Prof Daniele Del Rio (edited by Prof Sumantra Ray and Team)

An Evidence-based 'gut feeling': Dietary polyphenols and the gut microbiome

In addition to its educational remit, NNEdPro undertakes primary research into nutrition and health. In this article, NNEdPro's Scientific Director, Prof Daniele Del Rio talks about his research interests in diet-microbe interactions.

The link between nutrition and health has always been strong. One of the pillars of modern medicine is the role of diet in primary prevention (to reduce disease risk) and secondary prevention (to contain disease progression and prevent co-morbidities). However, inter-individual differences have always thwarted nutritionists' plans to define a global and unifying 'healthy diet'. Because of this person-to-person variability (partly due to genetics), a 'diet for all' is almost impossible and tailored (or personal) nutrition is now seen as a possible solution. In addition, the wide array of microbes colonising our body, the human microbiota, also influences our dietary needs. The gut hosts the vast majority of these microorganisms and, with them, their astonishing ability to perturb our metabolism, to regulate our capacity to harvest dietary energy, to regulate our appetite, our tendency to get sick and to transform compounds contained in the food we consume. They work with us. They work for us and we work for them, in a symbiotic collaboration that has often been described as a 'superorganism'. Studying how we collaborate with our guest microbes and how the diet is able to influence this continuous and multifaceted interchange has become one of the hottest topics in science!

There are many ways of approaching the diet/gut microbe issue. Microbiologists are interested in the way dietary nutrients and non-nutrients are able to modulate microbial growth and how specific microbes prevail over others. Nutritionists share this view with microbiologists, but are also interested in how gut microbes, through their arsenal of incredible enzymes, are able to transform dietary compounds and, subsequently, influence several different physiological processes. Clinicians, on the other side, are trying to understand if the microbiota, now considered almost like an independent organ, may be the key to understanding the links between diet and disease risk, a relationship that has often failed the expectations generated by epidemiological studies.

One aspect of this symbiosis is the capacity of our gut microbes to transform the molecules we introduce into our body on a daily basis. So, it turns out that some of the phytochemicals we introduce with plant foods, known as polyphenols (they are pretty ubiquitous!), might be effective in protecting our body from chronic diseases only because our microbial collaborators in the gut manage to radically change polyphenol structures, enhancing absorption and activity at specific target sites. This 'bioactivation' ensures that molecules that would otherwise pass through our gastrointestinal system almost untouched, are made useful. It is also interesting that the ability to carry out these beneficial transformations is not common to all of us, i.e. if you don't have the right bugs, you might not get any benefit at all.

But there's more! The microbial community colonising our large intestine is also able to chemically modify toxic molecules, like certain mycotoxins, bringing the present provisional maximum tolerable daily intake (PMDTI) under review. Finally, research evidence that diet-microbe interactions within the gut can impact on systemic processes linked both to brain development and function is also mounting.

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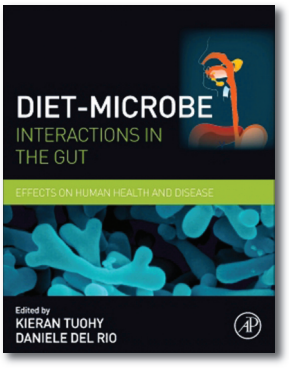

Well, if you want to know more about this, you might want to read the book *'Diet-microbe Interactions in the Gut – Effects on Human Health and Disease'*, where some of the leading scientists in the field report about the most recent evidence from all the possible and diverse viewpoints mentioned above. Also, if you want to know more about plant polyphenols and their ability to influence human health, you might want to go to the open access review *'Dietary (Poly)phenolics in Human Health: Structures, Bioavailability, and Evidence of Protective Effects Against Chronic Diseases'*, published on Antioxidants & Redox Signaling.

Or, even better, you might decide to attend the **Cambridge Summer School in Nutrition** – NNEdPro is offering an intensive one week **Cambridge Summer School and Certificate Course in Applied Human Nutrition** (40 hours). The course provides anyone with a professional interest in nutrition who does not currently hold a recognised nutrition qualification the opportunity to receive training at the cutting edge of evidence-based nutrition.

NNEdPro is always looking for potential collaborations with partners who share our vision in nutrition education and research, or potential supporters for our scientific meetings and courses in 2016. If you would like more information about our work or want to be added to our mailing list, please contact us at: nnedpro.group@mrc-hnr.cam.ac.uk or check out our website at: www.nnedpro.org.uk.

Events

- **International Summit in Medical Nutrition Education and Research:** 17th - 18th June 2016
- **Cambridge Summer School**: 20th - 24th June 2016

Registration for Summer School and Summit opens: 15th March 2016

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