

Replacement of dietary saturated with unsaturated fatty acid has beneficial effects in lowering plasma E-selectin and P-selectin concentrations - Results from the RISSCI-1 study

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E-selectin and P-selectin are the major cell adhesion molecules expressed by endothelium cells. Higher circulating concentrations of E-selectin and P-selectin have been associated with the development of atherosclerotic plaque and an increase in cardiovascular disease (CVD) risk⁽¹⁾. Reductions in E-selectin has previously been demonstrated after dietary substitution of saturated fatty acids (SFA) with monounsaturated fatty acids⁽²⁾. *In vitro*, replacement of SFA with unsaturated fatty acids (UFA) was found to decrease platelet sensitivity to a collagen receptor (Glycoprotein VI) selective agonist in the RISSCI-1 (Reading, Imperial, Surrey Saturated Fat Cholesterol Intervention) study⁽³⁾. The aim of this study was to determine whether the replacement of dietary SFA with UFA was also associated with differences in circulating cell adhesion molecule concentrations (intercellular adhesion molecule-1 (ICAM-1), vascular adhesion molecule-1 (VCAM-1), E-selectin and P-selectin) in men from the RISSCI-1 study.

Healthy men (n = 107), aged 30–65 y who participated in the RISSCI-1 study (ClinicalTrials.gov Identifier NCT03270527), consumed a high-SFA diet (33% total energy (TE) of total fat: SFA 18% TE and UFA 15% TE) for 4 weeks followed by a low-SFA diet (34% TE of total fat: SFA ≤10% TE and UFA 24% TE) for 4 weeks by the exchange of cooking oil, dairy, spreads and snacks high in SFA with those high in UFA. Concentrations of ICAM-1, VCAM-1, E-selectin and P-selectin were measured with the R&D Systems Human Adhesion Molecule Multiplex kit at baseline (week 0), at the end of a high-SFA diet (week 4) and at the end of a low-SFA diet (week 8). Wilcoxon signed-rank test was performed to determine differences in cell adhesion molecule concentrations from baseline to a high-SFA diet and then a low-SFA diet.

Relative to baseline, there was a 0.4% increase in plasma E-selectin during the high-SFA diet which decreased by 5.3% following the low-SFA diet (P = 0.008). Similarly, the changes in plasma P-selectin from baseline was 2.6% greater in response to the high-SFA diet which was found to be reduced by 4.3% following the low-SFA diet (P = 0.001). No significant changes were found in ICAM-1 and VCAM-1 concentrations following the high and low-SFA diets.

These findings provide evidence to suggest that the replacement of dietary SFA with UFA, in line with UK public health recommendations, may have a favourable effect on CVD risk by reducing the concentration of E-selectin and P-selectin.

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References

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