Dietary fibre: What's its role in a healthy diet?

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Although dietary fibre is not a 'nutrient', it is nevertheless an important component of our diets. The fact that it passes through the body without being absorbed is the main reason why fibre is so important.

What is dietary fibre?

Dietary fibre or 'roughage' comprises the edible parts of plant that cannot be digested or absorbed in the small intestine and passes into the large intestine intact. This includes non-starch polysaccharides (e.g. cellulose, hemicellulose, gums, pectins), oligosaccharides (e.g. inulin), lignin and associated plant substances (e.g. waxes, suberin). The term dietary fibre also includes a type of starch known as resistant starch (found in pulses, partly-milled seeds and grains, some breakfast cereals) because it resists digestion in the small intestine and reaches unchanged the large intestine.

Sources of dietary fibre

Dietary fibre is found in fruits (pears, strawberries, blackberries, raspberries, currants, oranges), vegetable (brussel sprouts, artichoke, onion, garlic, corn, peas, green beans, broccoli), pulses (lentils, chickpeas, beans) and wholegrains (all bran and oat bran cereals, whole and mixed grain breads).

Types of dietary fibre

Dietary fibre is often categorized according to its solubility into soluble or insoluble. Both types of fibre are found in different proportions in fibre-containing foods. Good sources of soluble fibre are oats, barley, fruit, vegetable and pulses (beans, lentils, chickpeas). Wholegrain cereals and wholemeal bread are rich sources of insoluble fibre.

Dietary fibre and health

Ingested dietary fibre moves along into the large intestine where it is partially or completely fermented by gut bacteria. During the fermentation process several by-products, short chain fatty acids and gases, are formed. It is the combined action of the fermentation process and the by-products formed that contribute the beneficial effects of dietary fibre on health.

The main physiological effects attributed to dietary fibre concern:

Bowel function

Dietary fibre, particularly insoluble fibre, helps prevent constipation by increasing stool weight and decreasing gut transit time. This effect is enhanced if fibre intake is paralleled by an increase in water intake.
The short chain fatty acids, produced when fibre is fermented by gut bacteria, are an important source of energy for colon cells and might inhibit growth and proliferation of gut tumour cells.
By improving bowel function, dietary fibre can reduce the risk of diseases and disorders such as diverticular disease or haemorrhoids, and may also have a protective effect on colon cancer.

Blood glucose levels

Soluble fibre, may slow digestion and absorption of carbohydrates and hence lower the rise in blood glucose that follows a meal (postprandial) and insulin response. This can help people with diabetes improve control their blood glucose levels.

Blood cholesterol

Results of epidemiological studies identify another role for dietary fibre in the prevention of coronary heart disease (CHD) that of improving blood lipid profiles. Clinical trials confirm the results of these epidemiological studies. Isolated viscous fibres such as pectin, rice bran or oat bran lower both total serum cholesterol and low density lipoprotein (LDL or bad) cholesterol levels. At the same time, research continues to show that diets high in a mix of dietary fibre also protect against CHD.

Other

While prevention of constipation, improved blood glucose levels, and blood lipid profiles predominate as beneficial outcomes of a diet high in dietary fibre, other benefits are worth noting. For example, because fibre provides bulk in the diet, without added calories, it can have a satiating effect on appetite; helping in weight management.

In order to have all the benefits of fibre it is important to vary the sources of fibre in the diet. Diets with fruits, vegetables, lentils/beans and wholegrains not only provide dietary fibre but as well many other nutrients and food components essential to good health.

References

1. Anonymous. Position of the American Dietetic Association: Health implications of dietary fibre. Journal of the American Dietetic Assoc. July 2002; Vol. 7: 993-1000.
2. Bessesen, D.H. The Role of Carbohydrates in Insulin Resistance. Journal of Nutrition

(2001)131: 2782S – 2786S.
3. De Vries, J. On defining dietary fibre. Proc. of the Nutrition Society (2003): 62, 37-43.
4. Lupton, J.R., Turner, N.D. Dietary Fibre and Coronary Disease: Does the evidence support an association? Current Atherosclerosis Reports (2003): 5, 500-505.
5. Carbohydrates: Nutritional and health aspects. 2003 ILSI Europe Concise Monograph Series. ILSI Press.