



Spectrum

Roughage and the heart

Did you have muesli and brown bread for breakfast? Do you eat a high-fibre diet to reduce, among other things, the risk of a coronary? It wouldn't be surprising; the emphasis on dietary fibre for good health has been rather heavy in recent years. Lack of sufficient fibre has been held to contribute to a frighteningly long list of diseases common in modern western society — including heart disease, appendicitis, gallstones, varicose veins, haemorrhoids, and tumours of the colon and rectum.

While a high-fibre diet may be important in keeping some of these ailments at bay, in the case of heart disease, at least, it now looks as though just eating fibre for the sake of it won't necessarily help. It may, but you need to choose the right sort. The reason is that some forms of fibre may lower blood cholesterol levels by absorbing bile salts in the gut, but it looks as though not all will do this.

The expression 'dietary fibre', which is often used to describe what may be termed the 'roughage' that we eat, is a convenient but not very satisfactory name for a rag-bag of chemically diverse



substances that occur in plants. It's not thread-like as the term may seem to imply — dietary fibre may include such unthread-like materials as gums, mucilages, and water-soluble pectin. In short, it's simply the part of our vegetable diet that we can't digest.

It seems that it's the quality of this indigestible part of our diet that is important, not the quantity.

Experiments with both Man and animals have shown that changing from a low-fibre diet to a high-fibre one may lower blood cholesterol levels. So, assuming that high cholesterol levels in the blood serum contribute to coronary disease, the high-fibre diets will reduce the risk. However, other experiments have shown that the fibre in wheat bran has no effect on human serum cholesterol levels. Dr David Oakenfull of the CSIRO

Division of Food Research has come up with a possible reason why.

One explanation of how dietary fibre lowers cholesterol levels goes as follows. As the indigestible material passes through the gut it absorbs bile salts. (These are biological detergents, which break up lipids in the food and disperse them.) Normally the bile salts are absorbed through the wall of the gut, and hence they are recycled — twice a day in fact with a loss of 15–20% of the total each day.

When these salts become adsorbed onto the surface of passing roughage, they pass through the gut to the outside world to be voided as excreta, with the result that they cannot be recycled. The body must therefore form more bile salts, which it does in the liver from cholesterol in the blood. Thus the roughage absorbs bile salts, the body makes more, and blood cholesterol levels fall.

Dr Oakenfull's studies have shown that only the fibre in the diet that contains substances known as saponins will absorb bile salts.

Saponins occur in many plants (they have been identified in about 500 species), but unfortunately we do not eat many of them. Common saponin-containing ones that we do eat include peanuts, spinach, chick peas, mung beans, and, in particular, soybeans.

There is some evidence that such foods really do lower levels of cholesterol in the blood. For example, Dr Oakenfull and his collaborators

at the CSIRO Division of Human Nutrition have recently carried out feeding trials with rats. These trials showed that saponins both increased the rate of excretion of bile salts and lowered the rats' blood cholesterol levels.

In addition, in an experiment in Italy, feeding 20 patients who had high blood cholesterol levels with a low-lipid diet containing soybean protein considerably lowered blood cholesterol levels.

Giving another group the equivalent diet that contained animal protein rather than soybean protein had only a small effect.

The presence of saponins in the soybean protein may well explain the difference, but this still needs to be rigorously tested in clinical trials.

However, the message is clear: if it's your heart you're worried about, it's probably pointless to increase your consumption of straight cellulose, wheat bran, or apples. Dr Oakenfull has shown that these foods, which contain no saponins, do not absorb bile salts. So eating them probably won't keep your blood cholesterol levels down. Go instead for foods rich in saponins like soybeans, spinach, and peanuts. And if you like Chinese food, then you can't go past bean shoots (mung beans) for their saponin content.

Dietary fibre, serum cholesterol and heart disease. D. Oakenfull. *Food Research Quarterly*, 1978, **38**, 66–70.