

Replacement of saturated with unsaturated fats had no impact on vascular function but beneficial effects on lipid biomarkers and blood pressure

Disease of the heart and blood vessels (referred to as cardiovascular disease (CVD)) is the primary cause of death worldwide. A key public health recommendation for reducing the risk of developing CVD is to lower our intake of dietary saturated fats (SFA). However, recent high-profile scientific research questioned the links between SFA and CVD. This has caused confusion among the general public regarding dietary recommendations and re-opened the scientific debate concerning the effects of SFA on our health. Therefore, well-conducted, large-scale dietary intervention studies are vital for government policy-makers to continue providing effective evidenced-based dietary advice. At present, the best nutrient to replace SFA in our diets is unclear, although unsaturated fats (found predominantly in vegetable oils) are considered more beneficial than carbohydrates

The Dietary Intervention and VAScular function (DIVAS) study is the largest of its kind to investigate the impact of replacing 9.5-9.6% of total energy intake from SFA with either monounsaturated fats (MUFA) or n-6 polyunsaturated fats (n-6 or omega-6 PUFA) on key indicators of CVD risk. The study involved 195 men and women from the UK aged 21-60 years at moderate risk of CVD. This included raised blood pressure, raised blood cholesterol or being overweight. Participants were randomly assigned to follow one of three experimental diets enriched with SFA, MUFA or n-6 PUFA over 16 weeks. Sources of fat substituted in their diets included oils, spreads, dairy products and snack foods. Other aspects of the diet, including energy, protein and carbohydrate, remained unchanged. Of primary interest was measurement of the normal functioning and stiffness of the arteries (referred to as 'vascular function') before and after the experimental diets. Additionally, blood pressure recorded at regular intervals over 24-hours, fasting levels of fats (lipids) in the blood (e.g. cholesterol) and circulating blood markers of vascular function, inflammation and insulin resistance (where our bodies respond less efficiently to insulin after eating) were measured.

When MUFA replaced SFA in the diet, blood pressure measured at night fell by 5 mmHg, and there were improvements in blood markers of vascular function (e.g. reduction in E-selectin). Fasting concentrations of low-density lipoprotein (LDL)-cholesterol (or 'bad' cholesterol) also fell when SFA was substituted with either MUFA (11%) or n-6 PUFA (14%). This was accompanied by reductions in total cholesterol and the ratio of total cholesterol to high-density lipoprotein cholesterol (an indicator of future CVD risk). However, there was no impact of replacing SFA with either unsaturated fat on vascular function.

The average 5 mmHg reduction in night-time blood pressure found in the DIVAS study when MUFA replaced SFA is considered to be of public health importance since a 3 mmHg reduction in blood pressure has been linked to a 5% lower risk of death from heart disease. Furthermore, since a 1% decrease in LDL-cholesterol has been associated with a 1.5% fall in CVD risk, the reductions in

LDL-cholesterol observed when SFA was replaced with MUFA (11%) and n-6 PUFA (14%) would be predicted to have a large impact on lowering CVD risk by 17% and 20%, respectively.

These findings reinforce the current UK government guidelines that advise us to lower our intakes of dietary SFA and replace them with unsaturated fats to reduce our risk of CVD. However, since the jury is still out as to which type of unsaturated fat is of greater benefit to health, additional research from well-conducted and large-scale clinical trials is required. Furthermore, these findings were observed in a UK population at moderate risk of CVD, so it is important to investigate the effects of replacing SFA in our diets with unsaturated fats in other healthy or higher risk populations.

Publication

[Replacement of saturated with unsaturated fats had no impact on vascular function but beneficial effects on lipid biomarkers, E-selectin, and blood pressure: results from the randomized, controlled Dietary Intervention and VAScular function \(DIVAS\) study.](#)

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