Large-scale meta-analysis discovered ten new genes that tune cholesterol levels

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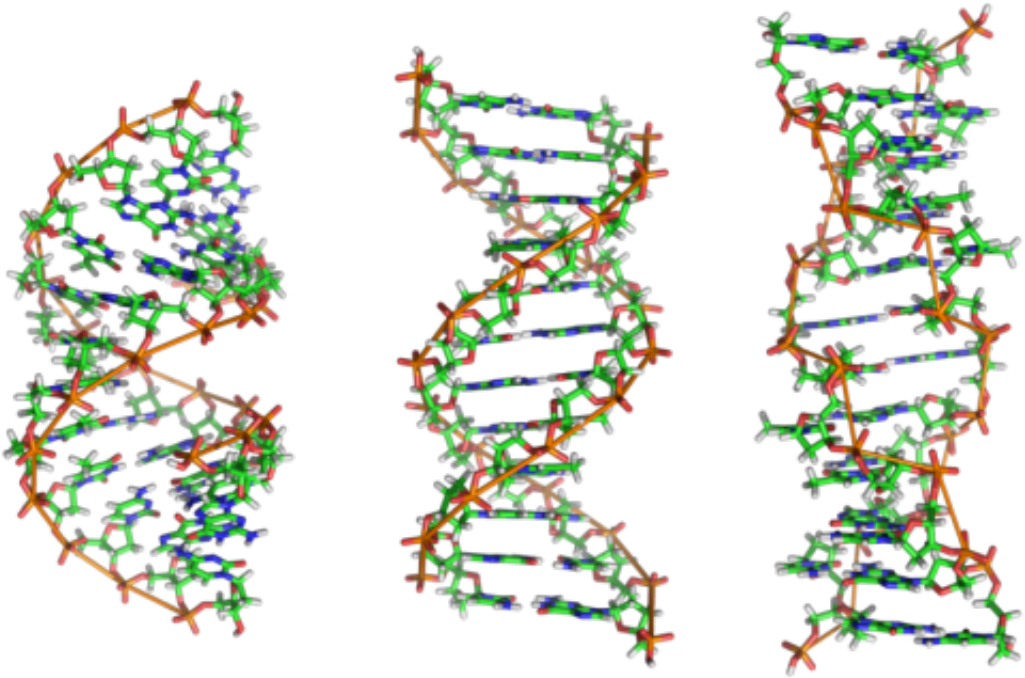

From left to right, the structures of A-, B- and Z-DNA. Credit: Wikipedia

An international research consortium has discovered ten new genes underlying blood lipid levels. This large study, published today in world's leading genetical journal, the *Nature Genetics*, was led by researchers at the Institute for Molecular Medicine Finland and Medical Faculty, University of Helsinki. In this study the DNA of more than 60,000 individuals was examined to discover genetic variants associated with cholesterol levels.

In addition to identifying novel risk genes, the researchers were able to pinpoint new genetic risk variants having the most significant effect on cholesterol for most of the already known genomic susceptibility areas. Many of these new risk variants were shown to have a manifold effect on blood cholesterol compared to the previously identified variants.

To identify different types of associated loci, genome-wide genetic information consisting of nearly 10 million variants and blood lipid level data from 22 European cohorts was combined. The study beautifully demonstrates the benefits of international collaboration and sharing the data.

"In the earlier genome-wide studies the genome information available has been less dense and the studies have concentrated on variants that at least one in twenty people have. By analyzing large numbers of samples and utilizing sophisticated statistical methods we were able to concentrate on variants that are much rarer in the population", explains Dr. Ida Surakka, the first author of the study.

The results demonstrated the many faces of the genomic variants impacting on cholesterol metabolism. Among the thus far identified risk variants are both rare familial mutations causing severe hypercholesterolemia and variants that are very common amongst the people with European origin.

Professor Samuli Ripatti from the University of Helsinki, the principal investigator behind this study comments: "These genetic findings provide information about the personal, lifelong exposure to cholesterol and thus about the risk of developing a cardiovascular disease. Identifying the high-risk individuals already in childhood would allow them to lower their risks by changing life style and through medication already early in their life and thus prevent the disease later.

A significant proportion of the variation in cholesterol levels is due to genetic factors. When combining all the genetic information available nearly fifth of the variation in cholesterol levels can now be explained.

More information: Surakka I, Horikoshi M, Mägi R, Sarin AP, et al. The impact of low frequency and rare variants on lipid levels. *Nature Genetics*, Advance online publication 11.5.2015, dx.doi.org/10.1038/ng.3300

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