2</sub> Solution**

The good news is that many of the conditions discussed in this article can be remedied with increased intake of vitamin K<sub>2</sub>. The bad news is that vitamin K<sub>2</sub> is fairly elusive in the modern Western diet. The best natural source of K<sub>2</sub> is natto, which contains approximately 1,100 mcg of vitamin K<sub>2</sub> in a 3.5 oz serving. However, natto is very pungent and bitter, which can make patient compliance a significant challenge.

Other good sources of vitamin K<sub>2</sub> include goose liver, various organ meats, and soft cheeses like Gouda and Brie. These natural food sources contain vitamin K<sub>2</sub> in its menaquinone-4 form (MK-4), which has a short half-life of roughly 4-6 hours. This means you would need to consume these foods every 4-6 hours in order to maintain optimal K<sub>2</sub> levels in the blood.

When considering supplementation with K<sub>2</sub>, research indicates that MK-7 is superior to MK-4 and vitamin K<sub>1</sub> in regards to half-life, bioavailability and safety. It's also important to choose naturally fermented forms of MK-7, as synthetic MK-7 currently is not as well-studied or held to the same quality standards as natural MK-7. Talk to your doctor for more information.

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