Cancer, Disease and your Diet: How What You Eat Can Influence Cancer

Cancer is one of the leading causes of death worldwide (1).

But studies suggest that simple lifestyle changes, such as following a healthy diet, could prevent 30–50% of all cancers (2, 3).

Growing evidence points to certain dietary habits increasing or decreasing cancer risk.

What’s more, nutrition is thought to play an important role in treating and coping with cancer.

This article covers everything you need to know about the link between diet and cancer.

Eating Too Much of Certain Foods May Increase Cancer Risk

It’s difficult to prove that certain foods cause cancer.

However, observational studies have repeatedly indicated that high consumption of certain foods may increase the likelihood of developing cancer.

Sugar and Refined Carbs

Processed foods that are high in sugar and low in fiber and nutrients have been linked to a higher cancer risk (2).

In particular, researchers have found that a diet that causes blood glucose levels to spike is associated with an increased risk of several cancers, including stomach, breast and colorectal cancers (4, 5, 6, 7).

One study in over 47,000 adults found that those who consumed a diet high in refined carbs were almost twice as likely to die from colon cancer than those who ate a diet low in refined carbs (8).

It’s thought that higher levels of blood glucose and insulin are cancer risk factors. Insulin has been shown to stimulate cell division, supporting the growth and spread of cancer cells and making them more difficult to eliminate (9, 10, 11).
In addition, higher levels of insulin and blood glucose can contribute to inflammation in your body. In the long term, this can lead to the growth of abnormal cells and possibly contribute to cancer (9).

This may be why people with diabetes — a condition characterized by high blood glucose and insulin levels — have an increased risk of certain types of cancer (12).

For example, your risk of colorectal cancer is 122% higher if you have diabetes (13).

To protect against cancer, limit or avoid foods that boost insulin levels, such as foods high in sugar and refined carbs (14).

**Processed Meat**

The International Agency for Research on Cancer (IARC) deems processed meat a carcinogen — something that causes cancer (15).

Processed meat refers to meat that has been treated to preserve flavor by undergoing salting, curing or smoking. It includes hot dogs, ham, bacon, chorizo, salami and some deli meats.

Observational studies have found an association between consuming processed meat and an increased cancer risk, particularly colorectal cancer (16).

A large review of studies found that people who ate large amounts of processed meat had a 20–50% increased risk of colorectal cancer, compared to those who ate very little or none of this type of food (17).

Another review of over 800 studies found that consuming just 50 grams of processed meat each day — around four slices of bacon or one hot dog — raised the risk of colorectal cancer by 18% (15, 18).

Some observational studies have also linked red meat consumption to an increased cancer risk (19, 20, 21).

However, these studies often don’t distinguish between processed meat and unprocessed red meat, which skews results.
Several reviews that combined results from multiple studies found that the evidence linking unprocessed red meat to cancer is weak and inconsistent (22, 23, 24).

**Overcooked Food**

Cooking certain foods at high temperatures, such as grilling, frying, sautéing, broiling and barbequing, can produce harmful compounds like heterocyclic amines (HA) and advanced glycation end-products (AGEs) (25).

Excess buildup of these harmful compounds can contribute to inflammation and may play a role in the development of cancer and other diseases (26, 27).

Certain foods, such as animal foods high in fat and protein, as well as highly processed foods, are most likely to produce these harmful compounds when subjected to high temperatures.

These include meat — particularly red meat — certain cheeses, fried eggs, butter, margarine, cream cheese, mayonnaise, oils and nuts.

To minimize cancer risk, avoid burning food and choose gentler cooking methods, especially when cooking meat, such as steaming, stewing or boiling. Marinating food can also help (28).

**Dairy**

Several observational studies have indicated that high dairy consumption may increase your risk of prostate cancer (29, 30, 31).

One study followed almost 4,000 men with prostate cancer. Results found that high intakes of whole milk increased the risk of disease progression and death (32).

More research is needed to determine possible cause and effect.

Theories are that these findings may be due to an increased intake of calcium, insulin-like growth factor 1 (IGF-1) or estrogen hormones from pregnant cows — all of which have been weakly linked to prostate cancer (33, 34, 35).

**Summary** Higher consumption of foods rich in sugar and refined carbs, as well as processed and overcooked meat, can increase your risk of cancer. In addition, higher dairy consumption has been linked to prostate cancer.
Being Overweight or Obese Is Linked to Increased Cancer Risk

Other than smoking and infection, being obese is the single biggest risk factor for cancer worldwide (36).

It increases your risk of 13 different types of cancer, including of the esophagus, colon, pancreas and kidney, as well as breast cancer after menopause (37).

In the US, it’s estimated that weight problems account for 14% and 20% of all cancer deaths in men and women, respectively (38).

Obesity can increase cancer risk in three key ways:

- Excess body fat can contribute to insulin resistance. As a result, your cells are unable to take up glucose properly, which encourages them to divide faster.
- Obese people tend to have higher levels of inflammatory cytokines in their blood, which causes chronic inflammation and encourages cells to divide (39).
- Fat cells contribute to increased estrogen levels, which increases the risk of breast and ovarian cancer in postmenopausal women (40).

The good news is that several studies have shown that weight loss among overweight and obese people is likely to reduce cancer risk (41, 42, 43).

Summary Being overweight or obese is one of the biggest risk factors for several types of cancer. Achieving a healthy weight can help protect against cancer development.

Certain Foods Contain Cancer-Fighting Properties

There is no single superfood that can prevent cancer. Rather, a holistic dietary approach is likely to be most beneficial.

Scientists estimate that eating the optimal diet for cancer may reduce your risk by up to 70% and would likely help recovery from cancer as well (2).

They believe that certain foods can fight cancer by blocking the blood vessels that feed cancer in a process called anti-angiogenesis (44).
However, nutrition is complex, and how effective certain foods are at fighting cancer varies depending on how they’re cultivated, processed, stored and cooked.

Some of the key anti-cancer food groups include:

**Vegetables**

Observational studies have linked a higher consumption of vegetables with a lower risk of cancer (45, 46, 47).

Many vegetables contain cancer-fighting antioxidants and phytochemicals.

For example, cruciferous vegetables, including broccoli, cauliflower and cabbage, contain sulforaphane, a substance that has been shown to reduce tumor size in mice by more than 50% (48).

Other vegetables, such as tomatoes and carrots, are linked to a decreased risk of prostate, stomach and lung cancer (49, 50, 51, 52).

**Fruit**

Similar to vegetables, fruits contain antioxidants and other phytochemicals, which may help prevent cancer (53, 54).

One review found that at least three servings of citrus fruits per week reduced stomach cancer risk by 28% (55).

**Flaxseeds**

Flaxseeds have been associated with protective effects against certain cancers and may even reduce the spread of cancer cells (56, 57).

For example, one study found that men with prostate cancer taking 30 grams — or about 4 1/4 tablespoons — of ground flaxseed daily experienced slower cancer growth and spread than the control group (58).

Similar results were found in women with breast cancer (59).

**Spices**

Some test-tube and animal studies have found that cinnamon may have anti-cancer properties and prevent cancer cells from spreading (60).
Additionally, curcumin, which is present in turmeric, may help fight cancer. One 30-day study found that 4 grams of curcumin daily reduced potentially cancerous lesions in the colon by 40% in 44 people not receiving treatment (61).

**Beans and Legumes**

Beans and legumes are high in fiber, and some studies suggest that higher intake of this nutrient may protect against colorectal cancer (56, 62).

One study in over 3,500 people found that those eating the most legumes had up to a 50% lower risk of certain types of cancers (63).

**Nuts**

Regularly eating nuts may be linked to a lower risk of certain types of cancer (64, 65).

For example, one study in more than 19,000 people found that those who ate more nuts had a reduced risk of dying from cancer (66).

**Olive Oil**

Many studies show a link between olive oil and reduced cancer risk (67).

One large review of observational studies found that people who consumed the highest amount of olive oil had a 42% lower risk of cancer, compared to the control group (68).

**Garlic**

Garlic contains allicin, which has been shown to have cancer-fighting properties in test-tube studies (69, 70).

Other studies have found an association between garlic intake and a lower risk of specific types of cancer, including stomach and prostate cancer (71, 72).

**Fish**

There’s evidence that eating fresh fish can help protect against cancer, possibly due to healthy fats that can reduce inflammation.
A large review of 41 studies found that regularly eating fish reduced the risk of colorectal cancer by 12% (73).

**Dairy**

The majority of evidence suggests that eating certain dairy products may reduce the risk of colorectal cancer (74, 75).

The type and amount of dairy consumed are important.

For example, moderate consumption of high-quality dairy products, such as raw milk, fermented milk products and milk from grass-fed cows, may have a protective effect.

This is likely due to higher levels of beneficial fatty acids, conjugated linoleic acid and fat-soluble vitamins (76, 77, 78).

On the other hand, high consumption of mass-produced and processed dairy products are associated with an increased risk of certain diseases, including cancer (29, 30, 31).

The reasons behind these results aren’t fully understood but may be due to hormones present in milk from pregnant cows or IGF-1.

**Summary** No single food can protect against cancer. However, eating a diet full of diverse whole foods, such as fruit, vegetables, whole grains, legumes, spices, healthy fats, fresh fish and high-quality dairy, may reduce cancer risk.

**Plant-Based Diets May Help Protect Against Cancer**

Higher intake of plant-based foods has been associated with a reduced risk of cancer.

Studies have found that people who follow a vegetarian or vegan diet have a reduced risk of developing or dying from cancer (79).

In fact, a large review of 96 studies found that vegetarians and vegans may have an 8% and 15% lower risk of cancer, respectively (80).

However, these results are based on observational studies, making it difficult to identify possible reasons.
It’s likely that vegans and vegetarians eat more vegetables, fruits, soy and whole grains, which may protect against cancer (81, 82).

Moreover, they’re less likely to consume foods that have been processed or overcooked — two factors that have been linked to a higher cancer risk (83, 84, 85).

**Summary** People on plant-based diets, such as vegetarians and vegans, may have a reduced risk of cancer. This is likely due to a high intake of fruit, vegetables and whole grains, as well as a low intake of processed foods.

**The Right Diet Can Have Beneficial Effects for People With Cancer**

Malnutrition and muscle loss are common in people with cancer and have a negative impact on health and survival (1).

While no diet has been proven to cure cancer, proper nutrition is vital to complement traditional cancer treatments, aid in recovery, minimize unpleasant symptoms and improve quality of life.

Most people with cancer are urged to stick to a healthy, balanced diet that includes plenty of lean protein, healthy fats, fruits, vegetables and whole grains, as well as one that limits sugar, caffeine, salt, processed foods and alcohol.

A diet sufficient in high-quality protein and calories may help reduce muscle atrophy (86).

Good protein sources include lean meat, chicken, fish, eggs, beans, nuts, seeds and dairy products.

Side effects of cancer and its treatment can sometimes make it difficult to eat. These include nausea, sickness, taste changes, loss of appetite, trouble swallowing, diarrhea and constipation.

If you experience any of these symptoms, it’s important to speak to a registered dietitian or other health professional who can recommend how to manage these symptoms and ensure optimal nutrition.

Additionally, those with cancer should avoid supplementing too heavily with vitamins, as they act as antioxidants and can interfere with chemotherapy when taken in large doses.
**Summary** Optimal nutrition can enhance quality of life and treatment in people with cancer and help prevent malnutrition. A healthy, balanced diet with sufficient protein and calories is best.

**A Ketogenic Diet Shows Some Promise for Treating Cancer, but Evidence Is Weak**

Animal studies and early research in humans suggest that a low-carb, high-fat ketogenic diet may help prevent and treat cancer.

High blood sugar and elevated insulin levels are risk factors for cancer development.

A ketogenic diet lowers blood sugar and insulin levels, potentially causing cancer cells to starve or grow at a slower rate (87, 88, 89).

In fact, research has shown that a ketogenic diet can reduce tumor growth and improve survival rates in both animal and test-tube studies (90, 91, 92, 93).

Several pilot and case studies in people have also indicated some benefits of a ketogenic diet, including no serious adverse side effects and, in some cases, improved quality of life (94, 95, 96, 97).

There seems to be a trend in improved cancer outcomes as well.

For example, one 14-day study in 27 people with cancer compared the effects of a glucose-based diet to those of a fat-based ketogenic diet.

Tumor growth increased by 32% in people on the glucose-based diet but decreased by 24% in those on the ketogenic diet. However, the evidence is not strong enough to prove correlation (98).

A recent review looking at the role of a ketogenic diet for managing brain tumors concluded that it could be effective in enhancing the effects of other treatments, such as chemotherapy and radiation (99).

Yet no clinical studies currently show definitive advantages of a ketogenic diet in people with cancer.

It’s important to note that a ketogenic diet should never replace treatment advised by medical professionals.
If you decide to try a ketogenic diet alongside other treatment, be sure to speak to your doctor or a registered dietitian, as veering from strict dietary rules can lead to malnutrition and negatively influence health outcomes (100).

**Summary** Early research suggests that a ketogenic diet may reduce cancerous tumor growth and improve quality of life without serious adverse side effects. However, more research is needed.

**The Bottom Line**

Though there are no miracle superfoods that can prevent cancer, some evidence suggests that dietary habits can offer protection.

A diet high in whole foods like fruits, vegetables, whole grains, healthy fats and lean protein may prevent cancer.

Conversely, processed meats, refined carbs, salt and alcohol may increase your risk.

Though no diet has been proven to cure cancer, plant-based and keto diets may lower your risk or benefit treatment.

Generally, people with cancer are encouraged to follow a healthy, balanced diet to preserve quality of life and support optimal health outcomes.

Written by Mary Jane Brown, PhD, RD (UK) on October 7, 2018

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How Bad Is Bacon for You, VERY BAD

It's a debate that plays out in everyone's head during a weekend brunch: Should I be eating this much bacon? Researchers have been diving into the question, too, specifically as it relates to cancer.

The question once again jumped to the forefront of people's minds with the recent release of a meta-analysis that concluded that bacon and several other types of meat are tied to an increased risk of breast cancer.

The research, published in September in the International Journal of Cancer Research, looked at 15 previous studies, including a total of more than 1.2 million women, focused on the link between breast cancer and processed meat. The researchers found that individuals who consumed the most processed meat — between 0.9 ounces and 1 ounce (25 and 30 grams) a day — had about a 9 percent higher risk of breast cancer compared with those who ate the least processed meat, which was 0 to 0.07 ounces or 0.17 ounces (2 to 5 grams) a day. [11 Ways Processed Food Is Different from Real Food]

Not every paper looking into this relationship has come to the same conclusion, however: A World Health Organization-affiliated study from 2015, for example, did not, though it did decide these foods increased the risk of colorectal cancer. If there are inconsistencies, what, then, should bacon lovers take away from the piles of papers that are published?

Dr. Marji McCullough, a senior scientific director of epidemiology research at the American Cancer Society, noted that breast cancer is a common disease in women, and that salamis, hot dogs and other processed meats are popular food choices. Together, those factors mean
the risk the food poses, even if small, is worth paying attention to, especially since an earlier meta-analysis on the topic that has reached similar conclusions.

**Limitations to keep in mind**

Still, it's important to know that there are limitations to the type of research that aims to link certain foods to the risk of health conditions. In this case, the research available to study meant that the authors could only assess the impact of high- and low-processed meat consumption — there wasn't enough data available to see what risks consumers run when they eat 0.35 ounces to 0.5 ounces (10 or 15 grams) of the product. What's more, the studies included in the meta-analysis relied on participants remembering what their diet had been like at certain points in the past. This research technique that depends on memories has a lot of room for under- and overestimation, said Andrew Milkowski, a meat science researcher and an adjunct professor of animal sciences at the University of Wisconsin-Madison who was not involved with the new report. (Before joining the University of Wisconsin in 2006, Milkowski worked for Oscar Mayer.)

But Maryam Farvid, the lead author on the latest project and a researcher at the Harvard T. H. Chan School of Public Health, said her team tried to counteract this last problem by relying only on studies that surveyed women before they received any diagnosis. That method, Farvid told Live Science, means women were less likely to confuse their pre- and post-cancer diets. [Top 10 Cancer-Fighting Foods]

Ideally, researchers could administer controlled diets to participants before they're diagnosed with anything, and closely watch for changes in their health — though those conditions are extremely difficult to pull off, Milkowski told Live Science. "If I were smart enough to figure that out, I'd be promoting that type of research — I don't know if it's a solvable problem," he added.

Milkowski also said that the 9 percent increase in risk that this report found could be a statistical error, and is not enough to warrant alarming people — a point that others have made when criticizing the 2015 WHO-associated report, which labeled processed meats as "likely carcinogens" after finding the food increased colon cancer risk by 18 percent.

But Farvid said that other dietary factors have also been associated with breast cancer risk, such amount of fiber or fruits and vegetables in a person's diet, and may decrease or increase risk of the disease by similar margins, yet there's much less alarm around these findings.

**Small but meaningful**

Indeed, the small advantages to eating less processed meat could be especially meaningful, seeing as some other breast cancer risk factors are unchangeable, such as whether women have the breast cancer gene or how young they were when they started menstruation, Farvid said. "You may say it's hard to change your diet," she said, "but that at least is modifiable."
Both Farvid and McCullough advise paying attention to how much processed meat you consume, which, as McCullough said, is part of the American Cancer Society’s current dietary recommendations for minimizing the risk of cancer.

"Rich in plants and low in red and processed meats is a recommendation similar to other healthy diet patterns," McCullough told Live Science. As time goes on, researchers will be better equipped to investigate risk factors for subtypes of cancers, she adds, which could provide more details about what snacks, exactly, play a role in our health.

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