

Preventing bowel cancer

There is no shortage of recommendations about how to prevent bowel cancer: more fibre, less meat, vitamin supplements and even medicines feature in the long list of suggestions that have been propagated for years. We have studied the latest evidence to see how much scientific support there now is for these common recommendations.

The result: Most people do not need to worry about getting bowel cancer. Even though there is not always strong scientific evidence about the effects on bowel cancer itself, general health advice to get enough exercise and avoid getting overweight apply here as well.

There is no strong evidence showing that recommendations like extra fibre, vitamin supplements and other dietary supplements provide protection from bowel cancer. Calcium supplements and some medicines are still under study.

1. Background: Bowel cancer

Bowel cancer is one of the most common cancers in Germany. For example, about 1 out of every 18 people in the German population will develop bowel cancer at some time in their lives [1]. Most of the people who will develop bowel cancer will be older. Only about 3 out of every 100 people who develop bowel cancer (3%) are less than 45, while 38 out of 100 will be older than 75 when they are diagnosed (38%) [2].

1.1. What can be done about bowel cancer today?

Basically there are three possibilities for reducing the threat of bowel cancer: preventing the disease, early treatment and the development of improved therapies. The chance of longer survival has been slowly growing in the last few decades. The outcomes for individuals, though, depend on the characteristics of their cancer and how advanced it is. Altogether, about half the people who get bowel cancer could recover, usually after surgery and further treatment [3].

Margot:

Because so many people in my family died of bowel cancer, I thought I would only have a few weeks to live when I heard the diagnosis. I couldn't quite grasp, at first, that there was any way I could survive.

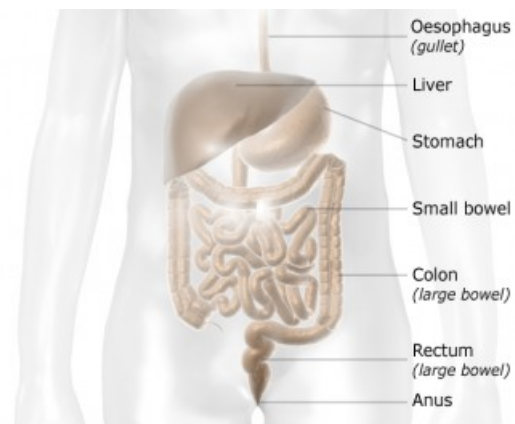
Many experts are hoping for a lot of benefit to come from earlier diagnosis. In Germany, for example, health funds now offer two types of screening tests for bowel cancer. One is the faecal occult blood test (FOBT), which is a test that looks for blood in the stools. In Germany, it is free to everyone over 50 who is publicly insured. The other test provided is colonoscopy, where the inside of the bowel is examined using an endoscope. Publicly insured people in Germany who are over the age of 55 can have two free colonoscopies: the first after the age of 55, and the second 10 years later. In other health care systems, the options will be different. We will describe the advantages and disadvantages of these tests in a future article.

Of course preventing bowel cancer developing in the first place would be ideal. Advice is often offered about this. We researched the evidence to see what it adds up to. What ways are there to protect yourself from bowel cancer? What is currently being studied?

1.2. The bowel

The bowel, or intestine, is about 5 to 6 metres long. It is a tube for digesting food, and connects the stomach to the anus (back passage). The bowel is made of several layers of muscle and connective tissue, as well as immune and nerve tissue. The inside of the bowel is protected by mucus membrane.

The first 3 to 4 metres are called the small bowel. The small bowel breaks down food so that nutrients can be taken up by the blood. The small bowel ends at the appendix. Then the large bowel takes over. The large bowel is the colon and rectum. Altogether, this part of the bowel is about 2 metres long. It gets water and salts out of the remains of the food.



Although the small bowel is very long, bowel cancer only rarely develops there. Bowel cancer usually occurs in the colon, and less often in the rectum. The medical terms for these are colon cancer and rectal cancer. As these types of cancer are similar to one another, they are often referred to together as colorectal cancer.

It is not known why cancer develops in the large bowel. It usually starts in the mucus membrane. Healthy cells there usually only survive for a few days, are discarded and then replaced by new cells. Cancer develops when the cells that keep the supplies coming stop following this pattern. More cells are supplied than needed, or the cells survive longer than normal. Research has shown that changes inside the DNA of the cells lead to changes in their behaviour. These cell changes might be caused by toxins that accumulate in the bowel [4].

1.3. Bowel cancer takes years to develop

Bowel cancer does not occur suddenly, but step by step

over years. In an early, still harmless phase, benign growths occur in the lining of the bowel. These growths are called polyps or adenomas. Some of these are like warts and others are on little stalks like mushrooms. Bowel polyps are very common as people get older. Between one-third and a half of people over the age of 50 will have at least one polyp in the bowel. The great majority of these polyps stay small and harmless. Some, though, will grow large. The risk of cancer developing in these polyps increases.

Only about 5 out of 100 bowel polyps (5%) become cancerous (malignant), a process that may take about 5 to 10 years [4].

Even though most polyps are not dangerous, most doctors are likely to recommend removing polyps as a precaution. The aim is to prevent the development of cancer. If a polyp develops into a cancer, there is a chance that the cancerous cells will grow more deeply into the bowel wall or spread to other organs outside the bowel, like the liver. Those cells could then start other cancers. This spreading of cancer cells is called metastasis.

1.4. What are the typical symptoms?

Margot:

I didn't feel anything at all. I didn't have any pain, no weight loss and no problems with bowel movements. If the tumour had not started to bleed, then it might only have been found later.

Bowel cancer can grow for a long time without causing noticeable symptoms. When there are symptoms, these are often general bowel complaints that could be caused by several other illnesses. That is one reason why it often takes a long time for bowel cancer to be diagnosed.

If a cancer is interfering with the movement of food through the digestive system, this can lead to an ongoing change in bowel habits. This could be constipation or diarrhoea, or the feeling that the bowels cannot be fully emptied. Bowel cancer can also lead to anaemia and weight loss [4]. Blood in the stools is one of the warning signs of bowel cancer, and sometimes blood or mucus can be obvious in the stools. Blood can cause red or sometimes black colouring in stools. Bowel cancer can also cause cramping or pain in the abdomen.

However all of these symptoms can have other causes, and they are not necessarily serious. For example, blood in the

stools can be caused by haemorrhoids (piles). Even though bowel problems are only seldom a sign of serious illness, changes in bowel habits that last for weeks or longer are a warning signal especially for older people as well as those who are at high risk of bowel cancer. We discuss who is at higher risk later.

Many people find discussing bowel problems or having such medical examinations embarrassing, or they are afraid of finding out they have cancer. However, only a consultation with a doctor, and bowel examinations if necessary, can help people find out if it is cancer or not. If necessary, specific examinations of the bowel will be performed; this will often include a colonoscopy. This is a test that allows a doctor to visually inspect the inside of the bowel through a device called an endoscope.

Angelika:

In the last 15 years the examinations have changed a lot. The difference is like night and day...I am not even aware of the actual examination. It is important to me, to be able to talk to the doctor before the examination. It helps me when I know the person doing the examination and the surroundings. I am not even aware of the examination itself and do not have any pain. I don't have any fear of having a colonoscopy.

2. Measures for preventing bowel cancer

Most people have a relatively low chance of getting bowel cancer. For them, only age and gender will influence their risk of getting bowel cancer - and those factors cannot be changed. Men have a higher chance of getting bowel cancer than women, but this difference is equalised by the fact that women live longer.

Angelika:

I have had a chronic inflammatory bowel disease, ulcerative colitis, for 28 years. My risk of getting bowel cancer is growing every year...

There are other factors that can increase the risk of bowel cancer for some people. One of the groups of people affected is those with ulcerative colitis, which is a chronic inflammatory bowel disease. The risk of cancer grows with the length of time someone has had the disease. After 20 years the average risk for people with ulcerative colitis is 1 in 12 [5]. People with Crohn's disease, another chronic bowel illness, are also at higher risk than average.

They are also at higher risk for cancer in the small bowel, which is usually rare [6].

Also on this list is bowel cancer itself: people who have already had it once are at risk of the cancer returning. This depends on the person's age. If a person gets bowel cancer at an unusually young age (between 20 and 30), they are at a very high risk of a second tumour. But people who first get bowel cancer when they are older than 80 are not more likely than other healthy people their own age to get bowel cancer.

2.1. Bowel cancer in the family

Margot:

My grandmother died of bowel cancer at 64. My mother was 52, and my aunt was 37 years old. It was obvious that bowel cancer ran in our family.

When close family members have had bowel cancer, this could be a sign of an inherited disorder. It depends on the individual circumstances. In general, people with only one family member with bowel cancer have only a slightly increased risk of bowel cancer [4]. The risk seriously increases though, if more close family members like parents and brothers or sisters have had it.

When bowel cancer is common among close family members, it could be due to a genetic disorder that others in the family can also inherit. Two of these conditions have been identified: familial adenomatous polyposis (FAP) and hereditary non-polyposis colorectal cancer (HNPCC). Adenomatous polyposis is a condition which causes many polyps to grow in the colorectal area. Even young adults with FAP can have more than a hundred polyps [4]. If no action is taken against these polyps, the risk is extremely high that at some point in life one of these polyps will become cancerous. People with FAP have the option of having regular colonoscopies, in which polyps that are detected are removed during the examination. Another alternative is an operation to remove the affected piece of the bowel.

Margot:

Then I had the test and made a family tree. It was established that I had HNPCC, hereditary non-polyposis colorectal cancer

The second inherited condition is hereditary non-polyposis

colorectal cancer (HNPCC). It is more difficult to diagnose as it does not cause polyps the way that FAP does, which is why "non-polyposis" is part of the name [7].

People with HNPCC are also more likely to get other cancers, for example cancers of the sexual organs. Doctors may not make the link between the various signs that a person might have HNPCC. Most people with HNPCC do not know that they have it.

The causes of both conditions are genetic changes that can be passed down from parent to child. Special genetic tests are needed to detect which family members have the condition and are at risk. Affected families in many countries are offered special counselling, so that they can discuss their situation with time to consider the consequences. In Germany, this is available, for example, at some university clinics.

Researchers assume that there are other genetic conditions that have an impact on the risk of bowel cancer, but which have not yet been identified. Surveys of people with bowel cancer have shown that between 10 and 15 out of every 100 have family members who also have bowel cancer (10-15%), even though they do not have FAP or HNPCC [8].

2.2. How do people cope with the worry?

This is a very individual issue. Most people do not worry very much about bowel cancer, and are not particularly in danger of getting it either. Others feel more threatened, possibly because a family member has had it.

When people have fears about their health, they have several options. One way is to inform themselves about the disease, so that they can get a clear picture of the reality and their personal risk. For those who prefer to take some kind of action, screening tests are available. On the one hand, the goal of screening is to identify cancer early, so that the chances of recovery might be higher. On the other, removing polyps could prevent bowel cancer developing [9].

Most people who have had bowel cancer will, even if their treatment appeared to be successful, experience a phase of insecurity as it will take several years for them to know whether they have been cured [10]. Survivors of bowel cancer seem to cope with the disease quite well: in general, their quality of life returns to levels that are

similar to people who have never had cancer [11].

Angelika:

There were nights in which I just lay awake and thought about it... But those difficult times are a long way back. I can only say, that dealing with this issue and the many talks with my doctor have given me a certain sense of security. I just needed someone who had the professional knowledge, and with whom I could speak openly. Talking with other people who are also affected, who are in a similar situation, also helps me so much.

3. Can bowel cancer be prevented?

International comparisons show that bowel cancer is much less common in some countries and regions than others. In industrial countries like Germany, for example, the rate of bowel cancer is higher than in Asia and Africa [1],[12]. Inside Europe there are definite differences as well. For example, the rate of bowel cancer in Greece is lower than the rate in Germany [13].

Researchers have been studying possible explanations for these differences for years. They have compared, for example, whether certain foods are eaten more often in countries or by communities of people who get bowel cancer less often, or if other differences exist that may explain why the disease is less common. The result is a long list of factors that can be divided into 4 groups.

The first group includes factors that people with a lower risk of bowel cancer have in common:

- Fibre-rich diet [14].
- Regular physical exercise [15]

The second group includes factors that people with a higher risk of bowel cancer have in common:

- Being overweight or obese [16]
- Diet with a lot of red or processed meats [17]

The third group includes factors where there is **no definite detectable difference** in the risk of bowel cancer:

- Eating meat at all [17]
- Cereals, nuts and seeds [17]
- Fruit, vegetables or legumes (beans, peas, lentils) [17]
- Tea (black and green) and coffee [17]
- Dairy products [17]
- Vitamin D [18]
- Folate or folic acid supplements [19]
- Low-fat diet

The fourth group includes factors where it is uncertain whether or not there is a link with bowel cancer risk [17]. However these factors are still being researched, as there is some possibility that they might increase the risk of bowel cancer:

- Smoking [20]
- High alcohol consumption [21]
- Eating eggs every day [17]
- Smoked and/or salted fish [17]
- Chlorinated water [17]

3.1. How sure can we be about the advice that is common now?

Angelica:

A healthy lifestyle is really important to me. I hope that it might help keep me cancer-free. I run several times a week and I try to eat a healthy diet. The goal for me to achieve a feeling of physical wellbeing.

A healthy lifestyle and regular exercise can have physical and psychological benefits. It is another question though, whether specific recommendations can be inferred from the list of potential risk or protective factors on how an individual can prevent bowel cancer. There is almost always some degree of uncertainty about lifestyle recommendations. This is because simple comparisons between groups of people in principle cannot definitely show the difference between cause and effect. Populations differ substantially in their lifestyles, and even when researchers have studied many individual differences in lifestyle between people, there is always the possibility that something that was really the cause has been overlooked.

The problem is also that lifestyle characteristics are so often closely tied to each other, and it is not easy to pull

these apart and be sure of the impact of one individual factor or particular combination of them. For example, people who eat more fruit and vegetables might also often get more exercise and not smoke. If these people are then less likely to get sick, it is hard to say if the reason was their diet, the exercise, not smoking, the combination of those factors - or because of something else entirely that they had in common, but the researchers did not study.

This is why you can only be really sure that a lifestyle change helps, if that factor has been scientifically tested. For example, to find out if fruit and vegetables really protect against bowel cancer, you need a trial with at least two groups of volunteers. At the beginning of the trial, all the possible differences between people will be spread more or less equally between the two groups if the people have been split up at random. Smokers and non-smokers, men and women, slim and overweight people - all will be represented in each of the two groups. If one group then eats more fruit and vegetables and the other does not, after some years it would be possible to know if eating more fruit and vegetables had prevented people getting bowel cancer.

Several of these factors have been studied in these kinds of controlled trials. Researchers have gathered the results and analysed them in so-called systematic reviews. We have analysed these systematic reviews, and we have found that the evidence contradicts or does not support some of the most common recommendations made about bowel cancer. There is a growing body of evidence that suggests that the links between simple dietary changes and bowel cancer prevention might not be as strong as previously thought [17]

In the following sections, we have summarised the evidence about common recommendations that have been the best studied. This includes fibre (URL: [http://www.gesundheitsinformation.de/index.112.en.html?bab\[subjpage_id\]=0-2-1](http://www.gesundheitsinformation.de/index.112.en.html?bab[subjpage_id]=0-2-1)), calcium (URL: [http://www.gesundheitsinformation.de/index.112.en.html?bab\[subjpage_id\]=0-2-3](http://www.gesundheitsinformation.de/index.112.en.html?bab[subjpage_id]=0-2-3)), so-called antioxidants (URL: [http://www.gesundheitsinformation.de/index.112.en.html?bab\[subjpage_id\]=0-2-5](http://www.gesundheitsinformation.de/index.112.en.html?bab[subjpage_id]=0-2-5)) such as selenium (URL: [http://www.gesundheitsinformation.de/index.112.en.html?bab\[subjpage_id\]=0-2-5](http://www.gesundheitsinformation.de/index.112.en.html?bab[subjpage_id]=0-2-5)), and particular medications.

We found no convincing evidence that there are any particular alternative or complementary therapies that can reduce the risk of bowel cancer. Colonic irrigation (also called "high colonics") was once a common (and

sometimes expensive) therapy to try to maintain bowel health, and is still quite popular in Germany. Sometimes it is claimed that it can prevent bowel cancer. There is no evidence that colonic irrigation can prevent bowel cancer or other bowel problems, and it may do harm [22].

3.2. Probably over-estimated: Fibre

A diet rich in fibre can have health benefits, particularly in preventing constipation. High-fibre diets, though, are one of those examples where it is not possible to jump to the conclusion that eating more fibre can prevent bowel cancer just because some people who have high-fibre diets have less bowel cancer. Research shows that people living in communities where there is a low rate of bowel cancer have diets with a high proportion of unprocessed fibre [14].

Fibre is material from plants, like bran, that cannot be totally processed by the bowel. These fibrous materials possibly have a beneficial effect on the way stools are formed in the bowel and might play an important role for bowel bacteria. They might help reduce the development of toxins, and in that reduce the development of polyps or cancer.

These observations have led to people buying a lot of bran, as well as fibre supplements based on materials like ispaghula husks. These fibre supplements are usually used to relieve constipation, but they are sometimes used in the hope of lowering the risk of bowel cancer. However, our research shows that there is little scientific foundation for the hope that eating more fibre or fibre supplements will prevent bowel cancer.

There have been 5 trials done by several groups of researchers. Each tried to find out if the risk of bowel cancer is lower if people eat more fibre-rich foods like fruit and vegetables or daily fibre supplements. More than 4,300 people took part in these trials. The results were however disappointing: people who ate additional fibre developed polyps and bowel cancer just as often as people who ate their usual diet [14]. The results of these trials cast doubt on the theory that increased fibre in the diet can prevent bowel cancer. Researchers are trying to identify why this theory does not seem to have worked in practice.

One reason might be that too much benefit was expected

from fibre. The trials only lasted between 2 and 4 years. It could be that for fibre to have any benefit, it might take 10 years to make a difference. Another explanation could be that the amount of fibre was not high enough. Other trials are now underway that are continuing for more than 4 years, and may help answer these questions.

3.3. Calcium supplements might help

Calcium is another candidate for bowel cancer prevention that is currently being studied. The body gets calcium mostly from milk and dairy products.

Researchers have searched for all trials that tested whether calcium could protect against bowel cancer [23]. They found two trials involving over 1,300 people. All of these people had already had at least one bowel polyp removed before. Half the people took 1200 mg or 2000 mg calcium tablets every day for about three or four years, and the other half took a calcium-free placebo.

At the end of the trial, all the people had a colonoscopy. This showed that the people who took calcium supplements had fewer new polyps. This suggests that calcium supplements might have some protective effect. However the researchers remain cautious. A supplement that might slow down the development of bowel polyps does not automatically stop the development of bowel cancer, which develops far more slowly. You can read more details about this research in our research summary (URL:

<http://www.informedhealthonline.org/index.88.en.html>).

3.4. Misplaced hope: Vitamin and antioxidant supplements

Antioxidants include some vitamins and minerals that the body needs to process oxygen. For example, they should protect the body from the kind of damage to the structures of cells that can be caused by oxygen. Because of this and other research observations, the idea developed that antioxidants might be able to prevent cancer.

Many people believe in this theory. In particular the use of vitamin C and vitamin E supplements has spread widely, as well as other anti-oxidants like beta-carotene and selenium. Beta-carotene is an early chemical stage of vitamin A.

However the results of trials of antioxidants provide more cause for concern than hope. It is not often, that a theory has been tested on so many healthy volunteers. Altogether about 170,000 men and women have taken part in trials on

vitamins and selenium [24]. The results were clear: beta-carotene, vitamin E and vitamin C do not protect against bowel cancer, whether they are taken alone or together. In fact, the opposite might be true: there was actually a slightly higher death rate in the people taking vitamins. The difference was small, but it is enough to state that vitamin supplements are not suitable to prevent bowel cancer.

3.5. Too soon to be sure: Selenium

It is still early days for testing the effects of selenium compared to the research done on vitamins [24]. The first trials show some benefit, but until larger trials are done, it is too soon to come to a conclusion about selenium and bowel cancer.

3.6. The search for effective medicines

Drug companies are also trying to find out whether it is possible to prevent bowel cancer with medicines. At the moment, no drug for the prevention of bowel cancer is licensed in Germany, although they might be licensed in other countries. There are several candidate drugs being researched or developed [12]. Taking medicines to prevent illness is a difficult issue. Any drug to prevent bowel cancer would need to be taken daily for a long time, perhaps even decades. The risk of adverse effects therefore rises. That is why the potential benefits and harms need to be carefully studied and weighed against each other.

Three types of medicines are being discussed as potential candidates for bowel cancer prevention:

- Pain relievers like acetylsalicylic acid (ASS) and other so-called non-steroidal anti-inflammatory drugs
- Hormones
- Statins

The non-steroidal anti-inflammatory drugs (NSAIDs) include drugs like diclofenac, ibuprofen and ASS. They are often used by people with arthritis.

The Cox-2 inhibitors like rofecoxib, valdecoxib and celecoxib belong in this group of drugs. Since rofecoxib was withdrawn from the market because of risks of heart and circulation disease, it is possible that the long term use of Cox-2 inhibitors for prevention may be out of the question.

Angelika:

I take anti-inflammatory drugs to fight the inflammation caused by ulcerative colitis. Maybe this drug will also reduce my risk of bowel cancer.

There have already been trials of the older NSAIDs, that is, the "pre-Cox-2-inhibitor" NSAIDs. Altogether more than 24,000 people tested these medicines to see if they could prevent bowel cancer [14]. Most of them took ASS every day for 1 to 3 years. After this time they were less likely to have new polyps.

A reduction in polyps might be a particularly important outcome for people with the genetic condition, familial adenomatous polyposis (FAP). For people with FAP, sulindac and celecoxib have been tested. Both of these medicines are licensed for prescription for people with FAP in some European countries. The benefit is not yet clear, though, as the drugs slow down the development of polyps, but do not completely prevent the development of new ones. Researchers are still not sure whether or not these medicines can actually prevent or slow down the development of bowel cancer itself [14].

If NSAIDs can prevent bowel cancer, then they would need to be taken for a long time. That means that the typical adverse effects of these drugs need to be taken account, especially stomach problems. The trials did not continue for long enough to be sure of how common or serious these adverse effects might be [14].

3.7. Reduced risk of bowel cancer, but the cancer might be more aggressive: Hormone therapy

The picture for hormone therapy for the menopause is inconsistent. Trials show that taking combined hormone therapy for at least five years reduces the risk of bowel cancer a bit [25]. However, in the women who did get bowel cancer while taking hormone therapy, the cancers that were diagnosed were further advanced. This meant their chances of a good recovery were lower.

Long-term use of hormone therapy also leads to a small increase in the risk of breast cancer and other serious illnesses like stroke. You can read more about the effects of hormone therapy in our article on menopause (URL: <http://www.informedhealthonline.org/index.161.en.html>) .

It is also not yet certain whether or not the contraceptive pill can reduce the risk of bowel cancer; the evidence

available is insufficient to make a conclusion in this regard [26].

Because of the possibility that hormones might prevent bowel cancer, drug companies are considering developing new hormone-like drugs to try to find an effective medicine for prevention [12].

3.8. No effect shown against bowel cancer: Statins

The picture is clearer for group of drugs called statins. These are drugs used for lowering cholesterol levels in the blood. Although some older studies raised hopes that a side effect of taking statins might be a reduction in bowel cancer, new analyses of the trials show no benefit [27],[28]. A systematic review of studies with about 87,000 people, found no proof that statins can prevent cancer [27]

3.9. What can we expect for the future?

The higher a person's risk for bowel cancer is, the more important it is to try to prevent it. Most people do not need to do anything but look after their health in general. This may have a positive effect not only on the risk of developing bowel cancer, but also on the risk of developing other illnesses like cardiovascular diseases. For families who have a higher risk, there are concrete actions they can take. We can expect that more candidates for prevention of bowel cancer will emerge in the future, particularly for groups that are at high risk. When there is more to report, this information will be updated.

Glossary

cholesterol levels

Cholesterol levels are a way of measuring the concentration of cholesterol in the blood. It is often called fat levels, although cholesterol is not really a fat. Fat is found in the tiny droplets that transport cholesterol through the blood. Depending on the type of transport molecule, doctors differentiate between HDL, LDL and VLDL cholesterol. The total level of cholesterol, measured in milligrams per decilitre (mg/dl), combines the individual values of all these types of cholesterol.

bowel polyps

Bowel polyps are benign growths in the mucus membrane lining the inside of the bowel. Cancer can sometimes develop in a bowel polyp.

small bowel

The small bowel is the four or five metres of the bowel in between the stomach and the large bowel (colon). It has three parts: duodenum, jejunum and ileum. The small bowel is also called the small intestine. In here, nutrients are further processed and absorbed into the body.

familial adenomatous polyposis (FAP)

Familial adenomatous polyposis (FAP) is an inherited disease that affects the large bowel (colon) and rectum. People with FAP will develop a large number of polyps at an early age. There is a high chance that bowel cancer might develop in some of them.

FAP

Abbreviation for familial adenomatous polyposis. This is an inherited disease that affects the large bowel (colon) and rectum. People with FAP will develop a large number of polyps at an early age. There is a high chance that bowel cancer might develop in some of them.

folic acid

Folic acid is a water-soluble vitamin. Green and leafy vegetables (eg lettuce, spinach and broccoli), liver, egg yolk, and particularly wheatgerm are rich sources of folic acid. Having too little of this vitamin can lead to anaemia. In pregnancy, low levels of folic acid can increase the risk

of a fetal abnormality called spina bifida. This is why women who are pregnant, or trying to get pregnant, are encouraged to increase their intake of folic acid.

hereditary non-polyposis colorectal cancer (HNPCC)

Hereditary non-polyposis colorectal cancer (HNPCC) is an inherited form of bowel cancer that does not start with the development of a large number of bowel polyps.

calcium

Calcium is an important mineral for human health. It is one of the building blocks for bones and teeth, and it is necessary for blood clotting, the muscles and the nerves. Calcium occurs in milk and milk products, as well as in green leafy vegetables. People can get a calcium deficiency if they have a chronic inflammatory bowel disease, as well as in pregnancy or during breastfeeding.

colorectal cancer

Colorectal cancer is cancer in the large bowel (including the colon) and/or the rectum. "Colo" stands for the colon, and "rectal" for the rectum. Colorectal cancer is one of the most common forms of cancer.

metastasis

Metastasis is the process where tumour or cancer cells start to leave the original cancer. These new cancer cells can then spread through the body via the blood or lymph system. It is one of the characteristics that turns a tumour into cancer. A metastatic cancer is basically an advanced form of cancer that is spreading.

polyps

Polyps are growths in the mucus membranes, for example in the bowel or inside the nose. The term usually means a benign growth, although strictly speaking the term does not describe whether or not the growth is harmless.

rectum

The rectum is the last 15 to 20 centimetres of the large bowel, that ends with the anus (back passage).

screening

Screening is a systematic approach to trying to find

illnesses among people who do not have symptoms or other obvious signs of disease. An example is screening for breast cancer with mammography.

selenium

Selenium is a mineral that is necessary for human health. It occurs in fish, meat, grains, nuts and offal (organ meats and giblets). Selenium deficiency can be caused by a chronic stomach or bowel disease, or an unhealthy diet. The body needs selenium to produce particular elements that are essential to protect the body cells.

statins

Statins are a class of drugs that are described as cholesterol-lowering. Statins affect the metabolism of building blocks of cholesterol in the body, which slows down the production of cholesterol.

vitamin C

Vitamin C is water-soluble. It is also called ascorbic acid. It is the vitamin that people need to have the most of every day. It occurs primarily in fresh fruit and vegetables. Vitamin C is one of the antioxidants. This means it protects cells from damage caused by particular aggressive atoms and molecules called free radicals. The food industry uses it frequently as a conservative. A major vitamin C deficiency leads to tiredness, irritability, and symptoms in bones, cartilage and teeth.

vitamin E

Vitamin E describes a group of 8 different fat-soluble vitamins. They are antioxidants, which mean they protect cells from damage caused by aggressive types of atom or molecule called free radicals. Vitamin E occurs particularly in nuts and cold-pressed plant oils, like sunflower oil. The food industry uses it as a conservative. Because it is not water-soluble, the body only absorbs vitamin E if it comes in fats in the diet.

hormones

“Hormones” is the collective term for different types of messenger substances in the body. They are produced in different organs or tissues and released into the blood or the lymphatic system to be distributed throughout the body. Hormones only have an effect on those parts of the organism that have a corresponding docking site. This is

how hormones can have such specific effects. Insulin, estrogens, vasopressin and thyroxine are some well-known hormones. Many medical ingredients imitate the effect of hormones.

bacteria

Bacteria are micro-organisms that, unlike viruses, can exist on their own. Viruses, on the other hand, can only exist inside a living cell. Most bacteria are not harmful to people, and some are actually beneficial. Bowel bacteria support bowel health. However if they get into the urinary system, they can cause an infection there. Doctors prescribe antibiotics for illnesses where bacteria need to be stopped or killed off. Immunisation is also possible against some bacterial infections, such as diphtheria, tetanus or whooping cough.

endoscope

With an endoscope, a doctor can look inside parts of the body that have openings, like the bowel, lungs, vagina or bladder. Endoscopes usually have a little light and a camera. Depending on the type of examination, an endoscope could be a short, stiff pipe that enables inspection of the bladder or vagina. Or it can be a long flexible tube that can be inserted into, for example, the stomach or bowel.

evidence

Evidence is what we call scientific proof from well-conducted, good-quality scientific trials that have been carefully designed to answer specific questions. Depending on the types of questions, different scientific research methods (types of study) are most appropriate to find reliable answers to these questions. Randomized controlled trials (RCTs), for example, are the best way to get reliable evidence on the effectiveness of medical treatments (interventions). This type of study, however, is not the best form of evidence for all possible questions, and does not provide the best answers to all kinds of questions, either. Epidemiological studies, for example, are very suitable for establishing well-founded proof for the spreading of a disease in the population.

systematic review

Systematic reviews pull together the evidence on a specific question. A systematic review sets out to find all the trials that have put that particular question to the test.

The quality of the trials are then evaluated and then results analyzed and explained. Often, the results of trials can then be summarized together through a statistical method called meta-analysis.

inflammation

An inflammation is a (defense) reaction of the body to an injury, irritation or infection. More blood is brought to the respective body part to protect the body. This is why this body part feels warmer, becomes swollen and red and is usually more sensitive. If the inflammation affects the mucous membranes, they secrete more fluid than usual. This helps to wash out the germs that have entered.

stroke

A stroke (also sometimes called brain attack, or apoplexy, which is Greek for “struck down”) is an acute condition where the brain does not get enough oxygen. It is most commonly caused by a blood clot that has travelled through the bloodstream and is blocking blood vessels in the brain. In rarer cases bleeding in the brain may also result in a stroke. Depending on which part of the brain is affected, there may be paralysis of either all or certain parts of one half of the body, facial nerve impairment, vision problems, trouble balancing and severe problems speaking. A stroke is a medical emergency: the parts of the brain that are affected need to be supplied with oxygen as quickly as possible, to avoid the death of more brain tissue. The risk of having a stroke is greater for older people and people who have hypertension or chronic arteriosclerosis.

ulcerative colitis

Ulcerative colitis is one of two similar forms of chronic inflammatory disease of the bowel (the other is Crohn’s disease). Ulcerative colitis affects the large bowel. There are periods without symptoms, but also phases of pain in the left abdomen, diarrhoea and weight loss that may be so severe that people cannot go to work or even need to go to the hospital.

dietary supplement

Dietary supplements (also known as food supplements or nutritional supplements) are concentrated vitamins, minerals, trace elements, fibers and/or other substances that are intended to supplement the diet. Advocates of dietary supplements claim that they have a certain, often preventive or strengthening effect on the body. They are

available as capsules, pills, powder or ampules, for example. From a legal point of view, dietary supplements rank among foods and therefore – as opposed to medications – do not need official approval. More information is available on the website of the German Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung, BfR): To the BfR website (in English)

diagnosis

The term diagnosis (from the Greek word *diagnosi*: “distinguishing”) is used to mean the identification and naming of an illness or a disease. A diagnosis is usually made by evaluating the medical history, symptoms and test results. The tests include both comprehensive physical examination and blood tests or examinations using medical instruments such as ultrasound or x-ray.

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