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Dietary fiber

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Quick Facts

Fiber is helpful in the prevention and treatment of constipation, hemorrhoids and diverticulosis.

Water soluble fiber helps decrease blood cholesterol levels and slows the absorption of sugars, an aid to diabetics.

Foods containing dietary fiber include fruits, vegetables, nuts and grains.

A variety of high-fiber foods should be included in the diet.

Can high-fiber diets really do all they claim to do? Studies have looked at the relationship between high-fiber diets and many diseases including colon cancer, coronary heart disease and diabetes. Proven benefits of a high-fiber diet include the prevention and treatment of constipation, hemorrhoids and diverticulosis. In addition, certain types of fiber help decrease blood cholesterol levels and slow the absorption of sugars, which is important for people with high blood cholesterol and diabetes.

What is Dietary Fiber?

Dietary fiber comes from the portion of plants that is not digested by enzymes in the intestinal tract. Part of it may, however, be metabolized by bacteria in the lower gut. Different types of plants have varying amounts and kinds of fiber including pectin, gum, mucilage, cellulose, hemicellulose and lignin. Pectin and gum are **water soluble fibers** found inside plant cells. They slow the passage of food through the intestines but do nothing to increase fecal bulk. Beans, oat bran, fruit and vegetables contain soluble fiber. In contrast, fibers in the cell walls are **water insoluble**. These include cellulose, hemicellulose and lignin. Such

fibers increase fecal bulk and speed up the transit time through the digestive tract. Wheat bran and whole grains contain the most insoluble fiber, but vegetables and beans also are good sources. Sometimes there is confusion as to the difference between crude fiber and dietary fiber. Both are determined by a laboratory analysis, but crude fiber equals only one seventh to one half of total dietary fiber. When reading food labels, check which type of fiber is listed. It is the dietary fiber that is of interest to people concerned about the amount of fiber in their diet.

Benefits of Fiber

Insoluble fiber binds water, making stools softer and bulkier. Therefore, fiber, especially that found in whole grain products, is helpful in the treatment and prevention of constipation, hemorrhoids and diverticulosis. Diverticula are outpouchings of the intestinal wall that can become inflamed and painful. In the past, a low-fiber diet was prescribed for this condition, but it is now known that a high-fiber diet gives better results.

Low cholesterol levels (below 200 mg/dl. blood) have been associated with a reduced risk of coronary heart disease. The body eliminates cholesterol through the excretion of bile acids. Water soluble fiber binds bile acids, suggesting that a high-fiber diet may result in an increased excretion of cholesterol. Some types of fiber, however, appear to have a greater effect than others. The fiber found in rolled oats is shown to be more effective in lowering blood cholesterol levels than the fiber found in wheat. Pectin has a similar effect in that it too can lower the amount of cholesterol in the blood.

People with diabetes also can benefit from some types of fiber, especially pectin. A high-fiber diet may slow the rate of glucose absorption,

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which helps to regulate blood sugar levels. As with most diseases, several factors must be considered. Heredity and obesity also have an effect on both coronary heart disease and diabetes.

Other claims for fiber are less well founded. Dietary fiber may help reduce the risk of some cancers, especially colon cancer. This idea is based on information that insoluble fiber increases the rate in which wastes are removed from the body. This means the body may have less exposure to toxic substances produced during digestion. A diet high in animal fat and protein also may play a role in the development of colon cancer.

High-fiber diets may be useful for people who wish to lose weight. Fiber itself has no calories yet provides a "full" feeling because of its water absorbing ability. For example, an apple is more filling than one half cup apple juice that contains about the same number of calories. In addition, foods high in fiber often require more chewing so a person is unable to eat a large number of calories in a short amount of time.

Sources of Fiber

Dietary fiber is found only in plant foods—fruits, vegetables, nuts and grains. Meat, milk and eggs do not contain fiber. The form of food may or may not affect its fiber content. Canned and frozen fruits and vegetables contain just as much fiber as in the raw state. Other types of processing, though, may reduce the fiber content of foods. Drying and crushing destroys the water-holding qualities of fiber. The removal of seeds, peels or hulls also reduces fiber content. For example, whole tomatoes have more fiber than peeled tomatoes, which have more than tomato juice. Likewise, whole wheat bread contains more fiber than white bread. Table 1 lists the dietary fiber content of some common foods.

How Much Fiber?

Currently no Recommended Dietary Allowances (RDAs) for fiber exist. The average American consumes 20 grams of dietary fiber per day. People with high cholesterol levels, diabetes or diverticulosis may benefit from a diet that contains up to 40 grams per day. For many people this requires major changes in eating habits. The use of whole grains, fruits, vegetables and dried beans must be greatly increased. These changes should be done gradually to avoid problems with gas and diarrhea. Anyone with a chronic disease should consult a physician before greatly altering a diet.

Although fiber is important, it is just one part of a properly balanced diet. It is possible that too much fiber may reduce the amount of calcium, iron, zinc, copper and magnesium that is absorbed from foods. Deficiencies of these nutrients could result if the amount of fiber in the diet is excessive, especially in young children.

Fiber supplements are sold in a variety of forms from bran tablets to purified cellulose.

Many laxatives sold as stool softeners actually are fiber supplements. At the present time fiber's role in the diet is still being investigated. It appears that the various types of fiber have different roles in the body. For these reasons, fiber supplements should be avoided. Instead, a variety of fiber-rich foods should be eaten. This is the best way to receive the maximum benefits from each type of fiber present in foods, and obtain necessary nutrients.

References

Burkitt, Denis P. The Link Between Low-Fiber Diets and Disease. *Human Nature*. December, 1978.

McNutt, Kristen W. Perspective—Fiber. *Journal of Nutrition Education* 8:150-152. 1976.

Paul, A. A., D. A. T. Southgate. McCance and Widdowson's 4th Revised Edition of MRC Special Report No. 297. 1978.

Story, J. A. Dietary Fiber in Health and Disease. *Lillian Fountain Smith 1981 Conference Proceedings*. p. 125-134. 1981.

Weinger, J. and G. M. Briggs. Nutrition Update. *Journal of Nutrition Education*. 8:172-174. 1976.

Table 1: Dietary fiber content of foods.

Breads, cereals, grains	Serving size	Fiber (grams)
White bread	1 slice	0.7
Whole grain bread	1 slice	2.1
100% All Bran	1/3 cup	5.1
Corn flakes	3/4 cup	2.3
Shredded Wheat	1 biscuit	3.1
Oatmeal, cooked	1 cup	1.9
Rice, brown, cooked	1/3 cup	1.6
Rice, white, cooked	1/3 cup	0.5
Fruits		
Apple	1/2 large	2.0
Apricots	2	1.4
Banana	1/2 medium	1.5
Blackberries	1/2 cup	5.3
Dates	2	1.6
Grapes	10	0.5
Grapefruit	1/2	0.6
Melon	1 cup	1.5
Nectarine	1	3.3
Orange	1 small	2.0
Peach	1	1.6
Pear	1/2 medium	2.0
Pineapple	1/2 cup	0.8
Plums	3 small	1.8
Prunes	2	2.4
Raisins	1 1/2 T.	1.0
Strawberries	1 cup	3.1
Vegetables		
Beans, baked	1/2 cup	9.3
Beans, green	1/2 cup	2.1
Beets	1/2 cup	2.1
Broccoli	1/2 cup	3.5
Cabbage	1/2 cup	2.1
Carrots	1/2 cup	2.4
Cauliflower	1/2 cup	1.6
Celery	1/2 cup	1.1
Corn	1/2 cup	4.7
Lentils, cooked	1/2 cup	3.7
Lettuce	1 cup	0.8
Peas	1/2 cup	5.4
Potato, baked	1/2 medium	1.9
Sweet potato	1/2 medium	2.1
Tomato	1 small	1.5
Winter squash	1/2 cup	3.5
Zucchini squash	1/2 cup	2.0
Meat, milk, eggs		0
Nuts		
Almonds	2 T.	2.2
Peanuts	2 T.	1.5
Walnuts	2 T.	0.8