Proceedings of the Nutrition Society (2009), **68 (OCE)**, E84 doi:10.1017/S0029665109990371

Scottish Section of The Nutrition Society, 7–8 April 2009

Adiponectin (*ADIPOQ*) gene variants as a determinant of serum adiponectin concentration

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Adiponectin is a 244-amino acid plasma protein secreted exclusively by omental adipose tissue, which is involved in the regulation of energy homeostasis and glucose and lipid metabolism. Adiponectin is coded by the gene on chromosome 3q27[1]. A low level of adiponectin is associated with the metabolic syndrome[2]. The aim of the study was to investigate the association between four single-nucleotide polymorphisms (SNP) in the *ADIPOQ* gene (−10066 *G/A*, −7734 *C/A* and +276 *G/T*) and promoter (−11391 *G/A*) with circulating adiponectin.

Subjects were overweight and obese healthy men and women with certain traits of the metabolic syndrome, who were recruited to the RISCK Study (a UK multi-centre study designed to examine the effects of different amounts and types of dietary fat and carbohydrate on metabolic syndrome; *n* 521, mean age 52 years) and for whom anthropometric measurements and fasting glucose, insulin, adiponectin concentrations and lipid profile were available. Baseline measurements were undertaken after 1 month on a reference diet (38% fat, 18% SFA and 12% MUFA). Adiponectin was measured by the AutoDELFIA (Perkin Elmer, Waltham, MA, USA) time-resolved-fluorescence-based immunoassay. DNA was extracted from buffy coat samples using the Illustra blood genomicprep Mini Spin Kit (GE Healthcare UK Ltd, Little Chalfont, Bucks., UK). The ADIPOQ SNP were detected by pyrosequencing, which is a real time sequencing strategy based on the release of pyrophosphate during enzymic DNA synthesis (Qiagen Ltd, Crawley, West Sussex, UK).

Of the four SNP tested, +276 *G/T* was the only one associated with baseline serum adiponectin concentration after adjusting for age, BMI and gender. Results showed a significant difference in serum adiponectin concentration in T allele carries (G/T + T/T) *v.* non-carriers (G/G), where the T allele carriers had significantly higher adiponectin compared with non-carriers (10.4 (SE 0.34) μg/ml *v.* 11.8 (SE 0.39) μg/ml; $P = 0.01$). No significant associations with serum adiponectin were found with −10066 *G/A*, −7734 *C/A* and 11391 *G/A* variants (Table).

	Baseline serum adiponectin concentration (μg/ml)									
	11			12			22			
SNP	Mean*	95% CI	*n*	Mean*	95% CI	*n*	Mean*	95% CI	*n*	*P*
−10066 G/A	11.4	10.6, 12.2	175	10.9	10.2, 11.6	222	10.3	8.9, 11.7	62	0.358
−7734 C/A	11.0	10.5, 11.6	365	12.2	9.5, 14.9	15	–			0.408
−11391 G/A	10.7	10.1, 11.2	342	11.8	10.6, 13.1	63	–			0.104
+276 G/T	10.4	9.7, 11.1	246	11.8	10.9, 12.5	189	–			0.010

*Geometric mean for serum adiponectin concentration after adjusting for BMI, gender and age.

These findings suggest that genetic variability at the +276 *G/T* locus may account for a small factor inter-individual variation in baseline serum adiponectin concentration in obese/overweight subjects and carriers of the +276 *T*-allele may be at reduced risk of developing the metabolic syndrome.

1. Kadowaki T & Yamauchi T (2005) *Endocr Rev* **26**, 439–451.
2. Santaniemi M, Kesaniemi YA & Ukkola O (2006) *Eur J Endocrinol* **155**, 745–750.