



Nutrition

Recommendations from the society for diagnosis and therapy of
haematological and oncological diseases

Publisher

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www.onkopedia-guidelines.info

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Date of document: April 2023

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1 General information

If you are healthy, you usually don't even notice your body. It is only when you become ill that drastic changes sometimes occur. This is an old story of evolution that has worked for millions of years, and still works well today. When a serious injury or illness occurs, our body adjusts and decreases alertness and concentration, physical activity and performance as well as the ability to enjoy and communicate in order to be able to put as much energy and resistance as possible into fighting the illness. In such a situation, it is important to provide the body with sufficient nourishment and to exercise carefully, but not to weaken yourself with unnecessary strenuous physical activity or strain for the immune system.

Once the injuries - e.g. from major surgery, radiation, and drug treatments - have healed and the disease has been overcome, it takes some time, but the body will soon begin to regain its pre-existing strength and abilities. Sometimes longer-lasting dysfunctions may remain in some areas, but usually our bodies are prepared to re-establish healthy functioning.

After a cancer therapy, it is beneficial to support the physical and emotional well-being and to avoid disruptive stresses as much as possible. A healthy lifestyle contributes significantly to this:

- regular moderate, but not over strenuous, physical exercise to gradually build and strengthen muscle and cell mass;
- a balanced and varied diet and avoidance of overweight and obesity
- effective stress management, so that you can enjoy and take pleasure in several things every day and avoiding chronic stressful situations that can unbalance the metabolism and weaken your immune defenses.

2 Good to know

An important message for patients after cancer therapy is: The recommendations for a healthy, balanced diet also apply to you!

If you have been eating a versatile and healthy diet so far, please continue. Try to follow a balanced diet. If you find this difficult, a qualified dietician can help you put together practical recommendations for your diet.

2.1 Eating, drinking and exercising after cancer - What is a healthy lifestyle?

The World Cancer Research Fund's (WCRF) international group of experts has been publishing lifestyle recommendations aimed at reducing the risk of cancer and its recurrence since the 1990s. These recommendations should be followed by all cancer patients, including those who are recovering from cancer. The WCRF and the S-3 guidelines of the German Society for Nutritional Medicine (Deutsche Gesellschaft für Ernährungsmedizin, DGEM)) recommend that cancer patients seek nutritional advice at an early stage so that deficiencies can be recognized and counteracted in time.

No behavior can prevent cancer with certainty, but the following recommendations can serve as a guide to strengthen the body's defenses and provide vitality. Eating and exercising are always about enjoyment. Health recommendations are never considered absolute, so you may deviate a little now and then; but it helps to follow the suggestions for the most part. You should be comfortable living your life and be as little afraid as possible of doing something wrong.

2.2 Recommendations of the World Cancer Research Fund

2.2.1 Pay attention to a healthy body weight

Try to keep your body weight within the healthy range. The Body Mass Index (BMI) is a measure for this and relates weight to height. The BMI score should be in a healthy range, which varies according to age, gender and ethnicity.

Calculate BMI: Weight (in kilograms) / Height (in meters) ²

However, the BMI does not reflect the body fat distribution, and in particular a high percentage of abdominal fat is unhealthy. For a better determination of the abdominal fat percentage, carrying out a further measurement is required: This is done by determining the waist and hip measurements and comparing the two values (waist-to-hip ratio). The classification of whether the resulting numerical score is within the normal range or not can be made from norm tables or through validated medical apps.

In various studies, a correlation between obesity (BMI over 30 kg/m²) and cancer has been observed. A variety of mechanisms are discussed for these findings. For example, lipid mass can produce estrogen resulting in an estrogen surplus and increasing the risk of breast cancer. With increased body fat mass, insulin resistance can occur - this in turn can lead to increased insulin circulating in the blood, which can promote cell growth. In addition, overweight and obesity maintain an ongoing activation of the immune system, which leads to increased cell stress and interferes with effective immune defenses against cancer cells. It has also been shown that a high BMI increases the risk of cancer recurrence, e.g. for breast cancer or prostate cancer.

2.2.2 Physical activity after cancer

The World Health Organization (WHO) generally recommends 150-300 minutes of moderate physical activity per week. Try to incorporate at least 30 minutes of moderate exercise (e.g. brisk walking) into your daily routine. Taking the stairs is better than using the elevator; take the bike rather than the car. For more information on physical activity, see [AYAmedia Exercise and Sport](#).

2.2.3 Try to avoid high-calorie and high-sugar food/drinks

According to the WHO recommendations, the maximum sugar intake should be 10% of the total energy intake. With an average total energy requirement of 2000 kcal, this corresponds to a maximum of 50 g of sugar (already contained alone in e.g. 500ml of lemonade). Increased sugar consumption and very high-calorie foods or drinks are associated with weight gain, which in turn indirectly increases the risk of cancer. Therefore, avoid sugary drinks and eat as little fast food as possible.

2.2.4 Eat as many different foods as possible and prefer plant-based products

- Eat as varied a diet as possible from all food groups. Plant-based foods should form the basis of your diet: fruit, vegetables, beans, peas, lentils, potatoes, nuts and whole grain cereals. In addition to vitamins, they also contain so-called secondary plant compounds that may provide anticarcinogenic effects. Therefore, the daily consumption of fruit and vegetables plays a relevant role in the diet. Dietary fibers, of which large amounts are found especially in whole grain products and legumes, increase the stool volume and accelerate the intestinal passage; by this, they may lower the amount of carcinogenic substances absorbed by the intestine.
- The following applies to vegetables and fruit: Eat three portions of vegetables and two portions of fruit every day (rule of thumb: one portion = 1 handful).
→ Tip: Eat a portion of vegetables with every main meal and choose vegetables as well as fruit as a snack in between meals.
- For peas, beans, lentils and cereal products: eat these foods at every meal and prefer whole grain cereal products.

2.2.5 Enjoy meat and meat products only in moderation

Your weekly meat consumption should not exceed an amount of 500-600 g. You should be especially careful with the consumption of processed meat (e.g. smoked meat, sausage products).

Several studies have concluded that red meat (e.g. beef or pork) and especially processed meat products such as smoked and cured sausages (e.g. salami) increase the risk of cancer.

2.2.6 Limit your alcohol consumption

Drink as little alcohol as possible. Alcohol consumption may increase the risk of various cancers. Maximum amounts should be 20 g ethanol for men and 10 g ethanol for women (20 g ethanol is equivalent to 250 ml of wine or 500 ml of beer). These amounts should not be consumed daily.

2.2.7 Avoid moldy foods and watch your salt intake

The WHO recommends a maximum of 5 g of salt per day. There is a link with specific types of cancer, such as stomach cancer. A lot of salt is contained in processed foods such as convenience foods and processed meat products (sausage, ham). Try to use mainly fresh foods, prepare them yourself and season to taste with herbs. This way you can both cut down on salt and enrich your food with important protective substances contained in many herbs.

2.2.8 Do not take food supplements

In the context of cancer prevention, you should cover your nutrient needs (except in medically justified cases) exclusively through your normal diet.

Taking vitamin or multi-micronutrient supplements (combinations of different vitamins and/or trace elements) does not reduce the risk of cancer; possibly, these supplements may even increase the risk of tumors and interact adversely with certain chemotherapy regimens. Cancer patients and patients in follow-up care may suffer from a variety of side effects or consequences of chemotherapy. Talk to your dietician or physician about this.

2.3 Special recommendations after high-dose chemotherapy or stem cell transplantation

During and after cancer therapy, food safety is very important because the immune system is often severely weakened by the treatment and the body is more susceptible to foodborne illnesses.

The focus here is clearly on food hygiene. If the immune system is weak, the general rules of kitchen hygiene must be observed even more consistently than usual. This concerns the safe preparation and handling of food (see the list below).

A so-called strict "low-bacteria" diet, in which fresh fruits and vegetables are strictly prohibited and only cooked or boiled foods are allowed, is no longer recommended by the German Robert-Koch-Institute.

Clinical studies over the past 10 years have not been able to show any advantage of such a "low-bacteria" diet and, in particular, no reduction in the number of infections. However, in cases of pronounced immune deficiency, especially with very low neutrophil counts (a group of white blood cells important for fighting bacterial infections), many major centers recommend avoiding foods that have a particularly high risk of being contaminated with dangerous germs. After discharge from the hospital, these tight restrictions are usually no longer necessary. Rather, it is important that you consume sufficient energy, nutrients, and fluids according to the basic rules listed below.

In addition, it is important to note that to date there are no uniform clear and detailed official guidelines for nutrition after stem cell transplantation, neither globally nor nationally. Thus, guidelines may differ somewhat from hospital to hospital. However, the basic principle remains: consistently follow basic kitchen hygiene when handling food (that is purchasing, storing and preparing) and avoid high-risk foods. Therefore, ask your physician or dietician regarding the individually required measures. Furthermore, you should remember that in all phases of the disease it is crucial that you take in enough energy and the vital nutrients to support your physical condition and resistance to disease. Excessive dietary restrictions may jeopardize this.

2.3.1 Important rules

- Wash your hands with soap before food preparation (disinfect your hands after contact with potentially contaminated meat or fish products).
- In the kitchen, separate areas (including cooking utensils) for preparing raw meat/poultry/ fish and for vegetables and others.
- Do not use a dishwashing sponge, rather clean kitchen surfaces with disposable cloths
- Wash kitchen textiles incl. boards, rags, cloths at min. 60 °C and iron after drying.

- Appliances exposed to raw meat (especially poultry) should always be cleaned hot and with detergent (preferably in the dishwasher).
- Dishes are best washed in a dishwasher (at least 65 °C).
- Store food in the refrigerator with adequate cooling (4-8 °C).
- Fruit and vegetable can be eaten raw but only after washing them thoroughly and for a sufficiently long time (30 seconds!) under running water, even if you peel them afterwards.
- Store meat, sausages, fish, and seafood only in the refrigerator or freeze them; prepare fresh meat and fresh fish within two days
- You can eat all animal products that are sufficiently cooked (fish; meat, fried white or brown at the core; eggs, egg white and yolk cooked solid) or which are pasteurized (milk, cheese, dairy products)
- A high risk is posed by raw or insufficiently heated food, e.g. raw milk products, sashimi, crabs, fresh sausage and raw or insufficiently heated eggs or egg products
- When cooking, always ensure that the temperature and cooking time are adequate.
- Store leftovers (including open fruit juices) only for a short time at a sufficiently cool temperature (24 hours maximum) or freeze and heat sufficiently before consumptions.
- Ready-to-serve products: Observe 'best-before' dates, do not use damaged packages.
- For nuts: consume only heated, vacuum-packed and peeled products (to be used up within 24 hours); commercial products with nut content such as nut-chocolate creams are allowed
- Avoid soft, unpasteurized cheeses and soft mold or blue cheeses (e.g. Brie, Camembert, Roquefort, Stilton, Gorgonzola).
- Avoid raw sprouts (e.g. alfalfa sprouts or soybeans sprouts).
- Avoid salad bars and salad buffets that are open to the public (e.g. in supermarkets, canteens, or restaurants).
- Avoid well or spring water (unless it has been analyzed to be germ-free, filtered, or boiled for a minute before drinking).

2.4 Information on fasting under chemotherapy

- During fasting, the body receives no or only very little food and energy (e.g. only tea or vegetable broth).
- For some years now, there has been discussion about whether various periods of fasting before, during and after chemotherapy can reduce therapy-related side effects, increase therapy response, and improve patients' quality of life. Food abstinence is supposed to strengthen the healthy cells during treatment, while cancer cells are supposed to remain fragile and vulnerable and – so it is hoped – will be more easily attacked by the therapy. Currently, several clinical studies are being conducted nationally and internationally to determine the effects of short-term fasting during chemotherapy in selected patient groups and under close medical supervision. So far, however, no conclusive clinical studies have confirmed the assumptions and expectations and fasting carries the risk of developing undernutrition.
- According to the current state of knowledge, therefore, fasting is not recommended during chemotherapy or radiotherapy. For detailed information on this topic you may read the statement of several German professional societies: https://www.ernaehrungs-umschau.de/fileadmin/ernaehrungs-umschau/pdfs/pdf_2022/11_22/eu11_2022_m606_m609

2.5 Information on Cancer Diets: ketogenic or low-carbohydrate diets

A low-carbohydrate diet (also known as "low carb") largely avoids sugar and other carbohydrates and instead is based mainly on foods rich in fat and protein. Particularly strict diets with very few carbohydrates are called "ketogenic" if they change the metabolism and lead to an increase in ketone bodies in the blood. The idea behind these diets is that tumor cells can obtain energy particularly well from sugar but hardly at all from fat, and that they are "starved" by deprivation of sugar or carbohydrates. However, while it is sometimes possible in cell culture to cause some tumor cells to die by depriving them of sugar, so far there is no evidence that this also works for a tumor in the human body. One of the reasons for this is that sugar is always circulating in our blood and the tumor cells take up enough of it to survive, even when blood sugar is low. On the other hand, similar to fasting because of their often low palatability low-carbohydrate diets are associated with a sizeable risk of weight loss and possible malnutrition. This is very problematic since many cancer patients already suffer from a lack of appetite and weight loss. Weight loss reduces body activity and defenses, and thus resistance to the tumor disease as well as to antitumor treatments.

Several authors postulate that low-carbohydrate diets have an effect on tumor growth and improve the tolerability of tumor therapies. So far, however, there are no reliable studies that show an advantage of such diets in patients with cancer.

Therefore, according to the available evidence, no low-carbohydrate or ketogenic diets are recommended during chemotherapy or radiotherapy. For detailed information on this topic, you may read the statement of several German professional societies: <https://www.ernaehrungs-umschau.de/print-artikel/13-07-2022-ketogene-und-kohlenhydratarme-diaeten-bei-krebs-erkrankten-menschen/>

Be careful of anyone promising benefits of a fasting or otherwise unusual anticancer diet and discuss your diet options during and after cancer treatment carefully with a specialist (e.g. a dietician or nutritionist).

3 Tips and tricks

You can find suggestions for preparing healthy food under [Nutrition Recipe Ideas](#) and on the patient website "Eat what you need" under the following link: <https://www.was-essen-bei-krebs.de/> .

3.1 Tips for adequate fruit and vegetable intake at home and to go

- Raw vegetable/fruit plate in the evening instead of salty or sweet snacks.
- Integration of vegetables in the midday meal (e.g. broccoli casserole, side salad), in the evening meal as a salad dish (cucumber/tomato with the bread meal) and for in between meals as vegetable sticks
- Integration of fruit as a dessert after lunch (e.g. peach curd) and as a
- Snack on the go (apple/ pear)
- Vegetable sticks for on the go at school or for work (e.g. kohlrabi, carrots, cucumber)
- Self-prepared smoothies (versatile selection of fruits and vegetables possible)
- Alternatively, 1 glass of juice instead of 1 fruit meal (make sure it is 100% fruit juice).

3.2 Dietary fiber

- Foods high in fiber and low in salt:
Whole grain bread, flaxseed, wheat and oat bran, various fruits (blueberries, strawberries, apples), legumes (beans, chickpeas, lentils).

Important: Do not forget to drink! Only with sufficient liquid, the dietary fibers can develop their positive effect.

3.3 Fat

- Advantages of vegetable fats over animal fats:
- Prevention of cardiovascular diseases through the supply of essential fatty acids (only polyunsaturated fatty acids, which the body cannot produce itself, therefore the intake through food is important)
- can have a positive effect on blood lipid levels and cholesterol levels
- rich in fat soluble vitamin E

3.4 Drinking

- Always carry a small bottle with you (e.g. in your handbag/backpack)
- Leave drink in sight during work/lecture to be reminded to drink
- Consume preferred low-energy drinks, provide variety
- In summer, tea can also be enjoyed cold and refined by additions, such as lemon or lime slices

4 Further links and information

- World Cancer Research Fund
<https://www.wcrf.org/>
- German Society for Nutrition (DGE) and German Society for Nutritional Medicine (DGEM)
<https://www.dge.de/fileadmin/public/doc/fm/10-regeln-der-dge>
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<https://www.onkopedia-guidelines.info/>
- Eat what you need – what to eat with cancer?
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7 Disclosure of Potential Conflicts of Interest

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