



KETO NATION

How bodybuilders, biohackers, scientists, nutrition nerds, and hucksters helped an extreme diet go mainstream.

BY MICHAEL EASTER | PHOTOGRAPHS BY THE VOORHES

GREYSON LOPEZ'S friend was about to be kicked out of the military for being too chubby. It was late 2017, and Lopez noticed his friend started losing weight—fast. “He’d lost 20 pounds in 20 days,” says Lopez, 23, who works in IT for the Navy. “So I asked, ‘How’d you do it?’”

Searching for a lose-it-quick plan, the rapidly becoming-less-fat guy explained, he’d gone to Reddit, where he glommed on to a thread on the “ketogenic diet.” People in the 870,000-strong /r/keto subreddit posted about losing 52 pounds in as many days, not feeling hungry, and even being able to focus better. However, the diet was, to put it mildly, contrarian in the same way you might say American politics is “divided.”

First, you eat very limited carbs. Low-carb isn’t radical, but ketogenic is ultralow: less than 50 grams a day. (The average American hits that at breakfast.) Fruit is mostly a no, and you strictly cap vegetables. Yes, vegetables.

Next, you’re limited to 100 grams a day, at most, of protein, that muscle-building nutrient embraced by nearly every other diet. What’s left? Fat. Lots of it: marbled steak, oily fish, yolky eggs, and streaky bacon. Top it all with butter, olive oil, and lard. A classic keto diet consists of 90 percent of calories from fat, 6 percent from protein, and 4 percent from carbs. The diet is, indeed, a giant F-U to the food pyramid.

But Lopez’s friend said the crazy diet was science-based: The absence of carbs and abundance of fat pushes your body into a biological state called ketosis, during which you burn fat instead of glucose. Lopez—who was five foot nine, 200 pounds, and “a bit portly”—was intrigued. His online digging led to the *Joe Rogan Experience* podcast. Rogan, a college dropout and self-described “silly bitch,” unpacks complex topics with no pretense. He was interviewing the top keto researcher, Dom D’Agostino, Ph.D.,

a professor of physiology at the University of South Florida.

“It was interesting to hear a scientist talk about what he eats and why,” says Lopez. D’Agostino is not a salesman, and he did not create the diet. Which raises the question: Who did? That’s when things get weird, involving a two-time felon, medical misconduct, and multiple deaths. But Lopez didn’t know about keto’s history. He just wanted to find out if the hype could be real. “I threw out all my carb-heavy foods, like ramen and Hot Pockets,” he says. “Then I grabbed as much bacon, grass-fed butter, and steak as I could find.”

WHAT MAKES A fad diet tip? That’s a question Adrienne Rose Bitar, Ph.D., a nutrition historian at Cornell University, has spent her career answering. “Most diets start with some unhappiness we have with our lives and bodies,” she says.

90%
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60%
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Keto Diet

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MILLIONS SERVED



Then you need a simple, counterintuitive message that resonates at the right time and place and blames a single culprit for your dissatisfaction. Low-fat diet: Fat is bad; don't eat fat. Paleo: Processed foods are bad; eat only preindustrial foods like a caveman. With keto, you just do what your doctor (and mom) told you not to: Eat fat and skip the veggies. While this partly explains keto's rise, it overlooks a critical aspect. The keto diet, it turns out, wasn't engineered for weight loss.

Fasting has been used as a treatment for epilepsy since 500 B.C. Your body usually runs on sugars harvested from the carbs you eat. You store around 2,000 calories' worth of sugars in your liver and muscles. Your body burns through that in about 48 hours, which is when an evolutionary survival mechanism kicks in. Your body switches to its stored fat, some of which is converted to a fuel called ketones.

This state is called ketosis (defined as registering 0.5 to 5 millimoles of ketones per liter of blood). In the early 1920s, Mayo Clinic doctor Russell Wilder, M.D., started tinkering with a fat-centric diet that mimicked the effects of fasting by depleting the body of sugar. He tested his "ketogenic" diet on people with epilepsy, and ever since, it's been an effective treatment for seizures.

Weight loss entered the fold in 1972, when Robert Atkins, M.D., published his first diet book. The first weeks of his eponymous diet centered on eating fat and very little carbs to induce ketosis, a "happy state... [in which] your fat is being burned off with maximum efficiency and minimum deprivation." That was how keto blipped on the radar of Stephen Phinney, Ph.D., an MIT-trained nutritional biochemist, who began researching this way of eating for endurance sports.

Then, in 1976, a ketosis-leveraging method called the Last Chance Diet took off. Its rule: You drink a fat- and protein-rich concoction until you lose your desired amount of weight. The diet's creator, osteopath Robert Linn, D.O., sold \$40 million worth of his elixir. But you were also supposed to have a physician's supervision to ensure you were getting the necessary vitamins and minerals, says Phinney. Few people did. Robbed of minerals, your body can't perform certain functions, like sending electrical impulses to your heart. As a result, the Last Chance Diet contributed to the deaths of at least 60 people. The fallout included new regula-

tions, a negligence lawsuit for Dr. Linn, and Phinney and his research on ketosis being banished to academic Siberia.

Still, Phinney forged on, conducting studies that, for example, showed that liquid ketogenic diets with adequate minerals don't cause heart problems. In 1988, Optifast emerged. Like the Last Chance Diet, it was a liquid diet, but with sufficient vitamins and minerals, plus a celebrity endorser: Oprah Winfrey. "She did it for four months," says Phinney. "One day she opened her show pulling a red wagon that contained 67 pounds of pig and beef fat. And she points to it and says, 'That's how much weight I've lost.'" The Oprah Effect was soon in full effect: Optifast immediately received more than 200,000 inquiries, and keto research surged in the early '90s.

That's when the diet was adopted by the hard-core bodybuilding underground. "I first heard about keto from this guy named Dan Duchaine," says D'Agostino, as did a handful of other key nutrition researchers interviewed for this story. Duchaine, who passed away in 2000, was a two-time felon credited with promoting the steroid movement of the '90s and, yeah, reviving keto as a way for bodybuilders to drop fat quickly for competition. And with the rediscovery of the Atkins diet in the 2000s, new generations of Americans warmed to the idea that low-carb could be a safe diet tool.

THE SCALING UP of keto starts with a study published in *Science* in January 2013. Scientists at the Gladstone Institute, a San Francisco-based research center, found that powerful antioxidant and anti-inflammatory genes are activated by beta-hydroxybutyrate, a ketone body produced when you limit calories or carbs. The keto diet could, as the press release put it, "slow the aging process and may one day allow scientists to better treat or prevent age-related disease, including heart disease, Alzheimer's, and many forms of cancer." Nutritionally woke biohack-

ers—interested in keto for fat loss, athletic performance, productivity, and longevity in equal parts—began to self-experiment.

Among them was Tim Ferriss, the Princeton-educated, Silicon Valley-based podcaster and author of *The 4-Hour Work Week*. He'd dabbled in keto—writing that it's "incredible for simultaneous fat loss and lean muscle gain, though perhaps needlessly complicated for non-athletes." In 2013, he posted to his blog a video of Peter Attia, M.D., a longevity expert. Dr. Attia talked about his battle with metabolic syndrome and how keto changed his body and health in ways exercise and vegetables could not. He revealed graph after graph plotting keto's positive impact on his triglycerides, cholesterol, and blood glucose levels.

Ferriss's one million monthly followers, people obsessed with data and anything that would give them a quantifiable edge, tested out the keto eating plan. Traditionally, diets were religious: halal, kosher, Lent. "Many diets were actually plans to purify the soul—and an impure soul meant you could go to hell," says Bitar. "But recently diet has become a means to creating an optimized self." In place of dogma, you have data. The number of people searching for the keto diet immediately doubled and continued to trend upward as other lifestyle gurus, like Dave Asprey and Mark Sisson, jumped aboard.

As keto's popularity increases, the medical establishment cautions that although the diet is considered safe when done right, the emphasis on saturated fat and the lack of nutrients may affect heart health over time. "We still don't have enough long-term evidence on what happens to your body after ten years of ketosis," says Stephan Guyenet, Ph.D., a nutrition researcher and author of *The Hungry Brain*.

Keto's other benefits—reduced hunger and increased focus—stoked the biohacker bros. "Keto does control hunger," says Guyenet. The driver, he says, may be the extreme nature of the diet. "Carbs and fat together stimulate dopamine release and

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activate motivational circuits in the brain that drive us to eat,” he says. Consider ice cream: It’s only so appetizing because it’s both sweet and fatty. As for the mental clarity that many advocates swear by? Controversial. Any effect is probably due to eating less junk food, which can cause a blood-sugar roller-coaster effect and impact mood, says Nicole Avena, Ph.D., a neuroscientist at Mount Sinai in New York City.

However, there are people for whom keto does deliver unique benefits: type 2 diabetics. Recent research by Phinney showed that those who followed a ketogenic diet and received diet counseling for a year significantly decreased diabetes-medication usage and lost an average of 30 pounds.

Thanks to the Internet telephone effect, the claims for keto became grander. Then something happened that pushed the diet to the top of Google News. On November 3, 2015, Ferriss aired a podcast with D’Agostino. “That is the tipping point of when the diet comes into the vernacular and zeitgeist of the country,” says Andy Galpin, Ph.D., a human-performance researcher at California State University, Fullerton.

The episode’s title: “Dom D’Agostino on Fasting, Ketosis, and the End of Cancer.”

Ferriss told the story of a friend with testicular cancer who would fast for three days, entering into ketosis, before chemotherapy. D’Agostino noted that anyone with cancer needs medical supervision of their diet, but also said: “If you put your physiology into a state of fasting ketosis, that puts tremendous metabolic stress on cancer cells that are highly dependent for survival and growth on high levels of glucose and insulin. By subtracting them of those growth needs, they can [die], and you could potentially purge yourself of some precancerous cells.” When asked about that quote, D’Agostino says, “The episode’s title is unfortunate,” but he points out that his research does suggest keto can help slow the progression of some cancers, though it speeds up others. “It’s much more complicated than ‘starve your cancer of sugar,’” he says. (Ferriss declined to be interviewed for this article.)

The Ferriss podcast was a gateway to *The Joe Rogan Experience*, and soon Rogan’s 30 million monthly listeners were hearing from keto experts, including D’Agostino in November 2017. As keto spread from Silicon Valley to the rest of the country, the emphasis shifted from self-optimization to the concerns of the everyman still working 40-hour weeks: weight loss.



KETO THRIVES IN the vortex of social media. It’s highly viral because it’s photogenic, offering swift results and dramatic before and afters on Instagram. “Short-term carbohydrate restriction can cause 5 to 10 pounds of almost immediate water loss,” says Galpin. And you have lots of data. Ketosis is a moving target: Some people lapse into it when they eat less than 20 grams of carbs a day, while others can eat up to 50. So you need to collect data and check your levels with a device. And because a single carrot can toss you out of ketosis, you need to quantify each meal, weighing your food and using a nutrition app to calculate the exact ratio of fats to proteins to carbs.

Within a year of the Rogan podcast, keto cookbooks flooded the market, searches for keto hit 17 million per month, and Orian Research estimated keto is a \$5 billion industry. A modified version, with 80 percent fat, 15 percent protein, and 5 percent carbs, has emerged as the most popular, and keto cycling (doing one week of keto per month) became a thing. And because people on keto often lack nutrients like vitamin C, magnesium, and fiber, there’s been a supplement gold rush for brands behind products that make staying on the diet easier.

Which brings us back to Lopez and the question: Does keto work for weight loss?

In the short term, yes. “But the weight-loss effects are primarily driven by the suppression of appetite, which in turn regulates calorie intake,” says D’Agostino. In other words: When you limit what you eat, you . . . limit what you eat. Weight-loss diets usually come down to eating less.

Consider the results of an influential 2018 study in *JAMA*. It found no significant difference in the amount of weight loss at one year between people who ate a low-fat diet and those on a low-carb diet. But the study’s results suggest an important factor about diets: individual preference. Some people lost 65 pounds; others on the same diet gained 20.

Greyson Lopez is now 12 months into his keto journey. “I’m down 50 pounds,” he says. His friend, meanwhile, bailed after three months, when a cross-country move made it hard to stay on keto. “The thing is, you can’t cheat, or it knocks you out of ketosis,” says Lopez. He prepares all his meals at home. A go-to is steak topped with butter and asparagus spears. Lopez plans on sticking to the diet, even though it makes him “that picky asshole” in social settings. “I recently listened to this debate on *Rogan* with D’Agostino and Layne Norton [Ph.D.], an expert who was more moderate,” he says. “And the conclusion was that the best diet is whatever diet works for you. Keto works for me.” ■