How the Gut Microbiome Affects Cancer Treatment

Microorganisms in the gut influence how the body responds to common cancer treatments, including immunotherapy.

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The gut microbiome, which hosts hundreds of thousands of bacteria, fungi, viruses and other microorganisms, may play an important role in how people respond to cancer treatment. In a recent paper, published in JAMA Oncology, researchers from Brigham and Women's Hospital in Boston suggest that targeting the microbiome might improve the therapeutic response to cancer surgery, chemotherapy, immunotherapy and more.

"We know that a healthy gut is key to our overall health," said lead author Khalid Shah, MS, PhD, of the Center for Stem Cell and Translational Immunotherapy in the Department of Neurosurgery at Brigham in a news release. "Our gut is so important that we often refer to it as our 'second' brain. In recent years, we've begun to appreciate the many roles of the gut, including the gut-brain connection and the connection between the gut and our immune system. Conversely, gut dysfunction or dysbiosis can have a negative effect on our health."

One active area of research involves immunotherapies such as immune checkpoint inhibitors.

Studies of species of bacteria in fecal samples from responders and nonresponders suggest that the kinds of microorganisms, or microbiota, may impact the response to treatment. Studies have also suggested that diet, probiotics, antibiotic medications and bacteriophages—viruses that infect bacteria—can influence the gut microbiome, and, in turn, response to immunotherapy.

But the role of the microbiome goes beyond immunotherapy. The review details how microbiota can influence response to chemotherapy and how, conversely, these cancer therapies may affect the microbiome and lead to adverse side effects.

"Overall, these findings support the potential of influencing the gut microbiota to diminish the side effects of conventional cancer treatment," said Shah. "There is strong evidence that the gut microbiome can have a positive influence on cancer therapies," said Shah. "There remain exciting possibilities to explore, including the influence of healthy diet, probiotics, novel therapies and more."

However, the authors advise cancer patients to exercise caution when using probiotic supplements

and making dietary changes since there is no one ideal bacteria combination.

To learn more about the link between the gut microbiome and antitumor immunity, click here. To read more about the microbiome and immunotherapy, see "The Microbiome Frontier."

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