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ORIGINAL RESEARCH COMMUNICATION

Diabetes mellitus and serum carotenoids: findings of a population-based study in Queensland, Australia[1,2,3]

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Background: Epidemiologic evidence suggests that serum carotenoids are potent antioxidants and may play a protective role in the development of chronic diseases including cancers, cardiovascular disease, and inflammatory diseases. The role of these antioxidants in the pathogenesis of diabetes mellitus remains unclear.

Objective: This study examined data from a cross-sectional survey to investigate the association between serum carotenoids and type 2 diabetes.

Design: Study participants were adults aged ≥25 y (n = 1597) from 6 randomly selected cities and towns in Queensland, Australia. Study examinations conducted between October and December 2000 included fasting plasma glucose, an oral-glucose-tolerance test, and measurement of the serum concentrations of 5 carotenoid compounds.

Results: Mean 2-h postload plasma glucose and fasting insulin concentrations decreased significantly with increasing quintiles of the 5 serum carotenoids—α-carotene, ß-carotene, ß-cryptoxanthin, lutein/zeaxanthin, and lycopene. Geometric mean concentrations for all serum carotenoids decreased (all decreases were significant except that of lycopene) with declining glucose tolerance status. ß-Carotene had the greatest decrease, to geometric means of 0.59, 0.50, and 0.42 μmol/L in persons with normal glucose tolerance, impaired glucose metabolism, and type 2 diabetes, respectively (P < 0.01 for linear trend), after control for potential confounders.

Conclusions: Serum carotenoids are inversely associated with type 2 diabetes and impaired glucose metabolism. Randomized trials of diets high in carotenoid-rich vegetables and fruit are needed to confirm these results and those from other observational studies. Such evidence would have very important implications for the prevention of diabetes.

Key Words: Type 2 diabetes • diabetes mellitus • impaired glucose tolerance • serum carotenoids • α-carotene • ß-carotene • ß-cryptoxanthin • lutein/zeaxanthin • lycopene • antioxidant vitamins • diet • cross-sectional surveys • health surveys • nutrition

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Am. J. Epidemiol., May 15, 2006; 163(10): 929 - 937.

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