



Health Tip: Vitamins-Friends & Foes Part 1: Vitamins A, C, and D

Everyone knows that vitamins are important to normal growth and development, as well as playing an important role in many body functions. There are 13 essential vitamins --- A, C, D, E, K and the B vitamins (thiamine, riboflavin, niacin, pantothenic acid, biotin, vitamin B-6, vitamin B-12 and folate) ---- and each plays a specific role in maintaining health.

Assuring an adequate intake of vitamins is important in preventing deficiency diseases. The best source of vitamins is through the diet, but many people take vitamin supplements also. Anemia, osteoporosis, night blindness, and bleeding disorders are just a few of the diseases that can develop from vitamin deficiencies.

It is also possible to get too much of certain vitamins, particularly when taking supplements. Vitamins A, E, D, and K are considered to be "fat soluble" vitamins, which means that they are stored in the body's fatty tissue. Taking too much of a fat soluble vitamin can cause the stores to increase to the point that toxicity symptoms develop.

In the next two Health Tips, we'll look at both the beneficial aspects of vitamins, as well as problems that can develop from taking too much.

Vitamin A



Friend: Vitamin A is important in maintaining night vision, promoting bone growth, supporting immune function (to prevent or fight infections), and in regulating cell differentiation (the process in which a stem cell becomes part of the brain, muscle, lungs, blood, or other specialized tissue.) Vitamin A also helps the skin and mucous membranes function as a barrier to bacteria and viruses.

Recommended intake: There are two forms of vitamin A, preformed retinoids and provitamin carotenoids. Preformed vitamin A is absorbed into the body as retinol, a highly active form of vitamin A. The recommended intake of vitamin A from retinol is 900 micrograms

(equivalent to 3,000 IU) for men and 700 micrograms (equivalent to 2,333 IU) of retinol for women. The upper limit for vitamin A intake from retinol is 3,000 micrograms. In contrast to preformed vitamin A, carotenoids (the most common of which is beta-carotene) is not toxic even at high levels of intake. Therefore, it is preferable to choose a multivitamin supplement that has all or the majority of its vitamin A in the form of beta-carotene.

Food sources: Preformed vitamin A sources include milk, margarine, eggs, beef liver, and "fortified" cereal. Colorful fruits and vegetables such as carrots, pumpkin, sweet potatoes, winter squashes, cantaloupe, pink grapefruit, apricots, broccoli, spinach, and most dark green, leafy vegetables are the best sources of beta-carotene. In general, the more intense the color of a fruit or vegetable, the higher the beta-carotene content.

Foe: As a fat soluble vitamin, it is possible to get too much vitamin A. Exceeding the recommended intake of preformed vitamin A (retinol) can cause a number of serious health problems, including birth defects, liver abnormalities, decreased bone mineral density resulting in osteoporosis, and central nervous system disorders. Also, acute toxic symptoms can develop if very large amounts of vitamin A are consumed in a short period of time. These symptoms include nausea, vomiting, headaches, blurred vision, dizziness, and loss of coordination. Beta carotene, even at high dosages, is not toxic, but can turn the color of skin to yellow or orange.

Vitamin C



Friend: Vitamin C, also known as L-ascorbic acid, is essential for the formation, growth, and repair of bone, skin, and connective tissue (collagen, tendons, ligaments, etc.). Vitamin C helps maintain healthy teeth and gums, as well as assisting in the absorption of iron, which is used to make red blood cells. Acute vitamin C deficiency leads to scurvy, a rare disease today, but one that killed thousands of sailors until the end of the 18th century. That was when the association between scurvy and vitamin

C deficiency was recognized. "Limey" is a term that was applied to British sailors after the Royal Navy began providing lime juice on long ocean voyages in order to prevent scurvy. Epidemiologic evidence suggests that higher consumption of fruits and vegetables is associated with lower risk of most types of cancer, perhaps, in part, due to their high vitamin C content.

Recommended intake: In adults, the Institute of Medicine recommends a daily intake of 90 milligrams for men and 75 milligrams for women. The upper limit of intake (UL) is 2,000 milligrams per day in men or women older than 18 years old. Regular intake of vitamin C is necessary, either through dietary means or supplementation, since it is not stored in the body.

Food sources: Fruits and vegetables are the best sources of vitamin C. The best food sources of vitamin C are citrus fruits, tomatoes, potatoes, red and green peppers, kiwifruit, broccoli, strawberries, Brussels sprouts, and cantaloupe.

Foe: Eating foods that contain higher than the recommended dietary allowance is unlikely to be harmful. Taking megadoses of supplemental vitamin C, however, has been associated with multiple adverse effects. These include nausea, diarrhea, kidney stones, and inflammation of the stomach lining (gastritis). In the 1970s, Chemistry Nobel laureate, Linus Pauling, promoted taking up to 10 grams of vitamin C per day as a way to prevent colds and some chronic diseases. This position, however, has never been confirmed scientifically, and doses in this range could lead to some of the adverse effects described above.

Vitamin D



Friend: Vitamin D is important in the absorption of calcium and phosphorus, minerals that are critical in building and maintaining bone. Recent studies suggest that adequate vitamin D stores help in preventing the development of breast, colon, and other cancers. Vitamin D may also play a role in preventing the development of multiple sclerosis, type 1 diabetes, and influenza. Deficiency of vitamin D has been associated with the development of a number of conditions including rickets, psoriasis, osteoporosis, and hypertension.

Recommended intake: The recommended intake from the Institute of Medicine for children and adults up to 50 years of age is 200 international units (IU) per day. This dosage increases to 400-600 IU per day in adults over the age of 50. Many experts believe this dosage to be too low, however, and have suggested that dosages as high as 1,000 to 2,000 IU per day may be needed. Along these same lines, the American Academy of Pediatrics has increased their recommended dosage of vitamin D for children and adolescents to 400 IU per day. Vitamin D is sometimes known as the "sunshine

vitamin" because it can also be synthesized by the body when ultraviolet rays from the sun strikes the skin. Approximately 5-30 minutes of sun exposure between the hours of 10 AM and 3 PM at least twice a week to the face, arms, legs, or back without sunscreen produces adequate amount of vitamin D to avoid deficiency disorders. Many Dermatologists, however, advise against even this level of sun exposure, citing concerns regarding the development of skin cancers.

Food sources: Fatty fish, such as salmon and tuna, are some of the best foods for receiving vitamin D naturally. Other good sources include dairy products and breakfast cereals (both of which are "fortified" with vitamin D). Small amounts of vitamin D are found in beef liver, cheese, and egg yolks.

Foe: The main consequence of getting too much vitamin D is a buildup of calcium in the blood (hypercalcemia). This can cause symptoms such as nausea, vomiting, constipation, weakness, confusion, heart rhythm abnormalities, and kidney stones.

Next week we'll look at the fat soluble vitamins E and K, as well as the water-soluble B vitamin complex.

If you or someone in your family would like to know more about Vitamins, then click on the 'Ask eDoc' icon, to the right, login, and send us your questions.



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