

From Prebiotic Concept to Prebiotic Effects - Metabolic and Health Benefits. Results from the ILSI Prebiotic Task Force.

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The validation and translation of the original prebiotic concept to the current status on prebiotic effects on metabolism and health will be discussed.

It has become clear that specific prebiotic food products/ingredients/supplements that cause a selective modification in the gut microbiota's composition and/or activity and thus strengthen normobiosis, could either induce beneficial physiological effects in the colon and also in extra-intestinal compartments and/or contribute towards reducing the risk of dysbiosis and associated intestinal and systemic pathologies.

Over the last decade, data has convincingly demonstrated that particular prebiotic food products/ingredients/supplements can, upon oral consumption, selectively modulate the gut microbiota composition (mostly demonstrated for the stimulation of bifidobacteria and lactobacilli) and possibly its activities. Some, but not all, studies have also reported a reduction in the concentration of pathogenic bacteria such as clostridia and salmonella. The more data are accumulating, the more it will be recognized that such changes in the composition of the fecal microbiota, especially increase in bifidobacteria can be regarded as a marker of intestinal health. The following areas will be addressed in particular: immunity, inflammation, mineral absorption, colon cancer and finally energy homeostasis, satiety regulation and body weight gain.

Specific beneficial health effects have been reported on dietary consumption of specific prebiotic food products/ingredients/supplements which are relevant for infants as well as for adults in both healthy and compromised status, respectively.

Summarizing the state of the art on the metabolic and health effects of these compounds will enable to recommend where research efforts should be concentrating on to improve understanding of the activities and the physiological role of the gut microbiota and in particular the importance of its qualitative composition and the consequences of modulation. Through this, it should be possible to better address the contribution of prebiotics in the maintenance of health and well being as well as in the reduction of the considerable burden of gastro-intestinally mediated disorders. Importantly, tools exist to underpin this with mechanistic explanations of effect leading to effective hypothesis driven research.

Key questions which need to be further addressed and discussed are:

- Which of the physiological and/or pathophysiological well-being and health benefits are causally linked with a particular composition of the gut microbiota or (a) selective change(s) therein?
- Which observed benefits, is (are) not linked to a particular composition of the gut microbiota or (a) selective change(s) therein but is (are) the consequence(s) of other mechanism(s) of the product claimed to have a prebiotic effect?

- Which protocol(s)/markers are validated to demonstrate change(s) in microbiota composition
 - Which protocol(s), methodologies and markers are available and validated to demonstrate links between a particular composition of the gut microbiota or a selective change therein and a particular physiological and/or pathophysiological well-being and health benefit?
- The prebiotic effects will be discussed in the context of the current scientific dispute on the needed scientific substantiation of a health benefit, including studies in experimental models and conclusive dietary intervention studies associated with improvement in well characterised and accepted markers of health status in the light of the extensive and growing body of evidence, that points towards improved function and/or reduction of disease risks.

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