

The Six Principles for Restoring Gastrointestinal Health

Gastrointestinal health is at the core of health of the whole person. Without healthy GI function, other systems—the immune system, the skin, the musculoskeletal system, the cardiovascular system—cannot function optimally. Clinical interventions that effectively support gastrointestinal function have been shown to help maintain and restore wellness and support health.

An optimally functioning digestive system is the cornerstone of good health. In addition to supporting the digestion and absorption of nutrients from the diet, the gastrointestinal tract protects the body by supporting detoxification and immunological processes. Eating a healthful diet is not necessarily enough. In order to assure digestive wellness, the gastrointestinal tract must function properly in these essential areas:

- Gastrointestinal secretions must be produced at adequate levels (e.g., hydrochloric acid, pepsin, pancreatic bicarbonate, amylase, lipase, protease, intestinal lactase, sucrase, maltase)
- The gastric mucosa must be protected by appropriate mucin production and microbial defenses
- Support of the intestinal mucosa is important for proper absorption of nutrients as well as to support a semipermeable barrier that permits passage of needed nutrients while barring absorption of undesirable substances from the gut
- Supporting intestinal comfort and normal stool frequency and composition may be influenced by the balance and activity of cell mediators present in the colonic mucosa
- Intestinal defenses must be able to support an appropriate balance of microorganisms
- Gastrointestinal motility must assure proper elimination of waste and toxins
- Hepatic function must be sufficient to assure proper assimilation of dietary lipids and detoxification of endogenous toxins and xenobiotics

Healthy intestinal microflora must be present in appropriate numbers to assure healthy intestinal pH, immune response, and microbial defenses.

In healthy individuals the aging process can contribute to a decrease in basal metabolic rate (BMR) and altered gastrointestinal function. The following digestive changes have been associated with aging:

- Reduced salivary production and decreased salivary amylase
- Decreased gastric acid secretion potentially impacting nutrient absorption
- Compromised capacity of the gastric mucosa to rebound from environmental, dietary, and oxidative stresses
- Reduction in absorptive surface area of the intestinal mucosa leading to decreased nutrient absorption
- Alteration of bacterial microflora balance in the small and large intestines
- Slowed digestion and many secondary effects that can result from these changes

Principle 1: Optimize Digestion

- In 2004 alone, patients made more than 100 million visits to healthcare professionals seeking support for healthy digestive comfort and function.
- For reliable results, supplementation with Pure Plant Enzymes can provide effective basic support for digestive function. Improved digestion can help to relieve gas, bloating, and occasional indigestion.
- Pure Plant Enzymes are vegetarian enzymes naturally derived from microbial and plant sources. They digest virtually all types of dietary macronutrients throughout a broad pH range. Because they are acid-stable, these enzymes are not destroyed by gastric acidity and do not require enteric coatings. They possess aggregate activity under both acid and alkaline conditions so they are effective beginning in the stomach and continuing in the intestines.

Other nutritional supplements can also be used to support digestion depending on individual needs:

- Betaine Hydrochloride (HCl) supports healthy stomach acidity, gastric function, and protein digestion.
- Pepsin supports protein digestion under acidic conditions in the stomach.
- Pancreatin supplies pancreatic amylase, lipase, and protease for digestion of carbohydrates, fat, and protein under alkaline conditions in the upper small intestine. Trypsin and chymotrypsin form the main constituents of pancreatic protease.
- Ox Bile Extract supplies bile salts to aid in the emulsification and assimilation of dietary fats.

Principle 2: Provide Soothing Gastric Support

The stomach maintains an acidic pH that helps to initiate digestion and promote microbial defense, yet its epithelial tissues must simultaneously be shielded against harsh acidic conditions. The stomach's protective mucin barrier must be intact in order to protect stomach health and comfort, while the lower esophageal sphincter must remain tightly closed during digestion.

People who experience occasional discomfort after consuming coffee, spicy or fried foods, and experience relief after eating food or drinking milk, may benefit from natural agents that provide soothing gastric support such as those listed below:

- Deglycyrrhizinated Licorice (DGL) has been shown to support a healthy gastric mucosal lining and to stimulate increased mucin production. Removal of the glycyrrhizin component preserves mucosal benefits while avoiding potential concerns with maintaining normal blood pressure.
- Gamma-Oryzanol, derived from rice bran oil, has been shown to produce soothing effects on stomach tissues in the presence of stress.
- Marshmallow Root has a long history of traditional use as a demulcent herb. Its mucilagenous properties form a soothing coat over mucous membranes such as the gastric mucosa.
- Slippery Elm is a botanical demulcent with a long history of traditional use in

soothing mucous membranes.

- Zinc-Carnosine, a unique ingredient that combines L-carnosine, a naturally occurring dipeptide, with elemental zinc, has been clinically shown to support mucosal integrity and gastrointestinal immune defenses. It also helps relieve occasional indigestion.

Principle 3: Restore Healthy Intestinal Mucosa and Colon Comfort

The human gut contains endotoxin and bacteria. Under healthy conditions, the epithelial lining of the gastrointestinal tract forms a selectively-permeable membrane that permits the absorption of nutrients from the diet while presenting a barrier against potentially harmful agents. Maintaining optimal structure and function of the intestinal mucosa plays an essential role in supporting overall health and wellness.

Intestinal permeability can be assessed by laboratory tests (such as the mannitol-lactulose test) or by clinical observation. Identifying and temporarily eliminating foods to which the body is sensitive supports healthy intestinal permeability. Research indicates that nutritional factors may help to support mucosal health and promote normal intestinal permeability, including certain antioxidants and mucosal nutrients.

Intestinal comfort and normal stool frequency and composition may be associated with healthy cell mediator balance in the colonic mucosa. Laboratory assays of cell mediators as well as clinical assessment can help to evaluate and monitor colon health and normal function.

Nutrients for Intestinal Barrier Function

- L-Glutamine is a conditionally essential amino acid used as fuel by enterocytes. Many well-designed clinical studies have shown that L-glutamine restores healthy gut barrier function and permeability.
- N-Acetyl D-Glucosamine (NAG) is a naturally occurring precursor for production of intestinal mucin, the protective glycoconjugate secreted by goblet cells that makes up the intestinal glycocalyx. NAG has been shown to be absorbed from the gut lumen and directly incorporated into glycosaminoglycans and glycoproteins of the intestinal mucosa.
- Gamma-Linolenic Acid (GLA) is an omega-6 fatty acid that has been shown to support healthy gut barrier function due to its incorporation into cell wall membranes.
- Gamma-Oryzanol has been shown to support gastrointestinal health and the lining of the stomach.
- Phosphatidylcholine is a major component of cell membranes and a key constituent of the hydrophobic mucus gel that protects the gastrointestinal mucosa. It has also been shown to help protect human epithelial cells from endotoxins.

Antioxidant Support for the Intestinal Mucosa

- Quercetin has been shown to support healthy regulation of histamine release from human intestinal mast cells and to enhance intestinal barrier function in human intestinal cells.
- Ginkgo biloba is an antioxidant and free radical scavenger with cytoprotective effects on cells of the gastrointestinal mucosa. Ginkgo has also been shown to support

healthy intestinal permeability and mucosal oxygen supply.

- N-Acetyl L-Cysteine (NAC) is an antioxidant and precursor to glutathione. Pre-treatment with NAC has been shown to support healthy intestinal permeability.
- Vitamins C and E help protect intestinal mucosa cells from oxidative and free radical stressors.
- Zinc plays a critical role in the maintenance of healthy intestinal permeability. Zinc has cytoprotective activity in the gastrointestinal tract and helps to stabilize intestinal mast cells.

Support for Colon Comfort and Cell Mediator Balance

- Turmeric Extract, Green Tea Extract, and Selenomethionine, in combination, support intestinal comfort and a healthy cell mediator response. One in vitro study suggested that curcumin, green tea extract, and selenomethionine, in combination, appear to work synergistically.

Principle 4: Support Intestinal Defense

A healthy intestinal defense system depends on a balance of intestinal microflora. An individual's intestinal flora can be influenced by many factors such as travel, diet, or other stressors. Certain botanical agents and nutritional factors have been shown to help provide support for intestinal microbial defense, which may help restore optimal gastrointestinal health and comfort.

Broad Microbial Defense

- Berberine Sulfate is a natural plant alkaloid found in goldenseal, barberry, and Oregon grape. Research indicates berberine sulfate can enhance intestinal health by promoting the balance of a broad spectrum of bacterial and fungal organisms.
- Goldenseal Extracts have been shown to support the balance of a broad range of intestinal organisms.
- Garlic and its key compound, allicin, have been shown to support bacterial, fungal, and yeast balance.
- Black Walnut Extract is a source of juglone, an important compound shown to balance a wide variety of bacterial and yeast organisms.
- Grapefruit Extract promotes a healthy balance of bacteria, yeast, and fungi.
- Sweet Wormwood is a source of artemisinin, a compound that has been shown to support healthy intestinal defense and improve microbial balance.

Healthy Yeast Balance

- Oregano Oil and its constituents have been shown to promote healthy yeast balance.
- Thyme contains a key constituent, thymol, which has been shown to be active in controlling yeast growth.
- Pau D'Arco Bark promotes a healthy balance of yeast and fungi.
- Caprylic Acid is a medium-chain fatty acid that has been shown to support healthy intestinal function.
- Undecylenic Acid flora is a monounsaturated fatty acid that has been shown to help maintain a healthy balance of intestinal flora.

Principle 5: Promote Detoxification and Elimination

Exposure to foreign chemicals, or xenobiotics, in the environment is virtually universal. The body even produces its own toxins as a normal part of its everyday metabolism and others are produced as waste products by the bacteria that inhabit the GI tract. In a healthy gut, these waste products are detoxified by the liver and eliminated via the bowel, supporting the health of tissues and organs throughout the body. A healthy intestinal mucosa also supports detoxification by screening what substances pass into the bloodstream and thus limiting the liver's total xenobiotic processing. Lifestyle and environmental factors can play a significant role in reducing exposure to xenobiotics. Toxic chemicals, including volatile organic compounds, such as solvents and formaldehyde, are found in a wide range of products from automotive fuels to household cleaners and building materials. Food represents the most common source of exposure to xenobiotics. Numerous studies have found pesticide residues in a significant percentage of food samples. Thousands of chemicals are used in food processing and packaging materials. Use of organic and minimally processed foods can help to reduce exposure to toxins from the diet.

Nutritional factors can also play an essential role in supporting healthy detoxification and elimination. Phase I and Phase II detoxification pathways in the liver require many cofactors and conjugating agents supplied by the diet. Other nutrients such as lipotropic factors are able to mobilize fat from the liver, facilitating the hepatic metabolism of hormones and other compounds.

Agents to Support Liver Detoxification Pathways

- Calcium-D-Glucarate supports Phase II conjugation reactions by forming D-glucaro-1,4-lactone in the body, a powerful inhibitor of beta-glucuronidase, an enzyme expressed by some gut bacteria that deconjugates products of Phase II liver metabolism.
 - Glycine, Glutamine, and Taurine are amino acids that act as conjugating agents to support Phase II detoxication.
 - N-Acetyl L-Cysteine (NAC) supports Phase II sulfation and promotes glutathione synthesis, thus supporting cellular health and aiding the excretion of toxins.
 - Reduced Glutathione is a powerful antioxidant and conjugating agent that plays a crucial role in the detoxication of xenobiotics. It is vital in the regeneration of other antioxidants, such as vitamins C and E.
 - Vitamin E supports Phase I detoxification and protects cell membranes from damage by quenching free radicals.
 - Choline, Methionine, and Inositol act as lipotropic agents to help support the mobilization of fat from the liver.
 - Dandelion, Fringe Tree, Greater Celandine, Beet Root, and Black Radish Root are botanical cholagogues that help support healthy bile flow, a marker of healthy liver and gallbladder function.
 - Milk Thistle Extract is rich in the bioflavonoid silymarin, a powerful antioxidant with hepatoprotective properties.
- ### **Agents to Support Elimination**
- Flax Seed, a rich source of omega-3 fatty acids and lignans, enhances intestinal peristalsis and adsorbs toxins thereby increasing elimination.

- Psyllium Husk provides soluble dietary fiber and supports healthy intestinal lubrication, for ease in elimination and bowel regularity.
- Rice Bran is a rich source of insoluble dietary fiber and contains gamma-oryzanol, which has been shown to help support gastrointestinal function.
- Dried Plum is well known for supporting healthy elimination.
- Fenugreek, Slippery Elm, and Marshmallow Root are botanical demulcents that soothe the intestinal lining.
- Triphala is an ancient Ayurvedic herbal blend comprised of amla, belleric myrobalan, and chebulic myrobalan fruits. This combination helps promote healthy digestion, aid in detoxification, and support the immune response.

Principle 6: Re-establish Healthy Microflora

Normal bowel microflora, such as Lactobacilli and Bifidobacteria species, support healthy gastrointestinal function through numerous mechanisms. These probiotic bacteria contribute to a healthy intestinal environment by helping maintain an optimal pH and producing important nutrients and enzymes. Bacteria that dwell in the large intestine help digest dietary fiber to produce short-chain fatty acids, the fuel for enterocytes that make up the intestinal lining. Lactobacilli and Bifidobacteria also help to support healthy digestion, support immune system homeostasis, promote healthy bacterial and yeast balance, support skin health, and promote normal intestinal permeability. Everyday factors such as poor diet, stress, and travel can disrupt healthy intestinal microflora, contributing to digestive upset and irregularity.

Research indicates that supplementation with probiotic bacteria and microflora growth-promoters, or pre-biotics such as fructooligosaccharides (FOS), can help to re-establish the natural balance of healthy bowel flora and support gastrointestinal function and comfort.

- Lactobacillus species are the primary probiotics inhabiting the small intestines.
- Bifidobacteria species are the primary probiotics inhabiting the large intestine.
- Fructooligosaccharides are prebiotics, growth factors that have been shown to promote the growth of beneficial microflora in the large intestine.

If you are experiencing any digestive difficulties and are interested in trying any of these phases or have any particular questions, please contact us.

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