Gastrointestinal Dysfunction

By Michele Ferchoff, ND

Sixty to seventy million people in the United States are affected by digestive diseases. These diseases account for 10 million hospitalizations and 6 million diagnostic and therapeutic procedures. The estimated economic cost of digestive diseases in the United States is $152.8 billion. Of this, $126.9 billion represents direct medical care cost, such as hospital care, physician and other professional care, nursing home care, and medications.

Gastrointestinal dysfunction occurs in a wide range of diseases. Causes include loss of absorptive surface, intestinal inflammation, intestinal damage from treatments such as radiation therapy, and reduced digestive capability. Gastrointestinal problems that may necessitate nutritional support include Crohn's disease, other forms of inflammatory bowel disease, pancreatic disease, short bowel syndrome/massive bowel resection, gastrointestinal enterocutaneous fistulas, radiation- or chemotherapy-induced enteritis, malabsorption, diarrhea, and constipation.

Patients with these disorders may not be able to absorb and use nutrients effectively from a regular diet. Even the most common gastrointestinal complaints, such as diarrhea, constipation, gas, and bloating can interfere with delivery of adequate nutrition and create problems.

Nutrient deficits can be profound and develop rapidly, particularly if maldigestion and malabsorption are combined with endogenous loss of nutrients through the bowel. Patients with GI disorders can experience persistent weight loss and decreased body proteins. In the presence of maldigestion and malabsorption, higher calorie and protein levels are indicated.

Dietary nucleotides are of emerging interest in supporting gastrointestinal function. Nucleotides are the building blocks of RNA and DNA and are needed for intestinal growth. Some tissues, including the small intestine, may benefit from an exogenous supply of nucleotides to help support the gut during acute or chronic gastrointestinal illness. It has been shown that nucleotides modify the type and growth of the intestinal micro flora, which is important in connection with repair and recovery after gut injury.

Increasing the amount and type of fiber facilitates appropriate bowel elimination. The clinical importance of dietary fiber and its metabolic products has been well established. Dietary fiber contains soluble and insoluble components, which play an essential role in colon health. Soluble fiber is fermented by colonic micro flora resulting in the production of short chain fatty acids (SCFAs), such as butyric acid. Butyric acid is utilized as the preferred fuel source by the colonic mucosa in addition to being secondarily metabolized to glutamine — an essential fuel for the cells of the small intestine. Fiber has been shown to restore the normal architecture and physiology of the intestinal microvilli and to prevent bacterial translocation in patients on total parenteral nutrition. Psyllium husks, collinsonia root, fennel, and fenugreek work together to encourage appropriate bacterial growth and colon health.

Supplemental glutamine has been shown to be beneficial for support and restoration of gastrointestinal mucosal cell function and structure. Glutamine is considered a non-essential amino acid, because human cells can readily synthesize it via activity of the enzyme glutamine synthetase, which is found in high concentration in skeletal muscle, liver, brain, and stomach tissue.

It is the most abundant amino acid in the body, comprising 60% of the total free amino acid pool. Approximately five to ten grams per day of glutamine is consumed in the diet, and under normal circumstances dietary intake and synthesis of glutamine is adequate to balance metabolic demand.

In situations where a particular tissue is in greater need of glutamine, inter-organ transfer of glutamine usually makes up for increased site-specific requirements. However, under certain pathological circumstances, the body's tissues need more glutamine than the overall amount supplied by diet. Under conditions of trauma, injury, burns, surgery, overtraining, or cancer, supplemental glutamine becomes necessary.

The gastrointestinal tract is by far the greatest user

of glutamine in the body. The small intestine accounts for the largest uptake of glutamine of any organ, absorbing it from the lumen of the gut as well as from the bloodstream. Epithelial cells lining the small intestine use glutamine as their principal metabolic fuel.

Glutamine is important for the health and function of the intestinal wall. N-acetyl glucosamine (NAG) is a major component of mucopolysaccharides and a key component in connective tissue. The gut and gastric epithelium (especially the glycocalyx) have high concentrations of mucopolysaccharides, which help provide structural integrity in the intestinal wall.

Glutamine's positive effect on the GI tract appears to be due to its use as a food source by both intestinal immune cells (lymphocyte-rich Peyer's patches) and mucosal cells. Intestinal epithelial cells contain very low levels of glutamine synthetase and hence are largely dependent on pre-formed glutamine, either from the diet or from the blood. If glutamine is lacking in the diet, or if a person is being fed parenterally due to illness, intestinal cells will take glutamine from the blood stream at the expense of muscle tissue, thus depleting the body's stores. Glutamine is found in particularly high concentrations in two vegetable sources: cabbage and beets. Administering vegetables that contain glutamine would offer a greater clinical effect on colon/intestinal health. A further example of a glutamine-rich food is beet root.

Gastrointestinal dysfunction can encompass many aspects of the digestive tract. Ensuring appropriate gut health through eating whole foods such as cruciferous vegetables like kale, Brussels sprouts, cabbage, broccoli, and beets that contain compounds specific for supporting intestinal health, such as glutamine and fiber, will maintain healthy elimination and absorption vital to overall health.

About The Author

Michele Ferchoff earned her B.S. in biology from the University Wisconsin, La Crosse and then attended the Southwest College of Naturopathic Medicine and Health Sciences, one of four accredited naturopathic medical schools in the country, where she graduated as a N.M.D. in 2002. Michele has several years of practical and clinical experience. She was selected as one of two residents for the National College of Naturopathic Medicine/Standard Process residency program, the first naturopathic residency in Wisconsin's history, beginning in September 2002. Michele is one of only five naturopathic physicians in Wisconsin who have graduated from a four-year accredited naturopathic medical school.