

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

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Non-fasting triacylglycerol (TAG) concentrations are being increasingly recognised as a cardiovascular disease risk factor⁽¹⁾. 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 S_f 60–400 TRL fraction (41%), and plasma NEFA (23% and 15%) following the HSF-DHA than the LF and HSF interventions (*P* ≤ 0.007).

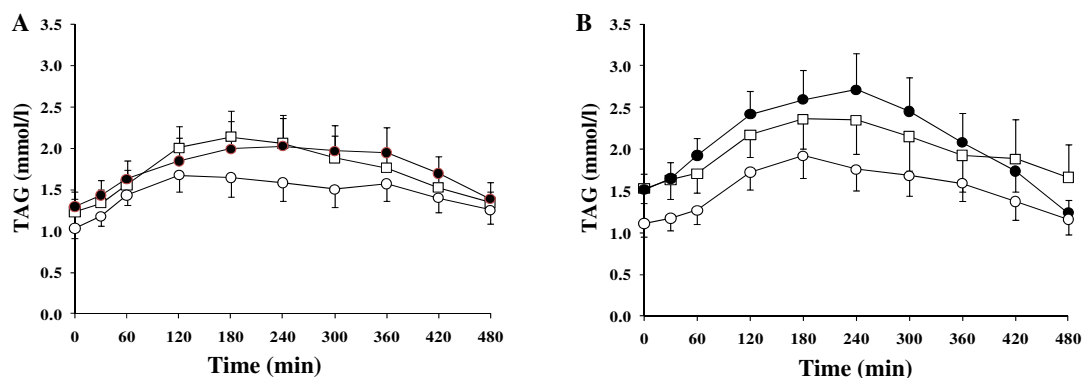


Figure 1: Mean ± SEM for the plasma triacylglycerol (TAG) response over 480 min after consumption of a test breakfast representative of the LF diet (□), HSF diet (●) and HSF-DHA diet (○) in a) the *APOE3/E3* group (*n* = 12) and b) the *APOE3/E4* group (*n* = 11). There was a significant meal*time*genotype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

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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1. Jackson KG, Poppit SD & Minihane AM (2012) *Atherosclerosis* **220**, 22–33.