

## 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

G. Wong<sup>1</sup>, A. Koutsos<sup>1</sup>, R. Antoni<sup>2</sup>, E. Ozen<sup>1</sup>, L. Sellem<sup>1</sup>, H. Ayyad<sup>2</sup>, B. Fielding<sup>2</sup>, M.D. Robertson<sup>2</sup>, K.G. Jackson<sup>1</sup>, B.A. Griffin<sup>2</sup> and J.A. Lovegrove<sup>1</sup>

<sup>1</sup>Hugh Sinclair Unit of Human Nutrition, University of Reading, Whiteknights, Reading, UK and

<sup>2</sup>Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, UK

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<sup>(1)</sup>. Reductions in E-selectin has previously been demonstrated after dietary substitution of saturated fatty acids (SFA) with monounsaturated fatty acids<sup>(2)</sup>. *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<sup>(3)</sup>. 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.

### Acknowledgements

RISSCI Study was funded by the BBSRC UK (reference: BB/P010245/1).

### References

1. Galkina E and Ley K (2007) *Arterioscler Thromb Vasc Biol* **27**(11), 2292–2301.
2. Vafeiadou K, Weech M, Altowajiri H, *et al.* (2015) *Am J Clin Nutr* **102**, 40–8.
3. Wong G, Kriek N, Koutsos A, *et al.* (2021) *89th EAS Congress* 137.