

HUMAN INTESTINAL UPTAKE OF CAROTENOID PHYTONUTRIENTS

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Carotenoids are uniquely functional, highly conjugated pigments ubiquitous in nature. The list of known, naturally occurring carotenes (hydrocarbon carotenoids) and xanthophylls (oxygenated carotenoids) has grown to approximately 700. Carotenoids are epidemiologically linked with the prevention of several chronic, degenerative human diseases and thus the identification and quantification of the various carotenoids present in foods and biological tissues has been the object of a great deal of research and continues to be vigorously pursued. Research investigations on the absorption, deposition and bioavailability of carotenoids have identified influences by several dietary factors, structural configuration of the carotenoid and characteristics of the food matrix. Evidence indicates that carotenoid uptake, blood levels and tissue deposition can be enhanced by food processing, modulated by formulation and influenced by co-consumption of other food components. Because carotenoids are hydrophobic, their absorption depends upon efficient release from the food matrix and subsequent solubilization by bile acids and digestive enzymes, culminating in their incorporation into micelles. Dietary lipids have been considered to be an important factor for stimulation of bile flow into the intestine and micelle formation. In particular, dietary lipids are hypothesized to be an important factor for carotenoid bioavailability. However, most carotenoid-rich fruits and vegetables are low in lipids. The amount of dietary fat required for optimal bioavailability of carotenoids in plant matrices is not clearly defined. However, substantially greater absorption of these antioxidants has been observed when carotenoid rich foods are co-consumed with added lipid. Adding avocado fruit can also enhance carotenoid absorption from meals, which is attributed primarily to the lipid present in avocado. Results of these studies with an emphasis on the carotenoids associated with chronic disease prevention will be discussed.