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**BOWEL FLORA AND INFLAMMATORY
BOWEL DISEASE**

Normal bowel flora may play a role in inflammatory bowel disease (Crohn's disease and ulcerative colitis). An article appearing in the *Scandinavian Journal of Gastroenterology* (2001;36(Suppl 234):29-40) discussed the role of bowel flora and intestinal permeability in this disease. The cells lining the intestine form a barrier that protects the body from the content of the intestines. If these cells fail to act as an effective barrier, increased intestinal permeability become a problem. This article states that increased intestinal permeability leads to a lack of tolerance to the bacteria that normally exist in the bowel. There is evidence of the immune system working against the bacteria that exist in the bowel, perhaps even overreacting. Also, the makeup of the bacteria is different in these patients than in normal controls.

In patients with inflammatory bowel disease, the bacteria tend to invade the mucosa. Research appearing in *Gastroenterology* (January 2002;122

(1):44-54) compared colonoscopic biopsies in 305 patients with 40 normal controls. Patients with inflammatory bowel disease had much higher concentrations of bacteria invading the intestinal lining than did the healthy subjects. A normal, healthy intestinal lining has the ability to act as a barrier to bowel bacteria; this ability has been compromised in patients with inflammatory bowel disease.

The *Scandinavian Journal of Gastroenterology* article mentions that taking probiotics is sometimes helpful; patients with Crohn's disease tend to have less *Bifidobacteria*, and more *Bacteroides*, *Eubacteria* and *Peptostreptococcus*. Generally, probiotics contain lactic acid bacteria, like *Lactobacilli*, *Bifidobacteria* (the species found to be in short supply in patients with Crohn's disease), and *Streptococci*. These bacteria can release antibiotic-like substances, reduce the pH in the intestine, improve the absorption of nutrients and help stimulate the immune system.

SUPPLEMENTS AND INFLAMMATORY BOWEL DISEASE

Patients with inflammatory bowel disease are often deficient in many nutrients. They commonly have problems absorbing nutrients, have poor appetites, are often on restrictive diets, or are nutrient deficient as a result of drug therapy. According to a review of research appearing in the *Annual Review of Nutrition* (1985;5:463-484), nutritional deficiencies are common in patients hospitalized with inflammatory bowel disease. Iron deficiency was found in 40% of the patients, 48% were deficient in vitamin B₁₂, between 54 and 64% were deficient in folate, between 14 and 33% were magnesium deficient, between 6% and 14% had a potassium deficiency, 21% were deficient in vitamin A, 12% were deficient in vitamin C, between 25% and 65% were deficient in 25-hydroxyvitamin D and between 40% and 50% had a zinc deficiency. Other vitamin deficiencies included vitamin K, copper and vitamin E.

A study of 114 patients with inflammatory bowel disease, appearing in the *Scandinavian Journal of Gastroenterology* (1979;14:1019-1024) found low serum folate in 59% of patients with chronic inflammatory bowel disease. There is an increased risk for colorectal cancer in patients with inflammatory bowel disease. Research appearing *Inflammatory Bowel Diseases* (2008 Feb;14(2):242-8), folic acid deficiency was

associated with an increased risk of colorectal cancer. Patients who had inflammatory bowel disease and both a folic acid deficiency and high homocysteine had 17 times as many cancerous lesions as patients who were not folic acid deficient.

Some of the vitamin deficiencies may contribute to the severity of the disease. The disease creates vitamin deficiency, which in turn makes the disease more severe. A study involving 30 male and 31 female patients with inflammatory bowel disease was published in the *American Journal of Gastroenterology* (2003;98(1):112-117). It found that vitamin B₆ levels were significantly lower in patients with inflammatory bowel disease than they were in healthy controls. Furthermore, vitamin B₆ levels were lower in patients who were experiencing a flare up in their symptoms than they were for patients in remission. Low vitamin B₆ levels were also associated with higher levels of inflammatory markers (chemicals that, when present, indicate inflammation) C-reactive protein is an example of an inflammatory marker; it was increased in patients with low B₆ levels.

Sometimes taking vitamin pills can exacerbate the condition. There are liquid vitamins that may be better tolerated (folic acid is not stable in a liquid multiple vitamin and should be given separately.

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EVENTS AT BIRTH CAN INCREASE THE RISK OF INFLAMMATORY BOWEL DISEASE

A study appearing in the *American Journal of Epidemiology* (1990;132(6):1111-19) looked at the birth records of 257 patients with inflammatory bowel disease born between 1924 and 1957. They were compared to 514 healthy controls and matched by date of birth, sex and maternal age. Infections before or after delivery increased the risk for developing inflammatory bowel disease four-fold. Viral infections with fever were a particularly strong risk factor. Children with lower socioeconomic status also had a higher risk for developing inflammatory bowel disease. Breast feeding had no influence on the incidence of the disease. Some evidence also suggests a genetic susceptibility to the disease. Children exposed to adult smoking, or who had a mother who smoked during pregnancy, may have an increased risk for developing Crohn's disease, but not ulcerative colitis. Research appearing in *Gastroenterology* (April 1992;102(4)) compared 39 patients with ulcerative colitis and 33 patients with Crohn's disease to healthy controls and found a dose-dependent relationship to the exposure of cigarette smoke and the development of irritable bowel disease.

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DIET AND INFLAMMATORY BOWEL DISEASE

Diet can play a role in inflammatory bowel disease (ulcerative colitis and Crohn's disease). Food sensitivity may play a role in some cases. A small study published in *South African Family Practice* (June, 1995;16:393-399) resulted in six of seven patients with inflammatory bowel disease became symptom-free after following an elimination diet. Foods found to trigger reactions in various patients included pineapple, banana, cheese, tomato, coffee and milk.

A study that appeared in *Hepato-Gastroenterology* (1990;37:72-80) looked at the effect an elemental diet had on patients with Crohn's disease. The elemental diet involves consuming all nutrients in a liquid form via a gastric feeding tube or IV, gives the inflamed gastrointestinal tract an opportunity to heal. With no food being consumed, digestion does not have to occur, giving the GI tract opportunity to reprieve from the very processes that inflame it. In this study, patients on an elemental diet actually improved more than patients who were given drug therapy.

Consumption of refined carbohydrates can aggravate symptoms. The *European Journal of Gastroenterology and Hepatology* (January, 1995;7(1):47-51) conducted a prospective, epidemiological study of 104 patients and found that patients with Crohn's disease and ulcerative colitis have a high intake of starch and sugar. Other research that appeared in *Epidemiology* (January 1992;3(1):47-52), followed the

dietary habits of 142 patients with ulcerative colitis, 152 patients with Crohn's disease and 305 healthy controls over a period of three years. The relative risk of Crohn's disease increased with sugar intake and decreased with fiber intake. Eating fast food increased the risk for both Crohn's disease and for ulcerative colitis. These studies may support Elaine Gottschall's model of inflammatory bowel disease.

In her book, *Ending the Vicious Cycle*, Gottschall describes a possible mechanism for inflammatory bowel disease and a dietary solution. She reasons that we eat too many complex carbohydrates (disaccharides like table sugar and lactose in milk, and starches like bread, potatoes, rice and beans). Our own enzymes are not adequate enough to digest the large amounts of sugar and starch that we consume, so it passes into the intestine without being digested. The undigested food allows bacteria to grow, irritating the intestinal lining. The irritation of the intestine causes a further reduction in the amount of enzymes produced, resulting in more undigested food. Gottschall suggests that completely avoiding starches and sugar (the sugar that is in fresh fruit is permissible). Some patients, but not all, go into remission after following Gottschall's recommendations. It would seem if this is the mechanism causing a patient's disease, giving a digestive supplement may be helpful.

"Money cannot buy health, but I'd settle for a diamond-studded wheelchair."

Dorothy Parker

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INFLAMMATORY BOWEL DISEASE AND GAGS

The term GAGs is a shortened way of saying glycosaminoglycans, which are long molecules composed of sugar molecules (if a sugar molecule is a train car, GAGS are the train). Most of the GAGS in the body are used to form Proteoglycans, which are very important to structure. Proteoglycans are very important for the formation of cartilage. Perhaps the best-know proteoglycan is chondroitin sulfate. These molecules are not only important for joint cartilage, they help give form and structure to all areas of the body—including the intestines. Proteoglycans help form what is known as the basement membrane. The basement membrane acts as an anchor to the epithelium of the intestine. The epithelium are the cells that provide the functionality of digestion; the

basement membrane attaches to cartilage and to the epithelial cells and helps give the intestine form and structure. An article appearing in *The Lancet* (March 20, 1993;341:730- 731) discusses the fact that the glycosaminoglycans are altered in chronic inflammatory bowel disease. Bacteria, viruses, antigens and oxidative stress challenge the structural integrity of the intestine, glycosaminoglycans help protect against these challenges and help reduce intestinal permeability (leaky gut).

Chondroitin sulfate is a proteoglycan, which is a glycosaminoglycan. Although it is commonly given for joint support, chondroitin sulfate can offer general support for connective tissue.