

Diabetes Mellitus

Dietary Lycopene and Disease Risk

Disease type	First Author	Study Title and Complete Citation	Date	Abstract	Study Type	G.Tom +, N, -	P.Tom +, N, -	F.Tom +, N, -	Lyco +, N, -	Other +, N, -
Diabetes	Granado-Lorencio F	<p>Assessment of carotenoid status and the relation to glycaemic control in type I diabetics: a follow-up study.</p> <p>Granado-Lorencio F, Olmedilla-Alonso B, Blanco-Navarro I, Botella-Romero F, Simal-Antón A.</p> <p>Eur J Clin Nutr. 2006 Aug;60(8):1000-8. Epub 2006 Feb 1.</p>	2006	<p>OBJECTIVE: To assess the carotenoid status in young type I diabetic patients and its relationship to the glycaemic control of the disease.</p> <p>DESIGN: A follow-up study. SETTING: Hospital Universitario Puerta de Hierro, Health Area VI of Madrid (Spain).</p> <p>SUBJECTS: Forty-seven type I diabetic patients, followed for 2.5 years.</p> <p>INTERVENTIONS: Coinciding with physical examination and laboratory tests, serum levels of carotenoids were analysed by HPLC, and dietary intake of carotenoids was evaluated by a semiquantitative food frequency questionnaire and 3-day prospective dietary records.</p> <p>RESULTS: In type I diabetic patients, average intake, serum levels and correlations between diet and serum levels of carotenoids were comparable to those in reference non-diabetic groups. Between-subjects seasonal variations were observed for beta-cryptoxanthin intake and serum levels (higher in winter) and serum lycopene (higher in summer). Significant within-subjects seasonal changes were shown for dietary and serum beta-cryptoxanthin and serum beta-carotene. Serum carotenoids were unrelated to glycaemic control markers. Subjects with clinically acceptable glycaemic control showed lower lycopene intake than those with unacceptable control. Intake of carotenoids did not explain variance in insulin dose, fasting glycaemia, fructosamine or HbA1c. With the exception of lycopene, serum carotenoids were predicted by dietary intake, but in no case by fasting glycaemia, HbA1c or fructosamine.</p>	PC				N	

				CONCLUSION: In type I diabetic patients, serum carotenoid concentrations and their variance are determined by dietary intake patterns, and are unrelated to the glycaemic control of the disease, as assessed by biochemical markers.						
Diabetes	Granado F	Carotenoid depletion in serum of young type-1 diabetics fed low-carotenoid diets. Granado F, Olmedilla B, Blanco I. Ann Nutr Metab. 2004;48(4):251-8. Epub 2004 Aug 25	2004	<p>BACKGROUND/AIMS: Type-1 diabetics have been considered to be at risk for increased oxidative stress which has been implicated in the development of long-term diabetes complications. Evidence suggests that antioxidant activity may be an important mechanism by which carotenoids could confer protection in human health. Our aim was to compare the serum carotenoid depletion rate in type-1 diabetics and control subjects consuming low-carotenoid diets.</p> <p>METHODS: Ten type-1 diabetics and 8 controls followed a very low-carotenoid diet for 21 days. Dietary intake was recorded daily and fasting blood samples collected at baseline and after 1, 2, 3, 6, 11, 15, 16, 17, and 21 days. Individual carotenoids in serum were analyzed by a validated HPLC method.</p> <p>RESULTS: In both groups, carotenoid intake was less than 5% of the season-adjusted carotenoid reference intake. These diets resulted in decreased serum carotenoid levels in both groups, although depletion curves, final mean concentrations and the estimated half-life of carotenoids in serum revealed no differences between type-1 diabetics and controls. Levels of other minor serum carotenoids, cis-isomers and keto-carotenoids, also decreased whereas serum retinol and alpha- and gamma-tocopherol did not change during the study.</p> <p>CONCLUSION: Upon a low-carotenoid intake, the depletion rate of carotenoids in serum in young type-1 diabetics does not differ from that observed in matched related controls.</p>	Interv					Depletion study
Diabetes	Kant AK	A comparison of three dietary pattern indexes for predicting biomarkers of diet	2005	<p>OBJECTIVE: Examination of dietary indexes in association with objective biomarkers of dietary intake and chronic disease risk is an important step in their validation. We compared three dietary pattern indexes-Healthy Eating Index (HEI), Recommended Foods Score (RFS-24 hour</p>	CS					N HbA1c Glucose

		<p>and disease.</p> <p>Kant AK, Graubard BI.</p> <p>J Am Coll Nutr. 2005 Aug;24(4):294-303.</p>		<p>recall), and Dietary Diversity Score for recommended foods (DDS-R)-for their ability to predict biomarkers of dietary intake, obesity, cardiovascular disease, and diabetes.</p> <p>METHODS: We used dietary and laboratory data from the third National Health and Nutrition Examination Survey to study these associations in 8719 disease-free adults aged > or =20 y. The HEI, developed by the USDA, was a sum of scores on consideration of ten individual components; the RFS was a sum of all recommended foods (lean meat, poultry and fish, whole grains, fruits and juices, low-fat dairy, and vegetables) mentioned in the recall; the DDS-R examined whether or not a recommended food was mentioned from each of the five major food groups. The independent association of the dietary pattern indexes with body mass index (BMI), blood pressure, and serum concentrations of several biomarkers were examined using regression methods to adjust for multiple covariates.</p> <p>RESULTS: All indexes were strong independent positive predictors of serum concentrations of vitamin C, E, folate, and all carotenoids ($p < \text{or} = 0.00001$), except lycopene, and were negative predictors of BMI, serum homocysteine, C-reactive protein, plasma glucose, and hemoglobin A1C ($p < 0.05$). The RFS and DDS-R were inversely associated with blood pressure and serum cholesterol ($p < \text{or} = 0.03$).</p> <p>CONCLUSIONS: The RFS and DDS-R performed as well or better than the HEI for predicting serum concentration of nutrients and biomarkers of disease risk.</p>						
Diabetes and lycopene	Ylönen K	<p>Dietary intakes and plasma concentrations of carotenoids and tocopherols in relation to glucose metabolism in subjects at high risk of type 2 diabetes: the Botnia Dietary</p>	2003	<p>BACKGROUND: The role of antioxidants in the pathogenesis of type 2 diabetes is uncertain. OBJECTIVE: We evaluated cross-sectional relations of dietary intakes and plasma concentrations of antioxidants with glucose metabolism in a high-risk population.</p> <p>DESIGN: The subjects were 81 male and 101 female first- and second-degree, nondiabetic relatives of patients with type 2 diabetes. Antioxidant intake data were based on 3-d food records. Subjects taking supplements containing beta-carotene or alpha-tocopherol were excluded.</p>	CS				(-) NEFA in women	

		<p>Study.</p> <p>Ylönen K, Alfthan G, Groop L, Saloranta C, Aro A, Virtanen SM.</p> <p>Am J Clin Nutr. 2003 Jun;77(6):1434-41.</p>		<p>Plasma antioxidant concentrations were measured by HPLC. By using multiple linear regression analysis and adjusting for demographic, anthropometric, and lifestyle covariates, we studied whether dietary and plasma alpha- and beta-carotene, lycopene, and alpha- and gamma-tocopherol were related to fasting and 2-h concentrations of glucose and nonesterified fatty acids during an oral-glucose-tolerance test, to the homeostasis model assessment index of insulin resistance, and to measures of beta cell function (incremental 30-min serum insulin concentration during an oral-glucose-tolerance test and first-phase insulin secretion during an intravenous-glucose-tolerance test).</p> <p>RESULTS: In men, dietary carotenoids were inversely associated with fasting plasma glucose concentrations (P < 0.05), plasma beta-carotene concentrations were inversely associated with insulin resistance (P = 0.003), and dietary lycopene was directly related to baseline serum concentrations of nonesterified fatty acids (P = 0.034). In women, dietary alpha-tocopherol and plasma beta-carotene concentrations were inversely and directly associated, respectively, with fasting plasma glucose concentrations (P < 0.05). In both sexes, cholesterol-adjusted alpha-tocopherol concentrations were directly associated with 2-h plasma glucose concentrations (P < 0.05).</p> <p>CONCLUSION: The data suggest an advantageous association of carotenoids, which are markers of fruit and vegetable intake, with glucose metabolism in men at high risk of type 2 diabetes.</p>						
Diabetes	Wang L	<p>The consumption of lycopene and tomato-based food products is not associated with the risk of type 2 diabetes in women.</p> <p>Wang L, Liu S, Manson JE,</p>	2006	<p>Lycopene is a major carotenoid with potent antioxidant properties that may provide protection against the development of type 2 diabetes mellitus (DM). In this study we examined the association between baseline dietary intakes of lycopene, lycopene-containing foods, and the subsequent development of type 2 DM in a large prospective cohort study. We analyzed a total of 35,783 women from the United States, aged > or =45 y and free from self-reported cardiovascular disease, cancer, and DM at baseline. Intakes of lycopene and total and individual tomato-based food products were assessed by a 131-item-</p>	PC				N	

		<p>Gaziano JM, Buring JE, Sesso HD.</p> <p>J Nutr. 2006 Mar;136(3):620-5.</p>		<p>validated semiquantitative food-frequency questionnaire. During a median follow-up of 10.2 y, 1544 cases of incident type 2 DM were documented. After adjusting for age, total energy intake, randomized treatment assignment, body mass index, and other known DM risk factors, the multivariate-adjusted relative risks and 95% CI of type 2 DM across increasing quintiles of dietary lycopene, were 1.00 (baseline), 1.10 (0.94-1.29), 1.10 (0.94-1.29), and 1.07 (0.91-1.26) (P linear trend = 0.56). Compared with women who consumed <1.5 servings/wk total tomato-based food products, women who consumed 1.5 to <4, 4 to <7, 7 to <10, and > or =10 servings/wk had multivariate relative risks (95% CI) of 1.03 (0.88-1.20), 1.02 (0.87-1.20), 1.09 (0.89-1.33), and 1.04 (0.80-1.36), respectively (P linear trend = 0.54). The associations for individual tomato-based food products were similar to the results for the combination of all tomato products. Our study found little evidence for an association between dietary intake of lycopene or lycopene-containing foods and the risk of type 2 DM.</p>						
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