Micronutrients

Name

University

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Below, the functions, deficiency, and intoxication related disorders of the vitamins, the major minerals, Iron and Iodine will be described based on materials by Calder et al. (2022).

1 – Vitamin A

Function: Vit A plays a major role in maintaining healthy vision, skin, and immune system, as well as promoting growth and development.

Deficiency: Vitamin A deficiency can cause night blindness, dry eyes, skin and immune system issues, and an increased risk of infections.

Intoxication: Excessive intake of vitamin A can lead to toxicity, causing symptoms such as nausea, vomiting, headache, dizziness, and liver damage.

2 – Vitamin B1

Function: Vitamin B1, also known as thiamine, is essential for converting food into energy, maintaining a healthy nervous system, and promoting heart health.

Deficiency: Neurological and cardiovascular disorders, Beriberi, Wernicke-Korsakoff syndrome, fatigue, and muscle weakness are all symptoms of Vitamin B1 deficiency.

Intoxication: Vitamin B1 intoxication is uncommon, as excess intake is usually excreted. However, high doses may cause allergic reactions or anaphylaxis.

3 - Vitamin B2

Function: Vitamin B2 (riboflavin) plays a crucial role in energy metabolism, as well as supporting healthy skin, eyes, and nervous system function.

Deficiency: Mouth sores, dermatitis, anemia, and light sensitivity are common symptoms of Vitamin B2 deficiency, also known as riboflavin deficiency.

Intoxication: Vitamin B2 is generally considered safe, as excess intake is excreted in the urine. No toxic effects have been reported.

4 – Vitamin B3

Function: Vitamin B3 (niacin) is important for energy production, DNA repair, and supporting healthy skin, nervous system, and digestive system function.

Deficiency: Pellagra is a condition resulting from severe Vitamin B3 deficiency, characterized by dermatitis, diarrhea, dementia, and even death if left untreated.

Intoxication: Intoxication from niacin supplements is rare but can cause flushing, itching, and gastrointestinal discomfort. High doses may also cause liver damage.

5 – Vitamin B4

Function: a nucleotide component of DNA and RNA, serving as a building block for genetic material.

Deficiency: genetic issues

Intoxication: not known

6 – Vitamin B5

Function: Vitamin B5 (pantothenic acid) is vital for energy production, hormone synthesis, and healthy skin, hair, and nails.

Deficiency: Vitamin B5 deficiency is rare but may cause fatigue, irritability, numbness, and tingling in the hands and feet.

Intoxication: Vitamin B5 is water-soluble, and no toxic effects have been reported from high doses or excess intake.

7 – Vitamin B6

Function: Vitamin B6 (pyridoxine) is essential for amino acid metabolism, neurotransmitter synthesis, and healthy immune system function.

Deficiency: Vitamin B6 deficiency can cause anemia, dermatitis, depression, confusion, and neurological symptoms like numbness and tingling in the hands and feet.

Intoxication: Intoxication from high doses of Vitamin B6 supplements can cause nerve damage, numbness, and difficulty walking.

8 – Vitamin B7

Function: Vitamin B7 (biotin) is important for healthy hair, skin, and nails, as well as carbohydrate, fat, and protein metabolism.

Deficiency: Biotin deficiency is rare but may cause hair loss, dermatitis, conjunctivitis, and neurological symptoms like depression and hallucinations.

Intoxication: Biotin has a low risk of toxicity, and no adverse effects have been reported from high doses or excess intake.

Reference

Calder, P. C., Ortega, E. F., Meydani, S. N., Adkins, Y., Stephensen, C. B., Thompson, B., & Zwickey, H. (2022). Nutrition, Immunosenescence, and Infectious Disease: An Overview of the Scientific Evidence on Micronutrients and on Modulation of the Gut Microbiota. *Advances in Nutrition*, *13*(5), S1-S26. https://doi.org/10.1093/advances/nmac052