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Genetic association studies of dyslipidemia and their implications

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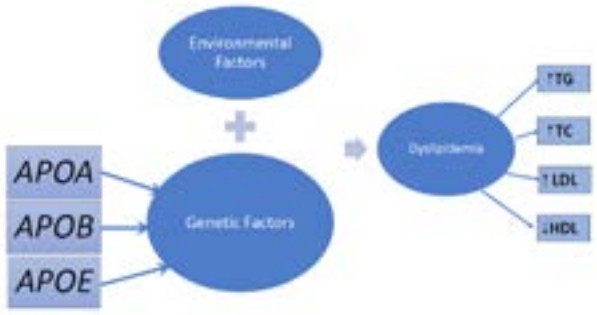
Plasma lipids have been well documented to be influenced by lifestyle factors, such as diet, obesity, and physical activity, as well as genetic factors. Persistent fluctuation in levels of cholesterol (TC), triglycerides (TG), and low-density lipoprotein (LDL), as well as decreased high-density-lipoprotein (HDL), often lead to clinical dyslipidemia which may consequently manifest into diabetes mellitus and/or coronary heart disease. Genetic association studies including genome wide association studies (GWAS) have attempted to elucidate the genetic and molecular mechanisms of dyslipidemia and have identified a limited number of candidate genes and pathways relevant to lipid metabolism and/or transport. However, conflicting results across different populations and ethnic groups have been reported. Variation in DNA sequences and candidate genes for blood lipid levels, therefore, remain unresolved. To demonstrate the importance of identifying cofounding gene variants in candidate gene loci relevant to specific ethnic groups and their role in dyslipidemia results from different studies conducted on the Kuwaiti population will be presented. Genetic association of the *APOA* promoter sequence, *APOB* and *APOE* common variants, and other related gene loci have been studied and positive association results from these will be presented. These include the association of the *I* -75G>A with increased levels of LDL-C and TC, *APOB* signal peptide and 3611 MspI polymorphisms with variation in TG levels and the APOE2 with LDL-C levels in the Kuwaiti population sampled. The nutrition of Kuwaitis is relatively high in fat and the lifestyle adapted by many in the Kuwaiti population often lead to an increase in many of the risk factors leading to heart disease especially dyslipidemia making this population ideal for genetic association studies. Important implications and conclusions drawn from these studies will be discussed.



Recent Publications:

1. Al Bustan S A, Al Serri A E, Annice B G, Alnaqeeb M A and Ebrahim G A (2013) Re-sequencing of the APOAI promoter region and the genetic association of the -75G > A polymorphism with increased cholesterol and low-density lipoprotein levels among a sample of the Kuwaiti population. BMC Medical Genetics. 14:90.
2. Yang X, Al-Bustan S A, Feng Q, Guo W, Ma Z, Marafie M, Jacob S, and Al-Mulla F (2014) The Influence of Admixture and Consanguinity on Population Genetic Diversity in Middle East. Journal of Human Genetics. 59(11):615-22.
3. Al Bustan S A, Alnaqeeb M A, Annice B G, Ebrahim G A and Refai T M (2014) Genetic association of *APOB* polymorphisms with variation in serum lipid profile among the Kuwait population. Lipids in Health and Disease. 13:157.

4. Al Serri A E, Ismael F, Al Bustan S A, and Al-Rashdan I (2015) Association of the insertion allele of the common ACE gene polymorphism with T2DM among Kuwaiti cardiovascular disease patients. Journal of the Renin-Angiotensin-Aldosterone System. DOI:10.1177/1470320315610255.

5. Alrashid M H, Al Serri A, Alshemmari S H, Koshi P and Al Bustan S A (2016) Association of genetic polymorphisms in the VKORC1 and CYP2C9 genes with warfarin dosage in a group of Kuwaiti individuals. Molecular Diagnosis & Therapy 20(1):183-90.

Biography

Suzanne A Al-Bustan has completed her PhD in Human Genetics from the Duncan Guthrie Institute in Medical Genetics at Glasgow University in 1992. She is an Associate Professor of Human and Molecular Genetics in the Department of Biological Sciences and the Director of the joint MSc degree in Molecular Biology at Kuwait University. She has published numerous papers in reputed journals and has been active in both scientific research and supervision of several graduate students in the areas of genetics and molecular biology. Her main line of research expertise and emphasis is on genetic association of candidate genes in the lipid metabolism and transport with dyslipidemia in the Kuwaiti population.

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