



Guest Editorial

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The Probiotics Renaissance

There has been a resurgence in the use and interest of probiotics in gastrointestinal disease, especially irritable bowel syndrome (IBS). At the 2002 annual meeting of the American College of Gastroenterology, several abstracts showed benefit from probiotics in IBS patients with regard to bloating, quality of life and overall symptom frequency.

The concept of dysbiosis was introduced back in the early 1900s, when Russian scientist Elie Metchnikoff recognized that the state of intestinal flora could have a major impact on health and disease. He defined dysbiosis as the state of living with intestinal flora that may have harmful effects on the human carrier. This idea now is receiving significant scientific validation. It has been suggested that changes in the types and quantities of intestinal flora may be associated with the symptoms in IBS patients.

Some authors have shown that colonic mucosal biopsies in IBS patients have a significant degree of bacterial invasion that could not be explained simply by a functional character of the disorder. It is not uncommon to find nonspecific or mild colitis on pathology reports from patients with IBS, especially the diarrhea-predominant type with normal-appearing colonic mucosa on colonoscopy.

The conventional modalities of treatment for IBS currently provide partial short-term relief of IBS symptoms but do not address the possible role of dysbiosis. Recent studies have shown that some IBS patients demonstrated bacterial overgrowth by hydrogen breath test and noted improvement in symptoms (i.e., abdominal pain, diarrhea and bloating) after a trial of antibiotics.

This would suggest that dysbiosis or a bacterial imbalance/overgrowth state of indigenous gut flora may play a pivotal role in the pathophysiology of some IBS patients. Overgrowth of certain bacteria such as *Klebsiella pneumoniae* (enterotoxin-producing) and *Pseudomonas aeruginosa*, which have been shown to colonize the gut after antibiotic usage, are not detectable by currently available stool cultures. The colonization and overgrowth of these bacteria may be responsible for symptoms including diarrhea, gas, bloating and abdominal pain.

Some authors reported that the gut flora in IBS patients is different from that in controls by showing in IBS patients a significant decrease in coliform bacteria, *Lactobacillus* and *Bifidobacterium*, and an increase in *Pseudomonas* and enterobacteria species compared to controls. New research has demonstrated that the colonic epithelial cells can reduce inflammatory response

in the presence of probiotic bacteria by identifying their DNA.

For example, probiotics have been shown to decrease interleukin-8 secretion and improve inflammation in chronic pouchitis. A change in the nutrient contents on the colonic epithelial cells brush border can change which bacteria they adhere to. Therefore, a healthy enteric system (symbiosis) actively encourages the survival of probiotic strains. Additional mechanisms proposed for probiotics and how they exert their beneficial effects in a dysbiotic environment include the crowding out of pathogens and the secretion of a pathogen-specific natural bactericide.

The challenge before us is to develop standards of treatment using probiotics and integrate them into the mainstream management of gastrointestinal diseases, such as IBD, *Clostridium difficile* infections, IBS, postinfectious IBS, antibiotic-associated diarrhea and viral etiologies of diarrhea. Probiotics appear to be safe, well tolerated and inexpensive. Several strains currently available meet the rigorous criteria needed to promote the many proposed health benefits.

Already we know that life genetics, motility, psychosocial, and central nervous system and enteric nervous system factors all interact to create havoc on the quality of life of our patients with IBS. It is difficult to determine what role dysbiosis will have in the pathophysiology of this condition.

My expectation is that results of ongoing and future research will provide us with a much greater understanding of the overlapping roles of gut infection, inflammation and immune activation. Because IBS is second only to the common cold in terms of absenteeism, it is a tremendous burden to our society and resources. As such, we look to our dedicated scientific community for continued clarity and direction to help provide better treatment for our patients suffering from IBS.