Food, Dietary Fiber and You

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Dietary fiber has become a popular topic in the past few years. Research has focused on the role that dietary fiber can play in the prevention and treatment of diabetes, cardiovascular disease, diverticular disease, and even cancer. The American Diabetes Association, American Dietetic Association, National Academy of Sciences, American Cancer Society, United States Department of Agriculture, and Department of Health and Human Services have all included increasing fiber in their nutrition recommendations.

The 1989 Surgeon General's Report on Nutrition and Health recommendation is to "increase consumption of whole grain foods and cereal products, vegetables (including dried beans and peas) and fruits."

Surgeon General's ... recommendation is to increase consumption of [fiber].

Dietary fiber is a more accurate measure of the amount of undigestible fiber in foods. While crude fiber may be reported on some food labels, it will be less than the amount of dietary fiber available. There are two main types of dietary fiber available in foods: soluble and insoluble fiber. Each type has more than one component (lignin, cellulose, hemicellulose, pectin, gums). Foods vary in the type and components of fiber that they contain. The components and their effects are described in the table. They appear to act in different ways in the body. For example, soluble fibers like pectins and guar gum can help

Fiber: What is it?
Fiber refers to that portion of a plant that cannot be broken down by the human digestive tract. There are two methods used to measure fiber. One gives crude fiber and the other gives dietary fiber.
lower serum cholesterol while insoluble fibers like cellulose may help prevent colon cancer. Both types absorb water and can combat constipation by softening the stool.

Dietary Fiber and the Gastrointestinal Tract

The primary effects of fiber that occur in the gastrointestinal tract begin with the mouth, and progress through the stomach and intestines. Fiber exerts its main effects by drawing water into the tract. In the mouth, chewing foods high in fiber can lead to a feeling of fullness. In the stomach, fiber can slow the movement of food into the small intestines causing a full feeling. Fiber in the colon (large intestine) can increase the stool size and act as a laxative to help relieve constipation. In contrast, fiber can normalize stools in persons with diarrhea by absorbing water.

Dietary Fiber, Cholesterol, and Heart Disease

Considerable attention has been paid recently to the effect of fiber on lowering cholesterol levels. Only the soluble fibers appear to have this effect. Fiber components like gums in oats and dried beans can lower cholesterol, while components like cellulose in wheat bran do not. The mechanism by which some fibers lower cholesterol is not completely understood. One theory is that soluble fibers decrease the reabsorption of bile acids (byproducts of cholesterol breakdown) in the intestines. The decreased reabsorption may increase the amount of cholesterol that is excreted from the body.

Research has shown that the cholesterol-lowering effect of dietary fiber appears to be greatest in those persons who already have an elevated cholesterol level. The use of soluble dietary fiber works best when combined with a low cholesterol, low saturated fat diet.

The mechanism by which dietary fiber lowers cholesterol is not completely understood.
**Dietary Fiber and Colon (large intestine) Cancer**

People who live in countries where consumption of dietary fiber is high can have a lower incidence of colon cancer as compared to people in the U.S., while people who consume a low fiber diet tend to have a higher incidence of colon cancer. Some research suggests that the insoluble fibers from whole grains may help decrease the chances of developing colon cancer. There are several theories as to how fiber exerts this effect. One theory is that by increasing the stool size, fiber may decrease the amount of time that potential cancer-causing agents come in contact with the colon.

**Dietary Fiber and Diabetes**

High-fiber diets may help control diabetes in some cases. Research indicates that high carbohydrate, high-fiber diets may offer better control for Type 2 diabetics (people who become diabetic as adults). This is generally due to the lower fat content and reduced calories associated with high-fiber diets. The reduced calories help control weight, and the result of weight loss in obese persons is better control of their diabetes.

In Type 1 diabetics (people who become diabetic as children or teenagers), some, but not all, research has demonstrated that eating a high-fiber diet reduces or eliminates the need for insulin. The best advice is for the diabetic to consult a physician and/or dietitian before making any changes in their meal plan.

**Dietary Fiber, Obesity, and Weight Loss**

Research on the relationship between fiber and obesity remains inconclusive at this time. Some persons have suggested that eating a high-fiber diet can allow for weight loss by helping a person feel full. Another characteristic of the high-fiber diet is that it is generally low in fat and calories which can help with weight
loss. Pills containing fiber for weight loss work on the idea that fiber makes you feel full. It is not necessary to buy pills to get this benefit. Increasing the amount of high-fiber foods in your diet will do the same thing.

**How Much Dietary Fiber?**

The Dietary Guidelines for Americans, published by the United States Departments of Agriculture and Health and Human Services,

to 35 grams per day. How much fiber is this? A good guideline is that common servings of fruits, vegetables, whole grain breads, and cereals contain about 2 to 3 grams of dietary fiber. So 8 to 10 servings from these foods should provide the dietary fiber that is recommended.

Dietary fiber is found only in plant foods and occurs in differing amounts and combinations. As the plant ages, it contains more fiber (e.g. stringy green beans). Modern processing methods often reduce the fiber content in some foods. You can increase your intake of dietary fiber by increasing the amount of unprocessed foods. For example, 2 slices of whole wheat bread have about the same amount of dietary fiber (5 grams) as 6 1/2 slices of white bread. Whole-grain breads and cereals

... common servings of [high fiber foods] contain about 2 to 3 grams of dietary fiber.
Dietary fiber and where it is found

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>Component</th>
<th>Major Food Sources</th>
<th>Effects on Body</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insoluble</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncarbohydrate</td>
<td>Lignin</td>
<td>breakfast cereals, bran, older vegetables</td>
<td>Uncertain</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>Cellulose</td>
<td>wholewheat flour, bran, cabbage, green beans</td>
<td>Increase stool bulk</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>Hemicellulose</td>
<td>bran, cereals, whole grains</td>
<td>Increase stool bulk</td>
</tr>
<tr>
<td><strong>Soluble</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>Pectin</td>
<td>squash, apples, citrus, dried peas, strawberries</td>
<td>Lower serum cholesterol</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>Gums</td>
<td>oatmeal, rolled oats, dried beans</td>
<td>Lower serum cholesterol</td>
</tr>
</tbody>
</table>
should be higher in fiber, but compare nutrition labels. Whole grains and cereals contain the entire, edible portion of the grain or cereal, for example, whole wheat, cracked wheat, bulgur, oatmeal, whole cornmeal, popcorn, brown rice, whole rye, and whole wheat pasta.

Is More Always Better?

Increasing dietary fiber in the diet may be good, but it does not mean an excess is better. There may be drawbacks to eating too much dietary fiber:

1. Minerals such as calcium, copper, zinc, magnesium, and iron are bound by fiber and may not be absorbed.

2. An abrupt increase in fiber may cause an increase in gas, diarrhea, and abdominal pain. Increase dietary fiber intake slowly, and drink plenty of fluids to allow the gastrointestinal tract to adjust.

(3) It is best to eat a varied diet with different types of fiber both soluble (like oats and apples) and insoluble (like whole grains) rather than consume only one type. One type of fiber taken in excess may lead to a problem, whereas eating various forms of fiber can help maintain health and prevent disease.

What Should I Do?

It may be possible to decrease the risk of some of the chronic health problems that occur as we grow older by increasing the amount of dietary fiber in the average U.S. diet. Choosing more fruits, vegetables, whole grains, and cereals is the best way to increase the fiber in your diet. You should not increase your fiber intake by consuming pills or powders. By choosing foods instead of pills or powders, you will increase both the variety of foods you eat and your intake of many vitamins and minerals. So make wise food selections for more fiber and a more nutritious and enjoyable diet.

Increasing fiber is best done through choosing high-fiber foods, not taking pills or fiber.