OSP Journal of Health Care and Medicine

Editorial

Vitamin C: Genetic Nutrient Deficiency

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Received: August 16, 2024; **Accepted:** August 20, 2024; **Published:** August 26, 2024

Abstract

We humans suffer from hypoascorbemia, a genetic defect that restricts us from producing ascorbic acid (vitamin C) internally the way almost all other mammals do. Endogenous ascorbic acid is a biochemical protective agent that prevents arthritis, heart attacks, strokes, viral infections, and the common cold. The purpose of this study is to determine how much exogenous ascorbic acid we need to take to compensate for hypoascorbemia.

Keywords: *Vitamin C; Ascorbic Acid; Hypoascorbemia; Biochemical Protection*

Introduction

Hypoascorbemia is a genetic disease caused by a defect in the gene that controls synthesis of the enzyme, L-gulonolactone oxidase, the final one of a series of enzymes utilized by the mammalian liver to synthesize ascorbic acid from glucose. Lack of this active enzyme in the liver restricts humans from producing ascorbic acid internally, a synthesis which is performed by almost all other mammals. This genetic defect disables us from utilizing this internal biochemical protective mechanism, thereby making us vulnerable to arthritis, heart attacks, strokes, the aging process, viral infections, and the common cold [1-4].

Humans, other primates, guinea pigs, and a fruit eating bat are the only mammals known to be unable to produce ascorbic acid in their livers. All other mammals synthesize ascorbic acid in substantial amounts. The response of these other mammals to biochemical stress is to increase their production of ascorbic acid, while the response in humans is to further deplete our already low stores of this liver metabolite [3].

Scurvy

Scurvy is a disease resulting from deficiency of vitamin C (ascorbic acid). Early symptoms include weakness, fatigue, and sore arms and legs. Vitamin C is required to make the building blocks for collagen, carnitine, and catecholamines. It also assists the intestines in the absorption of iron from foods [5].

Earliest symptoms of scurvy are malaise and lethargy. After one to three months, patients develop shortness of breath and bone pain. Muscle pain may occur because of reduced carnitine production. Other symptoms include skin changes with roughness, easy bruising, pinpoint sized spots of bleeding under the skin, gum disease, loosening of teeth, and poor wound healing. Dry mouth and dry eyes may occur, as may generalized edema (swelling, puffiness, and fluid retention in various parts of the body).

Vitamin C Deficiency

Symptoms of vitamin C deficiency can include [6]:

- Skin bruises easily, black and blue marks
- Hemorrhages or ruptured blood vessels in eyes
- Gums bleed easily when brushing teeth
- Loose teeth, loss of dental fillings.
- Cuts, wounds or sores heal slowly
- Fleeting pains in joints or legs, joint tenderness
- Broken capillaries or pink spots on skin
- Catch colds or viruses easily
- Listlessness, lack of endurance, tire easily
- Cuticles tear easily

- Nosebleeds
- Bloating or puffiness in face
- Anemia
- Fragile bones
- Thinning or premature aging of skin

How Much Vitamin C is Required?

Humans receive only tiny milligram amounts of ascorbic acid from dietary sources, whereas the synthesis in an equivalent sized mammal would be many grams per day. An adult gorilla in the wild state consuming enormous volumes of fresh vegetation has been estimated to get about 4 to 5 grams of ascorbic acid per day [3]. Linus Pauling observed that in the 1980s, Purina Monkey Chow provided 70 times more ascorbic acid than was recommended for humans (equivalent to 4.2 grams).[4] David Rowland recommends that to compensate for hypoascorbemia, adults need to supplement within the range of 4,000 to 4,500 mg. of Vitamin C daily [7].

Conclusions

Hypoascorbemia is a genetic defect that restricts humans from synthesizing ascorbic acid (vitamin C) in their livers, the way most other mammals do. Internally produced ascorbic acid is a biochemical protective agent that prevents arthritis, heart attacks, strokes, viral infections, and the common cold. To compensate for hypoascorbemia, adults need to supplement within the range of 4,000 to 4,500 mg. of Vitamin C daily.

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