

## Synbiotics: A combination of prebiotics and probiotics to improve gut microbiota and to prevent and fight diverse diseases.

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### Special Issue Editor's Note

The guest editor of this special issue is pleased for the timely opportunity to contribute to the Journal of Food Microbiology with a compendium outstanding articles focusing on synbiotics, a combination of prebiotics and probiotics to improve gut microbioma and to prevent and fight diverse diseases. In special, I would like to thank the Editorial Manager Lima Hepburn for her support, which was very important for the success of this publication.

The exponential growing interest on prebiotics, probiotics and synbiotics has been favoured by the current phenomenal number of discoveries and publications on the field of gut microbiota, reaching thousands of original articles in the last year. The contributors to this special issue, based on the lack of effective therapies for prevention and amelioration dramatic diseases, such as neurodegenerative, cardiovascular and metabolic disorders, present to the readers a discussion about de advancements on the molecular mechanisms of the beneficial effects of functional supplements, which are considered the main nutritional modulators of the gut microbiota.

Bernadine Ruiza Ang is giving a great contribution presenting an update related with the role of nutrition in human gut microbiota of type 2 diabetics, determining the causative, preventative and correlative role of microbe-host interaction in type 2 diabetes. The author presents important advances in the methodology and techniques to deal with the interface gut microbiota and diabetes. The author discusses the beneficial impact of omega-6, short chain fatty acids and protein rich diets on the modulation of the immune and inflammatory process that cause diabetes. In this article is highlighted the modulatory action of dietary compounds on the symbiotic microorganisms living in the gut, where they help to eradicate the eradicating the proliferation of pathogenic microbial population.

The review from Manuel Campos-Toimil and his collaborators, from the University of Santiago de Compostela, Spain, present new insights about the effects of prebiotics, probiotics and synbiotics in cancer processes, which are being considered of high impact worldwide and which have required high costs to the public health. Based on the data of the literature, the authors suggest that this type of supplement may help to translate the results of current research into effective clinical strategies in the fight against different types of cancer.

Piment (from Fabio Pimenta Institute) and Ton (From Ton Medical Services) and collaborators, provide us an excellent state-of-the-art on the gut microbiota-brain axis, which is provided by afferent and efferent neural projection pathways, neuroendocrine signals, immune and inflammatory processes. In their review, on conditions of dysbiosis an update on how the microbiota influences brain and behaviour. The authors show clear evidence of a bidirectional link between gut dysbiosis and neurodegenerative disorders affecting motor, affective and cognitive processes as observed in Alzheimer and Parkinson diseases and dementia. They discuss the growing research focused on the therapeutic benefits of prebiotics, probiotics and synbiotics to prevent and ameliorate brain-mediated diseases.

My research group is also providing a review in a field that is completely new in the literature: the effects of synbiotics on the neural control of cardiac and vascular function. The data we discuss in the present review is based on translational studies that have been performed during the last 5 years, using classical animal models of cardiovascular disorders, including arterial hypertension, vascular endothelial dysfunction, and neural dysautonomia of the cardiac function and impaired neuro-humoral control of the circulation. Our data here discussed demonstrate that one of the main causes of these abnormalities is the exacerbated oxidative stress and that the use of the synbiotic kefir is able to attenuate or reverse the imbalance between excessive oxidative stress and decreased nitric oxide production.

The editor of this special issue hopes that the papers are informative for both translational researchers and clinical investigators and hope that in future functional food could be act as a valuable natural therapy.

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