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Gut Microbiome May Be a Game Changer for Tumor Prevention

Analysis by Dr. Joseph Mercola ✔ Fact Checked | April 03, 2023

STORY AT-A-GLANCE

- Dozens of health conditions have been traced back to the influence of gut microbes, including obesity, depression, chronic fatigue syndrome, Parkinson's, allergies and cancer
- Recent research shows gut microbes control antitumor immune responses in your liver, and that antibiotics can alter the composition of immune cells in your liver, triggering tumor growth
- Certain gut bacteria promote inflammation, which is an underlying factor in virtually all cancers, whereas others quell it. Certain cancers have also been found to have infectious underpinnings
- Targeting the gut microbiome could be a real game-changer in the fight against cancer, as the presence of certain gut bacteria appears to boost the patient's response to anticancer drugs
- Even cancer therapies that do not rely on the activation of your immune response typically fail unless you have the appropriate gut microbes. Some chemotherapy agents rely on bacteria to eradicate the tumor, influence gene expression or alter the stability of your genes

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In recent years, it's become increasingly apparent that the composition of microbes in your gut — which is as distinct to you as your fingerprint — plays an enormous role in

health and disease prevention. Your gut flora influences the function of various internal organs, such as your skin, lungs, breasts and liver.[1]

For example, recent research[2] by the National Institute of Health shows gut microbes control antitumor immune responses in the liver, and that antibiotics — by depleting your gut of valuable bacteria — can alter the composition of immune cells in your liver and trigger tumor growth.

Aside from cancer, dozens of other health conditions have been traced back to the influence of gut microbes as well, including obesity, depression, chronic fatigue syndrome, Parkinson's and allergies,[3] just to name a few. One of the reasons for this is because your gut is the main residence of your immune system.[4]

Disrupt your gut microbiome and you automatically disrupt your immune function, which can have far-reaching consequences. As noted in a paper published in Clinical and Experimental Immunology:[5]

> *"The crucial position of the gastrointestinal system is testified by the huge amount of immune cells that reside within it. Indeed, gut-associated lymphoid tissue (GALT) is the prominent part of mucosal-associated lymphoid tissue and represents almost 70 percent of the entire immune system; moreover, about 80 percent of plasma cells ... reside in GALT."*

How Your Microbiome Influences Your Cancer Risk

Previous studies have shown certain gut bacteria quell inflammation, which is an underlying factor in virtually all cancers, whereas others promote it. As noted in a recent article in Nature,[6] "bacteria have been associated with cancer initiation and progression. Some of these microbes activate inflammatory responses and disrupt the mucus layers that protect the body from outside invaders, creating an environment that supports tumor growth."

Certain cancers have also been found to have infectious underpinnings. For example, Heliobacter pylori (H. pylori) has been linked to gastric cancer. The International Agency

for Research on Cancer actually defines this microbe as a carcinogen.[7] Interestingly, H. pylori has also been linked to a reduced risk of esophageal adenocarcinoma, demonstrating the complexity involved and the organ-specific effects microbes can have when it comes to their impact on cancer.

Similarly, hepatitis C virus has been shown to play a role in hepatocellular carcinoma, chronic Salmonella enterica infection has been linked to gallbladder cancer, and Haemophilus influenza and Candida albicans have been identified in lower respiratory tract tumors. Gut microbes have also been found to influence the effectiveness of cancer treatment.

Gut Bacteria Influence Effectiveness of Anticancer Drugs

Recent research adds support to the idea that targeting the gut microbiome could be a real game-changer in the fight against cancer, as the presence of certain gut bacteria appears to boost the patient's response to anticancer drugs. Several clinical trials are now being launched to see whether outcomes can be improved simply by manipulating the patient's gut flora.

One way in which gut bacteria improve the effectiveness of cancer treatment is by activating your immune system and allowing it to function more efficiently. Researchers have actually found that when these specific microbes are absent, the anticancer drug may not work at all.[8] Such was the case with cyclophosphamide, a chemotherapy drug.

Part of the mechanism that allows cyclophosphamide to work is that it damages your intestinal lining, allowing bacteria to travel into your spleen and lymph nodes, where they then activate the necessary immune cells to combat the cancer. As you probably know, your immune system is your first line of defense against all disease, including cancer, and when functioning well, cancer cells are eliminated before they can grow into a tumor.

Immunotherapy Fails When Certain Microbes Are Absent

Researchers have also explored the influence of gut bacteria on cancer patients' responses to checkpoint inhibitors — a class of immunotherapy drugs that work by triggering your immune system to attack cancer cells. However, this treatment has a fairly low success rate. Only 20% to 40% of patients respond to the treatment, and researchers began suspecting the gut microbiome might be the key to success or failure.

Indeed, as reported in Nature,[9] a 2015 study found that while microbe-free mice failed to respond to treatment with checkpoint inhibitors, mice given Bacteroides fragilis fared much better. Other researchers have had similar findings, showing Bifidobacterium improves the effectiveness of cancer immunotherapy in lab animals — again by triggering a more robust response by specific anticancer immune cells.

As you might expect, antibiotic treatment has been found to worsen response to immunotherapy, likely because antibiotics indiscriminately kill all gut bacteria, thereby ridding your body of many really important immune helpers. Importantly, even cancer therapies that do not rely on the activation of your immune response typically fail unless you have the appropriate gut microbes.[10]

For example, certain chemotherapy agents actually rely on gut microbes to eradicate the tumor directly. In other instances, the microbes' influence on cancer is related to their ability to influence gene expression alter the stability of your genes.

Your Gut Is Your Second Brain

Your gastrointestinal tract — in addition to housing a majority of your immune system — has also been likened to your second brain.[11] You have two nervous systems: the central nervous system, composed of your brain and spinal cord, and the enteric nervous system, which is the intrinsic nervous system of your gastrointestinal tract.

Both are created from identical tissue during fetal development. One part turns into your central nervous system while the other develops into your enteric nervous system.

These two systems are connected via the vagus nerve, the 10th cranial nerve that runs from your brain stem down to your abdomen.

It is now well-established that your vagus nerve is the primary route your gut bacteria use to transmit information to your brain, and research confirms the makeup of your gut microbiome can have a tremendous influence over your psychological health and well-being, affecting both your general mood and your risk of more serious mental health dysfunction.

The connection between mental health and gut health is so strong that some have proposed probiotics may be the new Prozac. According to an article published the June 2013 issue of Biological Psychiatry,[12] the authors suggest that even severe and chronic mental health problems, including post-traumatic stress disorder, might be eliminated through the use of certain probiotics.

Two bacterial strains shown to have a calming influence, in part by dampening stress hormones, are Lactobacillus helveticus and Bifidobacterium longum. According to the authors:

> *"As a class of probiotic, these bacteria are capable of producing and delivering neuroactive substances such as gamma-aminobutyric acid (GABA) and serotonin, which act on the brain-gut axis. Preclinical evaluation in rodents suggests that certain psychobiotics possess antidepressant or anxiolytic activity. Effects may be mediated via the vagus nerve, spinal cord, or neuroendocrine systems."*

Using MRI scans, Dr. Emeran Mayer, professor of medicine and psychiatry at the University of California, Los Angeles has compared the physical brain structure of thousands of volunteers, looking for connections between brain structure and the types of bacteria found in their intestines.

He's found some interesting differences in how certain brain regions are connected, depending on the dominant species of gut bacteria. As reported by NPR,[13] "That

suggests that the specific mix of microbes in our guts might help determine what kinds of brains we have — how our brain circuits develop and how they're wired."

The Gut-Heart Link

Your gut also influences your heart health, and recent research suggests your risk of heart attack and stroke can be predicted by the presence or absence of certain gut microbes.

The study,[14] published in the journal Atherosclerosis found that patients with inexplicably high amounts of arterial plaque, based on their age and risk factors for atherosclerosis, had higher levels of trimethylamine N-oxide (TMAO), p-cresyl sulfate, p-cresol glucuronide and phenylacetylglutamine — metabolites produced by certain gut microbes — whereas those with unexpectedly low amounts of plaque, despite having traditional risk factors, had lower levels.

According to the authors, these differences could not be explained by renal function or poor diet. There was, however, a difference in gut microbiome between the groups. Their findings strongly support the idea that your gut microbiome plays an important role in your risk for atherosclerosis, and that by repopulating your gut flora with beneficial bacteria might offer significant protection against heart attacks, stroke and death.

Previous research[15] has shown high levels of TMAO are associated with an increased risk of heart attacks and stroke, as well as premature death among those with stable coronary artery disease. In one analysis,[16] high blood levels of TMAO increased the risk of dying from any cause fourfold in the next five years.

According to the authors, measuring blood levels of TMAO could potentially be a powerful predictive tool for assessing cardiovascular risks, in addition to other measurements such as glucose and triglycerides.

Eating a diet rich in plant foods and fiber is also recommended as a preventive lifestyle measure, as this helps lower TMAO production and, with it, lower plaque formation. Probiotics (healthy bacteria) have also been shown to relieve hypertension[17,18,19] by

triggering communication from the gut to brain areas that influence blood pressure, and hypertension (high blood pressure) is yet another risk factor[20] for heart attack and stroke.

How to Optimize Your Gut Health

Following are several key dietary components that will help you nourish your gut microbiome, thereby protecting yourself against a whole host of chronic diseases:

Eliminate sugars and processed foods from your diet, as sugar feeds microbes known to have a negative influence on your health.

Implement a cyclical ketogenic diet — While nutritional ketosis will initially improve your gut microbiome, thanks to the elimination of excess sugars, in the long term, continuous ketosis may be problematic. To optimize your gut health, be sure to eat lots of fiber-rich vegetables (see next section) and implement a cyclical ketogenic diet, where once or twice a week you increase the amount of net carbs (total carbohydrates minus fiber).

Eat plenty of fiber-rich foods/prebiotics — There are two main types of dietary fiber: soluble and insoluble. Ideally, you need both on a regular basis. Soluble fiber, found in cucumbers, blueberries, beans and nuts, dissolves into a gel-like texture, helping to slow down your digestion.

Insoluble fiber, found in foods like dark green leafy vegetables, green beans, celery and carrots, does not dissolve and stays basically intact as it moves through your colon. By adding bulk to your stool, it helps food to move through your digestive tract more quickly for healthy elimination.

Prebiotics are found primarily in fiber-rich foods, which is perfect because your good gut bacteria thrive on indigestible fiber. Inulin is one type of water-soluble fiber found in asparagus, garlic, leeks and onions that helps nourish your beneficial gut bacteria.

Include digestive-resistant starches — Found in chilled, cooked potatoes, seeds, tapioca starch and unripe tropical fruits such as banana, papaya and mango — are basically low-viscous dietary fibers. Like insoluble fiber, digestive-resistant starch is not broken down as it travels through your digestive tract and therefore adds bulk to your stool. They're also powerful prebiotics.

Regularly consume traditionally fermented and cultured foods, which are loaded with a wide variety of healthy live bacteria. Healthy choices include lassi, kefir, natto and various pickled fermentations of cabbage, turnips, eggplant, cucumbers, onions, squash and carrots.

Consider a spore-based probiotic supplement, especially when taking a course of antibiotics. Sporebiotics are part of a group of derivatives of the microbe called bacillus. This genus has hundreds of subspecies, the most important of which is Bacillus subtilis.

Essentially, sporebiotics consist of the cell wall of bacillus spores, and they are a primary tool to boost your immune tolerance. Because sporebiotics do not contain any live Bacillus strains, only its spores — the protective shell around the DNA and the working mechanism of that DNA — they are unaffected by antibiotics.

Antibiotics indiscriminately kill your gut bacteria, both good and bad, which is why secondary infections and lowered immune function are common side effects of taking antibiotics.

As noted earlier, chronic low-dose exposure to antibiotics through your food also takes a toll on your gut microbiome, which can result in chronic ill health and increased risk of drug resistance. Since they're not destroyed by antibiotics, sporebiotics can more effectively help re-establish your gut microbiome.

In the video below, Dr. Dietrich Klinghardt, founder of the Klinghardt Academy, discusses sporebiotics, which he has used clinically for the treatment of food

intolerances, ALS, autism, Lyme disease, multiple sclerosis, Parkinson's disease and more.

Whatever approach you take — eliminating sugars, adding prebiotic foods, eating fermented foods, taking probiotics or sporebiotics, or all of the above — I encourage you to begin optimizing your gut. A healthy gut will boost your immunity, help your body resist disease and positively affect your health and well-being.

Avoid Factory Farmed Meats and Antimicrobial Sanitizers

In addition to knowing what to add to your diet and lifestyle, it's equally important to know what to avoid, and these include:

Antibiotics, unless absolutely necessary (and when you do, make sure to reseed your gut with fermented foods and/or a probiotic or sporebiotic supplement)

Factory farmed meat and other animal products[21] **—** Animals raised in concentrated animal feeding operations (CAFOs) are routinely fed low-dose antibiotics and genetically engineered grains, which have also been implicated in the destruction of gut flora

Processed foods, as the excessive sugars feed bacteria known to be detrimental to health

Chlorinated and/or fluoridated water

Triclosan-containing products[22,23,24] such as antibacterial dish soaps, wipes, hygiene and cosmetic products, clothing and kitchenware items

Agricultural chemicals, glyphosate (Roundup) in particular — To minimize exposure, avoid using these chemicals around your home, and opt for certified organic or

biodynamic foods

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