

The Ketogenic Diet



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What is Ketosis?

- The standard North American diet is relatively high in carbohydrates. Once carbohydrates are eaten they are quickly broken down into glucose which is then used by the body for energy. As a result, people who eat a standard North American diet get most of their energy directly from carbohydrates.
- If the diet changes from one that is high in carbohydrates to one that is higher in fat, the body will switch from using carbohydrates as its primary source of fuel, to instead burning fats for energy.
- When the body is using fats as its primary energy source, ketone bodies are produced and the person is said to be in a state of **ketosis**.
- This process of producing ketones will take anywhere from a few days to several weeks to develop after starting a ketogenic diet, depending upon each individual's metabolism.

What are Ketones?

- Ketones are water-soluble compounds that the body can use for energy when glucose levels in the blood are low. Ketones actually create more energy in the body compared to glucose and also produce less waste products and oxidative stress in their breakdown.
- There is evidence that, unlike healthy tissues, cancer cells cannot efficiently use ketones for energy. Ketones have been shown to slow the proliferation of tumor cells in animal models, however, large human trials are still needed to fully understand the effects of ketosis on cancer growth in humans.
- Studies that assess the impact of ketosis on outcomes of patients with brain cancer are limited to anecdotal case reports and retrospective series but have been positive; they have shown both reductions in tumor size and improvements in quality of life.
- Ketone supplements can be helpful in initiating ketosis and to alleviate symptoms of "keto flu" (see below). Talk with your naturopathic doctor to see if these might be indicated for you.

Ketogenic Diet

- The ketogenic diet has been used historically to treat seizures that do not respond to medication, especially in children. It has recently gained in popularity due to the wide range of potential health benefits including: decreased inflammation, increased energy and brain function, improved body composition and blood sugar management.
- A diet is ketogenic when it is very high in fat – high enough to cause a change in metabolism where fat is turned into ketones in order to make energy. In order for dietary fat to increase, carbohydrate intake will need to decrease. Protein intake should be kept at a low to moderate level.
- The general breakdown of a ketogenic diet is:
 - **60-80% of your calories from fats**
 - **10-30% of your calories from protein**
 - **5-10% of your calories from carbohydrates**
- Where you fall in the range depends on how active you are and how sensitive you are to carbohydrates and proteins. Therefore, the actual amount of fat and carbohydrate in the diet required to cause ketosis is unique to each person and their metabolism. However, most people will be in ketosis when eating about 20 grams of carbohydrate daily.
- Keto flu refers to the symptoms that some people experience when the body first transitions from a high carbohydrate burning state to a fat burning state. This is not an infection and typically lasts less than a week.
 - Symptoms of keto flu include: fatigue, sugar cravings, dizziness, difficulty focusing/brain fog, nausea, sleep disturbance, irritability, digestive upset.
 - Naturopathic support for the keto flu includes: lowering carbohydrate intake more slowly, drinking lots of water, considering the use of electrolyte replacement supplements, and regular exercise. Talk to your naturopathic doctor if you are experiencing any keto flu symptoms.

Measuring Ketones

- Measuring ketones is essential to determine whether or not you are truly in ketosis.
- Ketones can be measured in the blood (β -hydroxybutyrate), urine (acetoacetate) or breath (acetone)
 - **Breath** acetone testing is the least accurate and therefore is not commonly measured.
 - **Urine** acetoacetate testing is the least expensive method. It is useful for beginners, however, as you continue the diet long term, your body adapts and you may no longer spill ketones into your urine. Most urine dipsticks only tell you if you are in ketosis, however they don't tell you the level of ketosis. For urine, 0.5 mmol/L of urine acetoacetate is considered the minimum for ketosis. Urine ketone dipsticks can be purchased at most drug stores e.g. Ketostix brand.
 - **Blood** β -hydroxybutyrate testing is the most accurate however most expensive option. It uses a meter like a glucose meter, with a finger-prick and strip. At a minimum, a reading of 0.5 mmol/L means that you are in ketosis, whereas up to 5mmol/L would be considered deep ketosis. Some common brands are Freestyle Precision Xtra (meter and sticks), NovaMax, and KetoMojo.

Some Tips for Beginners

- Make sure you are eating enough calories from fat. One of the most common ketogenic diet mistakes is not eating enough healthy fats. Don't hesitate to increase fat intake to 70-80% of total calorie intake. Be generous with your fat intake. Healthy fats should comprise a major portion of every meal you eat so that your body can take those fats and turn them into ketones for energy. If you are feeling hungry after meals, increase your fat intake.
- Drink lots of water to avoid constipation. Ideally, you want to aim for half your bodyweight in ounces. For example, a 150 lb. person should try to drink 75 ounces (about 9 cups or 2.2 liters) of water throughout the day. You may need to add some electrolyte replacement to your water.
- Use a nutrient measuring App, like Cronometer, to help determine how many grams of carbohydrates, fat and protein you are having each day. This will be helpful when we start to increase your carbohydrate content while still on the diet.

Best Foods to eat on a ketogenic diet:

- Good fats: avocados, grass-fed butter/ghee, coconut oil, coconut milk, coconut butter, coconut flakes, MCT oil, SCT oil, pasture-raised eggs, olives and olive oil
- Non-starchy veggies and herbs: celery, cucumbers, spinach, kale, collard greens, broccoli, cauliflower, mustard greens, bok choy, Swiss chard, Brussel's sprouts, cabbage, ginger, turmeric, oregano, basil, thyme, cinnamon, rosemary, etc.
- Low-glycemic fruit: lemons and limes (as much as you like), berries (less than ¼ cup per day and keep track of overall net carbs).
- Clean proteins: grass-fed beef, wild-caught fish, organic poultry, wild game such as bison, lamb, elk, deer, duck, etc.
- Nuts/seeds: pumpkin seeds, hemp seeds, flax seeds, chia seeds, almonds, walnuts, macadamia nuts, pecans, etc. Nuts and seeds are always best when soaked and/or sprouted.
- Fermented foods: dill pickles, sauerkraut, kimchi, apple cider vinegar, coconut milk kefir, coconut milk yogurt, coconut water kefir (1/4 cup per day max and watch total carb count).
- Natural Keto sweeteners: monk fruit, stevia and sugar alcohols such as xylitol and erythritol. Xylitol and erythritol may cause digestive disturbances in large amounts, so be careful with these.

Helpful Resources

- Keto for Cancer book by Miriam Kalamian
- The Metabolic Approach to Cancer book by Nasha Winters
- The Ketogenic Kitchen book by Patricia Daly and Domini Kemp
- Patriciadaly.com for blog and recipes
- Healthfulpursuit.com for recipes
- Alldayidreamaboutfood.com for recipes, keto and gluten-free
- Ibreathimhungry.com for recipes