

Good Gut, Good Health

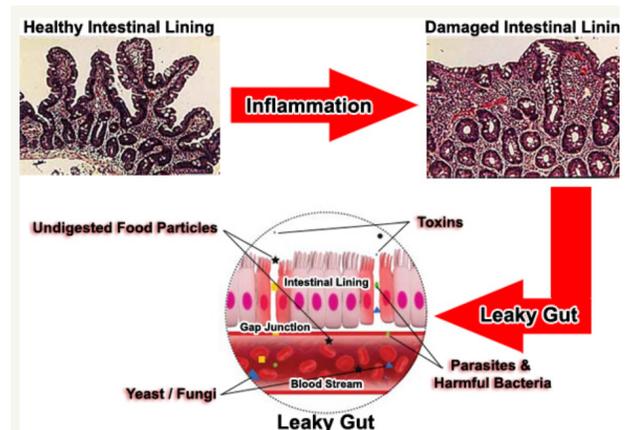
“All disease begins in the gut.” –Hippocrates

Everyone knows that the GI tract digests food, and absorbs nutrients and water. But life is more complicated than that. It is estimated that there are between 40-100 trillion bacteria in our GI system, our microbiome, which are greater in number than all of the human cells we consist of. It is also estimated that there are 400 - 1,000 different strains of bacteria within us, and each person has their own collection, depending on the types of foods they eat. They play many important roles for us.

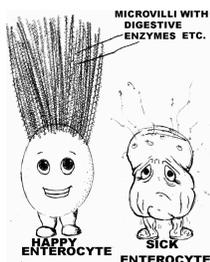
Eating fast food, or other poor quality processed foods that is loaded in fat and sugar changes the gut bacteria – dysbiosis - that can lead to impaired sugar metabolism that may then lead to diabetes, and poor absorption of nutrients. They also can have an impact on weight, fat storage, and inflammation. (1,2). Twin research, where one was fat and the other lean, also has found gut bacteria to be involved (3). Gut bacteria also can contribute to heart health or disease, such as by affecting ‘good’ HDL cholesterol, triglycerides, and TMAO levels (an unhealthy chemical that can cause heart disease (4). Cancer such as of the colon and prostate is another possible consequence of dysbiosis (5). i.e. It is important to nourish these trillions of bacteria. One function they play is the creation of a chemical called butyrate which exerts broad anti-inflammatory properties, along with having cancer fighting ability.

Another function of our GI system is that it insures that the right particle size of nutrients enters our blood stream. It also keeps bacteria and viruses out of the blood. When nutrient particles are larger than they are supposed to be, and/or germs get into our blood, serious problems arise. Such a situation is referred to as ‘leaky gut.’

With a leaky gut, the immune system comes into play and attacks whatever is not supposed to be in the blood stream. Endotoxins are a class of bacteria that get through a leaky gut. They can do so after eating just a single meal of animal products, like turkey, pork or dairy, by their saturated fat causing the leak. There is also a load of dead bacteria in animal products that get released into the blood as well. All of this triggers inflammation (6). If this persists for too long, the immune system is over taxed, and an auto immune disorder can arise (7). Immune problems that can result include irritable bowel syndrome (IBS), Crohn’s disease, and ulcerative colitis (8).



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Villi are microscopic hairs that line the gut and help absorb food. Enterocytes line the surface of the villi and also help in this absorption process. Microvilli are even more microscopic hairs that are growing on enterocytes. They interact with gut bacteria to digest food by secreting enzymes to break it down. They also help prevent disease by letting the immune system know what is happening. Health of the microvilli is completely dependent on the health of good bacteria, and vice versa. When this system is sick, malabsorption, food intolerance, and cancer can result.

Taking antibiotics can eliminate an infection in your system – but indiscriminately kills good GI bacteria too. Doing so has an impact not only on digestion & metabolism but immunity too, given that 60-80% of the immune system is in the gut. Perhaps a quarter of non-antibiotic drugs can also impact gut bacteria (9) such as chemo, calcium channel blockers (for high b/p), antipsychotics, antivirals, and Metformin (used for diabetes). Stomach acid blockers (e.g. Prilosec) also can have an impact. The acidity of the stomach is designed to keep good bacteria healthy and block bad bacteria being present. With the drug reducing acidity there is risk of toxic bacteria like E. coli, salmonella, and C. diff. increasing (10).

Gut bacteria might also impact our mental health, such as feelings of anger, distress, hostility, anxiety, and depression; autism, Alzheimer's, PTSD, and bipolar disorder (11, 12, 13, 14). Research done at UCLA gave women yogurt and using fMRI brain scans found that their emotions changed such as becoming less anxious. At Univ. College Cork in Ireland they transferred gut bacteria from depressed humans into rats – and the rats became depressed (15). Similar work has been done with Parkinson's patients, with changes in gut bacteria composition contributing and possibly causing the deterioration of motor skills in the disease (16).

Gut bacteria also make neurotransmitters. Serotonin is one well known neurotransmitter that is targeted by psychiatric drugs such as antidepressants. It is estimated that 90% of the serotonin is made in the gut, and altered levels of it have been linked to IBS, cardiovascular problems, and osteoporosis (17). Some gut bacteria can increase GABA receptors (a neurotransmitter sometimes called 'nature's Valium') in the brain. A deficiency of GABA receptors has been associated with problems like chronic depression (18).

What should be done to create and maintain good gut health? Eat fiber. Soluble forms (e.g. oatmeal, lentils, bean, fruit) feeds bacteria. Be careful about taking antibiotics – and giving them. Exposure to antibiotics at a young age may influence whether diseases like diabetes or Crohn's develops later in life. Sleeping well helps produce the hormones prolactin and melatonin, and they have been found to improve bacteria balance and aid in digestion (19). Eating fermented food *with live cultures* (e.g. yogurt, kefir, sauerkraut) is also advised. Eating more plant types per week (30+) leads to greater bacterial diversity than eating fewer (10 or less) (20). Eating prebiotic foods (e.g. artichokes, bananas, asparagus, apples, inulin) helps stimulate the growth of healthy bacteria. Breast milk for infants is best. It contains complex sugars that are actually indigestible to the baby, but are designed to feed its microbiota, and which then help produce chemicals important for brain development (21).

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