Gut microbiota and cardiometabolic disease

European researchers are working to identify biological markers and risk factors associated with cardiometabolic diseases. The focus is on gut microbiota and their interaction with the host.

Cardiovascular disease, obesity and metabolic syndrome are leading causes of discomfort and reduced quality of life. Given the interconnecting nature of these pathologies, they have been grouped under the term cardiometabolic diseases (CMD). Currently there is no way to predict how these multifactorial conditions will evolve as we lack understanding of the underlying mechanisms.

Progress in CMD research has identified relevant pathophysiological pathways. However, predictive tools remain elusive due to the complexity involved in assessing the role of environmental factors in disease incidence. The EU-funded METACARDIS (Metagenomics in cardiometabolic diseases) project aims to contribute to this knowledge by investigating...
the qualitative and quantitative changes in gut microbiota implicated in CMD. To this end, the consortium is undertaking clinical and experimental studies to validate the hypothesis that poor nutritional environment and lifestyle choices promote CMD progression.

Till now, the microbiome has been studied mainly in the context of metabolic diseases alone and not in relation to CMD. Its influence by environmental factors and amenability potential, make gut microbiota an attractive therapeutic target.

To study the complexity of the gut microbiome, and its interactions with the host, the consortium utilised metabolic network modelling, metagenomic, transcriptomic and metabolomic approaches. Results so far link a healthier dietary pattern with improved cholesterol and inflammatory markers. Also, weight loss improved gut-microbial diversity.

Further associations have been found between gut bacterial groups and cardiovascular risk factors. Project teams are working on samples from individuals undertaking bariatric surgery to correlate microbial gene profiles and determine the resulting clinical changes and outcomes.

Overall, the generated tools will help unveil the pathophysiological impact of alterations in gut microbiota and how this axis could be exploited therapeutically. Predictive signatures for the outcome of bariatric surgery would be extremely useful as they would help select the most appropriate treatment for the patient.

**Keywords**

Gut microbiota, cardiometabolic disease, obesity, metagenomics, bariatric surgery

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