Shaping Gut Microbiota Through Diet

A report from the workshop “Nutrition and the Human Gut Microbiome: What should health professionals know for their daily practice?”
Growing knowledge on gut microbiota offers great promise for optimizing health and managing disease. Many disorders of modern society, such as digestive, immune, metabolic or neurologic disorders, are now linked to dysbiosis—a disruption in the mutually beneficial relationship between a host and its microbiome, which may involve altered composition and activity of bacterial groups in the microbiota.
Healthcare professionals—including registered dietitians and physicians specializing in nutrition and gastrointestinal disorders—had a unique opportunity to learn about how dysbiosis relates to nutrition and health at a special workshop during the 2017 Gut Microbiota for Health World Summit, held in Paris on March 11th & 12th, 2017.

The workshop covered key concepts about nutrition and gut microbiota, focusing on dietary tools for nurturing proper gut health and managing gastrointestinal functional disorders and food sensitivities. Of specific interest were the restrictive diets (for example, gluten-free diets) that are often prescribed for functional digestive disorders; speakers covered the complexities of excessive dietary restrictions and reviewed diagnostic and dietary management algorithms for those with abdominal symptoms. The workshop — “Nutrition and the Human Gut Microbiome: What should health professionals know for their daily practice?” — generated an engaging audience discussion and could be followed on Twitter using the hashtag #GMFH20174RDs.

Dr. Elena Verdú is Associate Professor at McMaster University (Canada) and Canada Research Chair in Inflammation, Microbiota and Nutrition. She serves as a member of the GMFH Digital Scientific Board.

Workshop chair Dr. Elena Verdú, Associate Professor at McMaster University (Canada), reviewed evidence indicating that dietary patterns have a major influence on the microbiota and on global health and wellbeing. The work of Verdú and others has demonstrated important links between gut microbiota and immune homeostasis, indicating that disruptions in host-microbiota interactions may play a role in the pathogenesis of many immune-mediated diseases.

Adults’ gut microbiota can be modified by factors such diet, medications, stress, and physical activity/exercise, with diet being one of the most powerful factors. When explaining the three main triggers of chronic GI diseases, she explained that gut function parameters such as intestinal motility, visceral perception, and barrier permeability (allowing low-grade inflammation) have also been reported to be closely linked with bacteria-diet interactions.

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Dr. Verdú pointed out that the exact characteristics of what can be considered a ‘healthy microbiome’ and the diet that promotes it have not been completely elucidated, as microbiota profiles differ remarkably between healthy individuals. She highlighted, however, three possible features of the healthy gut microbiome: 1) Redundancy, as many bacterial species can fulfill similar functions; 2) Temporary stability, considering that over time the microbiome is more similar to itself than to that of another healthy person; and 3) Resilience to dietary changes, to antibiotic administration, and to invasion by new species; resilience can be defined as “the amount of stress or perturbation that can be tolerated before a system’s trajectory changes towards a different equilibrium state”.

See here for the three main outcomes of the workshop as described by Dr. Elena Verdú.

Figure 2. The main triggers involved in chronic GI diseases. (CD = Crohn’s disease, CeD = Coeliac disease)
The next part of the workshop addressed what is known about the ways particular therapeutic diets affect health through the gut microbiota.

Functional gastrointestinal (GI) disorders are common in the general population and patients often believe that food items are important triggers of their gastrointestinal symptoms. Without a proper diagnosis, patients tend to follow several restrictive diets, such as a diet low in fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs), a gluten-free diet (GFD) and a lactose-free diet. Although these diets are presumed benign, current scientific evidence shows that excessively restrictive diets may negatively impact the gut microbiota and nutritional status of the patient.

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Both Dr. Simrén and Dr. Störsrud emphasized there is no specific "IBS diet" available yet and individualized dietary advice should be the main goal. Although several clinical trials have showed the reduction of FODMAPs may be beneficial for IBS patients, a low FODMAP diet is not always superior to traditional IBS dietary advice (e.g. that from the National Institute for Health and Clinical Excellence), and the group of patients that benefits most from a low FODMAP diet is still unclear (here, here). Besides this, long-term management (> 4 weeks) of IBS through the low FODMAP diet has not been fully studied yet, and data on how the diet modulates the gut microbiota suggests long-term use is not desirable. Dr. Simrén raised

**Figure 3. IBS dietary algorithm based on the British Dietetic Association.**

the possibility that the way forward could be less restrictive FODMAP-reduced diets, based on knowledge about effects of the different FODMAP components.

Dr. Störsrud presented the IBS dietary algorithm based on a 2016 update of the British Dietetic Association evidence-based practice guidelines (Figure 3). Only if first-line dietary assessment and interventions show further dietary changes are necessary to improve symptoms, second-line intervention based on a low FODMAP diet guided by a dietitian should be considered. The presenters indicated probiotics may also be useful in the management of IBS; however, the most beneficial species/strain, dose and duration of intervention remain unclear.

Dr. Joseph Murray, professor at Mayo Clinic (USA), explored diagnosis and management of diet-induced symptoms.

Dr. Murray discussed how management of lactose intolerance should not be aimed at reducing malabsorption but rather at improving digestive symptoms. Reduction of lactose intake (rather than exclusion) can be beneficial, since most patients with self-reported lactose intolerance can ingest up to 12-18 g lactose daily without experiencing symptoms. Lactase enzyme replacement was mentioned as the other primary treatment for lactose intolerance in clinical practice. Directed modulation of the colonic bacteria through probiotics and fermentable fibres (short-chain galactooligosaccharides) for more effective lactose metabolism were discussed as potentially useful approaches to improve lactose-related symptoms.

Coeliac disease (CD) and non-coeliac gluten/wheat sensitivity (NCG/WS): Dr. Murray contrasted case descriptions of CD and NCG/WS to elucidate differences in their diagnosis and the role of dietary management. While symptoms are similar in both cases, in NCG/WS there are no associated antibodies and no damage to the lining of the gut, in contrast with CD (an autoimmune disease). When a patient is experiencing symptoms from eating foods that contain wheat, barley, rye or oats, it is important to first rule out CD. Dr. Murray emphasized patients must continue to eat gluten until they undertake a test for CD as this is essential for accurate initial diagnosis.

Fruitful discussions emerged from this workshop that aimed to provide health professionals with practical tools for assisting patients with food sensitivities. An important take-home point is that restrictive diets in patients with abdominal symptoms should be undertaken very cautiously and only when there is a specific reason and a clear diagnosis of the condition.