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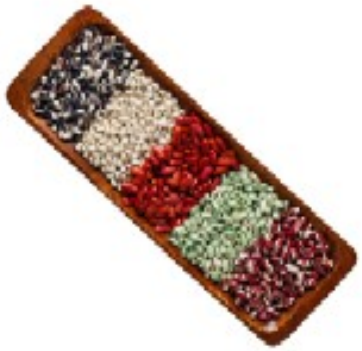
Fiber

Fiber

Start Roughing It!



Fiber is one of those nutrients that many of us know is important but that remains a bit of a mystery. Exactly what is it? What are the best sources of fiber? And what are its health benefits? Here we try to answer these and other questions.

Basically, the term fiber refers to carbohydrates that cannot be digested. Fiber is present in all plants that are eaten for food, including fruits, vegetables, grains, and legumes. However, not all fiber is the same, and there are a number of ways to categorize it. One is by its source or origin. For example, fiber from grains is referred to as cereal fiber. Another way of categorizing fiber is by how easily it dissolves in water. Soluble fiber partially dissolves in water. Insoluble fiber does not dissolve in water. These differences are important when it comes to fiber's effect on your risk of developing certain diseases.

Sources of Fiber	
Soluble Fiber	*Insoluble Fiber*
oatmeal oatbran nuts and seeds legumes • dried peas • beans • lentils apples pears strawberries blueberries	whole grains (for more information on whole grains, click here) • whole wheat breads • barley • couscous • brown rice • bulgur whole-grain breakfast cereals wheat bran seeds carrots cucumbers

	zucchini celery tomatoes

Current recommendations suggest that adults consume 20-35 grams of dietary fiber per day. Children over age 2 should consume an amount equal to or greater than their age plus 5 grams per day. Yet the average American eats only 14-15 grams of dietary fiber a day.

Health Effects of Eating Fiber

Long heralded as part of a healthy diet, fiber appears to reduce the risk of developing various conditions, including heart disease, diabetes, diverticular disease, and constipation. Despite what many people may think, however, fiber probably has little, if any effect on colon cancer risk.

Fiber and colon cancer

For years, Americans have been told to consume a high-fiber diet to lower the risk of colon cancer - mainly on the basis of results from relatively small studies. Larger and better-designed studies have failed to show a link between fiber and colon cancer. One of these - a Harvard study that followed over 80,000 female nurses for 16 years - found that dietary fiber was not strongly associated with a reduced risk for either colon cancer or polyps (a precursor to colon cancer).(1)

But just because fiber plays little role in preventing colon cancer doesn't mean you should abandon a high-fiber diet. As explained below, fiber provides many other benefits.

Fiber and heart disease

In the United States, coronary heart disease is a leading cause of death for both men and women. This disease is characterized by a buildup of cholesterol-filled plaque in the coronary arteries - the arteries that feed the heart. This causes them to become hard and narrow, a process referred to as atherosclerosis. Total blockage of a coronary artery produces a heart attack.

High intake of dietary fiber has been linked to a lower risk of heart disease in a

number of large studies that followed people for many years.(2, 3) In a Harvard study of over 40,000 male health professionals, researchers found that a high total dietary fiber intake was linked to a 40 percent lower risk of coronary heart disease, compared to a low fiber intake.(4) Cereal fiber, the fiber found in grains, seemed particularly beneficial. A related Harvard study of female nurses produced quite similar findings.(5)

Fiber intake has also been linked with the metabolic syndrome, a constellation of factors that increases the chances of developing heart disease and diabetes. These factors include high blood pressure, high insulin levels, excess weight (especially around the abdomen), high levels of triglycerides, the body's main fat-carrying particle, and low levels of HDL (good) cholesterol. Several studies suggest that higher intake of fiber may somehow ward off this increasingly common syndrome.(6, 7)

Fiber and type 2 diabetes

Type 2 diabetes is the most common form of diabetes. It is characterized by sustained high blood sugar levels. It tends to develop when the body can no longer produce enough of the hormone insulin to lower blood sugar to normal levels or cannot properly use the insulin that it does produce. (For more information on type 2 diabetes, see the Carbohydrates and Diabetes pages.) There are several important factors that may help lower your risk for type 2 diabetes, such as maintaining a healthy weight, being physically active, and not smoking. Researchers are also trying to pinpoint any relevant dietary factors, one of which seems to be a high-fiber diet. The studies of male health professionals and female nurses both found that a diet high in cereal fiber was linked to a lower risk of type 2 diabetes.

When it comes to factors that increase the risk of developing diabetes, a diet low in cereal fiber and rich in high glycemic index foods (which cause big spikes in blood sugar) seems particularly bad. Both Harvard studies - of nurses and of male health professionals - found that this sort of diet more than doubled the risk of type 2 diabetes when compared to a diet high in cereal fiber and low in high glycemic index foods.(8-10)

Foods that have a high glycemic index include potatoes, refined foods such as white bread, white rice, refined cereals (corn flakes, Cheerios), white spaghetti, and sugar. Foods with a low glycemic index do not raise blood sugar levels as quickly and, therefore, are associated with a lower risk of type 2 diabetes. Low glycemic index foods include legumes, whole fruits, oats, bran, and whole-grain cereals. For more information on glycemic index, see the Carbohydrates page.

Fiber and diverticular disease

Diverticulitis, an inflammation of the intestine that in Western society is one of the most common disorders age-related disorders of the colon. In North America, this painful disease is estimated to occur in one-third of all those over age 45 and in two-thirds of those over age 85. Among male health professionals in a long-term follow-up study, eating dietary fiber, particularly insoluble fiber, was associated with about a 40 percent lower risk of diverticular disease.(11)

Fiber and constipation

Constipation is the most common gastrointestinal complaint in the United States and is of particular concern to the elderly. The gastrointestinal tract is highly sensitive to dietary fiber, and consumption of fiber seems to relieve and prevent constipation. The fiber in wheat bran and oat bran seems to be more effective than similar amounts of fiber from fruits and vegetables. Experts recommend increasing fiber intake gradually rather than suddenly. The intake of beverages should also be increased, as fiber absorbs water.

Wondering how much water or other beverages you should drink a day? The Institute of Medicine's Food and Nutrition Board gives the following general recommendations for water consumption: Women generally need to consume 91 ounces of water each day from beverages and foods, while men generally need to consume 125 ounces each day. People typically obtain about 80 percent of their water from beverages (including beverages that contain caffeine) and 20 percent of their water from foods. So for women, that translates into drinking 9 8-oz. glasses of water or other beverages each day and obtaining another 18 ounces of water from foods; for men, that translates into drinking roughly 12 8-oz. glasses of water or other beverages each day, and obtaining another 25 ounces of water from foods.

The Bottom Line Recommendations for Fiber Intake

Fiber is an important part of a healthy diet, and you should get a least the minimum recommended amount of 20-35 grams of dietary fiber per day for adults. For children over age 2, the recommended intake is the child's age + 5 grams. The best sources are fresh fruits and vegetables, nuts and legumes, and whole-grain foods.

Some tips for increasing fiber intake:

- **Eat whole fruits instead of drinking fruit juices.**
- **Replace white rice, bread, and pasta with brown rice and whole-grain products.**
- **Choose whole-grain cereals for breakfast.**
- **Snack on raw vegetables instead of chips, crackers, or chocolate bars.**
- **Substitute legumes for meat two to three times per week in chili and**

soups.

- **Experiment with international dishes (such as Indian or Middle Eastern) that use whole grains and legumes as part of the main meal (as in Indian dahls) or in salads (for example, tabbouleh).**

References

1. Fuchs CS, Giovannucci EL, Colditz GA, et al. Dietary fiber and the risk of colorectal cancer and adenoma in women. N Engl J Med 1999; 340:169-76.

2. Pereira MA, O'Reilly E, Augustsson K, et al. Dietary fiber and risk of coronary heart disease: a pooled analysis of cohort studies. Arch Intern Med 2004; 164:370-6.

3. Van Horn L. Fiber, lipids, and coronary heart disease. A statement for healthcare professionals from the Nutrition Committee, American Heart Association. Circulation 1997; 95:2701-4.

4. Rimm EB, Ascherio A, Giovannucci E, Spiegelman D, Stampfer MJ, Willett WC. Vegetable, fruit, and cereal fiber intake and risk of coronary heart disease among men. JAMA 1996; 275:447-51.

5. Brown L, Rosner B, Willett WW, Sacks FM. Cholesterol-lowering effects of dietary fiber: a meta-analysis. Am J Clin Nutr 1999; 69:30-42.

6. McKeown NM, Meigs JB, Liu S, Saltzman E, Wilson PW, Jacques PF. Carbohydrate nutrition, insulin resistance, and the prevalence of the metabolic syndrome in the Framingham Offspring Cohort. Diabetes Care 2004; 27:538-46.

7. McKeown NM, Meigs JB, Liu S, Wilson PW, Jacques PF. Whole-grain intake is favorably associated with metabolic risk factors for type 2 diabetes and cardiovascular disease in the Framingham Offspring Study. Am J Clin Nutr 2002; 76:390-8.

8. Fung TT, Hu FB, Pereira MA, et al. Whole-grain intake and the risk of type 2 diabetes: a prospective study in men. Am J Clin Nutr 2002; 76:535-40.

9. Liu S, Willett WC, Stampfer MJ, et al. A prospective study of dietary glycemic load, carbohydrate intake, and risk of coronary heart disease in US women. Am J Clin Nutr 2000; 71:1455-61.

10. Schulze MB, Liu S, Rimm EB, Manson JE, Willett WC, Hu FB. Glycemic index, glycemic load, and dietary fiber intake and incidence of type 2 diabetes in younger and middle-aged women. Am J Clin Nutr 2004; 80:348-56.

11. Aldoori WH, Giovannucci EL, Rockett HR, Sampson L, Rimm EB, Willett WC. A prospective study of dietary fiber types and symptomatic diverticular disease in men. J Nutr 1998; 128:714-9.

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