Bioinformation tool improves the precision of personalized nutrition

October 7 2021

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Researchers at the Genomics and Health Department at the Foundation for the Promotion of Health and Biomedical Research of Valencia Region—FISABIO) have published an article in *Nature Communications* presenting the bioinformation tool AGREDA, a system for developing personalized nutrition programs that accounts for the composition of

each individual's microbiota. The study included the participation of the University of Granada and the Engineering School of the University of Navarra (Tecnun).

More than 100 billion microorganisms live in the human intestine and make up the intestinal microbiota. This affects the development of many diseases related to the lifestyle of industrialized countries, such as obesity as well as diseases related to the immune system. In addition, intestinal microbiota respond to an individual's diet and process many of the nutrients that are ingested with food.

The published study is framed within the European Stance4Health project, and its objective is to "better understand how that processing of nutrients by the intestinal microbiota transpires, and which compounds are produced that can have an impact on health positively or negatively," explained María Pilar Francino, researcher at Fisabio's Genomics and Health Department and author of the article.

"The new tool would allow designing personalized diets that take into account both a person's microbiota and their clinical condition in order to be able to direct the composition and activity of the microbiota in the optimal direction for each individual," explained Francino.

In total, using various bioinformation techniques, the work completes the metabolism of 250 nutrients, such as for example, that of phenolic compounds, which are present in plant foods, such as fruits, vegetables, legumes and drinks like tea and coffee.

The current personalized nutrition tools fundamentally use the patient's genetic data. "This approach is incomplete and not optimal because it does not take into account the metabolic contribution of the intestinal microbiota," explained Francisco J. Planes, researcher in the Biomedical Engineering Department, who led the study at Tecnun.

For his part, José Ángel Rufián, lead researcher at the Nutrition Department of the University of Granada added that taking into account the intestinal microbiota in the personalized nutrition programs has an enormous potential "because the compounds that a well-balanced microbiota produce can protect us from the development of chronic diseases."

More information: Telmo Blasco et al, An extended reconstruction of human gut microbiota metabolism of dietary compounds, *Nature Communications* (2021). DOI: 10.1038/s41467-021-25056-x

Provided by FISABIO