Low adherence to the Mediterranean Diet almost doubles the likelihood of developing coronary artery disease in genetically predisposed individuals.

Eirini V Theodoraki¹, Tiit Nikopensius²,³, Mary Yannakoulia¹, Maria Dimitriou¹, Vassileios Peppes³, Genovefa Kolovou⁴, Nikolaos Zakopoulos³, Kaarel Krjutškov²,⁵, Andres Metspalu²,⁵, George V Dedoussis¹

¹Harokopio University of Athens, Athens, Greece
²University of Tartu, Tartu, Estonia
³University of Athens Medical School “Alexandra Hospital”, Athens, Greece
⁴Onassis Cardiac Surgery, Athens, Greece
⁵Estonian Biocentre, Tartu, Estonia

Coronary artery disease (CAD) results from the interplay between genetic predisposition and environmental factors. The aim of our study was to identify novel genetic variants associated CAD in the Greek population, to assess their additive effect by means of a genetic risk score (GRS) and to investigate the modifying effect of an environmental exposure i.e. the adherence to the Mediterranean diet.

Methods: Genotyping was performed for 297 tagSNPs in 41 candidate-genes in a case-control study of CAD patients (n=305) and controls (n=305). Odds ratios (ORs) were calculated for each tagSNP, before and after adjustment for confounders. TagSNPs associated with disease were then used to calculate the GRS. Adherence to the Mediterranean diet was evaluated through a food frequency questionnaire.

Results: Twelve variants were associated with the presence of CAD. The likelihood of having CAD increased by 29.3%, for every 1-unit increase of the GRS (OR: 1.293; 95% CI: 1.152-1.451; P=1.5 x 10⁻⁵), and by 122.9% for subjects carrying ≥ 10 risk alleles (OR: 2.229, 95%CI: 1.549-3.207, P=1.2 x 10⁻⁵). For subjects with ≥ 10 risk alleles exhibiting low adherence to the Mediterranean diet, the likelihood of presenting with CAD was much higher comparing to those reporting high adherence to the Mediterranean diet (OR: 3.329, 95%CI: 1.747-6.334, p=2.5 x 10⁻⁴).

Conclusions: We identified 12 novel variants associated with CAD in our Greek population. The modest effects of single SNPs were propagated when a GRS was applied. Low adherence to the Mediterranean diet almost doubled the likelihood of developing CAD in subjects with high genetic predisposition.