

4th Glycobiology World Congress

September 17-19, 2018 | Rome, Italy

Dancing with non-digestible oligosaccharides in the gut to be immune-fit

Reshmi Mukherjee

Utrecht University, The Netherlands

The definition of health is changing always. Presently, the resilience or ability to adapt during stress or challenge is considered as healthy. The immune system —the sixth sense organ, the gatekeeper of health, a circle of protection from diseases— needs to be fit to remain healthy. How can we achieve that? One of the ways is regulation or balancing of immune system in the gut. Traditionally, medicines, which are mostly isolated from natural products, are used to cure diseases. Then, can we use food (i.e a mixture of natural products) to control our immune system? Non-digestible oligosaccharides (NDOs) are low molecular weight unique carbohydrate structures and are present in our healthy diet. It is very well known that these carbohydrates can play a pivotal role in the promotion of gut health since many decades. Oral treatment with NDOs – for example short chain galacto-oligosaccharides (GOS) and long chain fructo-oligosaccharides (FOS) – has been shown to have beneficial effects on allergy and intestinal inflammation. The beneficial effects of these carbohydrates in disease are not limited to the modulation of the intestinal microbiome, the so-called prebiotic effect. Both microbiota-independent as well as microbiota-dependent immunomodulating properties will be presented from a pharmacological perspective: improvement of intestinal barrier function as well as immune homeostasis locally in the intestinal tract and remotely in, for example, lungs. In both clinical studies as well as preclinical research programs, such as state-of-the-art intestinal epithelial cells/PBMC co-cultures, animal models for immune related disorders such as allergy, allergic asthma, autoimmune diabetes as well as inflammatory bowel disease, the immunomodulating effects of NDOs have been studied for many years. The molecular pathways of the immunomodulating effects of some of those carbohydrate structures have been demonstrated with a central role of short chain fatty acids, tight junction molecules, galectin 9, anti-inflammatory cytokines, dendritic cells and regulatory T cells. Identification of the bioactive structure(s) in e.g. GOS and the molecular pathways involved that are responsible for the epithelial-dependent effects could lead to the development of new affordable biomolecular compounds for the prevention and/or treatment of chronic inflammatory diseases. At the end we need to be immune-fit. So what do we need for that, food or medicine or shall we create foodicine?

Biography

Dr. Reshmi Mukherjee studied at IIT, Kharagpur (M.Sc.) and IEST, Shibpur (PhD). She has postdoctoral experience from the University of Zurich and Harvard Medical School. Presently, she is a senior research fellow at Utrecht University. She published many scientific research articles in peer-reviewed journals and holds five patents in drug discovery. She designed the CXCR4 inhibitor Balixafortide (POL6326) which is in Phase I trial. She is a recipient of Innocentive challenge award in 2009. Her research interest lies in finding novel molecules for biological applications and molecular mechanisms of diseases. She presently focuses on roles of non-digestive glycans in immunomodulation.

r.mukherjee@uu.nl

Notes: