

Food and cancer: Questions and answers



There are often stories in the media and emails that circulate about certain foods, things in foods or things used for storing and cooking food which may increase the risk of cancer. Many of these stories are not true and have no evidence to support them but leave people worried about what they should eat. False information can steer people away from things that are healthy, which may offer protection from some cancers. Some of the commonly reported food-related stories are discussed below.

Plastics and Cancer Risk

Does exposure to the chemicals in the different kinds of plastic increase the risk of cancer?

There has been quite a lot of talk about the safety of plastics in recent years, with people worried about the cancer risk linked to:

- freezing water in plastic water bottles
- re-using plastic water bottles
- leaving plastic water bottles exposed to heat or the sun, for example, in a car
- the plasticisers contained in plastic food wrap leeching into food
- microwaving foods in plastic containers or covered with food wrap
- Bisphenol A (BPA) being used in food packaging and babies bottles
- plastic bottles and food containers containing dioxin.

Plastic drink bottles

Plastic drink bottles, particularly water bottles, are, generally, made of polyethylene terephthalate (PET). Two of the chemicals used in making this kind of plastic, di-ethylexyl adipate (DEHA) and di-ethylhexyl-phthalate (DEHP), are rumoured to cause cancer. But neither are classed as being carcinogenic (cancer causing). There is no evidence that they have other harmful effects on humans.

Freezing water in plastic bottles does not pose a risk, as cold temperatures reduce the likelihood of chemicals being released from the plastic.

Water bottles can be safely re-used but should be washed thoroughly in hot soapy water regularly to ensure they do not become contaminated with bacteria. If bottles become damaged, or begin to deteriorate, use a new one.

Do not microwave or heat plastic water bottles, or other non-microwave-safe plastics, as at high temperatures they may release chemicals which could be harmful. However, there is no risk of the plastic reaching temperatures high enough to release these chemicals if left in the car or in the sun.

Plastic food wrap and containers

Plastic food wrap and flexible plastic food containers are, generally, made from polyvinyl chloride (PVC). Research has found DHEA, one of the plasticiser chemicals contained in PVC to make it flexible, can be released and absorbed by fatty foods. Examples are meat and cheese when they are wrapped or microwaved/heated in these plastics.

The International Agency for Research on Cancer says there is not enough evidence to suggest DHEA causes cancer. The Agency states most research shows the level of plasticisers consumed as a result of using plastic wrap is well below levels which show toxic effects in animal studies. Some researchers also suggest animal studies are not a reliable predictor of the risk to humans.

However, given the lack of evidence it is wise to reduce unnecessary exposure:

- Use heat-resistant glass, ceramic or stainless steel containers for hot food or liquids and especially for heating, cooking or microwaving. Do not use stainless steel in the microwave.
- Do not use plastic wrap in the microwave unless it is labelled as microwave safe.
- Do not use plastic containers not intended for food storage, such as cosmetic or household chemical containers.
- Do not use plastic containers not intended for cooking or heating food, such as ice cream or yoghurt containers to heat/microwave foods.

Bisphenol A (BPA)

Polycarbonate is a type of plastic that is clear, lightweight, heat resistant, and shatter resistant. This makes it useful for food and drink packaging, for example water and infant bottles and plastic tableware. BPA is a part of polycarbonate plastics. Plastics labelled with the number 7 are likely to contain BPA. BPA is also contained in lacquers used to coat metal products, such as food cans and bottle tops.

Very small amounts of BPA can transfer from the packaging into food and drinks.

What are the health effects of BPA?

It's possible BPA might affect the hormone system in humans but there is controversy and disagreement amongst scientists about the effects of low levels of BPA on health.

BPA belongs to a group of substances which can act in a similar way to some hormones and are sometimes called 'endocrine disruptors'. Studies in laboratory animals suggest low levels of (consumed) BPA may have an effect on the reproductive system. Some recent studies provide reason for some concern about the potential effects of BPA on normal hormone functions. However, there are uncertainties over what these studies may mean for human health. The effect of BPA on cancer risk (whether it increases risk or has no effect) is unknown.

BPA exposure can be reduced by:

- not microwaving polycarbonate plastic food containers. Polycarbonate is strong and durable, but over time it may break down from over-use at high temperatures.
- avoiding the use of plastic containers with the number 7 on the bottom
- reducing the use of canned foods and not storing food in opened cans
- using glass, porcelain or stainless steel containers, particularly for hot food or liquids
- using baby bottles that are labelled as BPA free.

Many international agencies and government organisations are carrying out additional studies and monitoring to address the uncertainties in the research.

Dioxin in plastic

Dioxins are organic environmental pollutants released by burning waste, especially PVC and some chemicals used in hospitals. After being released into the atmosphere, dioxins are taken up by fish and animals and stored in fat cells. People are exposed to dioxins most by eating meat, dairy foods, eggs and fish that contain dioxin. The Ministry of Health states that dioxin exposure in New Zealand's general population is at the low end of the range of exposure levels reported internationally.

Plastics used for food and water do not contain dioxins.

Summary

Currently, there is limited scientific evidence suggesting a link between the use of plastics for food packaging and wrapping and cancer. The general safety of many of these, and other, chemicals is constantly under review throughout the world. International agencies have conducted reviews in recent years and maintain a watching brief. At this time, the possibility of bad effects arising from plastics cannot be ruled out. Therefore, it is important to follow directions when using plastics to store, heat or cook food.

Food Additives

Many different additives are added to commercially prepared foods and there is a good deal of suspicion among some people about the safety of food additives.

In 2007, the World Cancer Research Fund reported on an exhaustive search of the evidence by a panel of experts on the links between food, nutrition and physical activity and cancer.

This report noted there is little epidemiological (the affect on humans) evidence on the possible effects of food additives in food and drinks. The report also noted that, because additives are subject to international and national surveillance and regulation, there is a vast amount of information on the effects of experimentation on animals. The report also noted food additives are monitored if any chemical present seems to be of special concern. Regulations limiting how much of any additive that may cause harm are, generally, based on the results of animal studies with very large safety margins added.

Experts do not consider general use of food additives to be a cancer risk. However, the nitrites and nitrates added to preserve meats can convert to carcinogens in the stomach and have been linked to cancer of the stomach.

What about nitrites and nitrates?

Nitrites and nitrates are chemical compounds that occur naturally in the environment. They are important plant nutrients, but they can also be added to some food products as a preservative. Nitrates and nitrites have been a traditional way to preserve food for hundreds of years but there is now evidence that they may be linked to stomach and colorectal cancers.

Nitrites and nitrates which are used as food additives in processed meats are known to form the carcinogenic (cancer causing) substances called nitrosamines when mixed with stomach acid after they are eaten. Examples of nitrites and nitrates are potassium or sodium nitrite [additive numbers 249, 250] or potassium or sodium nitrate [additive numbers 251, 252]. Several of these compounds are known to be carcinogenic in humans. However, we allow nitrites to be added in very small quantities in some foods because they kill bacteria, particularly the bacteria which cause botulism.

These bacteria pose a much greater risk to health than the cancer risk linked with eating small amount of nitrites. Nitrites are added to corned and preserved meat products to protect them from the bacteria and to give them their characteristic colour and flavour.

The levels of nitrites added to processed foods are controlled by law and often other additives, antioxidants, are also added to stop foods forming nitrosamines.

Processed meats also have high levels of salt. Eating alot of salt and salt preserved foods is a probable cause of some cancers. Processed meats may also be smoked. Smoked foods may also have chemicals which may be linked to stomach cancer. The World Cancer Research Fund recommends avoiding salt-preserved, salted or salty foods and processed meats which have been smoked or cured.

Nitrite can also be in vegetables. Nitrite containing vegetables also have vitamin C and D, which stop nitrosamines and nitrosamides compounds forming in the stomach. As a result, these vegetables (green vegetables, especially spinach, celery and green lettuce) are safe and healthy. They have positive health benefits that far outweigh the risks.

Are artificial sweeteners a risk for cancer?

Over many years there has been debate over the risks linked with eating food that have artificial sweeteners especially, saccharin and aspartame (brand names include NutraSweet, Equal). As result of these concerns artificial sweeteners have been highly researched.

There have been a series of scares about aspartame. But in each case the studies/papers have been flawed and the 'evidence' later discredited. There is no reliable evidence which links aspartame with any kind of cancer in humans. Many years ago saccharin was linked with an increase in bladder cancer in rats which were fed large quantities of saccharin. This link did not relate to humans and there has been no evidence to suggest saccharin causes cancer in humans.

Many of the studies on artificial sweeteners have been on rats. Animal studies do not prove carcinogenicity in humans.

Large studies looking at the affect of artificial sweeteners on people have not shown an increase in the risk of cancer.

Artificial sweeteners and other food additives are evaluated and monitored by government authorities in many different countries and any additives which are carcinogenic (cancer causing) are unlikely to be registered and used.

Pesticides

Pesticides and herbicides are widely used in food production. Many people worry they increase the risk of cancer. People also worry that the risk posed by the pesticide residues will outweigh the benefits of eating more fruit and vegetables.

High doses of some of these chemicals can cause cancer in animals. There may be an increased risk to people who are exposed to high levels of these chemicals as part of their job, for example, industry or farming.

Sometimes, traces of pesticides are left in or on the outside of food. There are strict limits on the levels of pesticide residues allowed in food, and pesticide residues in foods are monitored. Levels of pesticide in New Zealand food are monitored regularly. Residues levels have reduced over the years and current levels are considered to be safe.

There is no current evidence that shows very low levels of pesticide residues increase the risk of cancer. However, there is evidence which suggests eating lots of fruit and vegetables has many overall health benefits. These health benefits far outweigh any risk which might be linked with pesticide residues and, therefore, you should not limit the fruit and vegetables you eat, because of any pesticide concern.

Despite the low risk, it is worth washing or peeling fruit and vegetables as it can remove some pesticide residues. Organic fruit and vegetables do not appear to protect against cancer any better than fruit and vegetables grown by other methods.

Cooking Methods

The way some foods are prepared and cooked has been linked to an increased cancer risk.

Charred or burnt food

Charred meat

When meat is cooked at very high temperatures such as when grilling, frying or cooking over an open flame, chemicals called heterocyclic amines and polycyclic amines are formed. These chemicals can damage cells which may become cancerous. They may contribute to the risk of developing stomach cancer. These chemicals are found in higher quantities when meat is charred or burned. When barbecuing, grilling or pan-frying meat try not to overcook it and avoid eating any charred parts.

Acrylamide

Acrylamide is a chemical that can form in some starchy foods during high-temperature cooking processes, such as frying, roasting and baking. It has been found in fried and roasted potato products such as chips, chippies, coffee and cereal-based products such as breads and biscuits. It was first discovered in food in a Swedish study in 2002.

Acrylamide has been known as an industrial product for many decades and used for a variety of uses including waste-water treatment. It is known neurotoxin for people exposed to it at work. But it has not been linked with an increase in cancer in workers exposed to it. However, it has been shown to cause cancer in experimental animals.

Since its discovery, acrylamide in food has been further studied. It is now believed levels in food are probably too low to cause cancer, though there is still some uncertainty about its effects. Human studies have not found evidence which links acrylamide in food with any kind of cancer.

The foods that are likely to develop acrylamide during cooking are coffee, chocolate, almonds, french fries, potato chips, cereal, crackers, bread and starchy vegetables. These foods should not be eaten in large quantities in a healthy diet. A healthy diet is unlikely to contain acrylamide levels high enough to concern.

Smoked Food

Smoked foods, particularly meat, may have polycyclic aromatic hydrocarbons (PAH). However, this depends on the type of fuel burned to produce the smoke. There is some evidence from human studies which shows that eating smoked foods increases the risk of stomach cancer. Stomach cancer is more common in countries where meats and fish are preserved by smoking. Smoked foods usually also contain a lot of salt, and may also contain nitrites, both of which also add to the risk of stomach cancer.

A final word

Scientists estimate that with healthy eating, being physically active, maintaining a healthy weight and not smoking we can prevent about a third of the most common cancers. These healthy behaviours will also greatly reduce the risk of getting cancer.

The World Cancer Research Fund (WCRF) in a very thorough search of the evidence on the links between food, nutrition and physical activity and cancer found strong links between cancer and obesity and physical inactivity, smoking and alcohol.

As a result of this research the WCRF made the following recommendations:

- Be as lean as possible within the normal weight range.
- Be physically active as part of everyday life.
- Limit consumption of energy-dense foods and avoid sugary drinks.
- Eat mostly plant foods – fruits, vegetables, grains and pulses.
- Limit intake of red meat and avoid processed meat.
- Limit alcoholic drinks.
- Avoid salt-preserved, salted or salty foods; preserve foods without using salt.
- Do not eat mouldy cereals (grains) and pulses (nuts, peas and beans).
- Dietary supplements are not recommended for cancer treatment.