What to Eat During Active Cancer Treatment

For people who are newly diagnosed or undergoing active treatment, there is little specific dietary guidance, but new evidence is emerging.

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“You’re diagnosed, you’re getting treatment, what do you eat now?” asks University of Alabama at Birmingham cancer prevention and control expert Wendy Demark-Wahnefried, PhD, RD. Unfortunately, she says, “the data are really thin.” She is one of the authors of the latest guideline from the American Society of Clinical Oncologists (ASCO), “Exercise, Diet, and Weight Management During Cancer Treatment.” “We know that diet is important for prevention, for overall health and for cancer survivorship, but during the window of time you’re getting treatment, we can’t make a guideline supported by data,” she says. “It doesn’t mean it’s not important. We just really need more research.”

Popular approaches abound for people in treatment, to be sure. These include ketogenic diets, low-fat diets, intermittent fasting, plant-based diets, macrobiotic diets and more. But there are very few rigorous clinical studies to back them up—yet.

The ASCO guideline, based on 52 systemic reviews plus 23 randomized controlled studies, concludes, “There is currently insufficient evidence to recommend for or against dietary interventions.” But it also states, “Diet and weight management strategies that provide health benefits to the general population could also provide important benefits to people who are undergoing cancer treatment. The Expert Panel is not discouraging clinicians from discussing healthy diet and weight with their patients, but did refrain from making specific recommendations, given gaps in the evidence.”

Jennifer Ligibel, MD, a medical oncologist specializing in breast cancer at the Dana-Farber Cancer Institute in Boston who coauthored the ASCO guideline, was surprised by the research gaps. “It was eye-opening, reviewing the data, to see how little information about diet and dietary change for people in treatment there is,” she says. “Oncologists would like to be able to tell patients what they can do during treatment that would be helpful, and patients have really valid and important questions about what they should be eating during cancer treatment. But we just don’t have sufficient data yet.”

She contrasts that with studies on exercise, for which there is more research that “shows very

clear benefits, including less fatigue, feeling stronger, improved cardiovascular fitness, decreased anxiety and depression, improved quality of life. We know exercise helps people with cancer feel better—patients should be told that they should be exercising during treatment. Over the next five years, big studies should start to answer questions about diet." Until then, she says, "for a patient in treatment who is interested in pursuing dietary change, the best place to start is to talk with your physician and nutritionist."

To remedy the research desert, the National Cancer Institute has created a new initiative, ENICTO Consortium, which stands for "Exercise and Nutrition Interventions to Improve Cancer Treatment–Related Outcomes." These studies are looking at how exercise and nutrition may affect how people tolerate their treatments and whether side effects are reduced and quality of life improved. "Larger trials are [also] looking at whether we can make a difference in terms of recurrence and survival," adds Ligibel.

One such large randomized trial is the Diet and Androgen-5 (DIANA-5) trial, which is looking at adherence to the Mediterranean diet among women with breast cancer and its effects on treatment outcomes. "The data for colon cancer is stronger for diet, especially in avoiding red meat and processed meats, but these observations aren't as strong for breast cancer," says Ligibel. "This kind of study should answer some really important questions."

Earlier studies have provided intriguing clues, to be sure. The 2007 Women's Health and Eating Well Study, for example, looked at the effectiveness of a diet low in fat but high in vegetables and fruits in women after they were treated for breast cancer. "Those who increased fiber through fruit and vegetable consumption had improved survival," says Lorenzo Cohen, PhD, a cancer prevention expert at MD Anderson Cancer Center in Houston. "It wasn't overwhelming but was in the expected direction." A secondary analysis, he notes, found that a healthy diet combined with increased exercise was synergistic—that is, more effective than either intervention alone in reducing the risk for breast cancer recurrence.

For some men with prostate cancer, leaning into a Mediterranean diet may have benefits, finds Justin R. Gregg, MD, an assistant professor of urology at MD Anderson. He studied a group of men with generally slow-growing prostate cancer who were under "active surveillance"—undergoing regular scans to determine whether their tumors had started growing faster and thus needed treatment. The article, published in the journal Cancer in 2021, found that over 36 months, those whose diets mostly closely adhered to the Mediterranean diet had "a lower risk of their tumors upgrading over time."

Using a Mediterranean diet score of zero to 9, "every one point increase in score was associated with a 10% decreased risk of the biopsy upgrading," he explains. That is, the healthier the men ate, the less likely their prostate tumors were to become aggressive and potentially need treatment. "We think it may be related to inflammation," says Gregg. "There are specific inflammatory pathways that can lead to prostate cancer worsening. It's initial research, but if you're eating close to the Mediterranean diet, you are likely doing things that will lengthen your life anyway, reducing cardiovascular and stroke risk. So it's worth looking at further."

The Immunotherapy Microbiome Diet

One of the most promising areas of research involves dietary preparation for treatment with immunotherapy, specifically checkpoint inhibitors. These powerful medications unleash the body's own immune T cells to attack tumors by taking the "brakes" off their activity. The drugs can be lifesaving, but they don't work for every cancer patient who is a candidate for them. Diet may play a role by influencing the gut microbiome, the ecosystem of gastrointestinal bacteria that, among other things, helps regulate immunity, including influencing the T cells unleashed by checkpoint inhibitors.

Pioneering research with melanoma patients has found that those who have the most diverse microbiome—with the widest variety of bacteria—tend to respond better to checkpoint immunotherapy. "There's a consensus that our gut bacteria can promote immunity and specifically anticancer immunity," says Jennifer McQuade, MD, an assistant professor of melanoma medical oncology at MD Anderson Cancer Center in Houston.

People who have recently taken antibiotics, which can kill a wide range of microbiome bacteria, tend to do worse on immunotherapy, research shows. On the other hand, melanoma patients whose diets are rich in fiber, a key nutrition source for the microbiome, respond better to checkpoint inhibitors. Notably, however, those who take probiotics—supplements that flood the system with just one or a few strains of beneficial bacteria—did worse. One reason may be that probiotics reduce microbiome diversity.

"The more we learn, [the more] it's about the diversity of sources of fiber," says McQuade. "Different fibers stimulate different bacteria. They cross-feed and strengthen the overall microbiome ecosystem. So [this means eating] vegetables and grains and fruits and nuts and seeds and pulses."

While probiotic supplements seem to be unhelpful, McQuade does recommend fermented foods, which are rich in a wide variety of beneficial bacteria. These foods include sauerkraut, kimchi, yogurt and kefir. "Unlike probiotics, which blast your system with one particular bug, lowering microbiome diversity, these fermented foods actually increase diversity," she says. Fermented foods and fiber-rich foods act synergistically, she adds.

The benefits of a fiber-rich diet for people undergoing immunotherapy aren't limited to those with melanoma. "The microbiome plays a role in many cancers, including kidney, breast, lung, pancreatic, colorectal and more," says McQuade. Checkpoint immunotherapy drugs, she notes, have been approved for 15 different kinds of cancer. "More and more clinicians are aware of this research," she adds. "I tell my patients to eat a high-fiber diet." She defines that as 30 or 50 grams of dietary fiber a day. American adults consume on average only 15 grams a day.

The effect on the microbiome can occur quickly. "The microbiome can shift in a matter of weeks," says Cohen. He notes a landmark study from the University of Pittsburgh in which for two weeks, African Americans switched their diets with rural South Africans, who eat a diet much higher in fiber. "In two weeks, there were massive changes in the microbiome," he says. "The Americans

who ate like rural South Africans had a reduction in proliferative markers associated with colon cancer." For patients on immunotherapy, he says, "maintaining fermented foods combined with a high-fiber diet for a year may mean treatments have a higher probability of working. It should be the dietary standard of care."

McQuade is committed to conducting the kind of studies that could bring this research to the real world. While small studies have shown benefits, randomized trials have yet to demonstrate improved treatment outcomes from dietary intervention. "That's the kind of data that will bring oncologists to recommend these dietary interventions."

The Ketogenic Diet

While a microbiome-friendly diet dovetails nicely with recommendations to eat a plant-based diet, other specific diets take different tacks. One is the ketogenic diet, a diet so low in carbohydrates that it makes eating fiber-rich fruits and vegetables very difficult.

The high-fat ketogenic diet is popular for short-term weight loss, but its role in cancer treatment has a different rationale. This hypothesis holds that because many tumors depend on blood glucose, radically reducing blood levels of glucose and insulin may slow tumor growth. Unlike many tumor cells, normal cells can switch to a different form of fuel when deprived of glucose.

But most of the research is in early stages.

The keto diet is extremely high in fat—as much as 70% of calories from fat, compared with, say, 30% in a moderately low-fat diet. The diet includes a moderate amount of protein and very little carbohydrates. With hardly any carbohydrates, the body turns to fat to provide energy. A similar effect occurs during fasting, but the protein in a ketogenic diet helps maintain muscle mass, which is generally lost during fasting.

"In many animal models, a ketogenic diet does suppress tumor growth," says Evan Lien, PhD, an assistant professor at the Van Andel Institute in Grand Rapids, Michigan, whose work on nutrition and cancer has been supported by the Damon Runyon Cancer Research Foundation. "The problem is, in other models, it accelerates tumor growth. We don't understand the context in which that diet works—or doesn't work."

Several clinical trials are evaluating ketogenic diets. One area with promising results relates to glioblastoma, a form of brain cancer that has a generally poor prognosis. One reason ketogenic diets may be relatively effective for this cancer is that ketones, the compounds that replace blood glucose for energy, can cross the blood-brain barrier. Many nutrients and drugs cannot. In a systemic review of nine clinical studies of the ketogenic diet in people with glioblastoma, published in the journal Nutrients in 2022, the reviewers concluded that "The KD [ketogenic diet] is supported by most published studies as an effective therapy in the treatment of malignant gliomas due to its positive effects on patient survival."

The experts interviewed for this report made it clear that a keto diet is not ready for prime time for

other cancers. Ligibel agrees. “It’s not something I would recommend for cancer control. It’s also difficult to make this kind of dietary change in humans. It’s very hard to adhere to.”

“Ketogenic diets for glioblastomas are an emerging area,” says Johns Hopkins oncology nutritionist Mary-Eve Brown, RDN, CSO, “but we’re still waiting for some of the early studies to publish their data.” She also has patients with other cancers, such as breast cancer or lung cancer, who tell her they want to try it. But for those cancers, there are even less data. “I wouldn’t recommend it,” she says.

“Ketones pass the blood-brain barrier, and there is some evidence for glioblastoma and preventing seizures that result from that cancer,” says Demark-Wahnefried. “But it’s difficult to eat that way. And in recommendations for cancer prevention and control, diet quality is important, including eating more fruits and vegetables and whole grains—which are high in carbohydrates.” It can be difficult to consume adequate fiber as well as many minerals and vitamins—and to limit red meat and processed meats. “When most people follow the keto diet, they increase their intake of meat,” she says. “You can be eating [foods such as] salmon and avocado and have a healthy keto diet, but it takes a lot of work.”

Fasting Most of the Day

Most dietary studies evaluate a diet’s composition—what people eat. But when we eat may also play a role in creating an environment that starves tumor cells while allowing normal cells to thrive.

The benefit may be particularly important for people in chemotherapy. In animal models, says Lien, “if you take animals with cancer and fast them right before chemotherapy, that fasting therapy makes chemotherapy work better.” A few clinical trials are now testing whether a short-term fasting regimen, in combination with chemotherapy, may affect outcomes.

One trial, the Feasibility of Fasting & Exercise in Patients With HR+ MBC, is looking at the effects of a combination of exercise and intermittent fasting—no food or drink after 8 p.m. and then waiting at least 13 hours before eating again—on women with hormone-positive (HR+) metastatic breast cancer (MBC). Intermittent fasting is easier to maintain than multiday fasting, and it also minimizes the muscle loss that can happen with fasting. Some studies have found that intermittent fasting reduces blood sugar and insulin levels as well as insulin-like growth factor, a compound associated with tumor growth. The main goal is to see how feasible it is for people with MBC to live this way for 14 weeks.

“Intermittent fasting stabilizes my eating patterns, and it has helped with side effects of my treatment,” says Julie Murkette, 66, a participant in the study who lives in central Massachusetts, where she runs a small publishing house, is married and has five sons and five grandchildren. She has had a lump in her breast for 35 years, but it never showed up on a mammogram. But that changed in August 2021 when she was diagnosed with breast cancer; by November of that year, it was confirmed to be Stage IV, that is, metastatic.

During the study period, she participated in a Zoom exercise class three times a week and fasted intermittently. She didn't change what she ate. "I was already eating pretty healthy," she says. Since the study ended, in April 2022, Murkette, has kept up the exercise and intermittent fasting regimen. She finishes dinner by 8 p.m. and doesn't eat again until 11 a.m.

Total fasting on a short-term basis or intermittent fasting may help reduce certain side effects of chemotherapy as well, adds Brown, the oncology nutritionist. For example, she says, "fasting can be beneficial for people on cisplatin chemotherapy. Several studies have shown that when these patients fast 24 hours before and after this chemotherapy, there is less nausea and vomiting." Research has found similar benefits for other chemotherapy protocols. But it's not for everyone, adds Brown. "If you're already losing weight, do you really want to fast? I don't think so." However, she advises, if you're eating well, not losing weight and interested in short-term fasting before chemotherapy, "talk to your health care team."

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