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Precision Nutrition: A Review of Personalized Nutritional Approaches for the Prevention and Management of Metabolic Syndrome

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Abstract

The translation of the growing increase of findings emerging from basic nutritional science into meaningful and clinically relevant dietary advices represents nowadays one of the main challenges of clinical nutrition. From nutrigenomics to deep phenotyping, many factors need to be taken into account in designing personalized and unbiased nutritional solutions for individuals or population sub-groups. Likewise, a concerted effort among basic, clinical scientists and health professionals will be needed to establish a comprehensive framework allowing the implementation of these new findings at the population level. In a world characterized by an overwhelming increase in the prevalence of obesity and associated metabolic disturbances, such as type 2 diabetes and cardiovascular diseases, tailored nutrition prescription represents a promising approach for both the prevention and management of metabolic syndrome. This review aims to discuss recent works in the field of precision nutrition analyzing most relevant aspects affecting an individual response to lifestyle/nutritional interventions. Latest advances in the analysis and monitoring of dietary habits, food behaviors, physical activity/exercise and deep phenotyping will be discussed, as well as the relevance of novel applications of nutrigenomics, metabolomics and microbiota profiling. Recent findings in the development of precision nutrition are highlighted. Finally, results from published studies providing examples of new avenues to successfully implement innovative precision nutrition approaches will be reviewed.

Keywords: personalized nutrition, metabolic syndrome, nutrigenomics, deep phenotyping, metabolomics, obesity,

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