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Chemoprevention of prostate cancer with lycopene in the TRAMP model.

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Abstract

BACKGROUND: Dietary lycopene combined with other constituents from whole tomatoes was previously found to have greater chemopreventive effects against prostate cancer as compared to pure lycopene provided in a beadlet formulation. We hypothesized that tomato paste would have greater chemopreventive effects in transgenic adenocarcinoma of the mouse prostate (TRAMP) mice relative to equivalent lycopene doses provided from lycopene beadlets.

METHODS: Fifty-nine TRAMP mice were randomized to a control diet or to diets providing 28 mg lycopene per kg diet from tomato paste (TP) or from lycopene beadlet (LB), and sacrificed at 20 weeks. Prostate histopathology, prostate weight and serum levels of IGF-I and IGF binding protein-3 were evaluated.

RESULTS: The incidence of prostate cancer was significantly decreased in the LB group relative to the control group (60% vs. 95%, respectively, $P = 0.0197$) whereas the difference between the TP and control groups was not statistically significant (80% vs. 95%, $P = 0.34$). There was no difference in prostate weights between the groups. Total lycopene levels in the serum and prostate tissue were similarly elevated in the LB and TP groups relative to the control group. The ratio of 5-cis-lycopene to trans-lycopene in the serum was significantly greater in the LB group relative to the TP group ($P = 0.0001$). Oxidative DNA damage was significantly reduced in the livers of mice fed LB and TP diets relative to the control group.

CONCLUSIONS: This preclinical trial suggests significant chemopreventive activity with a lycopene beadlet-enriched diet. The chemopreventive effects of lycopene from beadlets versus whole tomato products requires further testing in preclinical and clinical models of prostate cancer.

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