Mitochondrial GWA Analysis of Lipid Profile Identifies Genetic Variants to Be Associated with HDL Cholesterol and Triglyceride Levels.

Abstract:
It has been suggested that mitochondrial dysfunction has an influence on lipid metabolism. The fact that mitochondrial defects can be accumulated over time as a normal part of aging may explain why cholesterol levels often are altered with age. To test the hypothesis whether mitochondrial variants are associated with lipid profile (total cholesterol, LDL, HDL, and triglycerides) we analyzed a total number of 978 mitochondrial single nucleotide polymorphisms (mtSNPs) in a sample of 2,815 individuals participating in the population-based KORA F4 study. To assess mtSNP association while taking the presence of heteroplasmy into account we used the raw signal intensity values measured on the microarray and applied linear regression. Ten mtSNPs (mt3285, mt3336, mt5285, mt6591, mt6671, mt9163, mt13855, mt13958, mt14000, and mt14580) were significantly associated with HDL cholesterol and one mtSNP (mt15074) with triglycerides levels. These results highlight the importance of the mitochondrial genome among the factors that contribute to the regulation of lipid levels. Focusing on mitochondrial variants may lead to further insights regarding the underlying physiological mechanisms, or even to the development of
innovative treatments. Since this is the first mitochondrial genome-wide association analysis (mtGWAS) for lipid profile, further analyses are needed to follow up on the present findings.