Diabetes Mellitus
Tomato/Tomato-based foods 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	Upritchard JE	Effect of supplementation with tomato juice, vitamin E, and vitamin C on LDL oxidation and products of inflammatory activity in type 2 diabetes. Upritchard JE, Sutherland WH, Mann JI. Diabetes Care. 2000 Jun;23(6):733-8.	2000	OBJECTIVE: To compare the effects of short-term dietary supplementation with tomato juice, vitamin E, and vitamin C on susceptibility of LDL to oxidation and circulating levels of C-reactive protein (C-RP) and cell adhesion molecules in patients with type 2 diabetes. RESEARCH DESIGN AND METHODS: There were 57 patients with well-controlled type 2 diabetes aged <75 years treated with placebo for 4 weeks and then randomized to receive tomato juice (500 ml/day), vitamin E (800 U/day), vitamin C (500 mg/day), or continued placebo treatment for 4 weeks. Susceptibility of LDL to oxidation (lag time) and plasma concentrations of lycopene, vitamin E, vitamin C, C-RP, vascular cell adhesion molecule 1, and intercellular adhesion molecule 1 were measured at the beginning of the study, after the placebo phase, and at the end of the study. RESULTS: Plasma lycopene levels increased nearly 3-fold (P = 0.001), and the lag time in isolated LDL oxidation by copper ions increased by 42% (P = 0.001) in patients during supplementation with tomato juice. The magnitude of this increase in lag time was comparable with the corresponding increase during supplementation with vitamin E (54%). Plasma C-RP levels decreased significantly (-49%, P = 0.004) in patients who received vitamin E. Circulating levels of cell adhesion molecules and plasma glucose did not change significantly during the study.	RCT		N Glucose			N CRP Cell adhesion molecules (CAM) Glucose

				CONCLUSIONS: This study indicates that consumption of commercial tomato juice increases plasma lycopene levels and the intrinsic resistance of LDL to oxidation almost as effectively as supplementation with a high dose of vitamin E, which also decreases plasma levels of C-RP, a risk factor for myocardial infarction, in patients with diabetes. These findings may be relevant to strategies aimed at reducing risk of myocardial infarction in patients with diabetes.					
Diabetes	Suzuki K	Relationship between serum carotenoids and hyperglycemia: a population-based cross-sectional study. Suzuki K, Ito Y, Nakamura S, Ochiai J, Aoki K. J Epidemiol. 2002 Sep;12(5):357-66.	2002	The present study investigated the relationship between hyperglycemia and both serum carotenoids and intake of vegetables and fruits. Subjects with a history of diabetes mellitus (DM group, n = 133) or with hyperglycemia diagnosed using a 5.6% cutoff value for hemoglobin A1c (High HbA1c group, n = 151) were recruited from among inhabitants of a rural area in Hokkaido, Japan. Intake frequencies of vegetables and fruits were assessed using a questionnaire administered by public health nurses. Serum levels of carotenoids and retinol were measured using high-performance liquid chromatography. The relationships between high HbA1c or DM and both serum carotenoids and intake frequencies of vegetables and fruits were analyzed using logistic regression modeling for a case-control study; each case (High HbA1c or DM) was matched to two controls (healthy subjects without any history of disease) matched for sex and age (within 3 years). The odds ratio (OR) for high HbA1c was 0.49 (95% confidence interval: 0.29-0.85) on high intake frequency of carrot and pumpkin and the OR for DM was 1.21 (95% CI: 0.79-1.84). No significant relationships were observed between high HbA1c and intake frequencies of other vegetables and fruits. The ORs on high serum levels of alpha- and beta-carotenes, lycopene, beta-cryptoxanthin and zeaxanthin and lutein were 0.38 (0.22-0.65), 0.35 (0.21-0.59), 0.57 (0.35-0.93), 0.35 (0.20-0.59), and 0.88 (0.54-1.46) for high HbA1c, respectively. In conclusion, intake of vegetables and fruits rich in carotenoids might be a protective factor against hyperglycemia.	CC	N HbA1c			(-) HbA1c (serum lyco)	

| Diabetes | Bose KS | Effect of long term supplementation of tomatoes (cooked) on levels of antioxidant enzymes, lipid peroxidation rate, lipid profile and glycated haemoglobin in Type 2 diabetes mellitus.

Bose KS, Agrawal BK.

West Indian Med J. 2006 Sep;55(4):274-8. | 2006 | The objective of the present study is to evaluate the beneficial effect of tomatoes, which are a rich source of lycopene, a relatively new carotenoid known to play an important role in human health. In this study, the lipid peroxidation rate was investigated by estimating malondialdehyde (TBARS) levels of antioxidant enzymes like SOD, GSH-Px, GR, GSH, lipid profile, which includes total cholesterol, triglycerides, high density lipoprotein, low density lipoprotein, very low density lipoprotein, and glycated haemoglobin HbA1c in (n = 40) the Type 2 diabetic group (n = 40) and an age-matched control group (n = 50). Significantly lower levels of antioxidant enzymes and very high lipid peroxidation rate in the Type 2 diabetic group were observed when compared to controls (p < 0.001). Likewise, significantly higher levels of lipid profile and glycated haemoglobin (HbA1c) in the diabetic group were observed when compared with control (p < 0.001). Long term tomato supplementation in diabetes mellitus showed a significant improvement in the levels of antioxidant enzymes and decreased lipid peroxidation rate (p < 0.001), but there were no significant changes in lipid profile and glycated haemoglobin HbA1c levels (p > 0.10). These findings suggest that tomato lycopene may have considerable therapeutic potential as an antioxidant but there was no significant lipid lowering effect in Type 2 diabetes mellitus. | CC | | | | N

Lipid HbA1c

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(-)

Lipid peroxidation | |
| Diabetes | Liese AD | Food intake patterns associated with incident type 2 diabetes: the Insulin Resistance Atherosclerosis Study.

Liese AD, Weis KE, Schulz M, Tooze JA.

Diabetes Care. | 2009 | OBJECTIVE: Markers of hemostasis and inflammation such as plasminogen activator inhibitor-1 (PAI-1) and fibrinogen have been associated with risk of type 2 diabetes. We aimed to identify food intake patterns influencing this pathway and evaluate their association with incident diabetes.

RESEARCH DESIGN AND METHODS: The Insulin Resistance Atherosclerosis Study cohort included 880 middle-aged adults initially free of diabetes. At the 5-year follow-up, 144 individuals had developed diabetes. Usual dietary intake was | PC | (+)
PAI-1
Fibrinogen
T2DM | | | | As part of a dietary pattern |

| | | 2009 Feb;32(2):263-8. Epub 2008 Nov 25. | | ascertained with a 114-item food frequency questionnaire. Using reduced rank regression, we identified a food pattern maximizing the explained variation in PAI-1 and fibrinogen. Subsequently, the food pattern-diabetes association was evaluated using logistic regression.

RESULTS: High intake of the food groups red meat, low-fiber bread and cereal, dried beans, fried potatoes, tomato vegetables, eggs, cheese, and cottage cheese and low intake of wine characterized the pattern, which was positively associated with both biomarkers. With increasing pattern score, the odds of diabetes increased significantly (Ptrend < 0.01). After multivariate adjustment, the odds ratio comparing extreme quartiles was 4.3 (95% CI 1.7-10.8). Adjustment for insulin sensitivity and secretion and other metabolic factors had little impact (4.9, 1.8-13.7).

CONCLUSIONS: Our findings provide support for potential behavioral prevention strategies, as we identified a food intake pattern that was strongly related to PAI-1 and fibrinogen and independently predicted type 2 diabetes. | | | | | | |
| Diabetes: platelet | Lazarus SA | Tomato juice and platelet aggregation in type 2 diabetes.

Lazarus SA, Bowen K, Garg ML.

JAMA. 2004 Aug 18;292(7):805-6. | 2004 | Letter in JAMA, no abstract available. | RCT | | (-) | | | |