Diarrhoea. A report of diarrhoea induced by a dramatic increase in fibre intake. Reduction of dietary fibre led to a return to normal bowel habit in 2 to 3 days.[1]

1. Saibil F. Diarrhea due to fiber overload. *N Engl J Med* 1989; **320:** 599.

Intestinal obstruction. Intestinal obstruction associated with excessive bran intake has been reported.[1-3]

1. Allen-Mersh T, De Jode LR. Is bran useful in diverticular disease? *BMJ* 1982; **284:** 740.
2. Cooper SG, Tracey EJ. Small-bowel obstruction caused by oat-bran bezoar. *N Engl J Med* 1989; **320:** 1148–9.
3. Miller DL, *et al.* Small-bowel obstruction from bran cereal. *JAMA* 1990; **263:** 813–14.

Precautions

Bran is contra-indicated in patients with intestinal obstruction or with undiagnosed abdominal symptoms. There is a particular risk of intestinal or oesophageal obstruction if bulk laxatives are swallowed dry; they should be taken with sufficient fluid and should not be taken immediately before going to bed. Wheat bran should be avoided in gluten enteropathies and coeliac disease.

Interactions

Bran may reduce the absorption of some drugs when given together by mouth. Interference with iron, zinc, and calcium absorption has been reported; calcium phosphate may be added to bran to neutralise fytic acid, which can contribute to such interference.

Uses and Administration

The main use of bran is as a bulk laxative and source of dietary fibre in the management of disorders of the gastrointestinal tract such as constipation (p.1693), especially in diverticular disease (p.1695); it is also widely used in irritable bowel syndrome, although its value has been questioned (see p.1699). It should always be taken with plenty of fluid.

Bran is used as the basis for some breakfast cereals.

Dietary role. There is no precise definition for the complex mixture of substances known as dietary fibre. It has been defined as *plant* polysaccharides and lignin resistant to hydrolysis by the digestive enzymes of humans but this covers many substances other than cell-wall and related polysaccharides. Non-starch polysaccharides are the major component of the plant cell wall and are used as an index of dietary fibre. They comprise water-soluble fibres such as pectins, gums, and mucilages and water-insoluble fibres such as cellulose. Wheat, maize, and rice contain mainly insoluble non-starch polysaccharides whereas oats, barley, and rye have a significant proportion of soluble fibres.[1] Because the USA originally included nondigestible *animal* carbohydrates in the definition of fibre, the Food and Nutrition Board in the USA proposed a new definition of fibre, whereby dietary fibre consists of nondigestible carbohydrates and lignin that are intrinsic and intact in plants, and functional fibre consists of isolated, nondigestible plant or animal carbohydrates that have beneficial physiological effects in humans. Total fibre is the sum of dietary and functional fibre.[2]

In the UK, dietary reference values (DRV) have been published for non-starch polysaccharides.[1] It has been proposed[1] that adult diets should contain an average for the population of 18 g daily (individual range 12 to 24 g daily) non-starch polysaccharide from a variety of foods whose constituents contain it as a naturally integrated component. Children should receive proportionately less non-starch polysaccharide according to body size. No evidence exists for benefit of intakes of non-starch polysaccharide in excess of 32 g daily, and therefore there is no advantage in exceeding this amount.

In the USA, an adult dietary fibre intake of 20 to 35 g daily has been suggested; children should consume an amount equivalent to their age plus 5 g daily.[3]

1. DOH. Dietary reference values for food energy and nutrients for the United Kingdom: report of the panel on dietary reference values of the committee on medical aspects of food policy. *Report on health and social subjects 41*. London: HMSO, 1991.
2. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes of the Food and Nutrition Board. *Dietary Reference Intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids*. Washington DC: National Academy Press, 2002/2005. Also available at: http://www.nap.edu/openbook.php?record_id=10490 (accessed 04/04/08)
3. Marlett JA, *et al.* Position of the American Dietetic Association: health implications of dietary fiber. *J Am Diet Assoc* 2002; **102:** 993–1000. Also available at: http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_10175_ENU_HTML.htm (accessed 28/03/07)

Disease prevention. Diseases such as colorectal cancer, ischaemic heart disease, diabetes mellitus, and obesity are common in affluent developed countries but occur rarely in rural Africa. This difference in disease patterns has been linked to the low fibre intake in developed countries compared with rural Africans. However, there are many other differences in diet and lifestyle, such as a lower intake of fat, protein, and sugar in rural Africans and less exposure to toxins and pollutants, any of which could contribute to the difference. The excessive consumption of energy-rich foods may be more to blame for diseases of affluence than is deficiency of dietary fibre.[1]

Results from large prospective cohort studies have been conflicting as to whether there is any *reduction in risk* of **colorectal cancer** associated with a high intake of dietary fibre, and have mostly failed to show a reduction in the *recurrence rate* of colorectal adenomas (although most adenomas do not develop into cancer, and so the relevance of these results is unclear[2]). A pooled analysis of 13 prospective cohort studies found a significant inverse association between dietary fibre intake and colorectal cancer. However, after adjusting for other risk factors, this association was attenuated and no longer statistically significant. There was some suggestion that intake of dietary fibre from cereals and from whole-grain foods were both associated with a weak reduction in the risk of rectal cancer.[3] Some have commented[4] that fibre is a broad term encompassing a wide range of organic material, which may have a large number of actions on digestive physiology. Furthermore, there is some concern that the use of fibre supplements is not entirely without harmful effects: it has been pointed out that fermentable fibre substrates can stimulate cell proliferation in the colon.[5] However, the role of cell proliferation as a marker for the development of colonic cancer is questioned by some authors.[6]

A small randomised crossover study[7] in patients with type 2 **diabetes mellitus** suggested that an increased intake of dietary fibre was associated with improved glycaemic control, decreased hyperinsulinaemia, and lower plasma lipid concentrations. In prospective cohort studies, inverse associations were found between whole-grain intake and the risk of type 2 diabetes mellitus;[8-11] in some studies, this inverse association persisted for cereal fibre intake,[9-11] but in one the protective effect of whole grain could not entirely be explained by fibre content.[8]

Fibre may act as an obstacle to energy intake by displacing available calories and nutrients from the diet, by increasing satiety, and by decreasing the absorption efficiency of the small intestine. Epidemiological studies support the hypothesis that a higher dietary fibre intake prevents **obesity**; populations that report higher fibre consumption also demonstrate lower obesity rates.[12] Weight gain was inversely associated with increases in the intake of whole grains but positively associated with increases in the intake of refined grains, emphasising the importance of distinguishing whole-grain from refined-grain products.[13]

A large prospective cohort study in men found an inverse association between whole-grain intake and the incidence of **coronary heart disease**; the finding was even stronger for bran intake. These associations were attenuated, but not eliminated, by adjustment for other risk factors for coronary heart disease.[14] There is some suggestion that diets high in fibre may have a moderate effect on blood pressure reduction.[15]

1. Anonymous. The bran wagon. *Lancet* 1987; **i:** 782–3.
2. Byers T. Diet, colorectal adenomas, and colorectal cancer. *N Engl J Med* 2000; **342:** 1206–7.
3. Park Y, *et al.* Dietary fiber intake and risk of colorectal cancer: a pooled analysis of prospective cohort studies. *JAMA* 2005; **294:** 2849–57.
4. Goodlad RA. Dietary fibre and the risk of colorectal cancer. *Gut* 2001; **48:** 587–9.
5. Wasan HS, Goodlad RA. Fibre-supplemented foods may damage your health. *Lancet* 1996; **348:** 319–20.
6. Hill MJ, Leeds AR. Fibre and colorectal cancer. *Lancet* 1996; **348:** 957.
7. Chandalia M, *et al.* Beneficial effects of high dietary fiber intake in patients with type 2 diabetes mellitus. *N Engl J Med* 2000; **342:** 1392–8.
8. Liu S, *et al.* A prospective study of whole-grain intake and risk of type 2 diabetes mellitus in US women. *Am J Public Health* 2000; **90:** 1409–15.
9. Meyer KA, *et al.* Carbohydrates, dietary fiber, and incident type 2 diabetes in older women. *Am J Clin Nutr* 2000; **71:** 921–30.
10. Fung TT, *et al.* Whole-grain intake and the risk of type 2 diabetes: a prospective study in men. *Am J Clin Nutr* 2002; **76:** 535–40.
11. Montonen J, *et al.* Whole-grain and fiber intake and the incidence of type 2 diabetes. *Am J Clin Nutr* 2003; **77:** 622–9.
12. Slavin JL. Dietary fiber and body weight. *Nutrition* 2005; **21:** 411–18.
13. Liu S, *et al.* Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. *Am J Clin Nutr* 2003; **78:** 920–7.
14. Jensen MK, *et al.* Intakes of whole grains, bran, and germ and the risk of coronary heart disease in men. *Am J Clin Nutr* 2004; **80:** 1492–9.
15. He J, *et al.* Effect of dietary fiber intake on blood pressure: a randomized, double-blind, placebo-controlled trial. *J Hypertens* 2004; **22:** 73–80.

Preparations

Proprietary Preparations (details are given in Part 3)
Braz.: Fibracap†; Trifibra Mix; ***Canad.:*** Novo-Fibre; ***Fr.:*** Doses-O-Son; ***Irl.:*** Trifyba†; ***Ital.:*** Crusken; ***Malaysia:*** Fibrosine†; ***Mex.:*** Fisiolax†; ***Neth.:*** Fiberform; ***Port.:*** Infibran; ***Singapore:*** Fibrosine; ***Swed.:*** Fiberform; Fiberform Mix; ***Switz.:*** Fibion†.

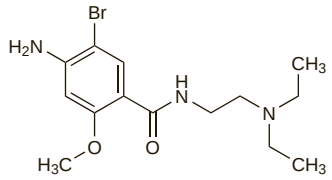
Multi-ingredient: *Arg.:* Centella Queen Reductora; Gelax; Gurfi Fibras†; Salutaris; ***Austral.:*** Neo-Trim Fibre†; Procholt; Proslender†; ***Austria:*** Herbelax; ***Fr.:*** Maxi-Flore; Stimulance; ***Ital.:*** Bio Fibralax Bi-Attivo; Ecofibra; Levoplus; Plurilac; Resource Benefiber; Sedastip; Stimulance; ***Mex.:*** Psilumax; ***NZ:*** Stimulance; ***Pol.:*** Magnezytki; Otrebuski; ***Port.:*** Stimulance†; ***Venez.:*** Senokot con Fibra†.

Bromopride *(rINN)*

Bromoprida; Bromopridum; CM-8252; VAL-13081. 4-Amino-5-bromo-*N*-(2-diethylaminoethyl)-*o*-anisamide.

Бромоприд

$C_{14}H_{22}BrN_3O_2$ = 344.2.
CAS — 4093-35-0.
ATC — A03FA04.
ATC Vet — QA03FA04.



Profile

Bromopride is a substituted benzamide similar to metoclopramide (p.1747), used in a variety of gastrointestinal disorders including nausea and vomiting (p.1700) and motility disorders. It is given in a usual oral dose of 20 to 60 mg daily in divided doses, or 20 mg daily by intramuscular or intravenous injection. The hydrochloride is also used.

Preparations

Proprietary Preparations (details are given in Part 3)
Braz.: Bilenzima; Bromoprid†; Digerex; Digesan; Digesprid; Digestil; Digestina; Digeston†; Pangest; Plamet; Pridecil; ***Ital.:*** Procirex; Valopride.

Multi-ingredient: *Braz.:* Digecap-Zimatico; Enziprid†; Lansoprid; Primeral; ***Port.:*** Modulanzime.

Buckthorn

Bacca Spinae Cervinae; Espino cerval; Kreuzdorn; Nerprun.

Жостер Слабительный; Крушина Слабительная

NOTE. Distinguish from Alder Buckthorn Bark (see Frangula Bark, p.1732) and from Sea Buckthorn (p.2384).

Pharmacopoeias. In *Ger.*

Profile

Buckthorn is the dried ripe fruit of *Rhamnus cathartica* (Rhamnaceae); the bark is also occasionally used. Buckthorn is an anthraquinone stimulant laxative.

Preparations

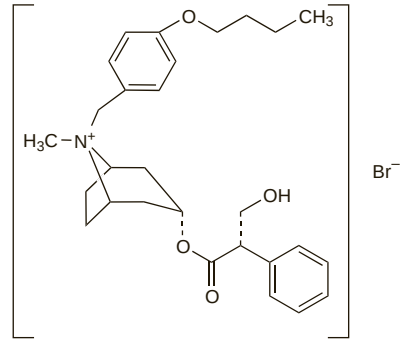
Proprietary Preparations (details are given in Part 3)
Multi-ingredient: *Austral.:* Neo-Cleanse; ***UK:*** Cleansing Herbs; Lion Cleansing Herbs.

Butropium Bromide *(rINN)*

Bromuro de butropio; Butropii Bromidum; Butropium, Bromure de. (−)-(1*R*,3*r*,5*S*)-8-(4-Butoxybenzyl)-3-[(*S*)-tropoyloxy]tropanium bromide.

Бутропия Бромид

$C_{28}H_{38}BrNO_4$ = 532.5.
CAS — 29025-14-7.



Pharmacopoeias. In *Jpn.*

Profile

Butropium bromide is a quaternary ammonium antimuscarinic with peripheral effects similar to those of atropine (p.1219). It has been used in the symptomatic treatment of visceral spasms in an oral dose of 30 mg daily in 3 divided doses.