Diet Affects Cancer Growth and Treatment

Diets that mimic fasting deprive cancer of fuel needed for rapid growth.

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Recent research suggests that diets that mimic fasting—severe calorie restriction for most of the day or for several days per week—deprive cancer of fuel needed for rapid growth. Matthew Vander Heiden, MD, PhD, of the Koch Institute for Integrative Cancer Research at MIT, and colleagues found that calorie restriction lowered glucose and lipid levels and slowed tumor growth in mice with pancreatic tumors. Another study found that severely restricting calories for five days a week led to an increase in cancer-killing CD8 T cells and a decrease in immune-suppressing cells in patients undergoing cancer treatment. For appropriate patients, calorie restriction is “a safe, inexpensive and potentially effective approach” that could easily be combined with standard cancer treatment, says Claudio Vernieri, MD, PhD, of the IRCCS National Tumor Institute in Italy.

Other research adds to the evidence that the gut microbiome—the ecosystem of bacteria and other microorganisms in the intestines—plays a role in immune response. Jennifer Wargo, MD, of the University of Texas MD Anderson Cancer Center, and colleagues analyzed fecal microbiota, diet and use of probiotic supplements in melanoma patients treated with checkpoint inhibitor immunotherapy. Consuming enough dietary fiber—from fruits, vegetables and whole grains—was linked to longer progression-free survival. For every five-gram increase in daily fiber consumption, the risk of cancer progression or death dropped by 30%. Conversely, use of probiotic supplements was associated with poorer response. In studies of mice with melanoma, probiotic use was linked to weaker response to immunotherapy, larger tumors and fewer T cells in tumors, while higher fiber intake was associated with higher T–cell levels and slower tumor growth. “Our study sheds light on the potential effects of a patient’s diet and supplement use when starting treatment with immune checkpoint blockade,” says Wargo. “These results provide further support for clinical trials to modulate the microbiome with the goal of improving cancer outcomes using dietary and other strategies.”