

Dietary fibre is important for your health.

What is dietary fibre? They are a heterogeneous mixture of polysaccharides (long chains of sugar molecules) and lignin that are not degraded by the enzymes present in the gut of vertebrate animals. Some are soluble such as pectins, gums, mucilages and some hemicellulose types; the rest are insoluble which include cellulose and other hemicelluloses. They are collectively called non-starch polysaccharides to distinguish them from starch, a polysaccharide which can be broken down gut enzymes and thus a major food source.

How does fibre work? Insoluble fibre acts as a bulking agent, reducing intestinal transit time and reduces constipation. Soluble fibre combine with water to form a thick gel, reducing reabsorption in the lower small bowel of bile acids. This causes of a shift in the liver from cholesterol production to replacement of bile acids lost in the stool, thus reducing cholesterol levels. Short chain fatty acids produced by fermentation of soluble fibre in the colon directly inhibit intestinal fat absorption, cholesterol transport and synthesis.

Further, soluble fibre damps the surge in blood glucose after eating, thus favourably influencing insulin secretion and sensitivity. Psyllium, a form of soluble fibre, has been shown to improve the effectiveness of the statins, drugs which lower cholesterol. A significant part of the benefit of a diet rich in fruit, vegetables and unrefined cereals is derived from the amount of dietary fibre contained in them.

How much do you need? The general recommendations for adults are a total intake of around 20 to 30g/day of fibre, of which 5 to 10 grams should be of the soluble type. As the following table shows there are considerable benefits from increasing fibre (James 03) (Shamliyan 06):

Disorder	Benefit of fibre
Diabetes Type II, Metabolic syndrome	Reduced blood glucose and insulin levels Improved glucose tolerance
Overweight/Obesity	Weight loss
Abnormal blood lipids	A drop in LDL-C by 10-15% Increase the effectiveness of lipid lowering drugs.

Heart disease	A drop in the risk of heart disease by 20-30% and a reduction in morbidity/mortality of up to 10%. Trials involving more than 300,000 people showed of up to 55% with average reduction of around 30% in both cardiac events and death. Blood pressure is lowered.
Blood pressure	Lowering of blood pressure up to 6mm Hg has been reported in randomized trials, independent of other factors. Increases the effectiveness of blood pressure medication.
Constipation. diverticular disease, irritable bowel syndrome.	All improved by bulking
Inflammatory bowel disease	Improved by the production of butyrates from fermentation.

This also clearly demonstrates the dangers of some diets which have little dietary fibre such as the Adkins diet. You may lose more than weight.

The role of dietary fibre and type II diabetes. It has been recognized that dietary fibre has been shown to protect against the development of diabetes. Three cohort studies (the Health Professionals Follow-up Study, the Nurses' Health Study and the Iowa Women's Health Study) have all shown the protective effect of dietary fibre. This fibre comes from unprocessed or minimally processed plant based foods such as wholegrain products, fruit and vegetables . The low level of intake of these foods combined with the consumption of highly processed foods which are low in fibre is adding significantly to the incidence of type II diabetes. It is not known precisely whether it is soluble or insoluble forms of this type of dietary fibre that confers the greatest benefit (WHO Study #916, 2003).

Sources of dietary fibre. Here are some examples

Food	Soluble fibre	Total fibre
Apple	1	4

Banana	1	3
Citrus	1	2-3
Kidney beans (1/2 cup)	3	6
Navy beans (1/2 cup)	2	6
Peas (1/2 cup)	1	6
Broccoli (1/2 cup)	1	1.5
Carrots (1/2 cup)	1	2.5
Oatmeal (1/2 cup cooked)	1	2
Shredded wheat (2/3 cup)	0.3	3
Brown rice (1/2 cup)	0.5	4

The recommended daily intake of these is at least 5 to 10grams of soluble/day and total intake of around 30g/day. As can be seen it requires a diet rich in fruit, vegetables and unrefined cereal to achieve this.

References:

(James 03) S.L.James, J.G.Muir, S.L.Curtis, P.R.Gibson. Dietary fibre: a roughage guide. Int Med Journ 2003;33:291-296.

(Shamliyan 06) Tatyana Shamliyan, David Jacobs, Susan Raatz, David Nordstrom, Joseph Keenan. Are your patients with risk of CVD getting the viscous soluble fiber they need? J Fam Pract 2006;55:761-770

(WHO Report 916, 2003) WHO Technical Report Series 916. Diet, Nutrition and the Prevention of Chronic Diseases. Joint WHO/FAO Expert Committee. 2003)