Dietary fat composition has a greater impact on postprandial lypaemia than apolipoprotein E genotype in normolipidaemic men – insights from the Satgen study

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Non-fasting triacylglycerol (TAG) concentrations are being increasingly recognised as a cardiovascular disease risk factor. Apolipoprotein (apo)E plays an important role in the clearance of TAG from the circulation, with the APOE genotype considered to influence the responsiveness of fasting lipids to dietary fat manipulation. Although meal fat quantity and quality also influence the magnitude of the postprandial TAG response, little is known about the interactions of these dietary variables with APOE genotype.

Participants (mean age 53 (SD 9) y and BMI 25.8 (SD 2.6) kg/m²) prospectively recruited according to APOE genotype (n = 12 E3/E3, n = 11 E3/E4), followed a sequential dietary intervention in which they were assigned to a low-fat diet (LF), high-fat, high saturated fat diet (HSF), and HSF diet with 3 g/d docosahexaenoic acid (HSF-DHA), each for an 8 week period. At the end of each dietary period, a 480 min postprandial assessment was performed using a test meal with a macronutrient profile representative of the previous dietary intervention. Blood samples were collected for the measurement of plasma metabolites, and for the isolation of TAG-rich lipoprotein fractions (TRLs).

A variable postprandial plasma TAG response according to APOE genotype was evident over the 480 min period (Fig. 1), with a lower area under the curve after HSF-DHA compared to LF (23%) or HSF (29%) diet/test meal in APOE4 carriers (P £ 0.005). Relative to APOE genotype, dietary fat manipulation had a greater impact on lipids, with a lower fasting TAG concentration in plasma (23%) and Sf 60–400 TRL fraction (41%), and plasma NEFA (23% and 15%) following the HSF-DHA than the LF and HSF interventions (P £ 0.007).

In conclusion, although a modest impact of APOE genotype was observed on the plasma TAG profile, dietary fat composition emerged as a greater modulator of the postprandial lipid response in normolipidaemic men.

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Figure 1: Mean±SEM for the plasma triacylglycerol (TAG) response over 480 min after consumption of a test breakfast representative of the LF diet (○), HSF diet (●) and HSF-DHA diet (□) in a) the APOE3/E3 group (n = 12) and b) the APOE3/E4 group (n = 11). There was a significant meal*time*genotype interaction (P = 0.033).

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