



coffee&health

from the institute for scientific information on coffee

coffee & health topics

Intended for professional audiences

Cancer

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1. Summary

- Current scientific evidence suggests that moderate coffee drinking is not associated with an increased risk of cancer at the majority of body sites.
- Coffee drinking is not linked to an increased risk of oesophageal, stomach, pancreatic, kidney, prostate, skin, ovarian or breast cancer.
- Research results also suggest that coffee consumption may be linked to a reduced risk of developing cancer at a number of body sites, including the oral cavity/pharynx, liver, endometrium, brain, colon and rectum. More research is needed to clarify these associations.
- A possible association has been shown between coffee consumption and bladder and lung cancer risk. However, in both cases, potential confounding factors such as smoking and alcohol consumption remain, and further studies are needed to confirm the association.

2. Cancer in Europe

The scale of the issue

Cancer causes 20% of deaths in Europe each year¹. With more than 3 million new cases and 1.7 million deaths annually, cancer is the most important cause of death and morbidity in Europe after cardiovascular diseases¹. The most common cancers in Europe in 2008 were bowel, breast, lung and prostate which together accounted for nearly 50% of all cancer cases².

Lifestyle, diet and cancer risk

Tobacco use is a major factor in the development of cancer, as are harmful alcohol use, poor diet and physical inactivity³. There has been an ongoing debate about the relationship between coffee consumption and cancer since the early 1970s, following a publication stating that coffee was positively associated with cancer⁴. Since then, over 500 epidemiologic studies worldwide have been devoted to looking at the potential link between coffee drinking and the risk of developing cancer.



3. Coffee consumption and cancers of the digestive tract

No evidence for an effect of coffee on cancer of the oesophagus or stomach

Two recent large literature surveys, covering studies from Europe, North America and Asia reported an unchanged⁵, or reduced, risk of oesophageal cancer with the consumption of 3 or more cups of coffee a day⁶.

Another large review in 2006 found no association between coffee consumption and the risk of developing stomach cancer⁷.

Moderate coffee consumption linked to reduced risk of cancers of the mouth and throat

In a review of observational studies published over a 20 year period⁸, overall there appeared to be a 36% reduction in risk for cancers of the oral cavity/pharynx in those drinking between 3-5 cups of coffee a day versus those drinking less than 1 cup a day. There was, however, no relationship between coffee consumption and laryngeal cancer.

A further large review of the literature confirmed that coffee consumption is linked to a lower risk of buccal and pharyngeal cancer⁵.

Moderate coffee consumption linked to reduced risk of liver cancer

Four meta-analyses^{5, 9-11} have reported a reduction in the risk of developing liver cancer with coffee consumption. This reduction reached an overall level of 30% in coffee drinkers versus non-coffee drinkers with reductions as high as 55% in heavy coffee consumers.

Among a group at higher risk of developing liver cancer – chronic Hepatitis B virus carriers, moderate coffee drinkers appear to be at a lower risk of developing liver cancer than those who do not drink coffee¹².

Coffee consumption also appears to reduce the risk of Hepatitis C evolving to cancer by 22% for each cup of coffee consumed per day¹³, with a further reduction in disease progression of 62% in those consuming at least 3 cups a day.

Moderate coffee consumption not linked to higher risk of pancreatic cancer

Despite the positive results of studies looking at coffee consumption and pancreatic cancer in 1970 and 1981, the International Agency for Research on Cancer (IARC) now considers the evidence inadequate and attributes the results to confounding factors, including smoking⁹.

More recently, the World Cancer Research Fund (WCRF), in a report reviewing over 50 studies¹¹, found no increase in risk of developing pancreatic cancer with coffee consumption.

Since then, further studies, including four meta-analyses, have confirmed the absence of a relationship between moderate coffee consumption and increased risk of developing pancreatic cancer^{5, 14-17}. Some, but not all, of these most recent studies suggest that regular coffee drinking is linked to a lower risk of developing pancreatic cancer^{5,14,15}.

Moderate coffee consumption linked to reduced risk of colorectal cancer

Four large literature reviews, carried out over the last seven years looking at studies from Europe, Japan, the USA and South America, consistently suggest a favourable effect of moderate coffee consumption on colorectal cancer risk^{5, 18-20}. Regular coffee drinkers appear to be up to 30% less likely to develop the disease than non-coffee drinkers. Further research is needed to confirm this link.



4. Coffee consumption and bladder, kidney and prostate cancers

Coffee and bladder cancer: inconclusive evidence

Although tobacco use and exposure to aromatic amines are the two main risk factors for bladder cancer, other lifestyle factors are also involved.

In 1990, the International Agency for Research on Cancer (IARC) considered that there was limited evidence available at that time that coffee drinking was carcinogenic to the human urinary bladder. It classified coffee in Group 2B (possibly carcinogenic to humans).

A number of studies since have reported a moderate increase in the risk of bladder cancer with coffee consumption⁹. However, the risk has not been associated with how much coffee has been consumed, or for how long, which suggests that any link between the two is not a straightforward one.

Recent evidence also contradicts these earlier findings: those who drink coffee are 18% less likely to develop bladder cancer than those who do not, and this figure increases to 26% in men^{9,11,21}.

A recent, large literature review also suggests that coffee consumption could be linked to a reduced risk of bladder cancer, particularly in men⁵.

Therefore the evidence to date is inconclusive. A critical confounding factor is linked to the type of water used to prepare coffee, as chlorinated tap water is thought to increase the risk of bladder cancer, whereas mineral water does not appear to. Another confounder is smoking which usually goes hand in hand with both alcohol and coffee consumption²¹.

No association between coffee and kidney cancer

The World Cancer Research Fund (WCRF) identified a total of 23 studies, which all concluded there was no link between coffee consumption and kidney cancer¹¹. A further review and another study including around 750,000 participants also found no link^{22,23}.

Coffee consumption not linked to a higher risk of prostate cancer

In 2010, a meta-analysis of studies found no influence of coffee on the risk of developing prostate cancer²⁴. Two further, large studies suggest that coffee drinkers are at lower risk of developing prostate cancer than non-coffee drinkers^{5, 25}.



5. Coffee consumption and breast, ovarian and endometrial cancers

Moderate coffee consumption may reduce risk of breast cancer in pre-menopausal women

Research to date has shown that coffee consumption is not linked to an increased risk of breast cancer^{5, 26}, and no association between coffee consumption and the incidence of breast cancer has been found in post-menopausal women^{9-11, 27, 28}.

However, in pre-menopausal women, the consumption of around 4 cups of coffee a day has been associated with a 38% lower risk of breast cancer⁹. This effect seems to be even greater in pre-menopausal women at high risk (because they carry the BRCA1 and BRCA2 mutation), as a reduction in risk of 25-70% with daily consumption of 4-6 cups of coffee²⁹ has been reported.

Studies have also shown an interaction of coffee with another genetic variable related to breast cancer, with a 64% reduction in risk of breast cancer reported in women with a specific genotype* but no effect in women with a different genotype³⁰.

These studies highlight the potential importance of individual genetic variability on diet-disease associations.

* A genotype is the genetic make-up of a cell, an organism or an individual, usually with reference to a specific character under consideration.

No effect of coffee on ovarian cancer

A recent meta-analysis of studies found no effect of coffee consumption on the development of ovarian cancer³¹. More research is needed to confirm these findings.

Moderate coffee consumption may reduce risk of endometrial cancer

Coffee drinkers are thought to be 20% less likely to develop endometrial cancer than non-coffee drinkers³². Studies show that this effect is even more pronounced in those drinking over 4 cups of coffee a day, where the risk could be up to 49% lower.

Further recent studies have all reached the same conclusion, finding a dose-dependent relationship^{5, 33-35}.

More research is needed to confirm these results.



6. Coffee consumption and cancers at other sites

No link between coffee and skin cancer

Research does not link coffee consumption with skin cancer. However, a couple of studies suggest that caffeine may protect cancer cells against the harmful effects of UVB radiation.

In 2008, a study in mice reported that caffeine added to drinking water, or placed directly onto the skin, induced death of cells damaged by UVB irradiation³⁶. In 2009, the same work on human skin cell cultures showed that caffeine doubled the death rate of cells damaged by UVBs, hence potentially decreasing the risk of cancer³⁷.

Coffee and lung cancer risk: more studies needed

A recent review of studies looking at coffee and lung cancer has reported an increased risk of lung cancer in those with a high coffee intake³⁸. Individuals reporting an intake of between 5-7 cups daily had a 27% higher risk of developing lung cancer. However, further evidence is required to clarify this association, due to the potential confounding effects of smoking and other factors.

Some evidence for lower occurrence of brain tumours in coffee consumers

Consumption of at least 5 cups of coffee or tea a day, compared with no tea or coffee, has been associated with a 40% lower risk of brain tumours³⁹. This association was not seen with decaffeinated coffee.

A European study⁴⁰ had similar results, showing a 34% lower risk of developing a brain tumour in individuals drinking more than one cup of tea or coffee a day, compared with those drinking less.

More research is needed to clarify the link between coffee and brain tumours.

7. Mode of coffee preparation

A recent Swedish study is the first to look at the influence of the method of coffee preparation on cancer risk⁴¹. It finds that the risk of cancer could vary between drinkers of filtered or boiled coffee.

8. Conclusion

To date, approximately 500 studies from America, Europe and Asia have evaluated the potential link between coffee drinking and the risk of developing cancer. They show that moderate coffee drinking does not appear to be associated with an increased risk of developing cancer. They also suggest that, in some cases, moderate coffee consumption may be associated with a lower risk of cancer; however, further studies are needed before any firm conclusions can be drawn.

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