New Link Discovered Between Gut Microbiome and Anti-Tumor Immunity

In animal studies, introducing intestinal bacteria can promote anti-tumor immunity in the colon.

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A growing body of evidence links the gut microbiome—the vast collection of bacteria and other microorganisms that live in the digestive tract—to the body's immune response to cancer. But the role of specific bacteria, and the nature of their interaction with immune cells, remain a critical subject of research. A better understanding of the crosstalk between the gut microbiota and the immune system would allow us, among other strategies, to use probiotics as part of cancer treatment.

At the forefront of this investigation is Damon Runyon Fellow Abigail E. Overacre-Delgoffe, PhD, and her colleagues at University of Pittsburgh, who recently discovered an unexpected link between intestinal bacteria and colon cancer. "This entire story stemmed from a rather simple question," Dr. Overacre-Delgoffe tweeted, following the publication of their findings in Immunity. "How does the microbiota impact anti-tumor immune responses?"

To find out, her team added the "rather infamous" bacteria Helicobacter hepaticus (Hhep) to the guts of mice with colorectal cancer and tracked the response of various T cells. They expected the addition of Hhep to make the tumors bigger by activating regulatory T cells, which suppress immune response to prevent excessive pathogen-induced inflammation.

To their surprise, infecting mice with Hhep shrank their tumors instead. Looking closer, the team found the tumors flooded with helper T cells, which trigger the body's immune response, and "natural killer" cells, so named for their ability to kill infected cells and tumor cells without being presented with an antigen.

Interestingly, the anti-tumor response did not rely on cytotoxic T cells, usually recognized as a key player in tumor suppression. The presence of helper T cells was both necessary and sufficient.

The discovery that introducing intestinal bacteria can promote anti-tumor immunity in the colon raises the possibility of new therapeutic approaches for colorectal cancer.

"We've learned so much, but we've uncovered even more questions," Dr. Overacre-Delgoffe concluded. "In current refractory tumors to immunotherapy, is the microbiota the key to response? Can we target microbiota-specific T cells in clinic? Stay tuned!"

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