Keto, Fat and Cancer: It's Complicated

New research points to low fat for a longer life, but some patients are bumping up fat to keep cancer away. Is that smart?

December 3, 2019 By Diane Mapes

When it comes to diet and disease, who isn't wondering: What the fat?

Should we eat it with abandon, as the meaty keto people advise? Should we try to keep it mostly low and "good" — some olive oil, some fish and the occasional avocado?

Fat, protein and carbohydrates are the three major players that fuel the human machine, supplying nearly 100% of our body's energy. For decades, there's been a push-pull regarding two of them — fat and carbs — with everyone from scientists to celebrities trying to come up with the optimal mix for good health and long life. The public is also looking for big fat answers to coronary heart disease, diabetes, cancer and all the rest, trying to identify that nutritional silver bullet.

Disease detectives (aka epidemiologists) at Fred Hutchinson Cancer Research Center have been studying dietary fat and health for more than 30 years. Clinical researchers here are also examining how diet and nutrition can impact cancer treatment and recurrence.

What do they say when it comes to its benefits and harms, particularly in the realm of cancer? Here's your big fat update.

Low fat for long life

New results just came out on a long-term dietary modification trial with the Women's Health Initiative that specifically looked at fat and women's health. Participants were healthy and disease-free, aged 50 to 79 at the outset of the study in 1993; data was gathered via biological samples as well as self-reporting.

Led by the Hutch's Ross Prentice, PhD, and a pack of WHI researchers around the country and published last month in the Journal of Nutrition, the study followed nearly 50,000 women for almost 20 years to see if cutting back on dietary fat reduced the risk of breast and colorectal cancers and heart disease.

Nearly half of the participants cut their fat intake to 20% of total calories, eating more fruits, veggies and whole grains than meat, cheese, nuts and other fat sources. The other participants ate a "usual diet" with about 35% of their calorie intake coming from fat.

Their findings: The women who kept their fat low and bumped up their vegetable, fruit and grain intake lived longer, healthier lives — or at least they reduced the likelihood of death following breast cancer, slowed diabetes progression and prevented coronary heart disease as compared to the women who ate the usual, higher-fat diet.

Low fat, it would appear, is the long game for long life. Full study details available here.

Dietary fat: friend or foe?

Fat first started getting the side eye about 60 years ago, when Americans began gaining weight and getting sick; experts concluded dietary fat must be driving obesity and diseases like diabetes, cardiovascular disease and maybe even cancer. Suddenly, fat was bad and carbs were the better option to break off our big fat love affair. Sausage and eggs gave way to breakfast cereals — many loaded with sugar. Hamburgers and steaks were hipchecked by pizza, pasta and packaged foods — many highly processed.

Hutch nutritional expert Marian Neuhouser, PhD, RD, and colleagues explained the genesis of this fat-carb smackdown in "Dietary fat: From foe to friend?" a review of nutritional science published late last year. The focus on fat, they wrote, was "driven by a prevailing belief that carbohydrates — all carbohydrates, including highly processed grains and sugar — were innocuous and possibly protective against weight gain, cancer, and cardiovascular disease through multiple mechanisms."

As the diet pendulum swung from high fat to high carb, though, the rate of obesity and diabetes continued to climb while life expectancy dropped. So, the macronutrient skirmishes and studies raged on. Now fat's back and bigger than ever, boosted by the wildly popular keto diet (short for ketogenic).

Fat's a major component of keto — making up about 70% to 80% of total calorie intake, with 10% to 20% from protein and a measly 5% to 10% from carbs. Drastically cutting back on carbs forces your body to bring energy via a different (and potentially harmful) chemical process known as ketosis. Glucose (sugar) from carbohydrates is the body's primary fuel; without carbs, it turns to its secondary source, fat. Particularly, the body's fat stores (often located in the rear).

As a result, you lose weight. And as a result of *that*, there are now thousands of keto diet experts with books, blogs, YouTube channels, Twitter testimonials and all the hoopla, hype, confusion and questionable advice that comes with a new diet craze. Case in point, there's actually a bacon and butter keto cookbook. (Read about the link between processed meat and cancer.)

Keto-curious cancer patients

Cancer patients are very keto-curious, although it's usually more about fending off recurrence or progression than fitting into skinny jeans. And there are plenty of cancer keto resources online. What there *isn't*, is much clinical data.

There are many keto diet cancer trials in the works, in research centers from Florida to Frankfurt. But some are still recruiting, others have shut down, and many more haven't yet published results.

So, some patients are DIYing it, going keto during chemo or other protocols without solid evidence as to whether it will make their cancer shrink or grow.

Others are turning to keto in lieu of standard treatment — and advising peers to do the same.

Carol Oxford Tatom, a 55-year-old research scientist and breast cancer patient from Vacaville, California, worries that patients will end up hurting themselves by taking things too far, too soon.

“The papers I read on keto and cancer were all in mice,” she said. “They’re still all in mice. And we’re not mice. There’s no clinical evidence that it’s healthy.”

Tatom gets the rationale for trying it — “the idea is the Warburg effect, that cancer feeds on sugar” — but she thinks people often look at dietary issues too simplistically.

"That whole idea that sugar feeds cancer? Well, sugar also feeds us, it feeds all cells. If you you eat a reasonably balanced diet, that’s really been shown to be the healthiest,” she said.

Randomized clinical trials — on people, not mice — are what’s needed to suss out whether there’s any there there, Tatom said. Until then, crusading for keto as a cure can “promote false hope and … cause harm.”

Pairing keto with cancer treatment

Some answers *are* trickling in. Columbia University oncologist Siddhartha Mukherjee, MD, author of The Emperor of All Maladies, has been researching the ketogenic diet as a potential tool in cancer treatment for a few years. Among other things, he found that a keto diet can actually accelerate certain leukemias.

But Mukherjee’s August 2018 paper in Nature also found that a ketogenic diet was helpful — even “synergistic” — with certain cancers and certain treatments. At least in mice.

“It’s probably most helpful in cancers that utilize the PIK3CA / AKT / MTOR pathway [an intracellular signaling pathway],” said V.K. Gadi, MD, PhD, a clinical researcher and breast cancer oncologist with Fred Hutch and its clinical-care partner, Seattle Cancer Care Alliance.

This pathway regulates cell cycle and proliferation; if it mutates and starts to overexpress, the body starts churning out cancer cells willy nilly. Luckily, there’s a kinase inhibitor that can flip the pathway’s “on” switch to “off.” A keto diet, Gadi said, “would help maintain the sensitivity to inhibitors in this pathway.” But — and it’s a big but — the diet would only be beneficial for those with the PIK3 mutation who are taking this particular kinase inhibitor.

“It’s an excellent example of where a keto diet might actually be something you want to pair with this drug,” he said. “That’s what the preclinical data suggest. But it is really, really complicated.”

And there is still much to learn. The common diabetes drug metformin, for instance, also appears to have an anti-tumor effect. “It may be a chemical version of keto,” Gadi said.

Keto, carbs and cancer trials

“I would never go out on a limb and say keto cures anything,” said Mia Spano-Curtiss, 53, a breast cancer patient advocate from Scottsdale, Arizona. But she does eat “close to keto” because bumping fat and cutting carbs “makes my body run more efficiently.”

Spano-Curtiss said she primarily eats meat, organic fruits and vegetables, beans, fresh cheese — and even admits to the occasional cookie. “Non-gluten, made in my kitchen,” she said. “Not a cookie out of a box. I don’t think sugar’s friendly for our bodies.”

Hutch public health researcher Mario Kratz, PhD, isn’t much of a sugar fan — neither the super-sweet drinks Americans guzzle nor the bouncing blood sugar levels that can lead to chronic disease. An expert in nutritional interventions, Kratz studies how the foods we eat affect our risk of diabetes, cardiovascular disease and cancer.

When you’re healthy, he said, you have normal blood sugar levels and low insulin levels. But “your blood sugar and insulin will go up and down all day if you eat carbs.” And that may be harmful to a person’s health — particularly cancer patients — since “glucose is a main source of fuel for cancer cells and insulin is basically a growth hormone that could help cancer cells grow.”

“If you don’t eat carbs — eat keto or low carb — the degree to which your blood sugar and insulin increase during the day will be much, much lower,” Kratz said, adding it makes “a lot of sense to minimize the availability of sugar and to minimize exposure to the growth hormone in insulin” for cancer patients. Kratz and SCCA lung cancer oncologist Renato Martins, MD, MPH, actually launched a small clinical trial nine months ago to investigate the effect of diet on treatment in newly diagnosed lung cancer patients.

“Our idea was to try to kill the cancer cells with drugs and at the same time use diet to withhold essential fuel and growth factors,” he said. “We thought there would be synergy between treatment and diet.”

Unfortunately, patients were either too overwhelmed to sign on to the trial or opted out when they learned they might end up on something other than keto. The trial was shut down due to lack of accrual.

Kratz still sees merit in investigating whether dietary hacks coupled with treatment can give patients a leg up on their cancer — if he can find the funding.

“If you eat a low-fat, whole foods vegan diet, there’s evidence you become more insulin sensitive and more glucose tolerant, which means your blood sugar doesn’t rise as much when you eat carbs,” he said. “Plus, it is much less restrictive than the keto diet.”

Both a high-fat/low-carb diet and a low-fat/high-carb diet could have benefits, he said, “because both would force people to stay away from unhealthy foods that combine fats and carbs, like potato chips, fries, cookies, cakes, ice cream, pies and pizza.”

(Learn more about clinical trials and how you can help research.)

Fear the fad, not the fat?

Until more data comes in, Neuhouser and company's review of dietary fat is a great primer on the benefits and harms of a ketogenic diet as well as a low-fat, high-carb regimen. Some key takeaways:

- **The quality of fats and carbs matter as much as the quantity**. In other words, there's a big difference between the nutritional value of broccoli versus that of a bagel. Ditto for fish and french fries.
- **Each of us is unique, especially with regard to glucose homeostasis** [maintaining steady blood sugar and low insulin]. Those with Type 2 diabetes may be much more suited, biologically, for a keto diet. Other people not so much.
- **Our bodies will respond to diets differently**. We each have unique metabolisms and microbiomes with "inherent or acquired biological differences … that affect response to specific diets."

Blanket diet recommendations are tricky. Right now, "Current evidence indicates that no specific carbohydrate-to-fat ratio in the diet is best for the general population," Neuhouser writes. Still, there is some consensus — avoid trans and most saturated fats; avoid high amounts of sodium; stay away from processed foods, particularly those with added sugars and refined grains — longstanding diet advice that many Americans still ignore.

Cancer patients need to be especially careful that they don't keto themselves into a corner. Some people may do well on a high-fat keto diet; others may experience significant side effects. Talk to your doctor (and most definitely talk to your oncologist) about whether a keto diet would be a good idea or a really bad idea.

Again, it's complicated. Not just by our own individual genetic quirks, but the fact that nutrition research is underfunded and challenging to conduct.

"Food is really complicated," said Neuhouser. "It's hundreds of thousands of food components — what we call the ingredient level and the whole food level — and then it can vary depending on how somebody cooks it: the temperature, the oil, the spices added. To be able to assess all of that across large populations is really difficult."

So, what the fat?

"If your goal is to quickly lose weight, then a low-carb, high-fat ketogenic type diet might work for

the short term," said Garnet Anderson, PhD, vice president and director of the Hutch's Public Health Sciences Division.

"But for long-term health, we need good data, which is hard to come by. The WHI diet trial suggested a low-fat diet may help reduce breast cancer risk but there are no other diet studies of sufficient quality to support overall health claims. But, avoiding fad diets is always good advice."

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