Lycopene intervention reduces inflammation and improves HDL functionality in moderately overweight middle-aged individuals.

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Abstract
The management of overweight subjects by interventions aimed at reducing inflammation is highly desirable. To date, observational studies have identified a link between increased dietary antioxidant intake and reduced cardiovascular morbidity. However, direct trial evidence regarding the ability of antioxidants to influence inflammation is lacking. Therefore, this study examined lycopene's ability to lower systemic and high-density lipoprotein (HDL)-associated inflammation in moderately overweight middle-aged subjects. Serum was collected before and after a 12-week intervention from 54 moderately overweight, middle-aged individuals. Subjects were randomised to one of three groups: control diet (<10 mg lycopene/week), lycopene-rich diet (224-350 mg lycopene/week) and lycopene supplement (70 mg lycopene/week). HDL was subfractionated into HDL(2&3) by rapid ultracentrifugation. Compliance was monitored by assessing lycopene concentration in serum and HDL(2&3). Systemic and HDL-associated inflammation was assessed by measuring serum amyloid A (SAA) levels. HDL functionality was determined by monitoring the activities of paraoxonase-1 (PON-1), cholesteryl ester transfer protein (CETP) and lecithin cholesterol acyltransferase (LCAT). Lycopene increased in serum and HDL(2&3) following both lycopene interventions (P<.001, for all), while SAA decreased in serum following the lycopene supplement and in HDL(3) following both lycopene interventions (P<.05 for all). PON-1 activity increased in serum and HDL(2&3) in both lycopene groups (P<.05, for all). Furthermore, the activity of CETP decreased in serum following the lycopene supplement, while the activity of LCAT increased in serum and HDL(3) following both lycopene interventions (P<.05 for all). These results demonstrate that in moderately overweight, middle-aged subjects, increasing lycopene intake leads to changes to HDL(2&3), which we suggest enhanced their antiatherogenic properties. Overall, these results show the heart-protective properties of increased lycopene intake.