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Heart, Hope, Healing

Nutritional Ketosis: Heal and Protect Your Brain

BY KARYN SHANKS MD | OCTOBER 21, 2017



Nutritional Ketosis: yikes—that sounds foreign and scary—and *hard!* But it's not. In fact, nutritional ketosis is a powerful food strategy that supports energy and brain health, and is quite simple (though not *easy*—it requires, like all new habits, that thing we're *really* afraid of: *change*).

After many years of experimentation (food is one of my favorite playgrounds), I've figured it out, it's become second nature, and, most importantly, I accomplish what I'm after: good energy and a proven way to protect my future wellbeing.

For those who know me, I'm always preaching that there's no more important "bio-marker" for good health than how we *feel*. This is what motivates me the most to stick with a nutritional ketosis food plan. It supports my BIG energy—passion, purpose, enthusiasm, joy of life! And it passes my test for a science-based strategy for *sustaining* that energy, while

protecting my precious brain throughout my life.

Health Benefits of Nutritional Ketosis are Backed By Science

Most Americans are adapted to using sugar as the primary fuel for energy production because the Standard American Diet (SAD) is quite high in carbohydrates (sources of sugar), and relatively low in fat.

Our remote ancestors (think hunter gatherers, pre-agriculture foragers), on the other hand, for whom sugar was more scarce and famine was more likely, were much more adapted (by necessity) to using fat for energy production. We know that many hunter gatherer tribes (both ancestral and those still inhabiting the earth), were/are healthier than we are. This is due, in no small part, to differences in how we manufacture and use energy.

We inherited this genetic legacy from our hunter-gatherer ancestors and tend toward better health when we eat minimal amounts of sugar and plenty of health fat. There are no known health benefits of a high carbohydrate diet. Sugar-based energy metabolism is an adaptation to our modern diets that has many disadvantages and has led to our epidemic of chronic disease.

Science on the health benefits of nutritional ketosis (which is exploding right now) is exciting and promising for how this eating strategy supports our vital energy all the while protecting our brains. Nutritional ketosis helps create internal biological conditions that support the healing and protection from many chronic disease states—including vascular disease, diabetes, obesity, cancers, and the dreaded neurodegenerative diseases (Alzheimer's, Parkinson's, MS, seizure disorders, and age-related memory loss)—all conditions that leave people energy and neurologically depleted.

For those of us who consider ourselves to be in good health already, a nutritional ketosis eating strategy promises more energy, greater clarity, and a longer lifespan of potential and vitality.

Advantages of Nutritional Ketosis:

- Cleaner energy: less damaging “fallout” in the form of free radicals—the price we pay for using oxygen to make energy—called “oxidative stress.”
- *More* energy: in the form of ATP (chemical energy) production.
- Increases the number of mitochondria (where energy is made) within our cells.
- Changes genetic expression in favor of healing and protection of the brain.
- Reduced inflammation.
- Reduced glucose (a toxin in excess) and improved insulin sensitivity (helps drive

glucose into cells to reduce toxicity).

How are energy and the brain related?

As a high consumer of energy, the brain *thrives* on it, and is very sensitive to the fallout of impaired energy production. When we optimize how we create energy and manufacture it in a clean and efficient way, we nourish and protect the brain.

Nutritional Ketosis in My Life: Why I Care

As many of you know I crashed and burned in my mid-thirties with severe fatigue and a litany of annoying, debilitating symptoms. There were many key contributing factors, accumulated over years, finally colliding in a perfect storm of misery (or my “Universal Smackdown,” as my friends and I like to call it): the high stress of medical training and perfectionism, years of low-fat-high-carb-vegetarianism, two pregnancies back-to-back, and there’s more... but you get the picture. I gradually climbed my way out of that valley by discovering Functional Medicine and applying its principles to myself. While I changed many things about my life, how I ate was one of the most important.

I started with removing gluten, dairy, and processed foods from my diet and felt great. Over time, as my understanding of nutrition biochemistry evolved, I explored more deeply. I adopted a Paleo-style food plan after listening to nutrition pioneer, Loren Cordain, PhD, speak about the health benefits of ancestral diets. (Many of you know I hate the “Paleo” label because it’s a misnomer-like I want to eat *just like* ALL my ancestors? But I digress...) Along with this I focused on my intake of specific nutrients to support my energy. I felt even better.

I finally took on the challenge of eating few enough carbs and enough healthy fat to put myself into a state of nutritional ketosis (see below)-and stay there. This process took some exploring to make it work for me, but this is how I feel the best and keep my energy the most sustained.

My Family Legacy of Neurodegeneration

I am also concerned about my brain health as I age. My dad began to show signs of cognitive impairment in his sixties and was diagnosed with Parkinson’s Disease with a rapidly progressive dementia in his seventies. His dad suffered the same fate. Two generations of Parkinson’s and dementia. *This* has my rapt attention.

But I’m not destined to develop dementia like my dad and grandfather. I know key things about health and healing that they did not. I know how to use the promise of nutritional science-like nutritional ketosis-to change my genetic expression (this is called the science of epigenetics) and literally change-and improve-my energy and brain physiology. I can use food-both what I *eliminate* from my diet and what I choose to *include*-to enhance my energy and heal and protect my brain.

How Nutritional Ketosis Works: Basic Energy Chemistry

The making of energy in our bodies depends on the availability of small carbon molecules to use as fuel. We get these from glucose (sugar) and fatty acids (fat). Our energy chemistry extracts the energy from these carbon molecules and stores them, ultimately, as ATP (adenosine triphosphate), the form of chemical energy we use throughout our bodies. ATP sustains us, keeps us alive, and drives all the business of the body.

Diets high in fat and very low in sugar will lead to a fundamental shift in how we make energy. With sugar not available, we gradually adapt to using fat to make energy. To do this, the liver converts fatty acids derived from dietary fat or adipose tissue into ketones, hence, nutritional “ketosis.”

With nutritional ketosis, energy is made from fat instead of sugar.

We can intentionally shift from sugar-based energy metabolism to fat-based energy metabolism. We do this by simply reducing our carbohydrate intake and increasing fat intake sufficiently to increase ketone production.

Nutritional Ketosis is an Essential part of an Ultimate Brain Wellness Plan

Last week I posted the article, [Brain Food: Feed, Heal, and Protect Your Brain](#), in which I introduced the attributes of including Brain Food in our diets.

With nutritional ketosis we reduce carbs and increase healthy fats enough to induce ketosis (a shift to using fat instead of sugar for energy production). This shift to using ketones for energy amplifies the healing power of Brain Food.

A Nutritional Ketosis food plan includes:

- Inducing ketosis (see below) through modifying our dietary carbohydrate and fat intake.
- Eating Brain Food (see article) to support optimal brain nutrition.
- Avoiding food irritants (see No-Brainer Foods to Exclude) that damage structure and function of the brain.

You may notice that my version of a Nutritional Ketosis food plan is different than many others. That’s because I’m interested in much more than just getting into ketosis. I want to do it in the healthiest possible way, maintaining the nutrient density of the food I eat and recommend to others. I’m interested in the synergistic effects of ketosis *combined with* high-powered, nutrient-packed brain-energy foods.

How to Get Your Nutritional Ketosis Food Plan Started

If you eat a plant-based whole foods diet, are already following a “paleo” style food plan, an autoimmune or anti-inflammatory diet, or eat very few carbs, nutritional ketosis will not be hard for you to adapt to. If you are starting from an SAD, you will have more of a challenge ahead of you, but you’ll feel great—it’s totally worth it!

- *First: Get organized.* Read through the rest of this article, then prepare your grocery list and think about your menu. For help with the nuts and bolts work with a Functional Medicine Nutritionist (I know a fantastic one—see Resources below).
- *Consider your sources of healthy protein, fat, and carbohydrates.* These will be the mainstay of your diet until you shift into ketosis. Make a list of your favorites.
 - **Healthy protein** (pasture-raised meat, poultry, and eggs; wild-caught fish,).
 - **Healthy fat** (avocado, fatty fish—wild caught salmon, mackerel, herring, sardines—, pasture-raised meat, olives, olive oil, coconut oil, coconut cream, high-fat nuts—macadamia). High quality oils can be added to meat and vegetables for cooking or as dressings quite easily.
 - Low carbohydrate-high nutrient density plants you like (dark green leafy varieties, cruciferous vegetables, onions and garlic, fatty-olives, avocado).
- *Avoid these:*
 - Because I am concerned with total health, I do not generally recommend dairy products (a common immune system irritant) as fat sources.
 - Avoid all starchy vegetables initially (carrots, sweet and white potato, peppers, squash, tomatoes, peas, green beans. You may be able to eat small amounts once you’ve converted to ketosis without falling out.
 - Avoid all fruit initially. You may be able to add dark berries once you’ve transitioned fully into ketosis.
 - And, of course, avoid all the high-carb content beans, legumes, and grains.
 - Use with caution: nuts and seeds. These are common drivers of inflammation and have significant carbohydrate content.
- *Measure ketones:*
 - Obtain urine ketone strips (“ketostix”) to test urine for the presence of ketones. You can order these from Amazon.
 - Make note of your urine ketone readings from ketone strips: first morning, and 2-3 times throughout the day.
 - Note that any degree of + ketone results on the strips is evidence of being in ketosis—the readings do not have to be high.

- You may want to track your blood ketone levels, though this is more for geeks (like me) and not at all necessary. Ketone testing meters and test strips are available on Amazon. Ketone levels in the 0.6-1.5 mmol/l range are average once you have converted.
- *Count Carbohydrate grams:* In general you will be keeping carbohydrate intake to around 20-30 grams of “net carbs” (net carb grams=total carb grams minus total fiber grams).
- *Healthy Protein intake:*
 - Total daily protein needs: 0.5-0.8 grams protein per pound body weight, depending on activity level.
 - Sedentary: 0.5; Highly active 0.8. This will be your total daily protein intake.
- *Healthy Fat Intake:*
 - Total fat will likely need to be around 100 grams plus per day to achieve ketosis. This varies amongst individuals.
 - Divide approximately 100 grams of fat between your meals and the MCT oil you put in your morning beverage.
 - Use an organic source of MCT oil (medium-chained triglycerides derived from coconut oil) as an excellent fat supplement: start with 1 teaspoon per day in your morning tea, coffee, or water and gradually work up to 1 Tablespoon (or to “bowel tolerance”). Eventually you may use 1/2-1 Tablespoon 2-3 times per day to help drive ketosis and stave off potential hunger.
- *Drink plenty of water.* In fact, a quart more per day during the initial weeks will offset some of the water losses that result from the shift in metabolism.
- *I recommend an extra multi-mineral supplement to your usual regimen.*
 - We’ve found by doing food analysis in our Center that most ketogenic food plans are deficient in potassium and tend toward deficiencies in other minerals, including magnesium and zinc.
 - I use “Complete Minerals” by Designs for Health: 3 capsules per day.
- *Start a diary* and track your daily protein, fat and net carb intake. You will need to do this until you learn the macronutrient contents of the foods you commonly eat. You can use My Fitness Pal app for this, or a good old fashioned notebook, pen, and a chart from one of my articles (see below) or an internet source.
- *Be patient.* The process of shifting into ketosis may take several weeks, less for those already eating a low sugar, low carb diet.
- *Use supportive resources:* see below for list of cookbooks and game plans.

Intermittent Fasting Enhances Ketosis

I wrote about [intermittent fasting](#) recently as a great adjunct to the ketogenic diet. It enhances ketosis and makes it easier to achieve and sustain.

Intermittent fasting simply means that you lengthen your overnight fasting period and shorten the interval during the day when you eat your meals. It does not mean going a whole day or days without eating anything, and as I discussed in my article, I do not recommend this.

Lengthen your overnight fasting period from the usual 10-12 hours to as much as 16-18 hours. You may use MCT oil in your first morning beverage and may repeat as necessary to stave off hunger. This is a great way to drive ketosis without much effort.

Common Challenges and Solutions to the Ketogenic-Brain Food Plan

- *I'm bloated and constipated.*
 - This is common as the gut responds to reduced fiber, dehydration, increased fat:carb, or gut flora changes.
 - Add magnesium buffered chelate to your daily regimen: 150-300 mg once daily. Gradually increase dose as needed.
 - Be sure to take a daily probiotic with lactobacilli, bifidobacteria, and saccharomyces-15-30 billion organisms. You can also use small quantities of fermented vegetables.
 - Eat as many low net carb veggies as you can to increase fiber.
 - Stay well hydrated-remember, your fluid needs will be increased in the beginning.
- *My first morning ketones are always negative-what am I doing wrong?*
 - During an overnight fast the body will shift into "gluconeogenesis," as part of a stress response to the fast itself. The liver makes glucose which raises blood glucose levels and reduces ketones.
 - Increase the fat in your evening meals.
 - Take a serving of MCT oil at bedtime: 1 teaspoon to 1 Tablespoon.
 - Be patient-this will gradually shift as your body's energy metabolism changes.
- *I feel hungry all the time.*
 - This one always surprises me-what? with all that fat?
 - This is food plan is not about calorie restriction-eat your fill, please.

- *I feel weak and wimpy.*
 - This is to be expected during the first several weeks as you transition into using fat to make energy.
 - Take good care of yourself and be patient.
 - Some feel that supplementing with exogenous ketones makes them feel better during the transition. You can buy these on Amazon.
 - For those of us already eating relatively low carb, this is much less of a problem.
- *I'm having a hard time staying in ketosis, though am following the fat and carb guidelines.*
 - The overnight fast without fat may be stimulating gluconeogenesis (see above).
 - You may be eating too much protein—another stimulant for gluconeogenesis (via insulin release). Adjust your protein intake back and make sure net carbs stay low and fat high.
 - Step up exercise. Unplanned sedentary days will lead to reduced utilization of glucose stored in the liver. Exercise keeps stored glucose low and drives ketone production to maintain energy.
- *When I cheat it takes many days to a week to get back into ketosis.*
 - This will be true in the beginning stages of transition from sugar to fat energy metabolism.
 - Once you've been in ketosis for at least several weeks, you'll find that you'll recover ketosis quite rapidly after a cheat meal or higher carb day. I've been at this so long that I go right back in within several hours.
- *I'm just dying for a dessert!*
 - Blend a few frozen berries in coconut cream (skim the cream off full-fatted culinary coconut milk). Add a drop or two of stevia to sweeten, if desired.
 - Make fat bombs—delicious!
 - Have a few high-fat nuts, like macadamias.

Achieving and sustaining nutritional ketosis is a dance. Because of our unique genetics, physiologies, and preferences, each of our requirements to make this successful will be different.

If you are committed to giving nutritional ketosis a try, stick with it, document what you are doing, and hang in there. Allow your body enough time to adjust to the new way of making energy and try it on for awhile.

Resources:

Functional Medicine Nutrition: [Lisa Scranton, MS, RDN, LD](#). Contact her at [The Center for Medicine and Healing Arts](#).

Karyn Shanks, MD. [Exploring Nutritional Ketosis to Improve Energy](#). 2016.

Karyn Shanks, MD. [Brain Food: Feed, Heal, and Protect Your Brain](#). 2017.

Karyn Shanks, MD. [Intermittent Fasting: How it Energizes My True Life](#). 2017.

Karyn Shanks, MD. [Healing Foods: My Favorite Healthy Fats](#). 2016.

Karyn Shanks, MD. [Protein: How Much Do We Need to Support Optimal Health?](#) 2016.

[The Ultimate Start-Up Guide to the Ketogenic Diet](#). 2017.

Amanda Hughes. *The Wicked Good Ketogenic Diet Cookbook*. 2016.

Martina Slajerova. *Sweet and Savory Fat Bombs: 100 Delicious Treats for Fat Fasts, Ketogenic, Paleo, and Low-Carb Diets*. 2016.

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Karyn Shanks, MD, is a physician who lives and practices in Iowa City. Her work is inspired by the science of Functional Medicine, body-mind principles, and wisdom gleaned from the transformational journeys of thousands of clients over her twenty-five-year career. Her work honors each individual and the power of their stories, their inner wisdom, and innate healing potential. She believes that the bones of healing are in what we do for ourselves. She is the author of *Liftoff*, a manual of energy recovery and healing through essential self-care practices.

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