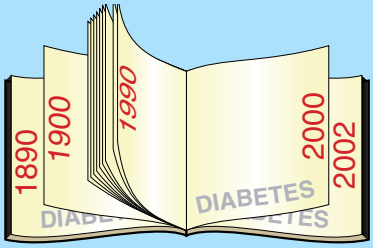
Tattersall's TALES

Diabetes and dietary fibre

Professor Robert Tattersall

Today's diabetes world is fast-moving and exciting; knowledge is accumulating at an astonishing rate, and discoveries and understanding lead to new ideas and innovations in treating, managing and preventing diabetes. However, there's nothing new under the sun. To help understand the present, it sometimes helps to examine the past.



Tattersall's Tales will enable readers to do just that. In every issue, Robert Tattersall, renowned diabetes sage and guru, will consider an aspect of diabetes and place it in a suitable historical context. Research, treatment, people and products will all feature. In this instalment, Robert Tattersall explores the history of ideas surrounding the health consequences of dietary fibre intake and the relationship between fibre and diabetes in particular.

In 1981 The *Lancet* published an article by Simpson et al entitled 'A high carbohydrate leguminous fibre diet improves all aspects of diabetic control' (Simpson et al, 1981). The 18 patients with type 2 diabetes had their fasting blood glucose reduced from 6.7 to 5.7 mmol/l by the test diet. This paper caused a great stir and the late Arnold Bloom suggested that in future people with diabetes should be advised to eat their diet sheets, not read them. What most diabetologists (myself included) did not grasp at first was that the daily fibre intake of the 'new' diet was a massive 96.6 g. After discussing the paper at a journal club, members of our unit decided to see how much we could boost our fibre intake. Only one managed to top 90 g/day and he only did it by eating a family-sized tin of baked beans for breakfast!

At the time I was not aware of the long history of controversy about fibre. It started in 1870 when the invention of the roller mill made it possible to remove most of the fibre from wheat and led to a widespread demand for 'pure' white bread. This was a commercial success but the backlash came in 1880 when an English physician, Dr TR Allinson, introduced his 'bread w' nowt taken owt' and claimed that:

> *'One great curse of this country is constipation, which is caused in great measure by white bread. From this constipation come piles, varicose veins, headaches, miserable feelings, dullness and other ailments.'*
>
> (Kellock, 1985)

For his pains Allinson, a vehement opponent of the use of drugs, was struck off the medical register, although his stoneground wholemeal flour has survived into the 21st Century.

Another crusader against over-refinement of food was a New England clergyman and itinerant preacher, Sylvester Graham (whose name is remembered in Graham crackers and Graham flour, both of which are high in fibre). He advocated bread made from coarse flour as part of a prescription for a healthy life – other ingredients were hard mattresses and cold showers! John Harvey Kellogg, of breakfast cereal fame, was another who warned of the dangers of 'concentrated foods' and advocated generous amounts of fruits, cereal and bran.

Many 'food fads' at the beginning of the 20th Century had in common the idea of 'getting back to nature'. Wholemeal bread was a prominent part of this and became associated in the minds of doctors and the public with cranks. A *Lancet* editorial in 1912 described bran dismissively as 'irritating particles of husk which retard digestion'. However, there was evidence that bran was good for you. In 1916, Louis Newburgh, later famous for a high-fat diet, investigated the problem of constipation in immigrant Russian Jews in Boston. On questioning them, Newburgh found that in Russia they ate vegetables for at

least two meals each day together with large quantities of coarse black bread. When they came to the USA, they ate American beef and white bread in large quantities. 'If,' said Newburgh, 'the disease is due to the absence of certain articles of food in the diet, it ought to be cured by adding such articles,' and this was successful.

Another crusader for a natural diet was Sir William Arbuthnot Lane (1856–1943), notorious because of his colectomies for 'intestinal autointoxication'. To the end of his long life Lane was obsessed by the belief that constipation was the root of many of civilisation's ills. In 1926 he set up the New Health Society, an aim of which was to make fruits and vegetables as abundant as possible and accessible to the general public at reasonable cost (Lane, 1931).

In the second half of the 20th Century, the éminence grise of the fibre story was a Royal Navy physician, Surgeon Captain Thomas Latimer 'Peter' Cleave (1906–1983). His 8-year-old sister's death from appendicitis affected him deeply and at medical school he was taught that appendicitis was caused by a lack of cellulose in the diet. His grand hypothesis was that many modern diseases were caused by eating refined carbohydrates, particularly bread and sugar. He first published his ideas in the *Journal of the Royal Naval Medical Society* in 1956 but they were not well received. In 1966, with George Campbell, he published *Diabetes, Coronary Thrombosis and the Saccharine Disease*, intended for a lay readership (Cleave and Campbell, 1966). His last book, *The Saccharine Disease*, published in 1974 and again written for laymen, became a best-seller. Cleve remained in the scientific wilderness, partly because his ideas were ahead of their time and regarded by medical orthodoxy as cranky. Also, he had no time for laboratory science and statistics and published almost exclusively books or polemical letters in journals.

The first suggestion that fibre might be involved in diabetes was made by Hugh Trowell (1904–1989). Immediately after qualifying he joined the Colonial Medical Service and worked in Africa for the next 30 years (Whitley, 1997). His early work was on kwashiorkor but he became fascinated that many 'Western' diseases were vanishingly rare in Africa. When Trowell retired in 1959 he was ordained and spent 10 years as a parish priest. His life changed again in 1969 when he renewed acquaintance with the surgeon Denis Burkitt (1911–1993), who he had worked with in Uganda in the 1950s. By this time Burkitt was famous for having described his eponymous lymphoma but was, like Trowell, fascinated by the faeces of Africans and in particular by their extraordinary bulk. One of Burkitt's maxims was that the size and frequency of the stools of a population are inversely proportional to the number of hospital visits.

Trowell's suggestion that fibre and diabetes might be linked was based on several personal observations. First, there was his experience in East Africa, where until 1935 he had not treated a single case of diabetes, whereas by 1960, in association with obesity and increased processing of maize and millet meal, it had become common. Secondly, Trowell noticed that diabetes mortality closely followed trends in diet. In Britain, diabetes mortality fell during the entire period that the high-fibre National flour was used to replace low-fibre white flour (1940–1954). This led to his formulation of the dietary fibre hypothesis of the aetiology of non-insulin dependent diabetes mellitus, namely that fibre-depleted starchy foods are a risk factor and fibre-rich starchy foods are protective (Trowell, 1976).

Later research has vindicated Trowell and his predecessors and it is generally accepted that 'diseases of civilisation' are due to discordance between our genetic make-up (selected over geologic eras, to fit the life of Paleolithic humans) and current eating and living habits. The problem is that most of our food today is calorically concentrated compared with the wild game and fruits and vegetables of the Palaeolithic diet. In eating enough to create a sensation of fullness, Palaeolithic man ate many fewer calories than we do today. He also had to take more exercise (Eaton et al, 1988).

Cleave TL, Campbell GD (1966) *Diabetes, coronary thrombosis and the saccharine disease*. John Wright and Sons, Bristol

Eaton SB, Conner M, Shostak M (1988) Stone agers in the fast lane: Chronic degenerative diseases in evolutionary perspective. *American Journal of Medicine* **84**(4): 739–49

Kellock B (1985) *The Fibre Man; the life story of Dr Denis Burkitt*. Lion Publishing, Tring

Lane WA (1931) *The prevention of disease peculiar to civilisation*. Faber and Faber, London

Simpson HC, Simpson RW, Lousley S, Carter RD, Geekie M, Hockaday TD, Mann JI (1981) A high carbohydrate leguminous fibre diet improves all aspects of diabetic control. *Lancet* **1**(8210): 1–5

Trowell HC (1976) Definition of dietary fibre and hypothesis that it is a protective factor in certain diseases. *American Journal of Clinical Nutrition* **29**(4): 417–27

Whitley S (1997) *The role of Hugh Trowell (1904-1989) in the development of the concept of dietary fibre*. Dissertation (BSc). Wellcome Institute for the History of Medicine