



Health & Wellness



The System at the Center of it All— The Gastrointestinal System



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In functional medicine we connect the dots. We connect your past exposures to your current health conditions, your physical health to your mental/emotional/spiritual health, and your current symptoms to various body systems. While conventional medicine continues to become more reductionistic with a specialist for every organ, in Functional Medicine we are taught Systems Biology because the body acts as a system. No organ acts alone. There are feedback loops of inputs and outputs from organs as they relate to one another their status and needs. Without thinking about this interconnectedness, a well-meaning intervention can become a patch that solves one problem but imbalances the system as a whole, creating new problems. The gastrointestinal system comes to mind - so complex and so related to all the other body systems it is becoming easy to see how we create multi-system, multi-symptom conditions. We take too many antibiotics, acid blockers, and steroids; we eat too many ultra-processed low-fiber foods, we don't have enough time to chew, we allow common stressors to overwhelm us, and we don't get enough physical activity or sleep. All these affect the natural function and rhythm of the gastrointestinal system which relays it's dysfunction to all the other systems: the brain, the immune system, the skin, the liver, the bones, the heart, the mitochondria (where ATP, your energy is made), the pain centers, the endocrine system....

Immune System: Bacteria that make up the intestinal microbiome communicate with the immune cells at the intestinal cell wall and the immune cells communicate back. This is an example of reciprocal crosstalk. Germ-free mice are bred to have no intestinal microbes. The immune cells cannot communicate to it and these mice show significant immune deficiency. Dysbiosis is the term given to an imbalanced microbiome when beneficial bacteria are present with harmful pathogenic bacteria. Pathogen by-products in the gut have been shown to create pro-inflammatory immune responses and this has been linked to the development of Inflammatory Bowel Disease, Celiac disease, Grave's disease, Hashimoto's thyroiditis, multiple sclerosis, type 1 diabetes, lupus and psoriasis. Specifically dysbiosis in the oral cavity has been associated with the development and progression of rheumatoid arthritis.

Nervous System: The emerging field of neurogastroenterology focuses on the functions and relationships of the sympathetic, parasympathetic and enteric divisions of the nervous system that engage the gastrointestinal tract. The pathways of this gut-brain interaction also intersect with the hormonal and immune systems. Disorders of gut-brain interaction are being studied for their relationship to Inflammatory bowel disease (IBD), dementia, Alzheimer's and Parkinson's diseases, chronic pain, depression and schizophrenia. Studies have shown certain probiotic supplements can restore microbiome balance, as well as reduce symptoms of stress, anxiety and depression.

Dementia is diagnosed earlier in life and at a four times higher rate in people with Inflammatory Bowel Disease. In IBD, with microbiome dysbiosis and intestinal permeability, it is believed that microbial derived neurotoxic

by-products can pass through to the central nervous system.

Liver: Fat accumulation in the liver is related to genetics, obesity, cardiovascular disease, type 2 diabetes, metabolic syndrome, chronic kidney disease and malignant tumors. It has a new name, Metabolic dysfunction-associated steatotic liver disease (MASLD). It can progress to metabolic dysfunction-associated steatohepatitis (MASH), and then on to cirrhosis and to liver cancer. The prevalence of MASLD in the US is ~ 34% and rising. Recent research points to an imbalanced gut microbiome as a potential underlying factor. An overgrowth of detrimental bacteria in the intestinal microbiome can lead to inflammation, increased gut barrier permeability (leaky gut), bacterial translocation to other parts of the body and intestinal bacterial by-product abnormalities. A 2025 study showed that fasting therapies and the Mediterranean diet reduced weight, inflammation and blood sugar control in this condition. A 2023 review also showed a beneficial effect from the use of prebiotics, probiotics, and synbiotics.

Cardiovascular System: Periodontal disease has been associated with atherosclerosis, heart disease and acute coronary events (including heart attack). The pathogenic bacteria of periodontal disease can continually spread into the circulation triggering inflammation. In a 2019 study, DNA from *Strep viridans* was found in the blood clot that was causing an acute stroke. There are ~ 1,000 species of bacteria in the oral cavity. These should not translocate to the intestinal microbiome unless the stomach acid is compromised. Once in the gastrointestinal tract they can change the microbiome composition, compromise the intestinal wall, alter immune function and produce harmful by-products. A 2024 review found that tooth brushing with flossing lowered the risk of developing type 2 diabetes and hyperten-

sion and was associated with a decrease in cardiovascular mortality when compared to tooth brushing alone.

Musculoskeletal System: Bone related disorders such as osteoarthritis, rheumatoid arthritis, and osteoporosis have been associated with dysbiosis of the intestinal microbiome. Beneficial bacteria in the gut promote intake of bone-related minerals (calcium, magnesium, phosphorous). They also produce by-products important for bone health (such as B vitamins and Vitamin K) as well as short chain fatty acids that help regulate osteoblasts and osteoclasts (the cells that build and break down bone).

Solutions: Healthy Gastrointestinal Function is the Best Foundational Cure

Eat whole foods, especially vegetables and some fruits, organic as much as possible. The Mediterranean diet is the diet preferred by the microbiome.

Brush and floss your teeth twice daily. Practice good oral hygiene.

Chew well; don't take stomach acid blockers for extended periods of time; add bitters or digestive enzymes at the start of a meal. Be sure your food is well digested so that it gets absorbed from the small intestine into the blood. Protein that reaches the large intestine will get fermented by the microbes. By-products created by the fermentation of protein are harmful to the microbes and to the intestinal wall. Dysbiosis, inflammation and leaky gut are the result. Undigested fiber is the appropriate food for the microbes of the large intestine. Microbes ferment fiber and produce beneficial Short Chain Fatty Acids (SCFA).

Don't take unnecessary antibiotics or steroids that can alter the gut microbiome and injure the intestinal wall. Be informed about environmental toxins and reduce exposure. Increase soluble fiber to feed the beneficial bacteria in the microbiome; my favorite is Guar gum.

Consider intermittent fasting. It has been shown to opti-

mize mitochondrial health, produce favorable changes in the composition of the intestinal microbiome and increase production of beneficial Short Chain Fatty Acids (SCFAs). These fatty acids are fuel for the intestinal cells.

Immunonutrition is the field of evaluating and providing missing nutrients that support the immune system including: Vitamins A, C, E, D, B9, beta carotene, and trace elements zinc, selenium, manganese and iron for the gut microbiome.

Get moving. Exercise affects all the parameters of GI health: improved transit time, healthy balanced microbiome, decreased pathogens in the microbiome, intestinal wall integrity, and production of short chain fatty acids. Sleep 7-8 hours/night (on schedule).

Practice yoga, mindfulness, journaling, gratitude, or one of the many varieties of therapy to de-stress. When you are stressed the small intestine freezes. It stops it's normal movements to push the digested food around and less absorption of nutrients takes place; bloating and gas may occur.

Get out in Nature to expand your focus; be in more microbe-rich environments (gardening, hiking, camping, etc.). Try not to be overly sterile.

Establishing and maintaining healthy gastrointestinal function is preventive medicine at its best!!!

Dr. Kate Thomsen's office for holistic health care is located in Pennington, NJ. She is trained in Family Medicine, and Board Certified in Integrative Medicine. She is an Institute for Functional Medicine Certified Practitioner. She has been practicing Functional Medicine for 26 years. For more information see www.drkatethomsen.com or call the office at 609-818-9700.