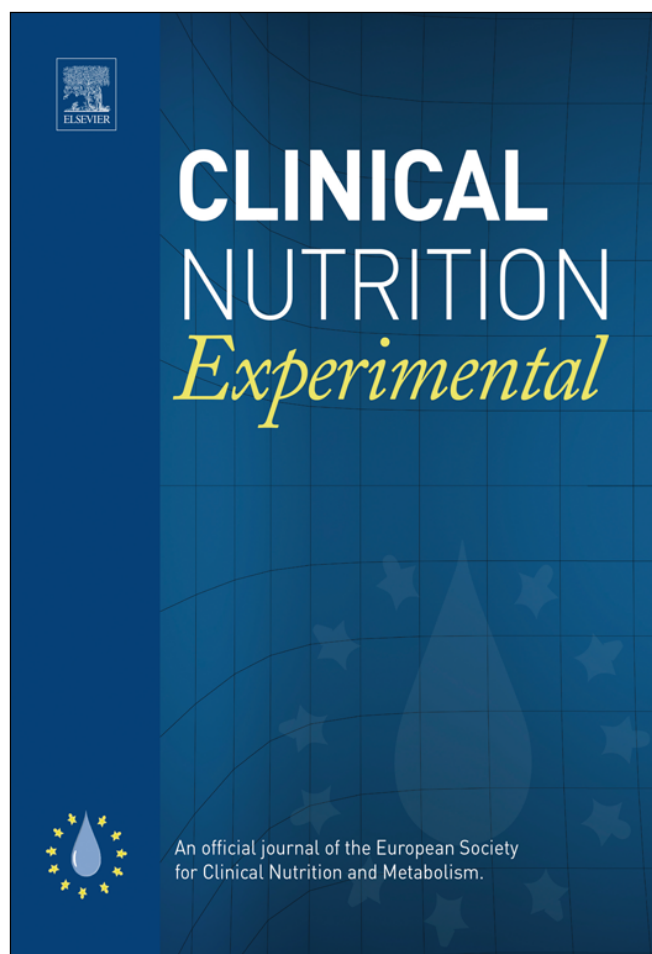




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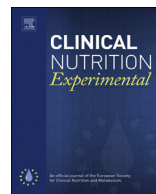
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## Editorial

# Gut microbiota and nutrition: Where are we now?

For the last fifteen years, the place we give to our gut in patho-physiology has been profoundly modified. The elucidation of the gut microbiome (bacterial genome) allowed to evaluate with a different angle the role of the microbial ecosystem –composed of thousands of bacteria, but also of viruses, phages, or moods–in the regulation of vital processes. We propose, in this special issue, to let the floor to scientists and physicians considered as pioneers and experts in their respective area of interest, to give an overview of the questions and answers arisen in different aspects of nutrition and health upon the evaluation of nutrients–host–microbes interactions.

Microbial colonization of the gut occurs at birth, a phenomenon which is crucial for educating the immune system. The paper written by M. Collado and collaborators [1] interestingly reports the role of the nutritional status and diet of the microbiota shaping of the mother and the baby. The importance of an adequate early colonization of microbiota might lead to update nutritional recommendations for both mothers and babies in the management of diseases risks later in life.

Relating the gut microbiota to the immune systems allows to ask the question raised by L. Nylund et al [2], on the role of gut microbiota in coeliac disease, as well as on and non-gluten coeliac sensitivity. The authors point out the crucial role played by the gut microbiota on innate immune system education and reactivity, and the difficulty to clearly elaborate a cause-effect relationship between specific changes in gut microbes and the evolution of the disease.

The gut is now often presented as the “second brain”. For sure, this is due to the tremendous innervation of the gastro-intestinal tract, that creates bottom-up and downstream neuronal networks in the control of key functions, emotion, and stress behavior. One may not ignore anymore the role played by the gut microbiota in the control of brain functions and behavior. The review of T. Dinan's group and collaborators [3], points out the very interesting potential to develop novel therapeutic and nutritional strategies to treat psychiatric disorders by targeting the gut microbiota.

A lot of hopes came from the discovery that the characteristics of human microbiome in obese or diabetic could be considered as a way to envisage novel approaches of the metabolic disorders. The paper proposed by Dao et al [4], mixing the experimental and clinical expertises of P. Cani and K. Clement's groups, respectively, presents a summary of the nutritional and surgical intervention studies in obese individuals, and points out the differences in response to treatment that can be attributed to characteristics of the gut microbiome. This clearly supports the interest a new type of “personalized” nutrition in this context. Similarly, J. Suez, H. Chapiro and E. Elinav [5] covered the field of diabetes, highlighting the way by which the gut microbiome controls glycemic response, thereby playing a role in the management of type 1 and type 2 diabetes.

Both reviews mention the inter-individual differences in gut microbial composition as a fact to be taken into account (including appropriate techniques) when trying to elaborate clinical studies devoted to assess microbiome–host interaction in metabolic diseases.

When talking about nutrition and health, one might often forget the fact that, upon evolution of non-communicable diseases, undernutrition may appear as an event precipitating the bad prognosis. It is clearly the case of cachexia linked to cancer development. In this particular field, the nutritional advices could take into account the novel discoveries – mostly related in animal models at this stage– which allow to point out how dysbiosis and specific changes in the gut microbiota composition and function, relates to muscle atrophy and related inflammation [6]. The nutritional support in oncology would gain novel insights in view of those discoveries.

The patho-physiological contexts in which the gut microbiota is mentioned as a potential “partner” or “target”, are expanding daily in view of the published papers relating the changes in gut microbiota composition or function, associated with a health or disease status. In this special issue, we did not try to cover all the fields in which the gut microbiota are probably playing a role, but we rather tried to exemplify, that adequate nutrition must nowadays takes into account the bacterial ecosystem as a key component of the digestive tract, playing a key role on energy, immune and behavioral homeostasis. All the authors pointed out the need of a rationale methodological approaches in order to evaluate the role of gut microbiota on host health in the next future.

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