

Lycopene Extracted from Sicilian Tomatoes Reduces Atherosclerosis Development in ApoE KO Mice Fed with a Western High Fat Diet

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Lycopene is a carotenoid found in tomatoes with potent antioxidant and antiinflammatory activity, the Mediterranean diet is particularly rich in lycopene with well known beneficial effects on cardiovascular health. We tested the effect of lycopene, extracted from Sicilian tomatoes (that have shown the highest concentration of lycopene per gram), in ApoE knock out mice fed with a high fat western diet. Mice were 5 weeks old at the beginning of the experiment and were fed with a high fat diet for 14 weeks. A group of mice received lycopene by oral suspension everyday from week 3 to week 14, at the human equivalent dose of 60 mg/day (0.264mg/mouse/day) that was previously reported effective in a pilot clinical trial. The body weight, food intake, cholesterol, and triglyceride levels were recorded every week and at the time of sacrifice the thoracic aorta, liver, and blood samples were taken. Lycopene supplementation reduced blood levels of triglycerides and cholesterol and the extent of atherosclerotic plaques. Moreover, lycopene acts through Nuclear factor erythroid-2-related factor 2 as demonstrated by immunohistochemistry in aortic sections. In liver samples the mRNA expression of PPAR-alpha and SREBP-1 was significantly affected by lycopene supplementation ($p < 0.05$ vs untreated ApoE mice), and the western blot analysis demonstrated an increased expression of the AMPK-alpha kinase demonstrating increased cellular metabolism in treated animals ($p < 0.05$ vs untreated ApoE mice). The positive results obtained in this pre-clinical model further support the use of lycopene extracts to reduce atherosclerosis.