



Nutrition and gut health - myths and false promises?

22/03/23

Covered in today's webinar

- The gut microbiota – why the interest?
- The role of fibre in the diet including health effects, food sources and barriers to consumption.
- Prebiotics and probiotics – what are they?
- Fermented foods and health – what's the evidence?
- Links to *Food – a fact of life* resources.
- Sources of further information and support.



Nutrition and gut health - myths and false promises?

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Gut microbiota in the news...

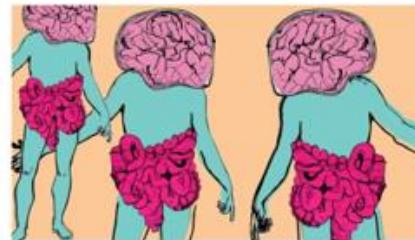
Could gut bacteria drive colon cancer?



Are the gut microbiota determined by genes or the environment?

Study reveals if gut microbiota is determined by genes or environment

How bacteria are changing your mood



Does Gut Microbiota Manipulate Our Minds?

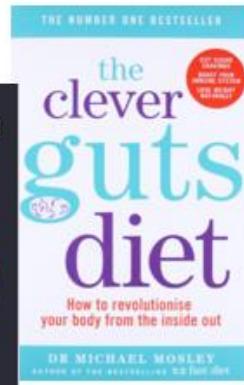
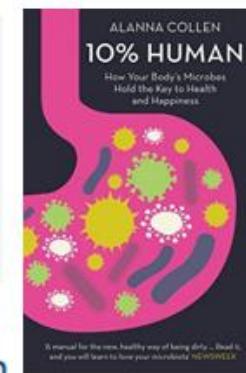


Gut microbiome linked to artery health

Gut bacteria flora linked to chronic heart failure

A new Norwegian study has found that chronic heart failure patients lack important microbiota in their intestinal tracts.

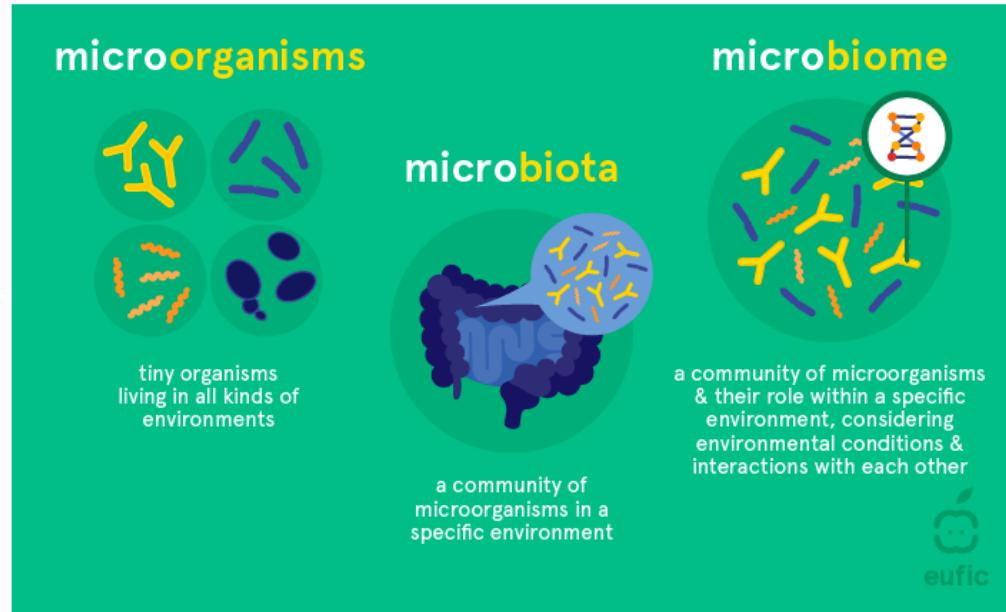
Scientists use dietary seaweed to manipulate gut bacteria in mice



Walnuts impact gut microbiome and improve health



What do we mean by gut microbiota?

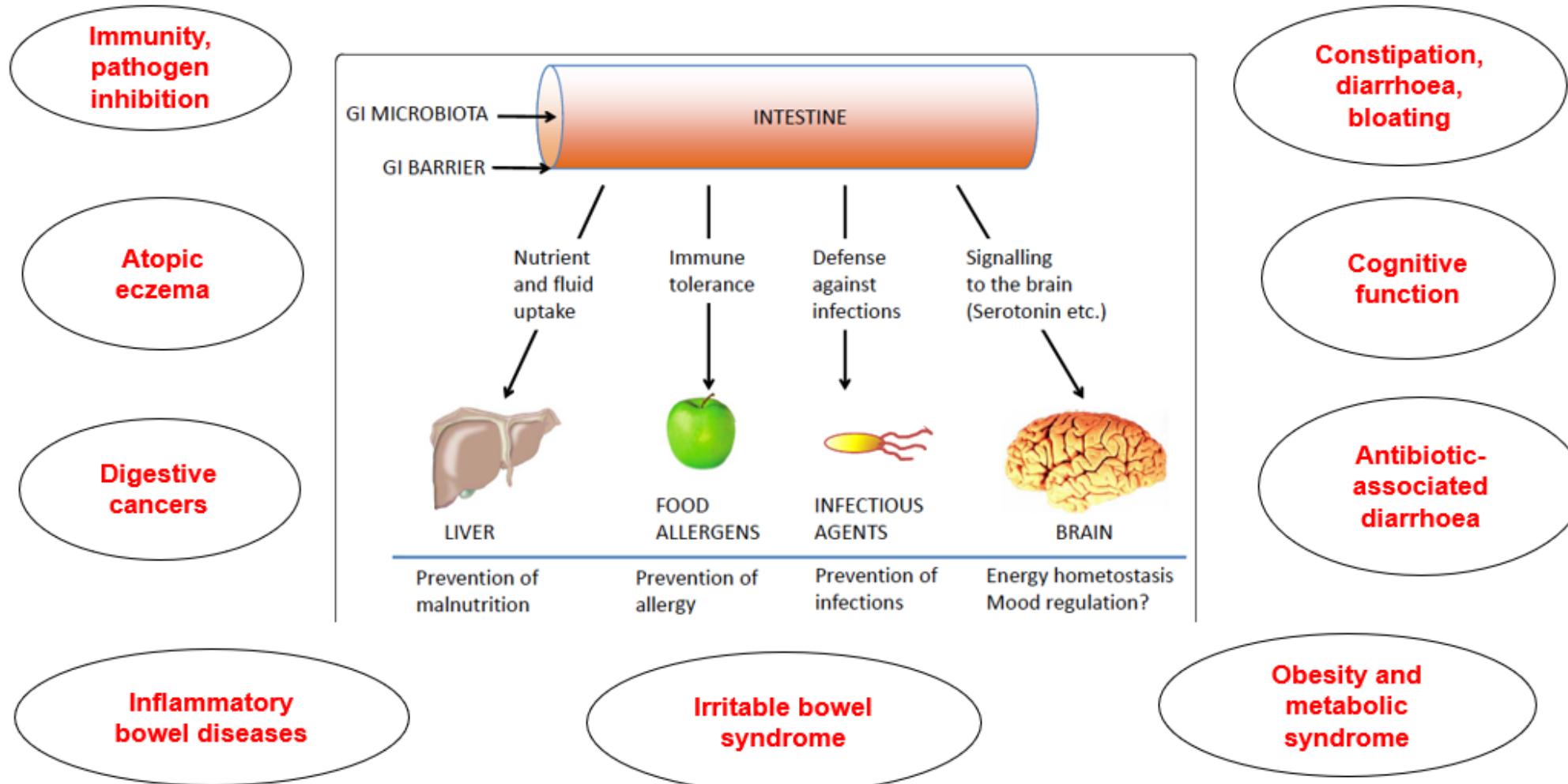


Functions of gut bacteria:

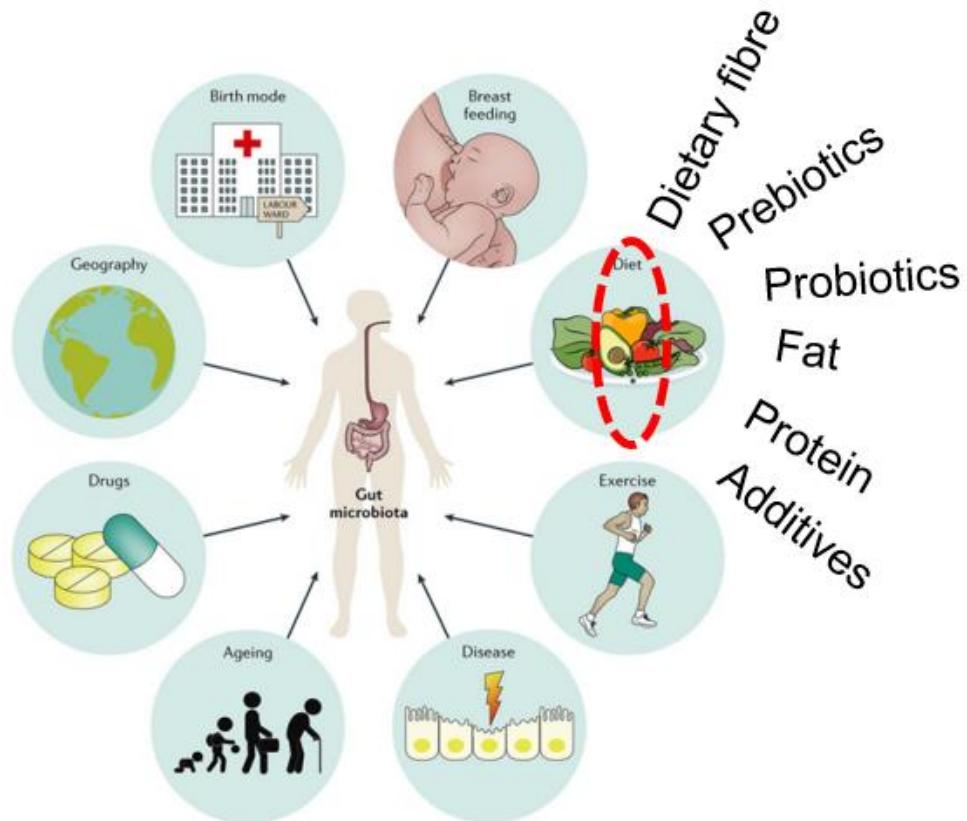
- Digestion of food
- Synthesis of vitamins and other nutrients
- Development and training of the immune system
- Metabolism of medications
- Resistance to pathogens
- Reinforce gut barrier



Why such interest in our gut bacteria?



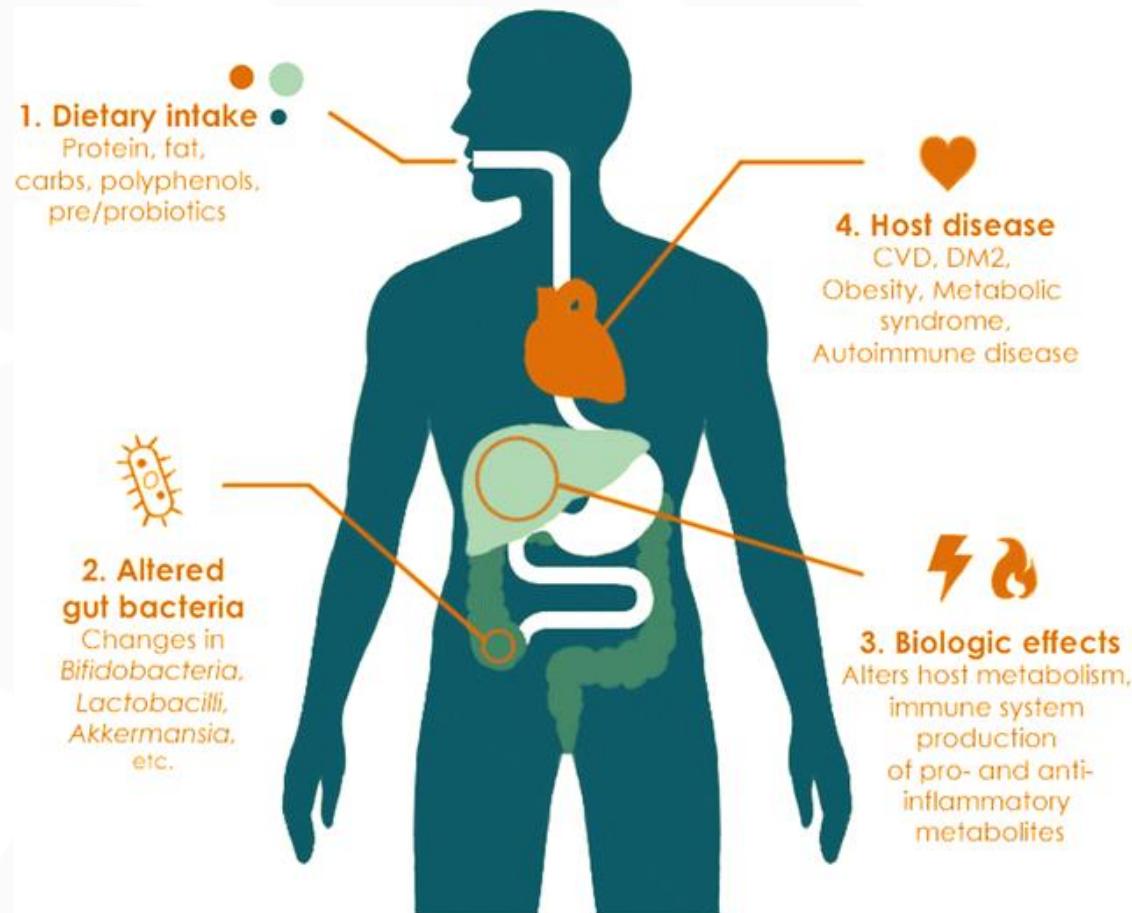
What determines the microbes you have?



Cryan & Dinan (2012)



Influence of diet



Acute diet modification can promptly cause change in gut microbiome, but such changes may not be sufficiently large or enduring to be conducive to better health.

Composition of a “healthy microbiome” has not been precisely defined; may vary from individual to individual – may influence response to dietary manipulation.

As technology evolves, we will find out more about different bacteria and their role in health.

Research into effects of diet on microbiome is at early stage but has promising therapeutic potential.

More human studies needed and care must be taken extrapolating animal studies to the human intestinal microbiota.



The importance of fibre

Global Burden of Disease study 2019
*What is absent from diets can be a greater marker of risk than what is present in excess.
'Eat more' messages (e.g. wholegrains, vegetables, nuts, seeds, fibre) should be balanced with 'eat less' messages (salt, saturated fat, free sugars)*



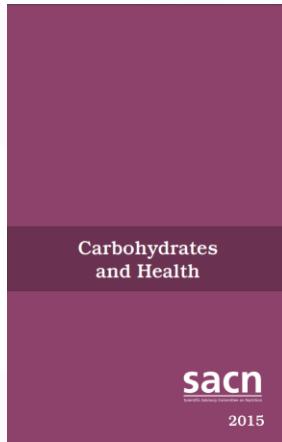
Aligning UK diets with the Eatwell Guide (without increasing total energy intake) could:

- increase life expectancy by 5.4 months (men) and 4.0 months (women)
- avert 17.9 million DALYs over the lifetime of the current population.
- prevent 440,000 new cases of T2D in men and 340,000 in women over 10 years.
- **23% of the health gains would be attributed to increases in fibre consumption**

Cobiac et al. (2016) PLOS ONE 11(12): e0167859



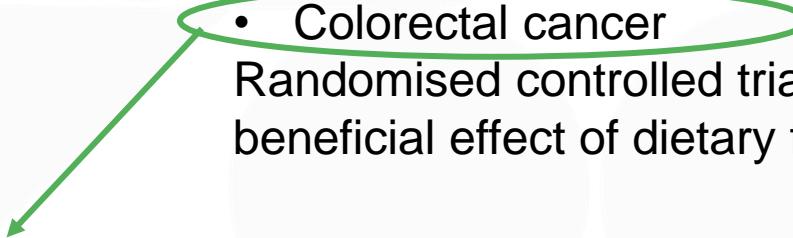
Health effects of fibre



Diets higher in fibre are associated with reduced risk of:

- Cardiovascular disease
- Coronary events
- Stroke
- Type 2 diabetes
- Colorectal cancer

Randomised controlled trials indicate a beneficial effect of dietary fibre on constipation.



- Fibre > fermented/metabolised by the colonic microflora > influence the types and patterns of bacterial populations found in the colon.
- Fermentation within the large bowel > short-chain fatty acids e.g. butyrate > anti-cancer activity.
- Reduction of intestinal transit time and increased faecal bulk > reduced contact between faecal toxins and tissues in the colon.



Fibre components and types

Sources of fibre

Because the components of dietary fibre are found in different proportions in fibre-containing foods and have different properties, it is important to eat a variety of fibre-containing foods. Some examples of different components of fibre and their food sources are listed below.

Fibre component	Description	Food sources
Cellulose	Polysaccharides comprising up to 10 000 closely packed glucose units arranged linearly.	Grains, vegetables, fruit, nuts, cereal bran.
Hemicellulose	Polysaccharides containing sugars other than glucose.	Cereal grains, vegetables, fruit, legumes (like peas, beans, chickpeas, lentils) and nuts.
Lignin	A non-carbohydrate component associated with plant walls.	Foods with a woody component, for example celery and the outer layers of cereal grains.
Beta-glucans	Glucose polymers that (unlike cellulose) have a branched structure	Mainly found in cell wall of oats and barley.
Pectins	A non-starch polysaccharide common to all cell walls.	Fruits and vegetables, legumes, nuts and potatoes.
Gums and mucilages	Non-starch polysaccharides which are thick gel-forming fibres that help hold plant cell walls together.	Gums: seeds and seaweed extracts; Mucilages: psyllium seeds. Gums and mucilages are used as gelling agents, thickeners, stabilisers and emulsifying agents.
Resistant starch	Starch and the products of starch digestion that are not absorbed by the small intestine.	Legumes, potatoes, cereal grains.
Oligosaccharides	Short chain carbohydrates of 3-9 monomers. These include fructo-oligosaccharides and galacto-oligosaccharides.	Onions, chicory, Jerusalem artichokes.
Micro components (waxes, cutin and suberin)	Micro components of the plant structures.	Cereal grains.



Fibre type	Claim
Barley grain fibre	Barley grain fibre contributes to an increase in faecal bulk
Beta-glucans	Beta-glucans contribute to the maintenance of normal blood cholesterol levels
Beta-glucans from oats and barley	Consumption of beta-glucans from oats or barley as part of a meal contributes to the reduction of the blood glucose rise after that meal
Oat grain fibre	Oat grain fibre contributes to an increase in faecal bulk
Oat beta-glucan	Oat beta-glucan has been shown to lower/reduce blood cholesterol. High cholesterol is a risk factor in the development of coronary heart disease
Resistant starch	Replacing digestible starches with resistant starch in a meal contributes to a reduction in the blood glucose rise after that meal.
Rye fibre	Rye fibre contributes to normal bowel function
Wheat bran fibre	Wheat bran fibre contributes to an acceleration of intestinal transit
Wheat bran fibre	Wheat bran fibre contributes to an increase in faecal bulk

Fibre recommendations

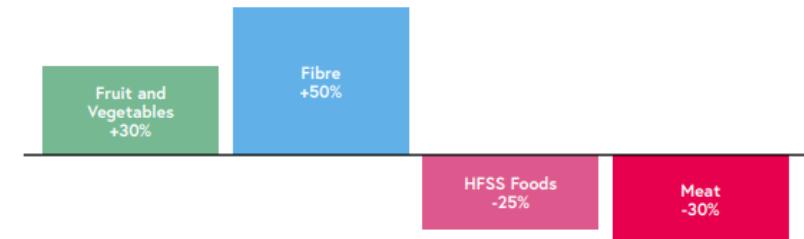
Age group	Recommended dietary fibre Intake
Adults	30g/day
Adolescents aged 16-18 years	30g/day
Children aged 11-16 years	25g/day
Children aged 5-11 years	20g/day
Children aged 2-5 years	15g/day

Age group (years)	Mean intake (g/day)	% meeting DRV
1.5-3	10.4 ▼	12
4-10	14.3 ▼	14
11-18	16.0 ▼	4
19-64	19.7 ▼	9
65-74	19.7 ▼	9
75+	17.3 ▼	3

*National Diet and Nutrition Survey years 9-11
(2016-2017 and 2018-2019)*

Figure 16.1

Changes are needed to the national diet by 2032 (compared to 2019) to meet health, climate and nature commitments¹

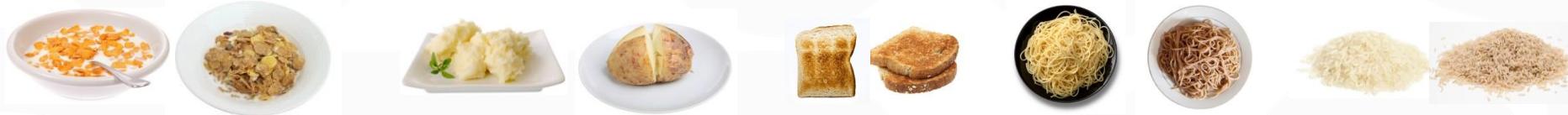


¹ Three of the diet-related targets are based on advice from the Scientific Advisory Committee on Nutrition. A 30% increase in fruit and vegetables would bring us in line with the Eatwell recommendation to eat five pieces of fruit and vegetables per day; a 50% increase in fibre would bring us in line with the SACN recommended 30g/day; a 25% reduction in consumption of HFSS foods will take us towards the required 60% reduction in salt, 20% reduction in saturated fat, and 50% reduction in free sugars. A 30% reduction in meat is required to achieve the fifth carbon budget and the 30x30 nature commitment – this represents the creation and maintenance of at least 410,000 hectares of woodland, maintaining and restoring 325,000 hectares of peatlands, and managing 200,000 hectares mainly for nature (for example, heathland and species-rich grassland, some of which would be managed through conservation grazing.)



Fibre content of starchy foods

Food, portion size	Fibre content (per portion)	Food, portion size	Fibre content (per portion)
Corn flakes (30g)	0.8 g	Bran flakes (30g)	4.0 g
White toast (54g)	1.6 g	Wholemeal toast (62g)	5.1 g
White spaghetti (220g)	3.7 g	Wholewheat spaghetti (220g)	9.2 g
White rice (180g)	0.9 g	Brown rice (180g)	2.7g
Mashed potato (120g)	1.6 g	Jacket potato with skin (180g)	4.7g



Source: McCance and Widdowson's Composition of Foods



Fibre content of fruit, veg, pulses, nuts, seeds

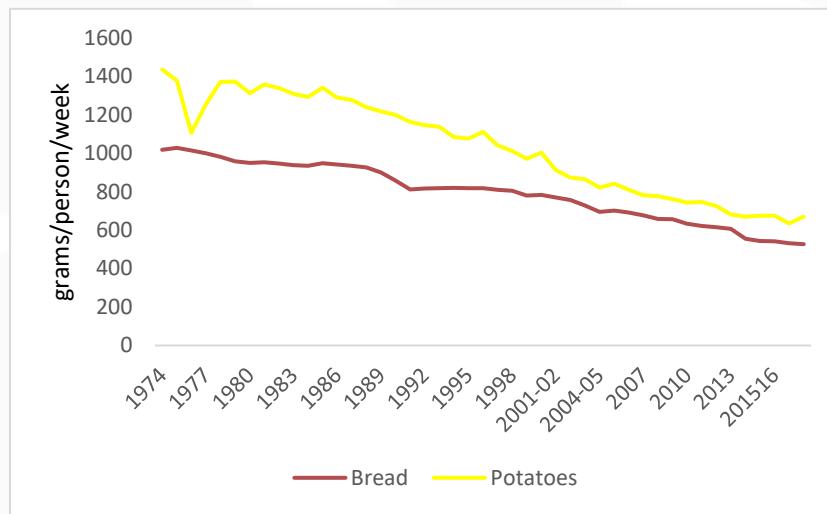


Food, portion size	Fibre content (per portion)
Red kidney beans (80 g)	6.0 g
Baked beans (80 g)	3.9 g
Hummus (50 g)	2.5 g
Peas (80 g)	4.5 g
Carrots (80 g)	2.7 g
Broccoli (80 g)	2.2 g
Strawberries (80 g)	3.0 g
Pears (80 g)	2.2 g
Bananas (80 g)	1.1 g
Almonds (25 g)	2.5 g
Hazelnuts (30 g)	2.1 g
Sunflower seeds (25 g)	1.7 g



Source: McCance and Widdowson's Composition of Foods

Intake of fibre-rich foods



Source: Family Food Survey 2017/2018 ([DEFRA 2019](#))



Less than a third of adults achieve 5 A DAY (average 4.3 portions/day).



Nuts and seeds only contribute on average around 2% of fibre in the UK diet (average consumption ~6 g/day including nut butters).

NDNS: results from years 9 to 11 (2016 to 2017 and 2018 to 2019)



Average intake of pulses 14 g/day (estimated 26 g/day to bring in line with Eatwell Guide).



18% of adults and 15% of children do not consume any wholegrains.



What does 30g of fibre per day look like?

Adult weekly meal plan						
What can 5% free sugars and 30g fibre look like? 						
<small>This menu simply shows one way of meeting the fibre and free sugar recommendations, as well other UK food and nutrient based dietary guidelines (e.g. energy, salt,  saturated fat, 5 A DAY, fish) - it is not, however, the only or definitive approach. It also allows you to still have a little bit of what you fancy - in moderation!</small>						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast No added sugar muesli, semi-skimmed milk and canned peaches (in juice) Small glass (150ml) orange juice Lunch Jacket potato with tuna mayonnaise, sweetcorn and salad 2 oatcakes, cheese and grapes Evening meal Chickpea and spinach curry (retail cooking sauce) with brown rice Snacks Guacamole and 1/2 wholemeal pitta bread 4 squares of dark chocolate	Breakfast 2 slices wholemeal toast with peanut butter Skinny latte Small glass (150ml) orange juice Lunch Chicken and wholewheat pasta salad 4 dried apricots Evening meal Baked salmon, new potatoes, broccoli and kale Snacks Smoothie: skimmed milk, low fat fruit yogurt, frozen berries 2 chocolate digestives	Breakfast Bran flakes, semi-skimmed milk and chopped banana Tea Lunch Cheese and chutney and salad on a wholemeal roll 1 pear Evening meal Vegetarian bean chili with brown rice Snacks Unsalted nuts (handful) and raisins 175ml glass of red wine	Breakfast Small can of reduced sugar baked beans on 1 slice of wholemeal toast Skinny latte Lunch Lentil soup, ham salad sandwich with salad cream, on wholemeal bread 2 tangerines Evening meal Lean pork and pak choi stir fry with noodles Snacks Low fat plain yogurt, berries and pumpkin seeds 25g packet of plain crisps	Breakfast 2 fortified wheat biscuits, semi-skimmed milk and chopped banana Small glass (150ml) orange juice Lunch Houmous, rocket and red pepper on a wholemeal wrap Low fat yogurt, honey and cinnamon Evening meal Fish pie, peas and green beans Snacks Plain scone with low fat spread 7 Brazil nuts	Breakfast Scrambled eggs, grilled tomato and 2 slices of wholemeal toast Small glass (150ml) orange juice Lunch Thin crust Margherita pizza with added vegetables and a side salad Fruit salad Evening meal Spaghetti Bolognese with wholewheat spaghetti Snacks Flapjack slice 175ml glass of red wine	Breakfast Porridge with dried figs and seeds Tea Small glass (150ml) apple juice Lunch Roast chicken, roast potatoes, peas and carrots Homemade spiced rice pudding Evening meal Cheese and onion omelette, sweet potato wedges, green salad, lemon mayonnaise Snacks 1 apple Homemade plain popcorn
TO NOTE:  For analysis, it is assumed that unsaturated oils are used for cooking (rapeseed) and in salads (olive), and spreads rich in polyunsaturates are used on toast and in sandwiches.  Tea and coffee: unsweetened with semi-skimmed milk.						
TOP TIPS:  Drinks - staying hydrated is important, so additional fluids will be needed! We should consume 6-8 glasses of fluid each day - water is recommended. Other options include unsweetened herbal and fruit infusions, tea/coffee with lower fat milk, or 'no-added sugar' or 'sugar-free' drinks.  Wholegrain variety - you could try to include a variety of options such as wholegrain breakfast cereals, wholewheat pasta, wholewheat/multigrain breads/wraps and bagels oats, barley, rye, buckwheat and quinoa.						

Meal plan weekly average = 33g fibre/day

Based on **three main meals/day plus snacks**. Illustrates just one approach to achieving the targets, demonstrates that UK recommendations are achievable through a balanced, healthy diet featuring inclusion of:

- wholegrain and higher fibre choices at mealtimes and for snacks
- around eight portions of fruit and vegetables daily
- pulses, nuts and seeds



Barriers to fibre consumption

Number of studies:
Children=13
Adolescents=5
Adults=30

	Kids		Adults		
	Children	Adolescents	Young	Middle-aged	Older
Barriers	+ Dislike taste / texture Poor availability of FCWG Lack of appeal (appearance / pack / marketing) Difficult to identify FCWG	Poor availability of FCWG Dislike taste / texture Time-consuming to prepare/eat Lack of appeal (appearance / pack / marketing)	Dislike taste / texture Cost of FCWG Difficult to identify FCWG Poor availability of FCWG	Cost of FCWG Dislike taste / texture Difficult to identify FCWG Lack of knowledge on nutrition & health benefits	Cost of FCWG Difficult to identify FCWG Dislike taste / texture Poor availability of FCWG
	- Lack of knowledge on nutrition & health benefits	Cost of FCWG	Lack of knowledge on nutrition & health benefits	Dietary habits & other family members (children)	Chewing difficulties (institutions)
Facilitators	+ ↗ sensory appeal Incorporate WG in usual and well-liked products Familiarization to FCWG Preference / liking of taste/texture ↗ availability of FCWG	↗ availability of FCWG Preference / liking of taste/texture ↗ sensory appeal Incorporate WG in usual and well-liked products ↗ variety of FCWG	↗ sensory appeal ↗ availability of FCWG Familiarization to FCWG Preference / liking of taste/texture ↗ ability to identify FCWG	↗ sensory appeal ↗ availability of FCWG Familiarization to FCWG Clear labeling of WG on packs Education vs FCWG cooking / preparation	↗ ability to identify FCWG ↗ sensory appeal ↗ availability of FCWG Preference / liking of taste/texture Education vs FCWG cooking / preparation
	- ↗ ability to identify FCWG Education vs FCWG cooking / preparation	↗ ability to identify FCWG Education vs FCWG cooking / preparation	↗ ability to identify FCWG Education vs FCWG cooking / preparation		

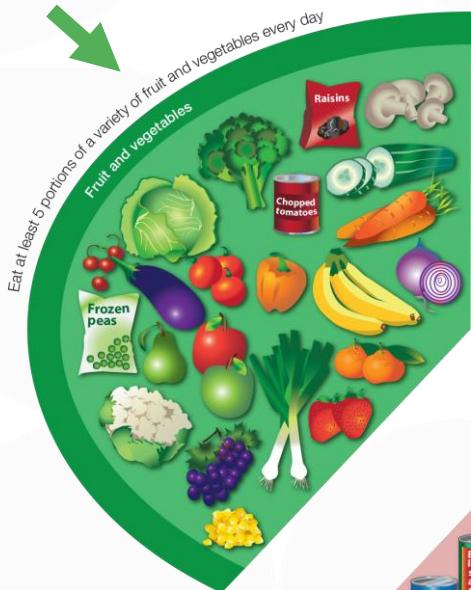
Figure 3. Main barriers to and facilitators of whole grain consumption in children and adults, as identified from the data collected in the frame of the current review. Factors are presented in decreasing order of their possible importance (from + to -), for each age group separately, on the basis of the number of studies that have concluded that the corresponding factor was a barrier or a facilitator. WG, whole grain. FCWG, foods containing WG.

Barriers:

- Dislike of taste/texture
- Poor availability
- Time consuming to prepare/eat
- Cost
- Difficult to identify
- Lack of knowledge of nutrition and health benefits
- Lack of appeal (appearance/pack/marketing) – children/adolescents



Fibre in current public health policy



Food facts

We're here to help you be healthier and happier. Find out more about what's really in the food your family eats.

Healthier food swaps

See simple food swap ideas to help cut down on sugar, salt and fat in your family's diet – plus easy ways to make a swap when you next shop.

Snacks

It can be really difficult to know what the best choice might be, so learn how to snack smart with these quick and easy ideas.

5 a day

All you need to know about 5 a Day for the whole family, including what counts, portion sizes and easy recipes.

Sugar

We're all eating too much sugar – get the facts, recommended amounts and tips to help you cut back.

Salt

Most of us are eating more salt than we realise. Find out how much is too much, simple ways to cut down and foods to watch out for.

Fat

Learn the difference between healthy and unhealthy fats, and see some handy tips for making the right choices at breakfast, lunch and tea time.

NHS Food Scanner app

Try our calculator to find out how much sugar your child might be having each day. You may be surprised at the results.

Sugar calculator

Try our calculator to find out how much sugar your child might be having each day. You may be surprised at the results.

How to eat healthier meals

It can be tricky to know what to do with your meals if you're trying to lose weight. Here are some quick tips to help.

Veg: go for 2 or more

Aiming for 2 or more portions of veg in a main meal means half your plate.



Carbs: stick to wholegrain

Carbs like potatoes, bread, rice or pasta should make up no more than a third of your meal – and try to have wholegrain versions where you can.



Dairy: keep it light and low

Pick lower-fat and lower-sugar options for milk, cheese and yoghurts.



Spreads: be sensible

Choose lower-fat spreads and only eat it in small amounts.



Protein: prize it!

Always include some protein – like beans, pulses, fish, eggs, meat or other types. It helps you stay full.

Fish: try twice a week

If you eat fish, try to have 2 portions a week. At least 1 portion should be oily fish like sardines, salmon or mackerel.

Oils: choose unsaturated

Go for olive, sunflower and rapeseed oil, which have unsaturated fats.

Water: stay hydrated

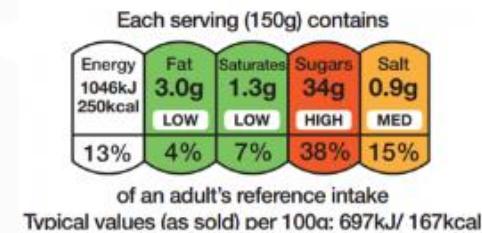
Drink 6 to 8 cups of fluid a day. Water, tea, coffee, soup... They all count!



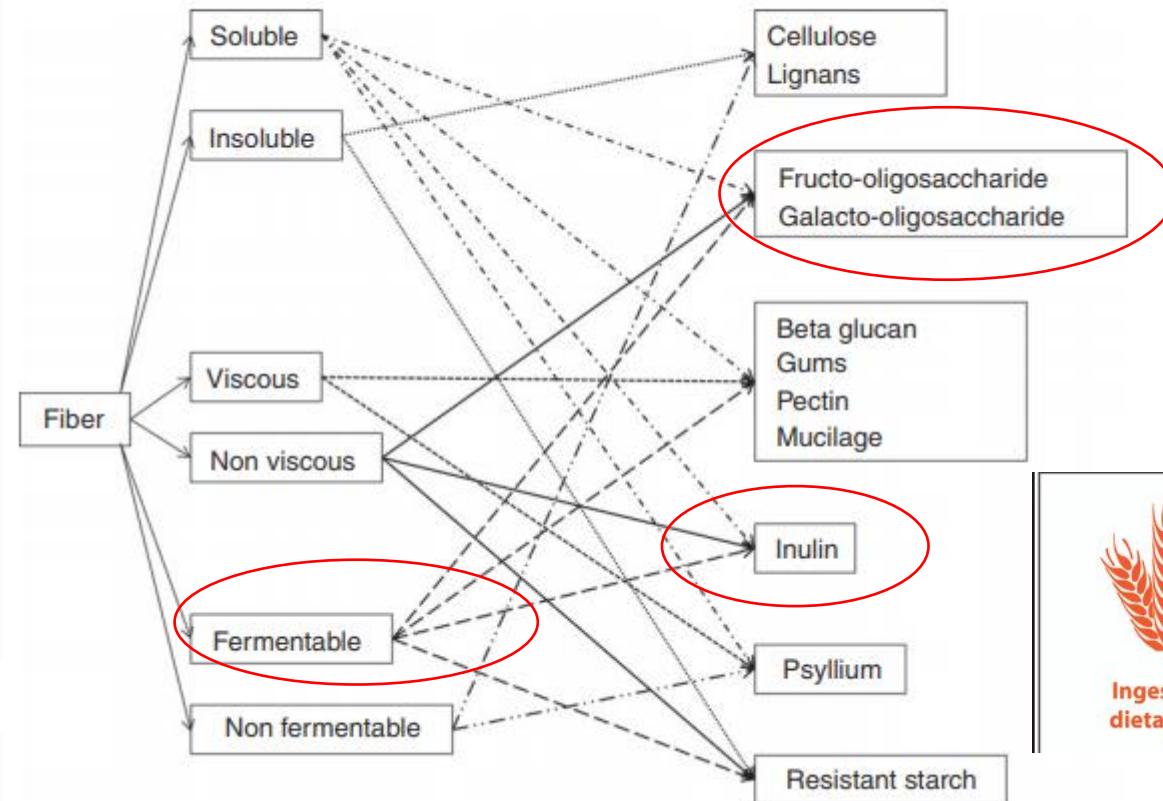
Challenges in communicating about fibre

- Limited number of generalised health claims for total fibre consumption.
- Wording of some authorised claims for specific fibre types may be unfamiliar and/or off-putting for consumers (e.g.):
 - Oat grain fibre contributes to an increase in faecal bulk
 - Wheat bran fibre contributes to an acceleration of intestinal transit
 - Rye fibre contributes to normal bowel function
- It is **not mandatory for fibre** to be declared on nutrition labels. It can be declared on a voluntary basis.
- Nutritional information on labels may also be expressed as a percentage of the reference intake (RI), but **fibre is not included**.
- Front-of-pack information is voluntary but, if provided, it can include energy alone or energy plus fat, saturates, sugars and salt. **Not fibre.**

Energy or nutrient	Reference Intake
Energy	8400kJ/2000kcal
Fat	70g
Saturates	20g
Carbohydrate	260g
Sugars	90g
Protein	50g
Salt	6g



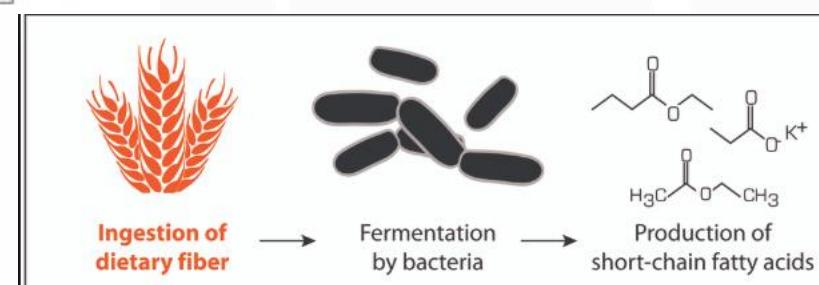
Prebiotics



Prebiotic effect?

A substrate that is **selectively** utilized by host microorganisms conferring a health benefit

Accepted prebiotics: Fructans (FOS and inulin) and galactans (including GOS)



Short-chain fatty acids (SCFAs):

- Provide fuel for gut bacteria
- Protect the cells lining our gut
- Stimulate release of gut hormones

Gibson et al. (2017) *Nat Rev Gastroenterol Hepatol* **14**, 491–502



Health effects of prebiotic fibres

Potential mechanisms of action

Increases in *Bifidobacteria* & *Lactobacilli*

Production of beneficial metabolites

Increases in calcium absorption

Decreases in protein fermentation

Decreases in pathogenic bacteria populations

Decreases in allergy risk

Effects of gut barrier permeability

Improved immune system defense

Authorised health claim
(EU & GB)

Chicory inulin contributes to normal bowel function by increasing stool frequency.

More research is needed to show if modulation of composition & function of microbiota translates to health benefits in humans



Prebiotic content of foods

(g/100g)	GOS	FOS	Total fructans
Asparagus		0.43	
Garlic		0.92	17.4
Onions	0.19	0.39	1.8
Rye bread	0.24		1.05
Wholegrain bread	0.59		0.69
White bread	0.20	0.11	0.68
Bran-based cereal	1.32	0.66	2.35

Total fructan content of UK bread:

White: 0.86 g/100g
Wholemeal:
0.88g/100g

Main sources of fructans in UK diet:

- Wheat
- Onion
- Banana
- Garlic

Anderson et al. 2015



Australian data: Muir et al., 2007, 2009; Biesiekierski et al., 2001



What about probiotics?

What is a probiotic?

Probiotics are live microorganisms that, when administered in adequate amounts, confer a health benefit on the host



Found in yogurts or other fermented dairy products, as well as in dietary supplements & functional foods

Probiotics are named using the conventions for all living things.

The name has a genus (plural: genera), then a species (and in some cases a subspecies as well) and a strain name e.g. *Lactobacillus acidophilus* xyz, *Bifidobacterium animalis* subsp. *lactis* xyz.

Probiotics typically do not take up residence in the gut but produce substances and interact with immune and gut cells, dietary components in our gut and the resident gut microbiota.

Different strains within the same species can have different health effects.

Hill *et al.* (2014) *Nat Rev Gastroenterol Hepatol* 11, 506–514.

No health claims authorised for use in EU or GB



Potential for clinical use

Some evidence exists for:

- Reducing antibiotic-associated diarrhoea
- Helping to manage IBS
- Helping to reduce colic symptoms and eczema in infants
- Treating infectious diarrhoea
- Decreasing risk or duration of common infections including upper respiratory tract, and gut
- Defecation frequency

Additional research clarifying the most effective strains and doses is needed for many clinical targets so far researched.

Sanders et al. (2019)
*Nature reviews
Gastroenterology & hepatology*



Fermented foods and gut health

- Foods made through desired microbial growth and enzymatic conversions of food components
- Tempeh, miso (fermented soybean), kimchi (fermented vegetables), kombucha (fermented tea) – no human data



- Kefir (fermented milk) – may benefit lactose malabsorption, *H.pylori* eradication – most widely investigated
- Sauerkraut (fermented cabbage) – may reduce IBS severity (limited evidence)
- Natto (fermented soybean paste) – may increase stool frequency and modulate microbiota (limited evidence)
- Sourdough bread (bread fermented longer) – lower in FODMAPs, some evidence tolerated better (improved GI symptoms) (low quality studies)

Overall, very limited evidence from human studies. Compositions vary.

Dimidi et al. (2019) *Nutrients*, 11(8), 1806.



EU & GB authorised health claim for yogurt

The EU have approved a health claim relating to a probiotic effect of yogurt.

“Live cultures in yoghurt or fermented milk improve lactose digestion of the product in individuals who have difficulty digesting lactose”.

The bacteria produce the β -galactosidase enzyme (lactase) necessary to break lactose down into glucose and galactose. This enzyme is produced in lower levels in people with lactose maldigestion.

The effect is limited to lactose consumed with the yoghurt and does not persist after the yoghurt has been eaten.



Fermented foods and public health

- Fermented foods is a broad category and includes many different types of foods from fermented dairy foods to fermented vegetables, fermented soy products and fermented grains.
- There is not enough evidence to give **specific** advice about fermented foods *per se* in UK dietary recommendations, although yogurt is an important part of the dairy group.
- While there is some evidence that yoghurt specifically has some health benefits, the evidence is not strong enough to recommend that people **should** eat yogurt.
- Nevertheless, yoghurt is a good source of nutrients such as protein and calcium and is included in UK food-based dietary guidelines on this basis.
- Gut health is important and if people like other types of fermented foods, they may have beneficial effects.
- However, the evidence that fibre improves gut health is stronger and eating more fibre is probably a better way, from a public health perspective, to improve gut health.



Sources of further information and support (1)

British Nutrition Foundation webinars (<https://www.nutrition.org.uk/training-and-events/on-demand-webinars/>)

Fermented foods - separating hype from fiction

Breastfeeding: Shaping the infant gut microbiota

Personalised Nutrition – Is it all in the gut?

Why is everyone talking about gut microbiota?

Prebiotics

British Nutrition Foundation webpage (including video and Fun way to fibre resource)

Fibre (<https://www.nutrition.org.uk/healthy-sustainable-diets/starchy-foods-sugar-and-fibre/fibre/>)

Fibre

We aim to give people access to reliable science-based information to support anyone on their journey towards a healthy, sustainable diet. In this section you can read about fibre in the diet, the foods that provide fibre and how they can affect our health.



Sources of further information and support (2)

Fibre up your BBQ	
	Mix it up! Include different fibre sources: fruit and veg, pulses, wholegrains, nuts and seeds
The main event	Veg or pulse side
Corn on the cob	Succotash (sweetcorn and broad beans)
Spicy falafel burger	Salsa
Baked potatoes (sweet or regular)	BBQ beans
Cauliflower steak	Lemon and mint grilled courgettes
	New potatoes
Did you know... on average in the UK we eat 19g fibre a day, when we should be eating 30g a day	
	Eating plenty of fibre is associated with a lower risk of heart disease, type 2 diabetes and bowel cancer

Fibre up your breakfast			
Base	Add	Extras	
Oats	Lower fat milk	Berries	 <small>Summer fruits with nuts and seeds!</small>
Wholegrain bread	Nut butter	Sliced apple	 <small>Try sliced pear or melon</small>
Wholemeal pancakes	Low fat yogurt	Banana and pecans	 <small>Add some chopped fruit</small>
Black beans	Scrambled eggs	Avocado	 <small>Yum with a wholemeal wrap!</small>
Wholegrains Fibre... + B vitamins and folic acid + Antioxidants	Nuts and seeds Fibre... + Protein Unsaturated fats	Fruit Fibre... + Vitamin C Folate Potassium	Beans and pulses Fibre... + Protein Vitamins Minerals

Fibre up!		Fibre up your salad		
		Mix it up! Include different fibre sources: fruit and veg, pulses, wholegrains, nuts and seeds	Sun	
Grains and more		Veg	Protein	Extras
Brown rice		Sugar snap peas	Chickpeas	Dried fruit
Freekeh		Sweetcorn	Mixed beans	Fresh fruit
Bulgur wheat		Peppers	Soya beans	
Wholewheat pasta	+	Cucumber	Lentils	+
New potatoes		Carrots	Cannellini beans	+
		Green beans	Tuna	Fresh herbs
		Beetroot	Chicken	Nuts
		Tomatoes	Feta cheese	Seeds
Jewelled freekeh with dried apricots, cucumber, red pepper, sundried and cherry tomatoes		Brilliant bulgar wheat with dried apricots, pumpkin seeds, hazelnuts and feta cheese with lemon juice and a drizzle of olive oil		
Fantastic fibre!		Mack and beans Smoked mackerel with green beans and a mixed salad leaves with horseradish and a mustardy crème fraîche		
Super seeds!		Useable vitamin D! Vitamin D is essential for strong bones and teeth. It's also important for a healthy immune system and for maintaining a healthy weight. It's hard to get enough from food, so it's a good idea to take a supplement.		
Nicely nutty!		Med pasta salad with chickpeas, red onion, parmesan, and basil with black pepper and a drizzle of olive oil.		

Nutrition Bulletin

NEWS AND VIEWS

Prebiotics – an added benefit of some fibre types

S. Lockyer and S. Stanner
British Nutrition Foundation, London, UK

Nutrition Bulletin

ORIGINAL ARTICLE

Dietary fibre and the prevention of chronic disease – should health professionals be doing more to raise awareness?

S. Lockyer, A. Spiro and S. Stanner
British Nutrition Foundation, London, UK

Nutrition Bulletin

NEWS AND VIEWS

Translating probiotic science into practice

L. Chambers¹, A. Avery², J. Dalrymple¹, L. Farrell³, G. Gibson⁴, J. Harrington⁵, G. Rijkers⁶ and L. Rowland⁷, A. Spiro⁸, G. Varela-Moreira⁹, L. Vokes¹⁰, L. Young¹¹, K. Whelan¹² and

DOI 10.1111/nbu.12122

DOI 10.1111/nbu.12121

DOI 10.1111/nbu.12120

Nutrition Bulletin

Nutrition Bulletin
The public health rationale for increasing dietary fibre: Health benefits with a focus on gut microbiota

Nutrition Bulletin

EDITORIAL DOI: 10.1111/nbu.12405

Nutrition: An old science in a new microbial light

Nutrition Bulletin

Pulses

What are pulses?

Pulses (sometimes called legumes) are beans (e.g. kidney beans, soy beans, lentils), peas (e.g. chickpeas) and lentils.

Pulses?

- High in protein - half a cup of black-eyed beans contains 15g protein, 1/3 of the daily requirement for a 10-year-old.
- Low in fat and saturated fat
- High in fibre
- A source of vitamins and minerals
- One of your 5 A DAY (minimum) in a 100g portion (adults 1200g)

Pulses can be used to make foods such as falafel, hummus, dips and soups. They are a great source of protein and fibre. It is better to choose those that are lower in fat, saturated fat, sugar and salt. For example, chickpeas are a great alternative to crisps - try to go for products with more greens and antiox, and fewer fats.

Healthy, sustainable diets

We should all be aiming to consume a healthy, healthy and varied plant-rich diet to improve the health and the health of the planet. Pulses are a great source of protein and fibre, and are a low cost and easy dependency on your dietary choices but they will be very to your protein sources. This includes eating pulses, nuts, seeds and other plant-based protein sources. Pulses are a great source of protein that are high in saturated fat and salts. Pulses typically have a lower energy density than meat, fish and dairy products, so a portion does not require many calories. Pulses also improve the quality of the soil which can benefit the growth of subsequent crops.

Nutrition and Immunity for Children (10 years and younger)



Vitamin A

We do our best to protect our kids, whether from the sun, from disease, and to send them to school and social activities. But did you know children are often in physical contact in a variety of ways with toys, books and eggs? This is where we can help. Learning the importance of handwashing is key to supporting children's immune systems to fend off infections as much as possible.



Vitamin B6

Found in: meat, fish, eggs, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



Vitamin B12

Found in: meat, fish, eggs, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



Vitamin C

Found in: citrus fruits, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



DID YOU KNOW?

Did you know? The body's immune system is a complex network of cells, tissues and organs that work together to defend the body against infection, and a variety of threats. A healthy immune system is vital to our health and well-being. It helps to keep us healthy and strong, and to protect us from a range of different threats, such as viruses, bacteria and other harmful agents.



DID YOU KNOW?

Did you know? Children are provided with a range of vitamins and minerals in their school meals, including vitamins A, C and D, and calcium, iron, zinc, iodine and vitamins B6 and B12. A child's diet should be varied and balanced to ensure they get all the vitamins and minerals they need. A healthy diet is important for a child's growth and development.



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Copper

Found in: meat, fish, eggs, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



Folate

Found in: meat, fish, eggs, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



Iron

Found in: meat, fish, eggs, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



Selenium

Found in: meat, fish, eggs, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



Zinc

Found in: meat, fish, eggs, wholegrain cereals, chickpeas, whole beans, lentils, beansprouts, bananas, sweetcorn, green vegetables, carrots, parsnips, turnips.



DID YOU KNOW?

Did you know? Baked beans are typically high in salt and sugar, and low in protein, fibre and vitamins. There are many lower salt and sugar versions.



DID YOU KNOW?

Did you know? Baked beans are ready to eat, so they are a great source of protein and fibre. They are also a good source of iron, zinc and magnesium.



DID YOU KNOW?

Did you know? Baked beans are a great source of protein and fibre. They are also a good source of iron, zinc and magnesium.



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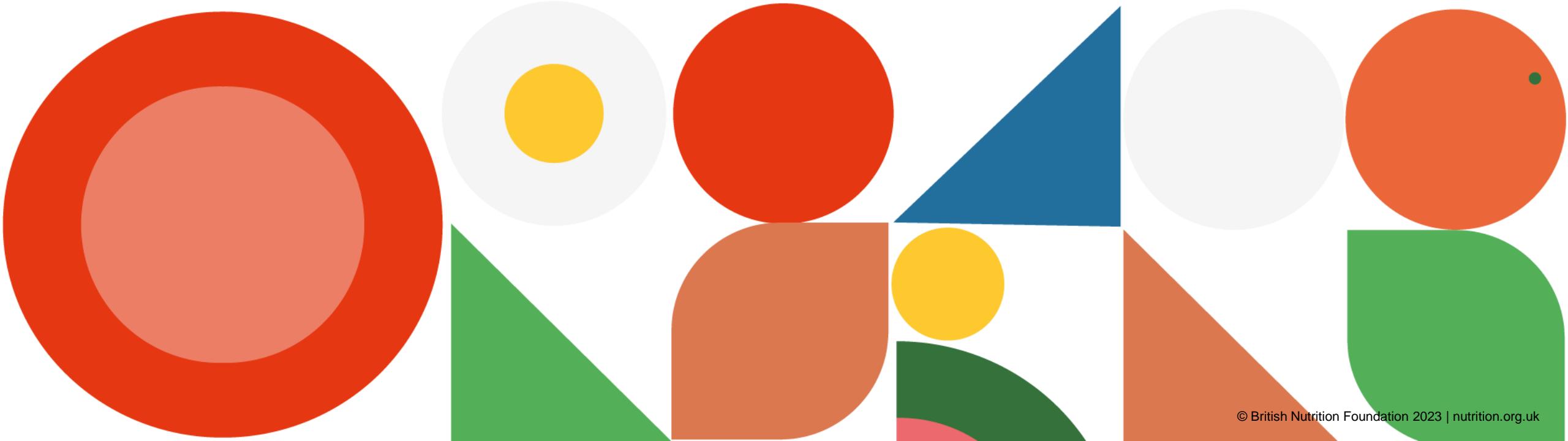
International Scientific Association of Probiotics and Prebiotics (isappscience.org)

World Cancer Research Fund (wcrf.org)





Thank you



Food – a fact of life resources: Digestion

- Presentations, worksheets, videos and quizzes – [11-14 years](#) and [14-16 years](#)
- Knowledge organisers – [11-14 years](#) and [14-16 years](#)
- Interactive resources – digestion drag and drop, digestion ‘hot spots’, fibre line up

Energy, nutrients and digestion

Key terms:

- Food and drink provide energy and nutrients in different amounts, they have important functions in the body and people require different amounts during their life.
- Digestion involves different parts of the body, each having an important role.
- Energy: Energy is essential for life, and is used for the body's basic functions, including processes, growth and activity. These include:
 - keeping the heart beating;
 - keeping the organs functioning;
 - controlling the temperature;
 - muscle contraction;
- Different people need different amounts of dietary energy, depending on their:
 - age;
 - gender;
 - body size;
 - level of activity;
 - genes;
- Energy balance: To maintain body weight it is necessary to take in enough energy intake (from food and drink) with energy expenditure (from activity).
- Body Mass Index (BMI): can be calculated by dividing weight by height squared (height in m x height in m).

$$\text{BMI} = \frac{\text{Weight}}{\text{Height}^2}$$
- Energy requirements: vary from person to person, depending on the following factors:
 - age;
 - gender;
 - body size;
 - level of activity;
 - genes;
- Energy expenditure: Total energy expenditure = Energy in - Energy out
- Protein: Protein is made up of building blocks called amino acids. There are 20 amino acids in total. Some of these have to be provided by the diet and are called **essential amino acids**. The body cannot make these and must obtain them from the diet.
- Fibre: Create an infographic on either macronutrients or micronutrients. Focus on the definition of each nutrient, recommended amounts and sources. Create a table showing the amount of each nutrient and the stages of digestion that occur at each part of the digestive system. Reflect on a hot day or one or two days using [the 'hotspot' tool](#) and refine the results.

Stages of digestion:

Ingestion: the intake of food into the mouth and into the oesophagus.

Digestion: a series of physical and chemical processes that occur in the mouth, the oesophagus and small intestine.

Absorption: the process of moving digested food substances across the gut wall into the bloodstream and lymphatic system.

Elimination: the excretion of undigested food substances (such as cellulose) or waste in faeces.

To find out more, go to: [digestion](#)

Digestion

Food as fuel: The body requires energy from food and drink. Our bodies release energy and nutrients from food through the process of digestion.

The mouth: Mastication is the action of the teeth and the jaw working together to break food down into smaller pieces. The tongue also gives the digestive enzymes a larger surface area which to work on.

Saliva: Saliva contains the enzyme amylase which breaks down starch into maltose. It also moistens the food to allow easier passage through the body. Saliva is secreted from salivary glands around the mouth.

The key organs involved in the digestive process:

Food as fuel: The body requires energy from food and drink. Our bodies release energy and nutrients from food through the process of digestion.

The mouth: Mastication is the action of the teeth and the jaw working together to break food down into smaller pieces. The tongue also gives the digestive enzymes a larger surface area which to work on.

Saliva: Saliva contains the enzyme amylase which breaks down starch into maltose. It also moistens the food to allow easier passage through the body. Saliva is secreted from salivary glands around the mouth.

Esophagus: Circular muscles in the wall of the oesophagus relax in front of the bolus (a ball like mixture of food and saliva) while other muscles behind the food contract, pushing the food bolus forward. This is called peristalsis.

The stomach: The stomach is an expandable sack muscle which is different layers of muscle which the bolus will be journeyed for a few minutes or up to a few hours. The bolus is mixed with hydrochloric acid (HCl) which helps to kill any bacteria present.

The small intestine: The small intestine is a tube about 6 metres long.

Key terms:

- Bile:** Bile is a fluid produced in the liver and stored in the gall bladder. This contains bile salts, which help to break down fat, which is normally insoluble in water.
- Passive absorption:** Through the process of osmosis, the nutrient passes through the wall of the small intestine into the blood supply.
- Active absorption:** A carrier transports nutrients through the wall of the small intestine, which greatly increases the surface area available for absorption.
- Bile salts:** These are the bile of the small intestine. It is folded into finger-like structures called villi, which greatly increase the surface area available for absorption.
- Key terms:**

The small intestine: The small intestine is divided into three sections:

- duodenum;
- jejunum;
- ileum.

The first section of the small intestine is folded into finger-like structures called villi, which greatly increase the surface area available for absorption.

Digestion: The process by which food is broken down into smaller particles to release nutrients.

Passive absorption: Through the process of osmosis, the nutrient passes through the wall of the small intestine into the blood supply.

Active absorption: A carrier transports nutrients through the wall of the small intestine, which greatly increase the surface area available for absorption.

Bolus: A ball-like mixture of food and saliva.

Stages of digestion:

- Ingestion:** the intake of food into the gastrointestinal tract.
- Digestion:** a series of physical and chemical processes which begin in the mouth and continue in the oesophagus and small intestine.
- Absorption:** the movement of digested food substances across the gut wall into the bloodstream and lymphatic system.
- Elimination:** the excretion of undigested food substances (such as cellulose) or waste in faeces.

Key terms:

- Pancreatic juices:** The pancreas secretes pancreatic juice which contains bicarbonate to neutralise the hydrochloric acid mixed into the chyme from the stomach and provide an optimum pH level for the enzymes to work.
- Colon (Large Intestine):** The colon is a tube just over 1.5 metres long. The main function of the colon is to absorb water into the bloodstream and to process waste products.
- Protein → Peptides + Amino acids**
- Trypsin and Chymotrypsin**
- Starch → Glycogen**
- Pancreatic amylase**
- Fat → Fatty acids + glycerol**
- Pancreatic lipase**

Task: Draw the digestion process and label each part of the body. List the stages of digestion, giving information on which part of the body is used for each stage.

This resource meets the [Guidelines for producers and users of school education resources about food](#).

[www.foodafactoflife.org.uk](#)

Food – fact of life resources: Fibre



[Fibre cards](#)

14 - 16 YR



Make it with mince challenge - high fibre dishes

A guide to a challenge to create a mince based dish with added fibre.

[Download](#)

[Fibre challenge](#)

The Challenge

Create a three-day menu for someone with a specific dietary need, which provides variety and balance, but also something a little different too!

For an extra challenge, choose one of the dishes to cook and prepare.



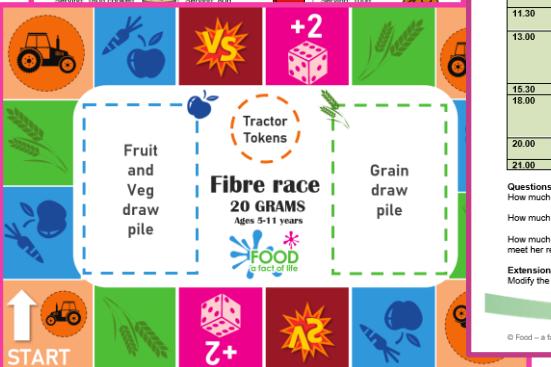
[Variety is the spice of life – Challenge-based activity](#)

Find your fibre fortune

Enter a randomly selected three digit number in the squares below.

<input type="text"/>	<input type="text"/>	<input type="text"/>
0) White bread	0) Sweetcorn	0) Ham
Serving: 2 slices (80g) Fibre: 2.3g	Serving: 80g Fibre: 1.6g	Serving: 2 slices (30g) Fibre: 0g
1) White pasta	1) Peas	1) Tuna
Serving: 180g cooked Fibre: 4.5g	Serving: 80g Fibre: 4.4g	Serving: 60g Fibre: 0g
2) Bagel	2) Broccoli	2) Boiled egg
Serving: 1 bagel (85g) Fibre: 2.6g	Serving: 80g Fibre: 3.0g	Serving: 120g Fibre: 0g
3) Brown rice	3) Cherry tomatoes	3) Chicken
Serving: 180g cooked Fibre: 4.4g	Serving: 80g Fibre: 3.5g	Serving: 100g Fibre: 0g

Fibre race
20 GRAMS
Ages 5-11 years



[#FibreFebruary blog](#)

Case study 1: Chloe

Below is Chloe's diet diary. She was asked to record everything she ate and drank over a day.

Name: Chloe	Date:	
Age: 25		
Further information: Chloe is moderately active at work, but does not exercise regularly. She is not pregnant or breastfeeding.		
Time of day	Food/drink consumed	Total amounts (g)
8.00	2 boiled eggs 3 thick slices ham Smooth orange juice Medium latte	100 90 150 190
10.00	Red grapes Glass of water	60
11.30	2 ginger nut biscuits Tea made with whole milk	20 190 tea, 10 milk
13.00	Chopped vegetable soup Salad containing olives and tomatoes 2 glasses water 1 slice white bread, buttered Baked beans	200 80 lettuce, 60 tomato, 50 olives 40 bread 10 butter 100
15.30	1 slice honeydew melon	200
18.00	2 beef burgers in buttered white rolls Glass of water	100 burger, 90 rolls, 20 butter 60
20.00		
21.00		

MULTI-YR



Recipe modification (Fibre-boosted pizza)

A worksheet that looks at recipe modification.

[DOCX](#)

(0.2 Mb)

[Download](#)

Sources of dietary fibre

Components of dietary fibre are found in different proportions in food, therefore it is important to eat a variety of fibre-containing foods.

Dietary fibre is found in:

- wholegrain cereals and cereal products;
- beans;
- lentils;
- fruit and vegetables;
- nuts and seeds.



[Presentation, worksheet and quizzes](#)

Fibre line up cards

Print off two sets of the food cards, divide the class into two groups and ask each group to place the foods in the order they think has the least fibre to the most fibre (per 100g). Go through the answers and ask the pupils to place the foods in the correct order. Discuss what they have found out.

Did anything surprise them? How might they use this information to increase the fibre content of a recipe?





Needs change

We need different amounts of nutrients through life. How do they change?

Life stage

- Infants and young children
- Adolescents
- Adults
- Pregnant and lactating women
- Older adults

Changing nutritional needs

Be balanced!

How do we get energy balance?

Energy balance is...
 If I use more energy than I take in, I take in more energy.

Eat well!

The Eatwell Guide shows the balance and variety of foods that make up a healthy diet. Over 2-3 meals, needs five different food and drink groups. Remember, some dishes may have foods from more than one food group!

The Eatwell Guide

Keep an activity diary for a week, including all activities, such as walking, taking the stairs, dancing or playing sports.

Be active!

Day: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday

Activity

Nutrition matters

What can we find these nutrients and what do they do?

Materials	Food sources	Function in the body
Carbohydrate	Flour, Fats, B Vitamins, C, Vitamin D, Vitamin E, Calcium, Iron, Magnesium, Potassium, Sodium	Flour: Give us energy and it is needed for our heart.

Reflection -
 Explain how your diet reflects the Eatwell Guide.
 Do you drink enough?
 Is there anything you need to change? Explain your answer.

Debits for the future

11-14 years Food route journals



Be a healthy weight

Being a healthy weight is important for your general health now and in the future. Over 2-3 days, think about the different food and drinks you consume, compared with how active you are.

Day	Food/drink	Activity
1		
2		
3		

Do you think your food/drink choices balance your level of activity? Why?

If you are less active, eat more than you need, what will happen over time?

Why is it important to stay a healthy weight?

Diet and health

Healthy Weight, Healthy Lives

We all need to be a healthy weight to stay healthy. To achieve and maintain a healthy weight, we must balance the energy from food with the energy used through activity. The eight tips for healthy eating help us to achieve a healthy balanced diet and to be active throughout life.

Our need for water can vary on a daily basis depending on a number of factors. Drinking needs change throughout life, so what you eat may be different in the future.

Eight tips for healthy eating

What are the eight tips for healthy eating? How can you achieve these? Tell with your friends and family about using these tips to be healthy.

Eight tips for healthy eating	What I have done to achieve this
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Do you know what other people need to be healthy?

I know that nutritional needs change over life.

Age	Nutrition need changes	Reason for change in needs
Infants and young children		
Teenagers		
Adults		
Pregnant and lactating women		
Older adults		

14-16 years Food route journals

Healthy Eating Week, 12 – 16 June 2023

Healthy Eating Week – For Everyone

Themes:

- Focus on fibre
- Get at least 5 A DAY
- Vary your protein foods
- Stay hydrated
- Reduce food waste



Healthy Eating Week 2022

6,400 registrants,
representing...

1.8 million participants

100,000 resources downloaded

Register for free resources and updates to help you plan and run the Week!
www.healthyeatingweek.org.uk



Keep up to date with our free resources and training

Education News (monthly email update)

Sign up on the homepage: www.foodafactoflife.org.uk

PPD newsletter (find out about upcoming FFL training)

<https://www.foodafactoflife.org.uk/professional-development/>

Follow us on Twitter @Foodafactoflife

<https://twitter.com/foodafactoflife>

Keep in touch:

education@nutrition.org.uk

BNF news <https://www.nutrition.org.uk>

A screenshot of the 'Education news' section of the website. It features a header with the 'Food - a fact of life' logo and the text 'Education news'. Below this is a 'Last chance to register!' section with a photo of children in a kitchen and text about a conference on 12 November 2021. There are also sections for 'New! Six Early Years activity packs' (with a photo of children playing) and 'Building cultural awareness when delivering healthy eating messages - webinar' (with a photo of a globe made of food). A sidebar on the right lists recent posts and a footer with social media links.

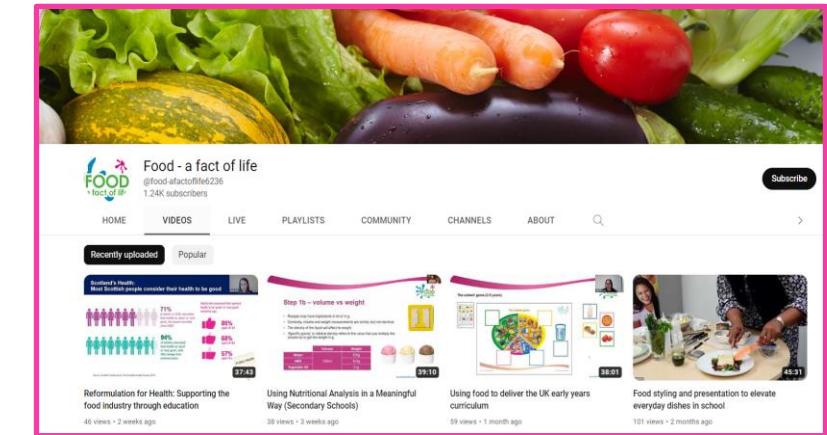
A screenshot of the 'Food - a fact of life' Twitter profile. It shows a profile picture of children in a kitchen, the handle '@Foodafactoflife', and a bio: 'Food resources for teaching young people aged 3-16 years about where food comes from, cooking and healthy eating, and food/beverage'. It includes location (London, UK), website (https://www.foodafactoflife.org.uk), and follower counts (1,588 followers, 9,001 following). Below the bio is a section for 'Food - a fact of life' with a photo of children and a link to a challenge pack. A sidebar on the right shows recent tweets and a media section.



More training...

FREE online modular courses:

- Functional properties of food
- Sensory science
- Food spoilage, hygiene and safety
- Characteristics of teaching food and nutrition education (secondary)
- Characteristics of teaching food and nutrition education to pupils with additional needs



[FFL webinar recordings](#)

To find out more and to book, go to

<https://www.foodafactoflife.org.uk/training/>

Nutrition and gut health – myths and false promises?



For further information, go to:
www.foodafactoflife.org.uk