

Cell type-specific expression of beta-carotene 9',10'-monooxygenase in human tissues.

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Abstract

The symmetrically cleaving beta-carotene 15,15'-monooxygenase (BCO1) catalyzes the first step in the conversion of provitamin A carotenoids to vitamin A in the mucosa of the small intestine. This enzyme is also expressed in epithelia in a variety of extraintestinal tissues. The newly discovered beta-carotene 9',10'-monooxygenase (BCO2) catalyzes asymmetric cleavage of carotenoids. To gain some insight into the physiological role of BCO2, we determined the expression pattern of BCO2 mRNA and protein in human tissues. By immunohistochemical analysis it was revealed that BCO2 was detected in cell types that are known to express BCO1, such as epithelial cells in the mucosa of small intestine and stomach, parenchymal cells in liver, Leydig and Sertoli cells in testis, kidney tubules, adrenal gland, exocrine pancreas, and retinal pigment epithelium and ciliary body pigment epithelia in the eye. BCO2 was uniquely detected in cardiac and skeletal muscle cells, prostate and endometrial connective tissue, and endocrine pancreas. The finding that the BCO2 enzyme was expressed in some tissues and cell types that are not sensitive to vitamin A deficiency and where no BCO1 has been detected suggests that BCO2 may also be involved in biological processes other than vitamin A synthesis.