Studies on the effect of dose size on the absorption of β-carotene by the rat in vivo.

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Abstract

This study was carried out to choose between two hypotheses with respect to the regulation of β-carolene (BC) conversion to retinol in the whole animal: uptake of BC into intestinal mucosa is limited by saturation of an intestinal receptor, or the conversion to retinol is limited by saturation of the conversion enzyme(s). Groups of rats were given five different dose levels of labeled BC by stomach tube. Labeled and total BC and retinol were isolated from tissues and intestinal contents after 4 h. Results showed a positive linear relationship between BC in the intestinal wall and the dose administered, with no saturation level up to 1440 μg administered. Per cent formation of newly formed retinol from newly absorbed (i.e., labeled) BC was 20-26% of the three lower dose groups, 10% for the highest dose. No retinyl esters could be detected in the intestine, Most of the administered BC was in the intestinal contents, about 100 times more than in the intestinal wall and mucosa. Newly formed retinal in plasma was about 10-times that in liver. Small amounts of newly absorbed BC were found in liver, but no labeied retinyl esters. These results suggest that the absorption of BC is very inefficient; that it does not occur through an intestinal receptor; that the formation of retinol is regulated at the level of the conversion enzyme(s).