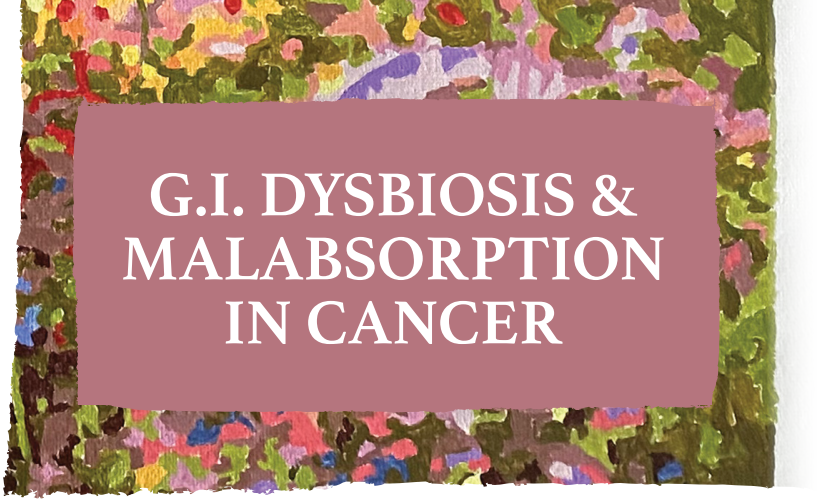
Healing Cancer at the Root
HYPERION
Functional Medicine



# G.I. DYSBIOSIS & MALABSORPTION IN CANCER

The terms "Microbiome" and "cancer" are popular topics of discussion and in research today. The "microbiota" is defined as the total of microbial organisms present in a specific environment; our focus is on the organisms in the G.I. microbiome. The "microbiome" refers to the genetic information characteristic in the microbiota itself. Microorganisms include bacteria, viruses, protozoa, and fungi. In our G.I. system, the microbes are influenced by our genetics, dietary habits, lifestyle, and microbial exposures at birth (determined by a birth via C-section or vaginal delivery). Metabolites or metabolic end-products of bacteria in the G.I. microbiome play a vital role inside of us, affecting processes in cardiovascular, neurologic, and metabolic health[1].

Microorganisms in the gut can also play a role in cancer acting as cancer "promoters" or "inhibitors".

Cancer is a multifactorial disease with many roots; the roots of cancer in the gut are influenced by the patient's lifestyle, genetics, and environmental factors. Differences exist in the components of the microbiota in the gut between healthy individuals and cancer patients. In addition, the microbiome has great variability in its composition between different people and within a person. There are also differences in the microbiome composition between different anatomical sites and tissues. These differences in microbiome composition are thought to be the underlying cause of many diseases and health problems. Decreases in beneficial bacteria and an increase in pathogenic bacteria, changes in bacterial content, and deterioration of balance are defined as "dysbiosis". Dysbiosis affects our health negatively by preventing the regular functioning of the immune system, dysbiosis is also connected with inflammatory diseases, metabolic disorders, and development of tumors[2].

When the "bad" bacteria outnumber the good bacteria in the G.I. microbiome, there's an increased risk for cancer in addition to symptoms that arise from dysbiosis such as diarrhea, constipation, intolerance of foods and nutrients, malabsorption of nutrients, and excessive bloating or gas. Good bacteria, otherwise known as commensal bacteria, protect us against pathogens that can cause infection and further the condition of dysbiosis. These good bacteria also help us digest our food and enable absorption of nutrients, synthesize vitamins and are involved in immune system regulation, hormone and neurotransmitter production, and help to maintain the structural integrity of the tissues inside the gut.

To optimize the G.I. microbiome, it is critical to maintain a healthy lifestyle with regular physical activity, reduction of stress, meditation, optimal sleep, and to eat a diet which includes fiber, prebiotics, and probiotics, and is very low in processed foods and meats. Antibiotic use, antidepressants, anti-inflammatory drugs or NSAIDS, and reducing acid production through proton pump inhibitors also have an impact on the gut and increase dysbiosis and symptoms of disease.

Dysbiosis can damage the intestinal lining and leads to "leaky gut "which contributes significantly to inflammation in the body. When the gut becomes leaky, food particles, microbes and toxins we ingest are allowed to enter the bloodstream. This initiates an inflammatory response that can become chronic if the gut is not healed. This inflammatory response induces "oxidative stress", which can increase the risk of damage to the DNA and cause normal cells to change into cancer cells. The microbiome affects the immune response which impacts tumor transformation and progression[3].

Change in the variety and supply of bacteria is the most important factor that causes chronic inflammation and the onset of cancer progression. Tumor progression is related to the reduction of certain microbial species, initiated by dysbiosis from ultra-processed foods and frequent use of antibiotics[4].

With disruptions in our microbiome, damage to the intestinal walls causes malabsorption of nutrients, and cancer promoting hormones and metabolites produced by bacteria contribute to hormone driven cancer risk.

Research on cancers in the G.I. tract, specifically research focusing on the gut microbiome, has further defined the link between the microbiome and cancer. Sixty to 80% of the immune system lies in the G.I. tract. Dysbiosis triggers immune response alterations and can increase the risk of colorectal cancer, gastric cancer, esophageal cancers, liver cancer and pancreatic cancer. We must define and diagnose dysbiosis in cancer patients to significantly decrease the cancer risk and cancer progression.

Bacteria in the gut send signals to the mitochondria, this has been observed to alter mitochondrial metabolism, activate immune cells, induce inflammation, and alter the intestinal barrier. Dysbiosis of the microbiome in the gut and the resulting mitochondrial dysfunction are associated with chronic intestinal inflammation and cancer[5].

In contrast to the G.I. microbiome, which is one of the roots of cancer, each organ system in our body has its own set of microbiotas. Even cancer tumors themselves have their own set of innate bacteria, possibly protozoa, and fungi. Research has just begun to understand more about the functions of bacteria and other microorganisms impacting cancer in cancer microbiomes. The new cancer hallmark identified by" polymorphic microbes" is bringing more research on cancer microbiomes to the forefront in cancer diagnosis and treatment. Microbes may be directly carcinogenic, impact the immune responses to further promote malignancy, and may be key in determining the efficacy of cancer treatment. Manipulation of the microbiome is showing promise as an opportunity to influence cancer outcomes[6].

In functional oncology we use stool testing to identify the root cause of symptoms and disease and define the health of the microbiome. All patients are offered a research-based stool analysis to identify dysbiosis, inflammation, immune dysfunction, and diversity of microbes. Cancer prevention and ceasing progression is a priority for all cancer patients, we know the role of probiotics can be essential in creating a healthy microbiome for all. All probiotics are not the same. Specific probiotics that have been found to be beneficial in cancer patients are Lactobacillus acidophilus, Streptococcus, Bifidobacterium, Propionibacterium, and Enterococcus, as well as beneficial yeasts such as Saccharomyces boulardii. But every cancer is different and not all probiotics work the same.

Through stool studies, patients can have  a well-defined microbiome to guide prescriptions for specific probiotics needed to optimize the microbiome and the prescriber need to have knowledge of their type of cancer and use the research defining the impact of bacteria in microbiota in the G.I tract. In many cancers, probiotics have been shown to decrease cancer cell proliferation, decrease inflammation, induce cancer cell death, and produce important anticancer substances such as short chain fatty acids[7].

CANCER ROOTS
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1 Rahman S, O'Connor AL, Becker SL, Patel RK, Martindale RG, Tsikitis VL. Gut microbial metabolites and its impact on human health. Ann Gastroenterol. 2023 Jul-Aug;36(4):360-368. doi: 10.20524/aog.2023.0809. Epub 2023 May 29. PMID: 37396009; PMCID: PMC10304525.
2 Ağagündüz D, Cocozza E, Cemali Ö, Bayazıt AD, Nanì MF, Cerqua I, Morgillo F, Saygılı SK, Berni Canani R, Amero P, Capasso R. Understanding the role of the gut microbiome in gastrointestinal cancer: A review. Front Pharmacol. 2023 Jan 24;14:1130562. doi: 10.3389/fphar.2023.1130562. PMID: 36762108; PMCID: PMC9903080.
3 Garg S, Sharma N, Bharmjeet, Das A. Unraveling the intricate relationship: Influence of microbiome on the host immune system in carcinogenesis. Cancer Rep (Hoboken). 2023 Nov;6(11):e1892. doi: 10.1002/cnr2.1892. Epub 2023 Sep 14. PMID: 37706437; PMCID: PMC10644337.
4 Ağagündüz D, Cocozza E, Cemali Ö, Bayazıt AD, Nanì MF, Cerqua I, Morgillo F, Saygılı SK, Berni Canani R, Amero P, Capasso R. Understanding the role of the gut microbiome in gastrointestinal cancer: A review. Front Pharmacol. 2023 Jan 24;14:1130562. doi: 10.3389/fphar.2023.1130562. PMID: 36762108; PMCID: PMC9903080.
5 Jackson DN, Theiss AL. Gut bacteria signaling to mitochondria in intestinal inflammation and cancer. Gut Microbes. 2020 May 3;11(3):285-304. doi: 10.1080/19490976.2019.1592421. Epub 2019 Mar 26. PMID: 30913966; PMCID: PMC7524274.
6 Lythgoe MP, Mullish BH, Frampton AE, Krell J. Polymorphic microbes: a new emerging hallmark of cancer. Trends Microbiol. 2022 Dec;30(12):1131-1134. doi: 10.1016/j.tim.2022.08.004. Epub 2022 Sep 1. PMID: 36058787.
7 Sankarapandian V, Venmathi Maran BA, Rajendran RL, Jogalekar MP, Gurunagarajan S, Krishnamoorthy R, Gangadaran P, Ahn BC. An Update on the Effectiveness of Probiotics in the Prevention and Treatment of Cancer. Life (Basel). 2022 Jan 2;12(1):59. doi: 10.3390/life12010059. PMID: 35054452; PMCID: PMC8779143.