Lipids: Tackling Vitamin A Deficiency by Understanding the Vitamin's Metabolism:
Two Carotenoid Oxygenases Contribute to Mammalian Provitamin A Metabolism

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Tackling Vitamin A Deficiency by Understanding the Vitamin’s Metabolism

Two Carotenoid Oxygenases Contribute to Mammalian Provitamin A Metabolism

Vitamin A deficiency leads to blindness in children and increases childhood morbidity. Efforts are under way to fortify foods (for example, in the form of golden rice) with vitamin A or its metabolic precursors to prevent this deficiency. Understanding how vitamin A is produced in the body is the key to effective public health interventions. In this Paper of the Week, a team led by Johannes von Lintig at the Case Western Reserve University School of Medicine in Ohio used genetic and biochemical approaches to understand how two carotenoid oxygenases, the cytoplasmic β-carotene-15,15'-oxygenase BCO1 and the mitochondrial β-carotene-9',10'-oxygenase BCO2, contribute to vitamin A metabolism. To date, the contribution of these enzymes to vitamin A homeostasis has been unclear. The investigators provide evidence that both enzymes utilize different carotenoids, which are precursors to vitamin A. They discovered that BCO1 is particularly essential for vitamin A homeostasis. The authors comment, “The compartmentalization of the enzymes elegantly prevents competition for the limited nutrient β-carotene and avoids production of non-retinoid byproducts that can interact with downstream components of vitamin A metabolism.”

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