

## Diet

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While the overall benefits of following a healthy diet have always been stressed by healthcare professionals, there is an ongoing discussion and a need for ongoing research about the potential role of diet and nutrition in the treatment of brain tumours.

This fact sheet is designed to explain how controlling your diet might help you to improve your quality of life and manage the side-effects of treatment.

It also looks at the extent to which some of the claims made about diet and brain tumour management are supported scientifically.

### **In this fact sheet:**

- The benefits of a healthy diet
- What constitutes a healthy diet?
- What should I eat when recovering from treatment?
- Can diet help treat my brain tumour?
- Who should I see for my diet?
- Further information

## **The benefits of a healthy diet**

A healthy diet is associated with numerous general health benefits, including reducing the risk of other medical conditions such as diabetes, heart disease as well as some types of cancer. Adopting a healthier diet after being diagnosed with a brain tumour could benefit you in the following ways:

- Keeping up your strength and energy
- Maintaining your weight and your body's store of nutrients
- Lowering your risk of infection
- Aiding the healing and recovery process

## **What constitutes a healthy diet?**

A lot of the information in this section is based on the 'eat well' plate created by the Department of Health to show the main foods groups, with the suggested proportions that make up a healthy diet.

### **Starchy carbohydrate foods**

It is recommended that starchy carbohydrate foods ideally form about a third of your diet. They include foods such as cereals, bread, pasta, potatoes, rice, plantain and yam.

Carbohydrates are the body's primary energy source. This is because it is faster and easier for the body to convert carbohydrate-rich food into energy than any other type of food.

Try including many wholemeal / wholegrain varieties of carbohydrate foods, such as brown rice, brown bread or brown pasta. The advantages of choosing these types of carbohydrate is that they are higher in fibre, keep you fuller for longer and help you maintain more sustained and balanced energy levels.

## **Fruits and vegetables**

Aim for fruits and vegetables also forming about a third of your diet. It is generally advised that you eat five portions of fruit and vegetables a day, as part of a healthy diet. Fruits and vegetables are an excellent source of vitamins, minerals and fibre.

## **Protein rich foods**

It is advisable that you try to include 2-3 portions of protein rich food a day. Good sources of protein include fish, poultry, eggs, dairy products, nuts and nut butters, and pulses. Dairy products (covered in the next section) are also a good source of protein.

Protein molecules are often referred to as the building blocks of the body. Using protein, the body performs vital functions such as growth and repair of tissue, and maintenance of the immune system.

A lack of protein in the diet can result in slower recovery and an increased risk of infection. Including protein in your diet, therefore, could be especially beneficial if you've had surgery, chemotherapy, or radiotherapy as it can support the body's healing process.

## **Milk and dairy foods**

Also ideally aim for 2-3 portions of dairy and/or dairy alternatives a day. Examples of foods within this food group include milk, cheese, yoghurts and alternatives such as soya milk (fortified with calcium). A portion is equivalent to a pot of yoghurt, small matchbox size of cheese or a glass of milk (approximately 200ml).

Dairy foods are an excellent source of calcium, which is essential for good bone health.

## **Foods high in fat and / or sugar**

The last food group on the 'eat well' plate is foods high in fat / sugar. It is generally advised that as part of a healthy diet, these foods are only consumed in real moderation.

However, these foods can be useful if you are losing weight, have a poor appetite or you are struggling to maintain an adequate intake.

## **Good and bad fats**

Fats are the richest energy source available, which means that every gram of fat has more calories than a gram of protein or carbohydrate. For this reason if you are seeking to put on weight, eating fat-rich food can help, while if you are overweight you might be advised to cut down on the amount of fat-rich food you consume.

There are some types of fat which are considered better than others due to the different effects they may have on cholesterol. Cholesterol is a substance in our body which supports various vital functions such as digestion and the production of hormones.

There are two types of cholesterol, one which is considered good because it lowers the risk of coronary heart disease (blocking of blood vessels and arteries) and one which is considered 'bad' because it raises the risk of coronary heart disease. 'Monounsaturated' or 'polyunsaturated' fats are healthier than those containing 'saturated' fat or 'trans-fatty acids' in terms of keeping levels of 'bad' cholesterol down.

You can find the amount of different types of fats contained in your food by referring to the food label on the packaging.

Sources containing the greatest concentration of monounsaturated or polyunsaturated fats are vegetable oils, nut oils and some types of fish.

Saturated fat is contained mainly in fatty meat and in high fat dairy products.

Trans-fatty acids, in the form of 'partially hydrogenated' vegetable oil, are contained in heavily processed snack foods and some baked goods.

## **Fluids**

The importance of staying hydrated cannot be stressed enough. Depending on your age and gender, water can make up 50-75% of your body mass. Water underpins every bodily function on every level and so the water we get through food and drink is, like the air we breathe, vital to our survival and wellbeing.

It is generally advised that you drink about eight 8-10 glasses of liquid each day (approximately two litres).

If you have diarrhoea or vomiting as a side-effect of treatment, then it is even more important that you replenish the fluid and minerals lost, by drinking more liquid than you would normally do. Your medical team can supply you with special rehydration drinks in such cases.

If you are having treatment in the form of chemotherapy or radiotherapy, getting plenty of fluids may also aid your body's ability to recover faster by expelling excess toxins.

## **What should I eat when recovering from treatment?**

The side-effects of brain tumour treatments can make it very hard for you to prepare and eat the necessary amount or variety of food that would aid your body in its recovery. In such circumstances trying to supply the body with sufficient nutrition is important.

If you are having difficulties with your diet, you can discuss your concerns with your doctor, who can give you advice or refer you to a dietitian.

Below are some tips dietitians give to those struggling with some of the most difficult food-related side-effects of treatment:

## **Too tired to eat**

If you are recovering from surgery, chemotherapy or radiotherapy you might be too tired to cook or eat. In such cases having a 'little and often' approach to meals can be helpful.

Try having six smaller meals per day than three larger ones. Using snacks, ready-made meals and including puddings could reduce the burden of cooking if you feel tired. You could also ask friends or family members to cook dishes in bulk and freeze portions so you can have them ready to defrost whenever you need to.

If you are particularly struggling with your eating, your doctor or dietitian might prescribe you with nourishing supplement drinks, which are high in energy, protein and micronutrients.

## **Feeling sick**

Chemotherapy or radiotherapy can cause nausea as a side-effect. If you feel sick following treatment you can ask your doctor to prescribe medication that can help to prevent or manage nausea. In terms of diet, nausea can make it increasingly difficult for you to build an appetite for food.

The following tips may be helpful if you are experiencing nausea related to treatment or medications:

- Try to eat smaller meals more often, rather than large meals further apart
- Try eating dry foods, like crackers, toast, dry cereals or bread sticks, when you wake up and every few hours during the day
- Avoid foods or rooms with strong odours
- Avoid hot or spicy foods
- Avoid foods that are overly sweet, greasy or fried
- Try to remain seated upright for at least an hour after eating

- Sip clear liquids frequently between meals to prevent dehydration, but try to avoid drinking with meals
- Try bland, soft, easy-to-digest foods on scheduled treatment days. Foods such as egg custards and soup with crackers may settle the stomach better and allow you to gradually begin eating a more varied diet
- Food or drink containing peppermint or ginger can help settle the stomach
- Try to avoid eating your favourite foods until you feel well enough to enjoy them

## **Constipation**

Constipation can be very painful and can even affect your appetite for food. Constipation is defined by an inability to open bowels routinely and a difficulty passing bowel motions. If you are experiencing constipation due to medicines, such as painkillers or anti-sickness drugs, your doctor may have to prescribe laxatives.

Here are some common suggestions for ways of easing or preventing constipation:

- Eating foods which are high in fibre are known to help increase your bowel movements. Foods which are high in fibre include wholegrain food (wholegrain cereal, brown bread, brown rice and brown pasta), fresh fruit and vegetables
- When increasing your fibre intake, it is essential to increase the amount of fluid you consume or it could further worsen your constipation
- Try to be active. Gentle exercise is known to help in keeping bowels moving

## **Taste changes**

Brain tumour treatments such as chemotherapy can sometimes affect your senses of taste and smell. People have often described a bitter or metallic taste in the mouth. If you are experiencing taste changes, trying different ways to flavour your food according to your preference can help keep your appetite up.

Below is a list of some common ways people have made their eating experience more enjoyable:

- Rinsing your mouth and brushing your teeth frequently has been found to help food taste better
- Plastic cutlery helps to deal with the metallic sensation
- Using fresh fruit and vegetables in meals instead of tinned to deal with the metallic sensation
- Seasoning foods with flavours such as lemon, vinegar, and pickles. However, be cautious if you also have a sore mouth, since some of these flavourings can make your mouth feel worse
- Adding herbs and spices, such as garlic, chilli, basil, oregano, rosemary, tarragon, coriander or mint to your dishes
- Some people find that serving foods cold or at room temperature helps them taste better

## **Big appetite due to medicines**

A side-effect of some medicines, such as steroids, is to increase appetite significantly. If you find yourself wanting to eat much more than usual as a result of taking certain medicines, maintaining a healthy weight might become more difficult.

Getting more protein and choosing foods which contain plenty of fibre (whole grains, fruits and vegetables) can help you feel fuller for longer without having to consume a great number of calories.

Also, avoiding foods which are high in saturated fats or trans-fatty acids is usually advised when you experience periods of high appetite.

**The list of food related side-effects addressed above is not exhaustive. If you are experiencing other food related side-effects as a result of having treatment, discuss them with your doctor or dietitian who can assist you further.**

## **Can diet help treat my brain tumour?**

There has been growing interest in the possible effectiveness of specific diet regimes and micronutrients for the treatment of brain tumours and their related symptoms.

Most notably, an increasing number of people affected by brain tumours are trying the ketogenic diet alongside more conventional forms of treatment.

In this section we explain what this diet is and why some people may be tempted by it.

However, it is important to remember that, although it is an effective treatment for drug-resistant epilepsy in children, there is a lack of scientific evidence for its effectiveness in the treatment of brain tumours or brain tumour-related epilepsy.

### **Ketogenic diets**

The ketogenic diet (KD) was devised in the early 1920s as a way of controlling seizures in people with unmanageable epilepsy.

The 'classic' KD is a special high fat, low carbohydrate diet which also requires careful measurement of proteins. Previous versions, which you may still hear about, also restricted fluid intake. However, fluid restriction is now rarely used in the UK, if at all. Indeed, staying well-hydrated is an important part of current ketogenic therapy, as well as being important to help with side-effects of tumour treatment.

A daily maximum fluid intake according to body weight, should be observed though, as well as advice about the rate of drinking, as too much fluid within a short space of time can dilute ketones, induce seizures and even cause death by altering the body's sodium levels.

The KD has been used for decades as an effective medical treatment for unmanageable epilepsy in children. It has the advantage that it is relatively safe, particularly compared to other treatments for unmanageable epilepsy.

In the last two decades, and particularly in the last five years, there has been a surge of interest regarding the possible benefits for adults affected by epilepsy and other diseases, such as Alzheimer's and cancer.

One of the main reasons for this recent surge in interest is the emergence of the more tolerable and easier to follow variants of the KD. These variants are used mainly for children, but may also be used with adults:

- **The Medium Chain Triglyceride (MCT)** diet allows for greater variety than the classic KD as it has a higher carbohydrate and protein allowance. It still requires all foods to be weighed and also relies heavily on the consumption of medium chain triglyceride (MCT) oil (usually in the form of palm and coconut oil) alongside all meals and snacks.

First suggested in 1971, and partly due to its associated gastrointestinal side-effects, such as diarrhoea, cramping and bloating, it is starting to be used less often than the more recent, and more practical, LGIT and MAD versions.

- **The Low Glycaemic Index Treatment (LGIT)** diet differs from the classic KD and MCT in that it focuses less on the universal restriction of carbohydrates and more on the consumption of carbohydrates with a low glycaemic index (GI) or less than 50. (Glycaemic index refers to how a food affects your blood glucose levels after eating.)

Your total carbohydrate intake is still restricted, however, to 50 grams or less. This means that although there is a chance of eating starchy, low

glycaemic foods, such as wholegrain versions of bread, pasta and rice, the amount you can eat of these is very small. Carbohydrates are better coming from vegetables, low carb fruits (such as berries), nuts, seeds and cream

- **The Modified Atkins Diet (MAD)** allows 20 grams of carbohydrates daily for adults while it strongly encourages fat consumption in order to maintain ketosis (the production of energy molecules from fat)

Both LGIT and MAD are more tolerable than the classic KD. Some studies have shown the efficacy of the more tolerable variants, at least in terms of seizure control, to be comparable to that of the stricter classic KD although more research is needed to establish this conclusively.

## **Ketogenic diets for management of drug resistant epilepsy**

Most of the studies so far have been in children, where KD has become an established treatment option for children with hard to control epilepsy - reducing seizure frequency and having a positive effect on behaviour.

Until now, little research has been done on the benefits in adults and it has generally not been used for their treatment. However, interest in this area is growing both in adults in the general epilepsy population, and also in brain-tumour-related epilepsy patients.

How is the diet thought to work? Our bodies usually use glucose for energy. Reducing our intake of glucose makes our bodies use the fats we eat to produce molecules called 'ketones' for energy instead.

When these enter the brain, they appear to have an effect by reducing seizure frequency. Their exact mechanism of action is not known, but they may alter the balance of chemical compounds and neurotransmitters involved in exciting and inhibiting electrical activity in the brain.

More research and scientific evidence is needed about the impact and results for adults before it can be established whether this diet can be useful in the

treatment of brain tumour related epilepsy. (For more information, see our 'Epilepsy and brain tumours' fact sheet).

## **Scientific evidence on ketogenic diets and brain tumours**

Some people have argued that KDs can help treat brain tumours. The main idea behind this is that, because some types of cancerous cells were seen under the microscope to die in the absence of glucose (sugar), the same would happen to the tumour of a person who doesn't eat sugar.

Adopting a low carbohydrate diet reduces (rather than eliminates) the availability of glucose in the body. In this situation, normal cells progressively switch from glucose to free fatty acids (converted to 'ketone bodies') as their energy source. Tumour cells are less able to do this. Consequently, some have argued that adopting a KD could starve the tumour cells of an energy source causing them to die. At present, there is insufficient scientific evidence for this idea.

While studies on the efficacy of the KD in the management of brain tumours in mice have shown some positive and promising results, there is a lack of large-scale clinical trials in humans. To date, the closest thing to a clinical trial in humans was a pilot trial undertaken in Germany to see the effect of the KD on the quality of life in 16 patients with advanced cancer.

The majority of participants dropped out of the trial early due to the progression of their illness or their inability to tolerate the required dietary changes, and in those who did manage to complete the three month intervention period the most noteworthy outcome was the lack of any severe adverse effects.

In addition, none of the patients were brain tumour patients, so unfortunately, this pilot study doesn't address many of the basic questions regarding the effectiveness of KD for the treatment of malignant brain tumours. It is not known, for example, if the strict reduction of sugar in the diet can actually starve a brain tumour in the body, as it does cancer cells under the microscope.

Until clearly proven otherwise, it is possible that ketogenic therapy has no effect on brain tumours.

Despite the lack of evidence on the efficacy of the KD treatment for malignant brain tumours, some people affected by brain tumours choose to follow the diet.

**If you wish to follow a KD, you should only do so under the supervision and guidance of your doctor or dietitian.** This is because it can affect your standard treatment and interfere with observations of your condition by your medical team. It can also cause side-effects, such as weight loss, constipation and fatigue. These may be short-term and your doctor/dietitian can help to alleviate or prevent these side-effects.

**Anyone with a pre-existing medical condition, such as diabetes, should always consult their doctor before making significant dietary changes.**

## **Who should I see for my diet?**

You might have already come across the titles dietitian, nutritionist and nutritional therapist. Sometimes it is difficult to distinguish between these titles when seeking help for matters concerning your diet.

If you are affected by a brain tumour and are experiencing problems concerning your diet or weight, a registered dietitian is the professional who is best qualified to assist you.

Dietitians are the only professionals in the field of nutrition whose practice and ethical standards are governed by law, ensuring that work is carried out to the highest possible standard.

Dietitians work within the NHS or privately and specialise in helping with dietary issues faced by those affected by various diseases. If you feel you need to see a dietitian, you can ask your doctor to refer you to one working within the NHS.

Nutritionists and nutritional therapists within the UK are not regulated to the same degree that dietitians are.

Nutritionists work in a variety of settings from the NHS to food industries. Nutritional therapists often have private practices where they give advice to people about what they should eat to lose or gain weight, or manage symptoms of different ailments.

Due to the fact that nutritionists and nutritional therapists are not well regulated, there is no real guarantee that they will give you advice or suggest supplements based on scientific evidence instead of their own personal opinion.

If you want to see a nutritional therapist, you should check that they are registered with the British Association for Applied Nutrition and Nutritional Therapy (BANT) and the Complementary and Natural Healthcare Council (CNHC).

## **Further Information**

For more information on what constitutes a healthy diet:

British Dietetic Association fact sheets:

***[bda.uk.com/foodfacts/home](http://bda.uk.com/foodfacts/home)***

NHS choices website:

***[nhs.uk/livewell/goodfood/pages/eatwell-plate.aspx](http://nhs.uk/livewell/goodfood/pages/eatwell-plate.aspx)***

To find a registered dietitian working on a freelance basis, you can use the following link:

***[freelancedietitians.org/](http://freelancedietitians.org/)***

If you do your own research on the internet about diet and nutrition, make sure you choose sources which are credible and trustworthy. The 'Information Standard' and 'HONcode' certifications in the UK and US respectively ensure that private organisation websites publish health information that is scientifically accurate and credible.

## What if I have further questions?

If you require further information, any clarification or wish to discuss any concerns, please contact our Support and Information Team:

- **Call 0808 800 0004**

(Free from landlines and most mobiles,  
including 3, O2, EE, Virgin and Vodafone)

- **Email [support@thebraintumourcharity.org](mailto:support@thebraintumourcharity.org)**

- **Join our closed Facebook groups:**

**[bit.ly/facebooksupportgroup](https://bit.ly/facebooksupportgroup)**

**[bit.ly/carersupportgroup](https://bit.ly/carersupportgroup)**

## About us

The Brain Tumour Charity makes every effort to ensure that we provide accurate, up-to-date and unbiased facts about brain tumours. We hope that these will add to the medical advice you have already been given. Please do continue to talk to your health team if you are worried about any medical issues.

The Brain Tumour Charity is at the forefront of the fight to defeat brain tumours. We fund pioneering research to increase survival, raise awareness of the symptoms and effects of brain tumours and provide support for everyone affected to improve quality of life.

We rely 100% on charitable donations to fund our vital work. If you would like to make a donation, or want to find out about other ways to support us including fundraising, leaving a gift in your will or giving in memory, please visit us at **[thebraintumourcharity.org](https://thebraintumourcharity.org)**, call us on 01252 749043 or email **[fundraising@thebraintumourcharity.org](mailto:fundraising@thebraintumourcharity.org)**

## **About this fact sheet**

This fact sheet has been written and edited by The Brain Tumour Charity's Support and Information Team. The accuracy of information has been verified by leading dietitians who specialise in diet for neuro-oncology. Our fact sheets have been produced with the assistance of patient and carer representatives and up-to-date, reliable sources of evidence. If you would like a list of references for any of the fact sheets, or would like more information, please contact us.

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## **Your notes**



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