

Systematic literature analysis on the effect of genetic factors on nutrition

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Individualized dietary recommendations based on genetic information are a popular trend. But a team at the Technical University of Munich (TUM) has systematically analyzed scientific articles and determined

that there is no clear evidence for the effect of genetic factors on the consumption of total calories, carbohydrates and fat. According to the current state of knowledge, the expedience of gene-based dietary recommendations has yet to be proven.

Overweight and obesity have become a global health problem. According to the World Health Organization, 39 percent of adults in EU countries are overweight. In Germany, more than 50 percent of adults suffer from overweight, and almost one fifth, according to the Robert Koch Institute, is currently considered obese. This is primarily due to the modern lifestyle, characterized by low physical activity and high-calorie foods.

Genetic factors also play a role in the occurrence of obesity. To date, around 100 genes (loci) have been identified that are related to [body mass index](#) (BMI). However, the function of these genes and the biological mechanisms behind them are still largely unknown. The investigation of the relationship between genetic factors and nutrition can shed light on whether the genes linked to BMI play a role in nutrition.

Systematic literature search

The initial database search revealed more than 10,000 [scientific articles](#) concerned with the topic. Of these, 39 articles were identified for a relationship between genetic factors and total energy, carbohydrate or fat consumption. "In all studies, we most frequently encountered the fat mass and obesity associated gene (FTO) as well as the melanocortin 4 receptor gene (MC4R). There are indications of a relationship between these two genes and total energy intake," explains Christina Holzapfel, Ph.D., from the Institute of Nutritional Medicine at TUM.

However, the evaluation of the studies did not provide a uniform picture.

"There is only limited evidence for the relationship between the FTO gene and low energy intake as well as between the MC4R gene and increased [energy intake](#)."

Hence, to date, there exist no indications that genetic factors are associated with the total intake of calories, carbohydrates and fat. The current state of knowledge is still too limited for deriving individual nutritional recommendations based on [genetic information](#), e.g. for weight management, explains the researcher. Expert associations also agree with the latter statement.

Human studies with detailed phenotyping, e.g. based on a genetic pre-analysis of the participants, are necessary in order to determine the interactions between [genetic factors](#) and diet on body weight. The Personalized Nutrition and eHealth Junior Research Group funded by the Federal Ministry of Education and Research, which is part of the enable nutrition cluster, is now working on this.

More information: Theresa Drabsch et al, Associations between Single Nucleotide Polymorphisms and Total Energy, Carbohydrate, and Fat Intakes: A Systematic Review, *Advances in Nutrition* (2018). [DOI: 10.1093/advances/nmy024](#)

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