# APOLIPOPROTEIN B GENE POLYMORPHISM ASSOCIATES WITH PLASMA CHOLESTEROL CHANGES INDUCED BY DIETARY FAT AND CHOLESTEROL

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Low density lipoprotein (LDL) is the major cholesterol carrying lipoprotein in human plasma. LDL is cleared from the circulation by the LDL receptor which binds apolipoprotein B (apo B) on the surface of LDL.

Studies of genetic variations in the apo B gene have revealed several correlations between the plasma cholesterol concentration and restriction fragment length polymorphism (RFLP) of the gene. Two common polymorphisms have been identified by the restriction enzymes Xba1and EcoR1 (Breslow 1988). These two enzymes recognise specific nucleotide sequences in the DNA for apo B and the polymorphisms define individuals who either lack, or possess a specific enzyme cutting site.

Hypercholesterolemia is most commonly polygenic, reflecting interactions between multiple minor genetic dysfunctions and diet. Apo B gene polymorphism may therefore be more closely related to the nature of an individual's response to diet than to a causal plasma lipid level. We have determined apo B DNA polymorphism within a study which distinguished individuals who either responded or failed to respond to a low fat, low cholesterol diet with substantial falls in plasma cholesterol (Clifton et al. 1990).

Fifty one subjects were defined as responsive or non-responsive to a low saturated fatty acid (25% of energy as fat, P:S=1), low cholesterol (180 mg/day) diet, on the basis of at least a 10% fall in plasma cholesterol concentration after four weeks. A significant association was found between such responsiveness to dietary change and the allele to EcoR1 characterised by absence of a cutting site in the gene. In the non-responders the allele frequency was 0.87 and 0.13 for the presence and absence of the cutting site respectively. The frequency was significantly different in the responders, 0.71 and 0.29 ($P<0.05$). No association was seen with the polymorphism detected with Xba1.

These results demonstrate that dietary responsiveness is, at least in part, influenced by genetic background.

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