

APPENDIX A

Nutrition Basics

Let's define the basic terms nutritionists use in planning out healthy diets. What exactly do we mean when we talk about carbohydrate, protein, and fat? What are they for, and how much (or how little) of each should we be getting each day?

Good nutrition means getting these nutrients, along with fiber, vitamins, and minerals, not only in the right amounts, but also the right form. This section will help you understand the basics of the macronutrients (carbohydrate, protein, and fat) and fiber—why we need them, and what the most healthful choices are.

Carbohydrate

Carbohydrate is the main source of calories in a healthy diet. It is the primary fuel source for the brain and muscles and helps maintain nervous system function. Normally, your body stores a bit of carbohydrate in your muscles and liver as *glycogen*, which acts as a reserve energy source. Liver glycogen maintains blood glucose levels, but it is depleted within 18 hours if no carbohydrate is consumed. When that happens, your body can make carbohydrate from amino acids that are drawn from your muscles, but that means that your muscle mass will dwindle. Low-carbohydrate diets prevent the complete breakdown of fat, which leads to the production of ketones. During this time, the body goes to its fat stores for energy. People who are using ketones for energy (versus carbohydrates) experience bad breath, headaches, and fatigue. Plus, since our brain works exclusively on glucose, people not consuming enough carbohydrate may experience decreased mental functioning.

There are two types of carbohydrate: simple and complex. *Simple carbohydrates*, or sweets, are the quickest source of energy because they lack bulk (fiber). Because simple carbohydrates turn into glucose so quickly in our bloodstreams, they can be useful for someone having a hypoglycemic episode. However, for the most part, simple carbohydrates are discouraged because they are low in fiber, high in sugar, and low in vitamins and minerals, and they do not signal our brains that we've had enough to eat. You may have noticed that you're much more satiated with a snack of fat-free popcorn than you are with sugar candies. Some simple carbohydrates:

§ Table sugar § Fruit juices § Jams, jellies §
Molasses

§ Brown sugar § Honey § Maple syrup

Complex carbohydrates, on the other hand, are rich in fiber, more satisfying, more health-promoting because they are high in vitamins and minerals, important for proper digestion and elimination, and important for colon health and proper elimination. Some complex carbohydrates:

§ Vegetables § Fruits § Whole grains § Potatoes § Beans

Approximately 55–75 percent of daily calories should come from carbohydrate. For an average adult, that works out to about 275–375 grams of carbohydrate per day.

Fiber

Fiber is only found in plant foods. This is why vegetarians, particularly vegans, often have a high fiber intake. Fiber provides us with many benefits, including cancer prevention, as we saw in Section 2. Fiber intake is one of the reasons vegetarians have significantly lower rates of cancer, heart disease, and diabetes and are usually slimmer than other people. Fiber helps you to “fill up” so that you don’t “fill out.”

There are two types of fiber: insoluble and soluble. It’s important to have both insoluble and soluble fiber in your diet. Most foods contain a mixture of both fibers, and the two types are not usually differentiated on the food label.

Insoluble fiber is not readily metabolized by the bacteria in your intestinal tract and does not readily dissolve in water. It increases fecal bulk and decreases intestinal transit time. All plants, especially vegetables, wheat, wheat bran, rye, and rice are rich in insoluble fiber.

Soluble fiber dissolves or swells when it is put into water and is readily metabolized by intestinal bacteria. It has been shown to help lower cholesterol levels and slow down gastric emptying time (thus keeping you full longer). Beans, fruits, and oats are especially good sources of soluble fiber. Other examples of soluble fibers include guar gum and locust bean gum—these are found in salad dressings and jams.

Most health authorities recommended fiber intake in the range of 25–35 grams per day as a minimal goal, and, optimally, your goal should be about 40 grams.

The average American eats 14–15 grams a day, and vegetarians get two to three times that amount.

Here are the fiber contents of some common foods:

- 5 grams of fiber per serving: beans, pear with skin, raspberries, whole-wheat spaghetti, bran cereals
- 3 grams of fiber per serving: apple with skin, blueberries, corn, orange, potato with skin, strawberries
- 2 grams of fiber per serving: banana, broccoli, mango, mixed veggies, oatmeal, whole-grain bread, peach

Increase your fiber intake slowly, and increase water intake as well.

Protein

Protein is needed to build and repair muscles, bones, skin, and blood; regulate hormones and enzymes; and help fight infection and heal wounds. It is also an integral part of genes and chromosomes.

The building blocks of protein are called *amino acids*. The body can synthesize some amino acids; others must be ingested from food. Of the 20 or so different amino acids in the food we eat, our bodies can make 11. The 9 remaining amino acids are called *essential amino acids*—that is, the body cannot produce them, and they must be obtained from the diet.

It is remarkably easy to get enough protein. A variety of grains, legumes, and vegetables can provide all of the essential amino acids our bodies require. It was once thought that, to get their full protein value, various plant foods had to be consumed together, a practice known as protein combining or protein complementing. However, researchers have found that intentional combining is not necessary. As long as the diet contains a variety of grains, legumes, and vegetables, protein needs are easily met.

Approximately 10–15 percent of daily calories should come from protein—protein needs depend on body weight and increase with activity level and body stress (such as tissue repair, medical treatments, etc.). Like carbohydrates, there are 4 calories in 1 gram of protein. All foods except pure fats, sugars, and fruits contain protein. The Recommended Dietary Allowance (RDA) for protein for the average, sedentary adult is only 0.8 grams per kilogram of body weight, with protein needs increasing only slightly with more activity. To find out your average individual need, simply perform the following calculation:

- Body weight (in pounds) $\times 0.36$ = recommended protein intake (in grams)
- Example:
 - A person who weighs 150 lbs. needs 54 grams of protein per day.
 - What does 54 grams of protein taste like?
 - § 1 bowl of Raisin Bran and 1 cup soymilk (12 grams) +
 - § 1 veggie burger and whole-wheat bun (20 grams) +
 - § 1 cup pasta with 1 cup assorted vegetables and beans (22 grams) = 54 grams of protein.

The most protein-rich plant foods are listed in the table on the following page. Of all plant foods, legumes (beans, peas, and lentils) are more nutrient dense and easily supply a substantial amount of protein. Most varieties of legumes are about 25 percent protein and yield approximately 15 grams of protein per cup. But don't think that beans have a patent on protein. Wheat noodles contain substantial amounts; some varieties have about 10 grams of protein in every two ounces of dry pasta, and that's before you figure in any toppings.

Higher-Protein Plant Foods (serving size: 1 cup)			
	Calories	Protein (g)	Fat (g)
LEGUMES (cooked)			
Baked beans (vegetarian)	235	12.2	1.1
Black beans	227	15.2	0.9
Chickpeas	285	11.9	2.7
Kidney beans	225	15.4	0.9
Lentils	231	17.9	0.7
Pinto beans	235	14.0	0.9
Split peas	231	16.4	0.8
SOYBEAN PRODUCTS			
Soymilk	140	10.0	4.0

Tempeh burger (1 burger)	110	12.5	3.2
Textured vegetable protein (prepared)	120	22.0	0.2
Tofu (firm)	366	39.8	22.0
BREAKFAST CEREALS			
All Bran	213	12.0	1.5
Grape-Nuts	416	12.4	0.4

Fat

Fat is the most concentrated source of calories in the food you eat. Any sort of fat—chicken fat, fish fat, beef fat, or vegetable oil—has 9 calories per gram, more than twice the calorie content of carbohydrate or protein. Most health authorities recommend that fat intake not exceed 30 percent of your calories. This means that a person consuming 2000 calories per day should have less than 60 grams of fat per day.

However, research has shown that the lower your fat intake, the better your chances of warding off heart disease and cancer and keeping your waistline slim.

Fats are made up of a combination of *fatty acids*, which can be *monounsaturated*, *polyunsaturated*, or *saturated*. All fats contain some of each of these three, but health authorities have long recommended minimizing saturated fats because of their tendency to raise cholesterol levels. Animal products are generally very high in saturated fatty acids whereas vegetable oils are generally much lower in this type of fat. There are a few exceptions: coconut oil, palm oil, and palm kernel oil are quite high in saturated fat.

Foods high in monounsaturated fatty acids and low in saturated fatty acids include:

- § Olives, olive oil
- § Almonds, almond oil, almond butter
- § Canola oil (also called rapeseed oil)
- § Hazelnuts (also called filberts)
- § Peanuts, peanut oil, natural peanut butter
- § Avocados

Foods high in polyunsaturated fatty acids include:

- § Sesame seeds, sesame oil, sesame butter
- § Sunflower seeds, sunflower oil
- § Safflower oil
- § Corn oil
- § Walnuts, walnut oil
- § Soybeans and soy products (tofu, tempeh, TVP)
- § Flax seeds, flax seed oil

Foods high in saturated fatty acids include:

- § Foods of animal origin (beef, pork, lamb, poultry, eggs, milk, butter, cheese, sour cream, etc.)
- Tropical oils, such as coconut, palm, and palm kernel oils
- Chocolate, cocoa butter

Fat is necessary for structure and maintenance of cells and hormones, healthy skin and hair, and the metabolism of fat-soluble vitamins (A, D, E, and K). As long as we consume enough calories, we can synthesize fat from surplus protein and carbohydrates. However, there are two *essential fatty acids* that we need to obtain from our diet. They are alpha-linolenic acid (an omega-3 fatty acid) and alpha-linoleic acid (an omega-6 fatty acid). Both are important in the normal functioning of all tissues of the body. Deficiencies are responsible for a host of symptoms and disorders, including abnormalities in the liver and kidney, changes in the blood, reduced growth rates, decreased immune function, and skin changes, including dryness and scaliness. Adequate intake of the essential fatty acids results in numerous health benefits. Prevention of atherosclerosis, reduced incidence of heart disease and stroke, and relief from the symptoms associated with ulcerative colitis, menstrual pain, and joint pain have also been documented.

Most people consume too many omega-6 fatty acids and too few omega-3 fatty acids. It's important to maintain a balance of these two. Omega-6 fatty acids are present in higher concentrations in many foods, whereas omega-3 fatty acids are not as widespread. Beans, vegetables, fruits, and vegetables do contain omega-3 fatty acids, but the most concentrated plant sources include canola oil, flaxseeds, wheat germ, soybeans, and walnuts.