

New study shows how genes control blood proteins important to health

A new study shows how genes control levels of many blood proteins implicated in disease. The findings are the result of an international collaboration between scientists at the University of Exeter, the National Institute on Aging, and the Tuscany and Florence Health Agencies. Details, published May 9th in the open-access journal *PLoS Genetics*, determine how many of the key proteins within our blood are under genetic control, showing that diet and lifestyle are not the only factors influencing its makeup.

Maintaining the correct proportions of proteins, fats and other molecules in our blood is critical for normal health. An obvious example is cholesterol: high blood levels of “bad” LDL cholesterol and low blood levels of “good” HDL cholesterol increase the risk of heart disease. Previous studies have shown how cholesterol levels are not only influenced by diet and lifestyle but are also under strong genetic control.

This latest study, involving the entire genome, shows how blood levels of many other proteins are under strong genetic control. These proteins include a class of molecules called “interleukins” that are important in inflammatory diseases such as multiple sclerosis and rheumatoid arthritis. Interleukins may also play a role in heart disease and related “metabolic” disorders.

As an example, the group identified variations in genes that influence “Sex hormone binding globulin,” a protein that controls how much testosterone is freely available in one’s blood. As another example, the group identified variations in genes that influence “Macrophage inflammatory protein beta” (MIP-beta), a protein that may play a role in influencing how likely people with HIV infection will go on to develop AIDS. The identification of these genes could lead to a greater understanding of the diseases they are implicated in.

“By identifying versions of genes that alter blood levels of important molecules we should be able to understand whether these molecules are important in disease processes or not,” said Professor Tim Frayling, one of the study’s leaders.

In this comprehensive study the researchers studied a total of 42 circulating proteins. The findings make way for future studies focusing on how the whole genome influences all proteins, not just those that end up circulating in the blood, although these are some of the most important from a disease perspective.

Citation: Melzer D, Perry JRB, Hernandez D, Corsi A-M, Stevens K, et al. (2008) A Genome-Wide Association Study Identifies Protein Quantitative Trait Loci (pQTLs). *PLoS Genet* 4(5): e1000072. doi:10.1371/journal.pgen.1000072

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