



VITAMINS IN EXCESS

Vitamins

Vitamins are organic substances that do not provide energy or building material to the human body but are irreplaceable for its normal functioning. As the human organism cannot synthesize them, they must be supplied with the diet, albeit only tiny amounts are required. Insufficient or suboptimal supply results in various diseases or susceptibility to diseases. These are, however, rare in developed countries. Nowadays, they are mostly observed in developing countries, where malnutrition, lack of access to diverse foods, and starvation are common. In developed countries, vitamin deficiencies may develop in people suffering from other diseases, institutionalized and/or elderly people, or those eating restrictive diets.

Vitamins are grouped together, according to their biological and chemical properties. For example, vitamin A denotes more than one compound, and there may be differences in the effects of these various compounds.

Who should take vitamin supplements?

There are conflicting recommendations, but it is generally considered that normal healthy adults who eat a balanced diet do not need to take vitamin supplements, and such supplements cannot replace a diverse diet. Certain vitamins and micro-elements are recommended for specific groups of people or those with specific diseases; for example, folic acid for women who are likely to become pregnant for the prophylaxis of neuronal tube defects; folic acid and iron for pregnant women; vitamin D and calcium for the prevention of fractures in the elderly;

vitamin D for children; and zinc and antioxidants for the prevention of macular degenerations for the people at risk.

Vitamins in excess

According to the 2004 Annual Report of the American Association of Poison Control Centers, three deaths and 53 life-threatening events were reported from a total of 62,562 overdose exposures to any type of vitamin formulations (most of the exposures were in children under six years). Many people take daily multivitamin formulations – 35 - 50% of the adult population in the USA do. This can lead to accumulation and development of clinical signs and symptoms (hypervitaminosis). Even in cases when the regular intake of vitamins does not lead to hypervitaminosis, the outcomes for personal health are unclear and debated. For example, supplements with carotenes, vitamin A, and vitamin E can be harmful for smokers.

The doses that lead to the development of signs and symptoms depend upon additional factors, such as duration of intake, age, or disease status. For instance, children can more easily develop vitamin A toxicity than adults.

Vitamins can be divided into 2 groups – water- and oil-soluble. Most of the water-soluble vitamins are easily “flushed away” and are less likely to build up and produce toxic effects. It is easier for the oil-soluble vitamins to accumulate and cause toxicities, when taken in excess. Such hypervitaminoses usually resolve without treatment, after the vitamin intake is stopped.

Skin effects of excessive vitamins intake

Vitamin A

Vitamin A toxicity is most frequently observed, compared to the other vitamins. It causes dryness of the skin with scaling, follicular hyperkeratosis, itching, cheilitis (dry, chapped lips), dryness of the mucous membranes, hair loss, and nail dystrophy. Such effects can appear not only from vitamin A, but also from treatment with medicinal products derived from vitamin A, the so-called retinoids (tretinoin, isotretinoin, acitretin, etc.). The intake of vitamin A, together with retinoids, is especially risky for the development of hypervitaminosis.

Beta-carotene

The ingestion of large amounts of carrots can lead to the accumulation of carotene – a precursor of vitamin A. This condition is called carotenemia and is characterized by yellow-orange skin discoloration, more intense at sites with thicker keratin, such as the palms and soles, or with more subcutaneous fat. It may be associated with amenorrhea, but it is, otherwise, a harmless condition, and its main significance is that it may be confused with jaundice. The unchanged sclera in carotenemia will make the distinction. No treatment is required, but the condition can persist months after the ingestion has ceased, and the serum carotene level has returned to normal.

Vegetables and fruits, other than carrots but with red or orange color, can lead less frequently to similar discoloration. Lycopenemia is a similar condition, caused by excessive eating of tomatoes. Diseases, like hypothyroidism, diabetes mellitus, anorexia, and hepatic and renal afflictions, can result in carotenemia without the excessive ingestion of carrots or other foods.

Vitamin B3 (niacin, nicotinic acid, niacinamide)

The intake of pharmacologic doses (much higher than the recommended daily allowance -RDA) of niacin or related compounds is known to induce facial flushes and/or facial erythema. Other skin reactions from vitamin B3 compounds include itching, dry skin, dermatitis, hives, sore mouth, dry hair, and acanthosis nigricans. Flushing and other reactions are less common with niacinamide, than with niacin.

Vitamin B6 (pyridoxine)

Photosensitive eruptions are reported with vitamin B6, when taken in high (pharmacologic) doses. These eruptions are itchy and with redness, papules, or papulovesicles on the sun-exposed areas of the skin. Other reactions, including pseudoporphyria, rosacea fulminans, and vasculitis, are known high doses of vitamin B6.

Vitamin overdose

Vitamin overdose may lead to systemic effects, which in turn affect the skin. Vitamin D hypervitaminosis may be associated with metastatic calcifications in the skin, besides being found in other organs.

Vitamins in topical preparations

Vitamins are included in many topical preparations. Some vitamins, such as the vitamin A group and their derivatives, are unstable under UV light. They are usually included in night creams, and these should not be applied during the day. Niacinamide (vitamin B3) is shown to lighten the skin, when applied topically. Pyridoxine (vitamin B6) may be a constituent of topical preparations, including hair lotions, and very rare contact dermatitis reactions have been described.

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