Proceedings of the Nutrition Society (2013), **72 (OCE4)**, E180 doi:10.1017/S002966511300205X

Summer Meeting, 15–18 July 2013, Nutrition and healthy ageing

Impact of *APOE* genotype on postprandial S_f>400 lipid and apolipoprotein B-48 responses to dietary fat manipulation – insights from the SATgenε study

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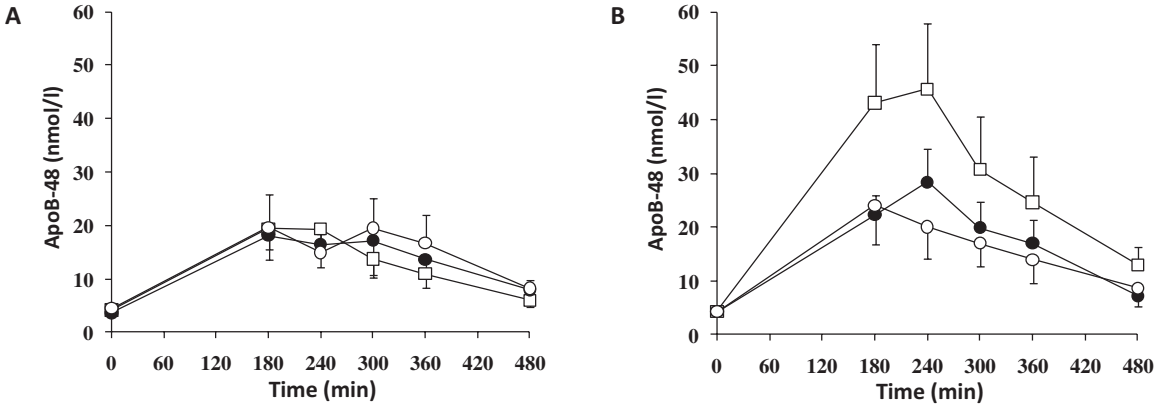
Raised levels of intestinally derived lipoproteins before and after a fat containing meal have been associated with an increased cardiovascular disease risk[(1)]. Given the pivotal role that apolipoprotein (apo)E plays in the clearance of triacylglycerol (TAG)-rich lipoproteins, the *APOE* genotype is now considered to be an important genetic determinant of the responsiveness of plasma lipids to dietary fat manipulation. Although both meal fat quantity and quality influence the postprandial S_f>400 (chylomicron) apoB-48 response, little is known about the interactions of these dietary variables with *APOE* genotype.

Male participants (mean age 53 (SD 9) y and BMI 25.8 (SD 2.6) kg/m^2) prospectively recruited according to *APOE* genotype ($n = 12$ *E3/E3*, $n = 11$ *E3/E4*), were assigned to a low-fat diet (LF), high-fat, high saturated fat diet (HSF), and HSF diet with 3.45 g/d docosahexaenoic acid (HSF-DHA), each for an 8 week period in the same order. At the end of each dietary period, a test meal with a macronutrient profile representative of the dietary intervention was consumed and blood samples collected at regular intervals for the isolation of the S_f>400 fraction. TAG was analysed using an automated assay and apoB-48 by specific ELISA[(2)].

A significant interaction between genotype and diet/test meal composition was found for the S_f>400 apoB-48 response (Figure), with a 45 % lower area under the curve after the HSF-DHA than LF diet/test meal in the *APOE4* carriers ($P = 0.008$). We have previously reported a similar relationship for the S_f>400 cholesterol response[(3)]. There was no significant impact of *APOE* genotype or diet/test meal composition on the S_f>400 TAG response.



Mean ± SEM for the S_f>400 apoB-48 response over 480 min after consumption of test meals representative of the LF diet (□), HSF diet (●) and HSF-DHA diet (○) in A) the *APOE3/E*3 group ($n = 12$) and B) the *APOE3/E4* group ($n = 11$). There was a significant diet/test meal*genotype interaction ($P = 0.030$).

In conclusion, our study has revealed *APOE* genotype to influence the metabolism of large TAG-rich dietary derived lipoproteins to diets/meals of varying fat quantity and quality, with the greater apoB-48 (and cholesterol) response to the LF test meal in *APOE4* carriers worthy of further investigation.

This work was funded by the Wellcome Trust (WT085045MA).

1. Jackson KG, Poppit SD & Minihane AM (2012) *Atherosclerosis* **220**, 22–33.
2. Lovegrove JA, Isherwood SG, Jackson KG *et al.* (1996) *Biochim Biophys Acta* **1301**, 221–229.
3. Jackson KG, Lockyer S, Carvahlo-Wells AL *et al.* (2012) *Mol Nutr Food Res* **56**, 1761–1770.