Understanding the Ketogenic Diet

The ketogenic diet is a therapeutic protocol used in nutrition therapy. It allows the body to burn its fat stores by starving cells of glucose and transitioning its fuel into fat or ketones.

The ketogenic diet is commonly used to address weight management, inflammatory conditions and cancer.
Overview

Normally, the human body uses glucose as its main energy source, which we get from food. We can’t store large amounts of glucose; we have about a 24-hour supply. When a person uses up their stored glucose, the body begins to burn stored fat.

A ketogenic diet forces the body to burn fat around the clock by keeping carbohydrates (sugars) low and making fat the primary food for the body’s metabolism.

Why and how do we make ketones?

- The body’s ability to make ketones is a vital evolutionary advantage
- The liver can take fat and select amino acids (the building blocks of proteins) and turn them into ketones, that first and foremost, feed our brains
- Our bodies’ ability to produce ketones is required for basic survival

Cells

- Normal cells have the metabolic flexibility to adapt from using glucose to using ketone bodies
- Cancer cells lack metabolic flexibility, so when you eliminate carbs, which turn into sugar, you effectively starve the cancer
Nutrients

- A ketogenic diet plan focuses mainly on healthy fats and quality proteins, with a remaining emphasis on carbohydrates coming from organic vegetables.
- The amount of carbohydrates, protein and fat consumption depends on weight, gender and amount of exercise.
- The balance of calories comes from fat.

The nutrient intake on a ketogenic diet typically works out to about 70-75% of calories from fat, 20-25% from protein, and 5-10% from carbohydrates on a daily basis. These ratios ensure that most people go into ketosis and stay there, which is the main objective of the ketogenic diet.

Why high fat and moderate protein?

Fats have no effect on blood sugar and insulin levels. Protein affects both blood sugar and insulin if large quantities are consumed. If you overeat protein, about 56% of any excess protein will be converted to glucose (sugar) in the body. The extra glucose hanging around will increase insulin and put the brakes on the body’s ability to release and burn fatty acids (go into ketosis).

Caloric Intake

Individual caloric intake varies on a bio-individual basis. An approximate example of a 2,000 calorie per day diet looks like this:

- Fats (9 calories/gram) = 165g or 1500 calories
- Proteins (4 calories per gram) = 100g or 400 calories
- Carbohydrates (4 calories per gram) = 25g or 100 calories.
What to expect when transitioning into a Ketogenic Diet

Responses to the ketogenic diet are widespread.

Some people feel almost instant benefits once they cut out inflammatory foods from their diets and switch to high quality whole foods. Some people experience uncomfortable symptoms that accompany the adaptation period, called keto-adaptation (or fat-adaptation) period. This transition usually lasts 1-2 weeks, although it can take as long as 4 weeks in some people.

Benefits may include:

- Increased energy
- Improved digestion
- Better concentration
- Improved mental/emotional state
- Higher quality sleep

Symptoms may include:

- Headache
- Fatigue
- Lack of concentration
- Weakness
- Light-headedness
- Dizziness
- Irritability
- Constipation or diarrhea
- Body aches
- Cold sweats
- Nausea
- Cravings

The key is to be patient, make sure you are drinking enough water, and make sure you eat at regular intervals – no longer than 3 hours between meals.
The presence of ketones can be assessed by home test kits of both urine and blood. While urine test strips are the easiest and most affordable option, blood testing is slightly more accurate.

### Urine Testing

- Ketostix Reagent Strips can be ordered from Bayer (online from retailers like Amazon)
- A negative reading indicates no ketones are present
- Trace (5 mg/dL), small (15 mg/dL), moderate (40 mg/dL) and large (80 to 100-plus mg/dL) are the four positive ranges, indicated by a pale pink (trace) through deep burgundy (large) color on the test pad
- You are in ketosis when readings are above 0.5 mmol/L

### Blood / Serum

- For serum testing, Precision Ultra Xtra test kit can be used
- Samples should be taken first thing in the morning, before food or drink
Healthy Fats (75%)

Avoiding fats and oils that are high in omega 6s while focusing on omega 3s is recommended across the board.

FOCUS ON THESE FATS:

- Organic raw nuts: pumpkin, sunflower, sesame, pecan, pistachio, almond, macadamia, brazil, walnut (no peanuts and cashews)
- Organic seeds: flax, chia
- Organic oils: flax oil, coconut oil, MCT oil, cold pressed extra virgin olive oil, avocado oil, toasted sesame oil
- Organic other: fresh and shredded coconut, coconut milk (canned), avocados, raw grass fed cheese, pastured butter, ghee, plain yogurt from grass-fed cows, goat or sheep, olives, fresh nut milks, butter.

AVOID THESE FATS:

- Fried foods
- Oils: hydrogenated and partially-hydrogenated oils, corn oil, soybean oil, cottonseed oil, vegetable oil, non-organic canola oil, margarine, Earth Balance
- Other: conventionally raised animal and animal bi-products (i.e. non-organic dairy, etc.)
#2 Protein (20%)

Proteins from clean sources help to keep blood sugar balanced, ensure proper functioning of detox pathways, and provide needed amino acids for cell and healthy hormone creation.

FOCUS ON THESE PROTEINS:

- Meat: 100% grass-fed & grass finished beef, organic and pasture raised chicken and turkey, New Zealand lamb
- Wild caught fish: salmon, halibut, mackerel, cod, haddock, sardines
- Seafood: fresh shellfish
- Other: organic eggs from pasture raised chicken, gelatin – great lakes brand, grass-fed whey protein powder (i.e. vital whey)

AVOID THESE PROTEINS:

- Cured or smoked meats such as ham, hot dogs, bacon, sausage, SPAM, and jerky - many contain sodium nitrate which have been shown to increase risk of cancer
- Charred or burnt meat products – the more well done a piece of meat, the higher the amount of carcinogens

* Look for seafood products certified by the Marine Stewardship Council.
* Recommendations can vary from person to person.
### #3

**Carbohydrates (5%) – a rainbow of vegetables:**

This means selecting produce that is in a variety of colors: red, orange, yellow, green, blue, and purple. The evidence in support of this recommendation is so strong it has been endorsed by U.S. government health agencies, and by virtually every major medical organization, including the American Cancer Society. Fermented versions of any of these vegetables are also excellent choices!

**Focus on the Following Families of Vegetables:**

<table>
<thead>
<tr>
<th>CRUCIFEROUS</th>
<th>DARK LEAFY GREENS</th>
<th>ONIONS</th>
<th>MUSHROOM</th>
<th>SEA</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy choy</td>
<td>Arugula</td>
<td>Chives</td>
<td>Cordyceps</td>
<td>Arame</td>
<td>Avocado</td>
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<tr>
<td>Broccoli</td>
<td>Beet greens</td>
<td>Garlic</td>
<td>Maitake</td>
<td>Bladderwrack</td>
<td>Asparagus</td>
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<td>Brussels Sprouts</td>
<td>Collard greens</td>
<td>Leeks</td>
<td>Mannentake</td>
<td>Dulse</td>
<td>Artichoke</td>
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<tr>
<td>Cabbage</td>
<td>Dandelion greens</td>
<td>Onion</td>
<td>Reishi</td>
<td>Kombu</td>
<td>Olives</td>
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<tr>
<td>Cauliflower</td>
<td>Endive</td>
<td>Scallions</td>
<td>Shiitake</td>
<td>Nori</td>
<td>Winter Squash</td>
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<tr>
<td></td>
<td>Kale</td>
<td></td>
<td></td>
<td>Sargassum</td>
<td>Cucumber</td>
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<td></td>
<td>Mixed greens</td>
<td></td>
<td></td>
<td>Wakame</td>
<td>Celery</td>
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<tr>
<td></td>
<td>Mustard greens</td>
<td></td>
<td></td>
<td></td>
<td>Fresh &amp; Dried</td>
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<tr>
<td></td>
<td>Radicchio</td>
<td></td>
<td></td>
<td></td>
<td>Herbs</td>
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<tr>
<td></td>
<td>Romaine</td>
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<tr>
<td></td>
<td>Red Leaf Lettuce</td>
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<td></td>
<td>Spinach</td>
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<tr>
<td></td>
<td>Swiss Chard</td>
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Consumption of starchy vegetables including: purple carrots, purple potato, beets, tomatoes should be kept to a minimum (rotation basis every 2-3 days).

**Beverages to add:** Green tea, filtered water, organic coffee, herbal teas (Tulsi), Kevita (daily cleanse flavor).

**Other foods to add:** Raw cocoa powder, cocoa nibs, apple cider vinegar, gluten free balsamic vinegar, coconut aminos, horseradish, capers, pickles, fermented vegetables.
Foods to Avoid

FOODS TO AVOID

Packaged, processed, fried, or fast foods: Anything that comes in a box, can, or package or has more than 4 ingredients.

Sugars & Artificial Sweeteners: refined white sugar, high fructose corn syrup, soda, energy drinks, and processed white flour.

Fruits: avoid all the fruits, except lemon and lime until ketosis has been achieved. At that point berries and green apples can be integrated.

WHY

The modern diet of processed foods, takeaways and microwave meals are partly to blame for the sharp increase in autoimmune diseases concluded a team of scientists from Yale University in the U.S and the University of Erlangen-Nuremberg, in Germany.

Cancer feeds on sugar. The German biologist Otto Heinrich Warburg won a Nobel Prize for his discovery that the metabolism of malignant tumors is largely dependent on glucose consumption.

In 2009, American Heart Association released guidelines for the recommended sugar intake:

- Adult women = 5 teaspoons (20 grams) of sugar/day
- Adult men = 9 teaspoons (36 grams) daily
- Children = 3 teaspoons (12 grams) a day

One teaspoon of granulated white sugar = four grams
<table>
<thead>
<tr>
<th>FOODS TO AVOID</th>
<th>WHY</th>
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<tbody>
<tr>
<td>All grains especially gluten-containing grains: wheat, barley, corn, kasha, oats, rye, spelt, kamut, quinoa, rice, etc.</td>
<td>Grains are 1) a carbohydrate which converts easily to glucose, 2) gluten is inflammatory and has been found to contribute to leaky gut, 3) in some cases – especially with corn – grains are genetically modified which have been shown to increase tumor growth.</td>
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<tr>
<td>Legumes - all beans, including soy, garbanzo, pinto, black, lentil, etc.</td>
<td>Beans contain lectins, which are sticky proteins that enter your small intestine and attach to the brush border. They are seen as foreign invaders by your immune system. Antibodies are created in response to the lectins, which the body is unable to differentiate from other healthy cells. This can lead the body to mount an autoimmune attack and increase systemic inflammation.</td>
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<td>Processed, unfermented, hormone treated dairy products – i.e. milk, cottage cheese, ice cream, creamers, non-organic cheeses.</td>
<td>Many people are allergic to dairy products and therefore cannot digest the milk sugars, causing increased blood glucose levels. Secondly, Recombinant Bovine Growth Hormone (rBGH) is a synthetic (man-made) hormone that is marketed to dairy farmers to increase milk production in cows. It has been used in the United States since it was approved by the Food and Drug Administration (FDA) in 1993, but its use is not permitted in the European Union, Canada, and some other countries. Some research has shown that rBGH can increase IGF-1, an inflammatory marker in the body.</td>
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<tr>
<td>Alcohol</td>
<td>Alcohol is hard on the liver, high in sugar, and is dehydrating. While there is some evidence that one glass of organic red wine a day is beneficial in some cases, for the most part it should be avoided due to the inherent sugar content.</td>
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Meet the School

Nutrition Therapy Institute has been leading innovative programs in holistic nutrition since 1999. Now being offered is the nation’s first board certified Oncology Nutrition Therapy Program for the prevention and management of cancer. Students gain extensive knowledge of nutrition related to the different types of cancer, food-based preventative approaches, therapeutic diet design, mechanisms of anticancer foods, supplements and interactions, laboratory assessments, conventional treatment approaches, and the management of side effects.

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