

METABOLIC SYNDROME AND GUT MICROBIOTA - A REVIEW

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Abstract

The relationship between gut microbiota and human health is complex, and the role of gut microbiota in pathogenesis of various diseases has been in the focus during the last decade. There is accumulating evidence that dysbiosis can be linked to different diseases, such as metabolic syndrome (MetS). Still, there is no consensus on the most appropriate tools and approaches for microbiota analyses. Numerous factors - diet, lifestyle, chemical microenvironment etc. influence the composition of gut microbiota. We aimed to analyze the current state of the knowledge on complex interplay between gut microbiota and development of MetS, as a basis for future research.

The permanent interplay between immune system, metabolism, and gut microbiota plays a significant role in the homeostasis control and potential obesity development. Increased energy harvest from the diet, changes in gene expression, energy expenditure and storage are mentioned to lead to inflammation, insulin resistance and MetS. Most of the data on its mechanisms were from mouse models, so the question of their informativeness for human microbiota research arose. Current state of the literature (using PubMed database), including GWAS studies of obesity in mice, suggests that they are relevant for human studies of microbiota composition change in response to diet. Besides the role of *Firmicutes/Bacteroidetes* ratio in predisposition to obesity, its difference in obese and lean humans and its decrease with weight loss, confirms the dominating role of nutrition in shaping gut microbiota composition and functions. There is an increasing evidence that microbiota can inflict their reach on physiological functions outside the gastrointestinal tract, and can therefore possibly manipulate our eating behaviour, using metabolic, neural, immune and endocrine pathways.

Our findings implicate a deeper host-microbiota relationship than previously realized, which may contribute to broader and multilayer approaches in future research of gut microbiota and shaping of prevention strategies for tackling MetS.

Key words: Diet, Gut Microbiota, Metabolic Syndrome, Modulation, Prebiotic, Probiotic.