

What to Eat During 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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For cancer survivors, over the long term, healthy eating improves quality of life; protects against new cancers, heart disease and diabetes; and in some cases, reduces the risk of recurrence. But when you are undergoing active treatment, the best dietary approach for your particular cancer and type of therapy is still largely an open question.

“You’re diagnosed, you’re getting treatment, what do you eat now?” asks Wendy Demark-Wahnefried, PhD, RD, associate director for cancer prevention and control for the O’Neal Comprehensive Cancer Center at the University of Alabama at Birmingham and a coauthor of “Exercise, Diet, and Weight Management During Cancer Treatment,” from the American Society of Clinical Oncologists (ASCO). “Unfortunately, the data are really thin.” Indeed, that ASCO guideline concludes that “there is currently insufficient evidence to recommend for or against dietary interventions.”

Says Demark-Wahnefried, “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. It doesn’t mean it’s not important. We just really need more research.”

To remedy that dearth of research, the National Cancer Institute has funded several new clinical studies, but results are still a few years away.

For cancer survivors not currently on treatment, the evidence is clearer. “Being physically active, consuming foods that reflect a healthy dietary pattern and avoiding obesity after completion of cancer treatment improves long-term survival,” concludes the American Cancer Society’s 2022 guideline “Nutrition and Physical Activity Guideline for Cancer Survivors.” It goes on to state that the recommended dietary pattern is “rich in a variety of plant foods, such as vegetables, whole fruits, whole grains and beans/legumes, but limited in or not including red and processed meats, sugar-sweetened beverages, highly processed foods and refined grain products.”

Among men diagnosed with slow-growing prostate cancer who were under active surveillance, for example, those whose diet more closely adhered to the plant-based Mediterranean diet had “a lower risk of their tumors upgrading over time,” says Justin R. Gregg, MD, an assistant professor of

urology at MD Anderson Cancer Center in Houston and the author of a 2021 study published in the journal *Cancer*. The healthier the men ate, the less likely their prostate tumors were to become aggressive and potentially need treatment.

For many people on active treatment, a plant-based diet remains a good dietary model. It may be particularly important for individuals being treated with immunotherapy. But different diets, such as a very high-fat ketogenic diet or short-term fasting, may be beneficial for certain individuals. Meanwhile, the new field of precision nutrition is harnessing the sophisticated tools of genomics to tailor dietary prescriptions for individuals with specific types of cancer (see the sidebar “Precision Nutrition for Cancer Treatment,” below.)

The Immunotherapy Microbiome Diet

Checkpoint inhibitors, the most common form of immunotherapy, are powerful medications that 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 patient who is a candidate for them. For some, diet may make a difference.

Melanoma patients who eat a high-fiber diet, which supports a diverse gut microbiome, respond best to checkpoint inhibitors, finds Jennifer McQuade, MD, an assistant professor of melanoma medical oncology at MD Anderson. Diverse gut bacteria, she explains, promote immunity and, specifically, anti-cancer immunity.

“It’s about the diversity of sources of fiber,” she says. “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 [such as peas, beans and lentils].” She also recommends fermented foods, such as kimchi, yogurt, sauerkraut and kefir, which are rich in a variety of beneficial bacteria. Fiber-rich and fermented foods act synergistically.

The benefits aren’t limited to those with melanoma. “The microbiome plays a role in many cancers, including kidney, breast, lung, pancreatic, colorectal and more,” McQuade says. Checkpoint inhibitor immunotherapy drugs, she notes, have been approved for 15 different kinds of cancer.

“I tell my patients to eat a high-fiber diet,” McQuade continues. She recommends 30 or 50 grams of dietary fiber per day; the American average is 15. She 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 that might demonstrate improved treatment outcomes from dietary intervention have not yet been conducted. “That’s the kind of data,” she says, “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, the ketogenic diet is so low in carbohydrates that it makes eating fiber-rich fruits and vegetables difficult. It's very high in fat (as much as 70% of calories), with adequate protein. Deprived of carbohydrates, the body turns to burning fat for energy, which can reduce blood glucose levels and improve insulin resistance. The hypothesis is that many tumors depend on glucose, so radically reducing blood levels of glucose and insulin will slow tumor growth.

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But most of the research is still in early stages. "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.”

One promising area relates to glioblastoma, a form of brain cancer with a generally poor prognosis. In a systematic review of nine clinical studies published in the journal *Nutrients* in 2022, reviewers concluded that the 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.” Says Demark-Wahnefried, “Ketones pass the blood-brain barrier, and there is some evidence [that a ketogenic diet may be effective] for glioblastoma and preventing seizures that result from that cancer. But it’s difficult to eat that way. 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. 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 fostering an environment that starves tumor cells while allowing normal cells to thrive.

Fasting may be beneficial for some people on chemotherapy. In animal models, says Lien, “if you take animals with cancer and fast them right before chemotherapy, that makes chemotherapy work better.” Clinical trials are now testing whether a short-term fasting regimen in combination with chemotherapy may affect outcomes in humans.

Short-term fasting may help reduce certain side effects of chemotherapy as well, adds Johns Hopkins oncology nutritionist Mary-Eve Brown, RDN. 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. She doesn’t recommend it for people with cancer who are losing weight, but “if you’re eating well, not losing weight and interested in short-term fasting before chemotherapy, talk to your health care team.”

Intermittent fasting, in which one eats only during a short window of time each day, may have additional benefits. One clinical trial is looking at the feasibility of exercise plus intermittent fasting—no food or drink after 8 p.m. or before 11 a.m the next day—in women with hormone-

positive metastatic breast cancer. 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.

“Intermittent fasting stabilizes my eating patterns, and it has helped with side effects of my treatment,” says Julie Murkette, 66, a study participant. She lives in central Massachusetts, where she runs a small publishing house; she’s married and has five sons and five grandchildren. Murkette was diagnosed with Stage IV metastatic breast cancer in 2021. 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. “I don’t know if it’s the meds working or a combination of meds, exercise and intermittent fasting (all of which I continue to do), but as of December 2022, I am NED (no evidence of disease). Even my oncologist was a bit taken aback by the results.” She’s definitely feeling good these days. “There’s a tendency not to overeat over the course of the day,” she says, “and I’m in the best shape I’ve been in for 20 years.”

Navigating Nutrition During Treatment

It can be daunting to navigate your way through cancer treatment and its obstacles to eating right. Many treatments can sap appetite, cause nausea or other issues, such as mouth sores, and lead to fatigue. So the first goal is to work with your care team to make sure you can continue eating normally to maintain your nutrition status. And if you are considering a specific dietary intervention, enlist your treatment team in that decision.

You don’t have to do it alone. Try working with a registered dietitian (RD) or, if possible, a board-certified specialist in oncology nutrition (CSO), a registered dietitian with additional training to work with cancer patients. But the truth is, many people undergoing treatment get no nutrition help at all.

Nutrition support should be a standard of care for people on treatment, argues Lorenzo Cohen, PhD, the Richard E. Haynes Distinguished Professor in Clinical Cancer Prevention at MD Anderson. “We have specialists trying to figure out the right surgical or chemo treatments for people with cancer—we need to take the dietary component as seriously,” he says. “We need professionals working with patients. We need to take the burden to navigate eating well during treatment off the patient and put it where it belongs: in a formal profession.”

Insurance often does not pay for these services, he acknowledges, but he advocates for changes that would require insurers to do so. A healthy diet, says Cohen, is one of the foundations of an anticancer lifestyle, whether you want to avoid getting cancer in the first place, reduce the burdens of treatment, reduce the risk of recurrence, protect against a second cancer or strengthen your chances of becoming the healthiest longtime survivor you can be.

Precision Nutrition for Cancer Treatment

In the near future, it may be possible to design specific diets tailored to individual genomic profiles to starve tumors.

Cancer genomics—the study of DNA sequencing and gene expression—has led to precision cancer treatments that target tumor mutations. Today, some scientists are using these tools to develop nutrition-based treatments, an approach called precision nutrition.

“What really kicked this field off was the finding that some cancer cells are very dependent on an amino acid named serine,” says Evan Lien, PhD, a cancer and diet researcher at the Van Andel Institute in Grand Rapids, Michigan. “About 10 years ago, some groups showed that when you give animals [with certain cancers, such as pancreatic and colorectal] a serine-deficient diet, it impaired tumor growth.”

Several clinical trials are now underway. One such clinical trial, currently recruiting participants, is being run by Faeth Therapeutics (faeth is Welsh for “nutrient”), a private firm founded by seven established cancer researchers to explore combining dietary interventions with pharmaceuticals to enhance response to the drugs. “We can use precision nutrition to starve tumors of what they need to grow,” explains Faeth CEO Anand Parikh, JD.

One trial is recruiting individuals with metastatic pancreatic cancer, who generally have poor survival odds. Sequencing RNA from tumor biopsy samples, Faeth researchers have found that about 80% have tumors that rely on serine. Participants receive a free diet rich in fruits and vegetables, with protein coming from special shakes that contain essential amino acids but not serine and glycine (another amino acid potentially associated with pancreatic tumor growth). “It’s real food, shipped to the patients’ doors,” Parikh says. Other clinical trials at the company are focusing on colorectal, endometrial and ovarian cancers. Preliminary results are expected in about a year.

“Every time a patient with pancreatic cancer comes into the office of a gastrointestinal oncologist, the first question is, ‘What can I change about what I eat?’” says Parikh. “The oncologist usually just has to wave his hands around and say, ‘Just eat healthy.’ We are aiming to change that. I want every cancer patient to have a nutrition intervention that is evidence-based.”

Says Lien, “My view is, there is never going to be a magic bullet, a single diet that will cure cancer. But there is a real opportunity to leverage nutrition to make existing cancer treatments work better. It’s pretty exciting to consider how we can leverage dietary interventions in combination with drugs that are already being used or are in development.”

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