

Beta Carotene Is The Safe Form Of Vitamin A

The fact that beta carotene is stated to be a safe form of vitamin A suggests that vitamin A is in some way unsafe. In fact an overdose of vitamin A can lead to any one of a number of conditions, including nausea, jaundice, vomiting, abdominal pain and headaches. This vitamin is fat soluble, and so any excess is not easily washed out of the body but can build up in the tissues.

Toxicity in the liver can occur at fairly low concentrations, and the toxicity of the vitamin is increased by excessive alcohol intake. However, toxicity only occurs with vitamin A already formed such as that obtained from liver.

There are several forms of vitamin A, including the retinoid form originating from animal sources and the carotenoid forms that have a vegetable origin. Carotenoids are converted to vitamin A in the liver, but the higher the concentration of beta carotene in the body, the smaller the percentage that is converted to vitamin A, so beta carotene is a safer source of vitamin A than retinoids. It is only the finished form of vitamin A that is toxic, and beta carotene is therefore self-regulating in its production.

This vitamin is stored in the body in the form of the alcohol (retinol) and of retinyl esters. Studies have indicated that as much as 95% of the stored vitamin is in the form of the ester. The liver is responsible for releasing vitamin A to the body as it is required. One of its better known effects is on vision, and the old wives tale that carrots help you to see in the dark has an element of truth in it.

In order for it to aid vision, retinol is oxidized to the aldehyde, retinal, that forms a complex with a molecule of opsin, a light sensitive protein found in the retina. Rhodopsin, as the complex is called, is an essential component of the biochemical chain of events that lead to the perception of light. It is extremely sensitive, and enables you see in very low levels of light. In other words it is essential for good night vision, so carrots do help you to see in the dark! When a photon of light hits a molecule of rhodopsin, it leads eventually to an impulse being sent up the optic nerve to the brain.

One of its properties is its reaction to white light. When rhodopsin is exposed to white light it loses its pigmentation, and hence its photoreceptor properties and can take 30 minutes to regenerate. That is why you lose your night sight if your retina is exposed to bright light. The more rhodopsin you can generate the quicker you develop night sight.

The other biochemical processes of the vitamin include the synthesis of some glycoproteins and maintenance of normal bone density. Without vitamin A, calcium is not properly absorbed by the body and glycoproteins are involved in this process. A deficiency of vitamin A can lead to the abnormal development of bone and other health problems, so there are limits between the levels of vitamin A in the body that must be maintained: above or below these limits will lead to health problems, some of which can be extremely serious.

Most of the biochemistry of vitamin A in the liver is initiated by the presence of alcohol, and otherwise it is thought to passively store the vitamin until needed when it is released into the blood. There are several ways in which the presence of alcohol allows the liver to deplete its store of retinol, but generally there are a number of enzymes that, in the presence of ethanol, can render vitamin A into a water soluble form that is excreted by the urine.

The benefits of vitamin A other than its effect on night sight and the healthy development of bone tissue, includes a powerful antioxidant effect that neutralizes free radicals that can destroy body cells. These free radicals are generated by the body's metabolism in generating energy from blood glucose, and are also created through exposure to pollutants such as cigarette smoke and traffic fumes. They are electron deficient, so when they are generated they grab an electron from tissue close by which destroys the cells involved. This can lead not only to the appearance of premature aging as the skin cells are damaged but also to serious health problems such as atherosclerosis and some forms of cancer. Vitamin A helps to protect against these by destroying the free radicals before they can do damage. It also helps build up resistance against infections by supporting the immune system.

Beta carotene is converted to vitamin A either by cleaving at the center of the molecule, or by breaking it down from one of the ends. This latter process is carried out in the small intestine, and the resultant vitamin stored in the liver in the ester form. Only a proportion of what you eat is converted to retinol ester in this way, and the more beta carotene you consume, the less is converted, so you can never suffer from an overdose of beta carotene-derived vitamin A. It might turn you yellow, but you won't suffer from excess vitamin A since the excess beta carotene is stored in your body fat, including the subcutaneous fat reserves.

Alpha carotene can also be used in the synthesis of vitamin A, but not as actively as beta carotene. The best natural sources are fruits and vegetables, especially the red, yellow and orange varieties such as carrots and apricots, and also the leafy green vegetables, although supplements are also a convenient way of maintaining your beta carotene uptake. It is a much safer supplement than straight vitamin A for the reasons explained earlier. The supplement is not useful just for its antioxidant effect, but also for its ability to protect you from excessive exposure to the sun. While not

as effective as a good sun blocker, beta carotene does provide some protection.

There is no doubt that beta carotene is a safer way to maintain an adequate vitamin A uptake due to the fact that you cannot take an overdose, since an overdose of beta carotene does not translate into the same dose of vitamin A, and the change is self-regulating. It is therefore safer to obtain your vitamin A needs from colored fruits and vegetables or beta carotene supplements than from eating liver, from which the retinol is in a form that can cause damage in the event of consuming an excess.

The old adage that you should never eat polar bear livers is a true one, and certainly has a provable scientific basis, so use beta carotene as your main vitamin A source for maximum health benefits in the safest possible way.

About the Author

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