

OVERVIEW

Updated May 2018

GI FUNCTION

Overview:

The gastrointestinal (GI) tract runs from the mouth through to the large intestine and anus, encompassing associated organs that are involved with the process of digestion such as the gallbladder and pancreas¹.

Research into gastrointestinal conditions such as dyspepsia²⁻⁶, gastro oesophageal reflux disease⁷⁻¹⁶, peptic ulcers^{17,18}, and gastritis¹⁸ suggests that coffee is not associated with the development of these disorders. Research also suggests that coffee consumption does not worsen symptoms in those who suffer these conditions when confounding factors, such as BMI and smoking status, are controlled for^{2,8,10,13}.

In the small intestine, studies suggest that coffee consumption does not increase the risk of duodenal ulcers^{19,20} and has no effect on fluid balance in this location^{21,22}. Research also suggests that there is no association between coffee consumption and disorders of the large intestine, such as diarrhoea²¹⁻²³, or irritable bowel syndrome^{3,24,25}. Research on organs associated with the gastro intestinal tract suggests that coffee consumption is associated with a reduced risk of gallbladder disease^{26,29}, and with lower incidence and rates of progression of liver disease³⁰.

In relation to cancers throughout the GI tract, in its 2016 report, the International Agency for Research on Cancer (IARC) concluded that there is inadequate research to suggest any link between coffee consumption and cancer of the oral cavity, pharynx, larynx, stomach, oesophagus, or colorectum³¹. The review also suggests that coffee drinking is associated with a reduced occurrence of liver cancer³¹. Data reviewed by IARC also suggests that there is no association between coffee consumption and increased risk of pancreatic cancer³¹. However, IARC classified beverages consumed at very high temperatures, defined as drinks over 65°C, as "probably carcinogenic to the human oesophagus"³¹.

The content in this Overview was last edited in March 2018. Papers in the Latest Research section and further resources are added regularly.

Background

The gastrointestinal (GI) tract provides the means for the body to digest and absorb nutrients contained in food and drink and comprises the oral cavity, stomach, small intestine and large intestine. Digestion commences in the oral cavity when food and beverages are ingested and is completed in the large intestine. The digestive process is also dependent upon other organs including the pancreas, gallbladder and liver.

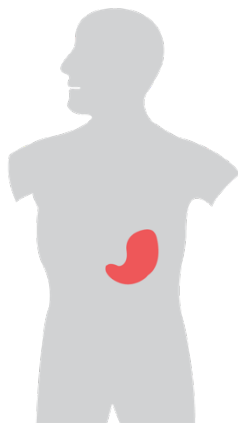
The process of digestion involves the enzymatic breakdown and absorption of nutrients and fluid in a systematic manner, ensuring that the body is nourished with an adequate supply of nutrients for health. A healthy GI tract promotes healthy digestion. Damage, disease or infection in any part of the GI tract can limit the effectiveness of the digestive processes and may have an impact on the nutritional status of the individual¹.

This topic discusses the impact of coffee consumption on the various functions of the GI tract.

Oesophagus

In 2016, the International Agency for Research on Cancer (IARC) classified beverages consumed at very high temperatures, defined as drinks over 65°C, as “probably carcinogenic to the human oesophagus”³¹. It is the temperature, rather than the drinks themselves, that appears to be responsible. 65°C is significantly hotter than the temperature at which most people can comfortably drink coffee without scalding their mouth and tongue; coffee is typically drunk at temperatures below 60°C^{32,33}. When IARC assessed evidence for a link between oesophageal cancer and coffee specifically, it found insufficient evidence of an association³¹.

Coffee and disorders of the stomach



Dyspepsia

Dyspepsia is a term covering a group of symptoms including poor digestion, pain, and discomfort in the upper digestive tract. Research to date does not show any relationship between coffee consumption and dyspepsia.

- Several studies have found no relation between coffee consumption and dyspepsia³⁻⁵. One study which considered the effect of alcohol, coffee and smoking on GI symptoms revealed 37% of 500 adults considered coffee to be a cause of dyspepsia. However, further investigations show no association between drinking coffee and this condition. Both smoking and having stopped smoking are strongly associated with dyspepsia³.
- A UK cross sectional study of 8,407 individuals also suggested that there is no association between coffee consumption and dyspepsia, but showed a significant relationship between the presence of the bacterium *Helicobacter pylori* (*H. pylori*) and dyspepsia⁶.

Gastro oesophageal reflux disease (GORD)

Gastro oesophageal reflux disease (GORD) is an uncomfortable reflux condition caused by return of stomach acid into the oesophagus. It is suggested that common causes are the consumption of spicy or fatty food and overeating⁷. Coffee has been suggested as a possible cause in some cases, however there is no evidence that coffee consumption affects the symptoms of GORD⁷⁻¹⁵. Those who suffer from symptoms often self-regulate their diet according to their own sensitivities and some patients may choose to limit their coffee consumption⁷.

- Although some research suggests coffee drinking is perceived as a risk factor for GORD, several studies have found no association⁹⁻¹¹
- Research from the Netherlands involving monitoring reflux, using a catheter inserted inside the oesophagus of sufferers show that coffee only has an impact when consumed on an empty stomach, and the effect on reflux is smaller than that observed following consumption of a full meal. Coffee was not found to affect other factors associated with reflux such as the functioning of the oesophageal sphincter muscle. The researchers concluded that coffee itself does not affect GORD in healthy volunteers³.
- A large patient control study in Norway involving 3,153 sufferers and 40,210 controls examined associations between reflux and lifestyle factors. Both smoking and high salt consumption appear to have the greatest impact. The researchers suggest that coffee consumption, together with consumption of high fibre bread and regular physical movement lowered the risk of GORD¹².
- A further study of lifestyle factors and reflux in twins suggests that high BMI, smoking and lack of physical activity at work are risk factors for frequent GORD symptoms¹³. No nutritional factors, including coffee consumption, have been found to have a link and in fact, in men the consumption of more than seven cups of coffee per day is associated with a lower risk of reflux¹³.

- A 2006 review of 16 studies assessing the role of lifestyle factors in GORD shows that modifying eating habits, including coffee consumption, does not affect symptoms of acid reflux¹⁴. A further 2013 meta analysis also showed no association between coffee intake and GORD¹⁵.
- One study suggests that consuming decaffeinated coffee at breakfast time reduces acid reflux¹⁶, but this has not been confirmed in other studies and conclusions cannot be drawn.

Peptic ulcers

Peptic ulcers are lesions that develop in the mucosa of the stomach wall causing pain and discomfort. Previously, coffee has been linked with the development of peptic ulcers. However, in recent years research has focused on understanding the role of the bacterium *Helicobacter pylori* (*H. pylori*) in the development of peptic ulcers. Studies investigating the risk factors for the development of stomach ulcers conclude that coffee is no longer considered a risk factor^{17,18}.

- A Danish cohort study of 2,416 adults assessed the risk factors for stomach ulcers and concluded that *H. pylori*, smoking and use of tranquilisers are risk factors. Coffee consumption was found not to be a risk factor¹⁷.
- A 2013 cross-sectional study of 8,013 healthy subjects in Japan also shows no association between coffee consumption and peptic ulcers¹⁸.

Gastritis

Gastritis is a slight inflammation of the stomach wall, which is generally unnoticeable however, more serious gastritis can cause ulcers, with associated pain. There is no evidence that coffee influences the development of gastritis^{17,18}.

Patients who suffer with painful gastritis often choose to avoid certain foods or beverages if they experience discomfort, and self-management is common^{17,18}.

Stomach Cancer

Research to date shows that there is no evidence to suggest a link between coffee consumption and the risk of developing stomach cancer. In 2016 the International Agency for Research on Cancer (IARC) reviewed all available scientific evidence and found no clear association between coffee intake and cancer at any body site, including the stomach³¹.

- A previous systematic review and a meta-analysis of 23 studies found no association between coffee consumption and the development of stomach cancer³⁴.
- Findings from the EPIC Cohort study suggest that consumption of total coffee intake, as well as intakes of caffeinated and decaffeinated coffee are not associated with overall gastric cancer risk. However, total coffee and caffeinated coffee consumption may be associated with an increased risk of gastric cardia cancer³⁵.

Further detailed information is available in the Cancer section of the Coffee and Health website [here](#).

Coffee and disorders of the small intestine



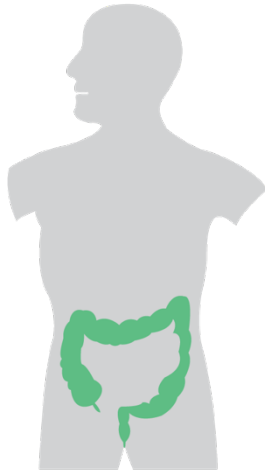
Duodenal ulcers

The duodenum is the first part of the intestine after the stomach and, as such, is regularly exposed to stomach acid, as the contents of the stomach passes into the duodenum to continue the process of digestion. The wall of the duodenum is protected from stomach acid by a mucus covering, however infection or use of certain drugs, including painkillers and anti-inflammatory drugs, can disrupt the production of mucus.

Currently, available research shows no relationship between coffee consumption and the development of duodenal ulcers^{11,18,19,20}.

- A large prospective cohort study of 47,806 American men assessed the relationship between caffeine, alcohol and smoking on the risk of developing duodenal ulcers¹⁹. None of these factors were found to be associated with a substantial increase in risk.
- A further 2013 cross-sectional study of 8,013 healthy subjects in Japan also showed no association between coffee intake and duodenal ulcers¹⁸.
- An additional study shows no difference in the daily pattern of coffee intake, or the pattern of complaints after drinking coffee between those with duodenal ulcers and controls²⁰.

Coffee and disorders of the large intestine



Intestinal peristalsis

Peristalsis is the process of muscular contraction in the intestines, which encourages the movement of food along the intestine. Coffee can stimulate peristalsis in some individuals²¹⁻²³.

- A study of 99 individuals suggested that coffee stimulated intestinal movement in 29% of people²¹.
- Research comparing the effect of regular and decaffeinated coffee on intestinal motility with the same amount of hot water or a full meal of 1,000 calories, showed that the effect of caffeinated coffee was as substantial as the meal, 60% stronger than water, and 23% stronger than decaffeinated coffee²².
- Further work suggests that strong coffee and hot water both have a significant effect on bowel movement²³.

There is no indication that coffee causes diarrhoea in healthy adults and it is not possible to draw conclusions about a role for coffee consumption in constipation, since this will depend on the cause and severity of the constipation.

Irritable Bowel Syndrome

Irritable Bowel Syndrome (IBS) is described as a chronic disturbance of the intestine, but the cause is often difficult to specify. The symptoms that patients describe include abnormal bowel motions, stomach pain and bloating; complaints that may also be experienced by those who do not suffer IBS.

- A screening exercise as part of research in the Netherlands suggests that there is no association between IBS and coffee consumption³.

- Further research from Sweden found that 63% of IBS sufferers assume that their symptoms are related to meals, especially foods rich in carbohydrates and fat. In this group, coffee was associated with serious complaints such as dyspepsia and stomach pain by 10% of patients²⁴.
- Results from a questionnaire amongst IBS patients from Switzerland reviewing perceived effects of coffee drinking suggest that over two thirds of patients consumed coffee regularly, with 38% suggesting that coffee drinking has an effect (either positive or negative) on their symptoms. Interestingly, almost half of respondents who claimed to experience a negative impact of coffee consumption continued to regularly consume coffee²⁵.

Colorectal Cancer

In 2016 the International Agency for Research on Cancer (IARC) found inadequate evidence to suggest any link between coffee consumption and colorectal cancer³¹.

- A number of large literature reviews show no association between coffee consumption and colorectal cancer and in fact suggest that moderate coffee consumption could reduce the risk of colorectal cancer³⁶⁻³⁹.

Further detailed information is available in the Cancer section of the Coffee and Health website [here](#).

Other intestinal disorders

There are many other disorders of the intestine that have a variety of causes, including diverticulitis, inflammatory bowel disease, Crohn's Disease and ulcerative colitis. There is no indication that coffee influences the course of these disorders. A 2017 systematic review concluded that coffee consumption tends to result in reduced risk of ulcerative colitis, but this finding is not significant and is confounded by smoking⁴⁰.

Coffee and disorders of other intestinal organs

Gallbladder



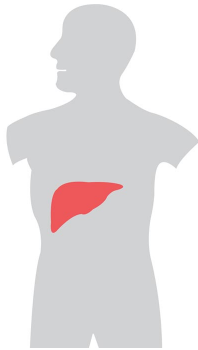
The gallbladder stores bile, a fluid which is released into the small intestine where it emulsifies fats and assists their digestion. Gallstones are deposits that form in the gallbladder and in a minority of cases trigger severe abdominal pain (symptomatic gallstones) which can cause the gallbladder to become inflamed and lead to gallbladder disease.

- Two major prospective cohort studies consistently show an inverse association between coffee consumption and the risk of symptomatic gallstones^{26,27}. Other studies suggest that the effect of coffee may vary depending on the progression of the gallbladder disease²⁸.

Coffee and caffeine appear to trigger the contraction of the gallbladder and may prevent small crystals becoming large gallstones early in the disease²⁹. However, if large gallstones are already present, such contraction of the gallbladder may cause pain. There is some evidence to suggest that coffee exerts its effect through caffeine, but further studies are required to confirm this hypothesis²⁶⁻²⁹.

Further detailed information is available in the Gallstones section of the Coffee and Health website [here](#).

Liver



Studies looking at the relationship between coffee consumption and risk of liver cancer suggest an inverse association.

- Epidemiological research suggests that moderate coffee consumption may help to reduce the risk of liver cancer, and the risk falls as coffee consumption rises^{31,41,42}.
- In its 2016 review, IARC concluded there is a consistent and statistically significant inverse association between coffee consumption and liver cancer³¹.
- Further epidemiological studies in patients with other liver diseases have all found a positive effect of moderate coffee drinking on limiting disease progression³⁰.

Further detailed information is available in the Liver section of the Coffee and Health website [here](#).

Pancreas



The pancreas serves multiple roles in both the digestive and endocrine systems. Pancreatic juice secreted from the pancreas contains enzymes that contribute to the breakdown of fats, carbohydrates and proteins in the GI tract.

- IARC concluded that coffee consumption is not linked to a higher risk of pancreatic cancer³¹. The World Cancer Research Fund also reviewed over 50 studies and found no increase in risk of developing pancreatic cancer with coffee consumption⁴³.
- Further studies have also confirmed the absence of a relationship, and some studies suggest that regular coffee drinking is associated with a lower risk of pancreatic cancer⁴⁴⁻⁴⁷.

Further detailed information is available in the Cancer section of the Coffee and Health website [here](#).

REFERENCES

1. US National Library of Medicine, 'Gastro Intestinal Tract (GI Tract). Available at: <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMHT0022855/>
2. Boekema P.J. (1999) Coffee and gastrointestinal function: facts and fiction. A review. *Scand J Gastroenterol*, 230:35-9.
3. Boekema P.J. et al. (2001) Functional bowel symptoms in a general Dutch population and associations with common stimulants. *Neth J Med*, 59(1):23-30.
4. Haug T.T. et al. (1995) What Are the Real Problems for Patients with Functional Dyspepsia? *Scand J Gastroenterol*, 30(2):97-100.
5. Nandurkar S. et al. (1998) Dyspepsia in the community is linked to smoking and aspirin use but not to Helicobacter pylori infection. *Arch Intern Med*, 158(13):1427-1433.
6. Moayyedi P. et al. (2000) The Proportion of Upper Gastrointestinal Symptoms in the community Associated With Helicobacter pylori, Lifestyle Factors, and Nonsteroidal Anti-inflammatory Drugs. *Am J Gastroenterol*, 95(6):1448-1455.
7. Boekema P.J. et al. (1999) Effect of coffee on gastroesophageal reflux in patients with reflux disease and healthy controls. *Eur J Gastroenterol Hepatol*, 11:1271-1276.

8. Bolin T.D. et al. (2000) Esophagogastroduodenal Diseases and Pathophysiology, Heartburn: Community perceptions. *J Gastroenterol Hepatol*, 15:35-39.
9. Dore M.P. et al. (2007) Diet, Lifestyle and Gender in Gastro-Esophageal Reflux Disease. *Dig Dis Sci*, 53(8):2027-2032.
10. Pandeya N. et al. (2011) Prevalence and determinants of frequent gastroesophageal reflux symptoms in the Australian community. *Diseases of the Esophagus*, 25(7):573-83.
11. Alsulobi A.M. et al. (2017) Gastroesophageal reflux disease among population of Arar City, Northern Saudi. *Electronic Phys*, 9(10):5499-5505.
12. Nilsson M. et al. (2004) Lifestyle related risk factors in the aetiology of gastroesophageal reflux. *Gut*, 53:1730-1735.
13. Zheng Z. et al. (2007) Lifestyle factors and Risks for Symptomatic Gastroesophageal Reflux in Monozygotic Twins. *Gastroenterol*, 132:87-95.
14. Kaltenbach T. et al. (2006) Review: sparse evidence supports lifestyle modifications for reducing symptoms of gastroesophageal reflux disease. *Arch Intern Med*, 166:965-971.
15. Kim J. et al. (2013) Association between coffee intake and gastroesophageal reflux disease: a meta-analysis, *Diseases of Esophagus*, 27(4):311-317.
16. Pehl C. et al. (1997) The effect of decaffeination of coffee on gastroesophageal reflux in patients with reflux disease. *Alim Pharm Ther*, 11:483-486.
17. Rosenstock S. et al. (2003) Risk factors for peptic ulcer disease: a population based prospective cohort study comprising 2,416 Danish adults. *Gut*, 52:186-193.
18. Shimamoto T. et al. (2013) No association of coffee consumption with gastric ulcer, duodenal ulcer, reflux esophagitis, and non-erosive reflux disease: a cross-sectional study of 8,013 healthy subjects in Japan. *PLoS One*, 8(6):e65996.
19. Aldoori W.H. et al. (1997) A Prospective Study of Alcohol, Smoking, Caffeine, and the Risk of Duodenal Ulcer in Men. *Epidemiol*, 4(8):420-424.
20. Elta G.H. et al. (1990) Comparison of coffee intake and coffee-induced symptoms in patients with duodenal ulcer, nonulcer dyspepsia, and normal controls. *Am J Gastroenterol*, 85:1339-1342.
21. Brown S.R. et al. (1990) Effect of coffee on distal colon function. *Gut*, 31:450-453.
22. Rao S.S.C. et al. (1998) Is coffee a colonic stimulant. *Eur J Gastroenterol Hepatol*, 10:113-118.
23. Sloots C.E.J. et al. (2005) Stimulation of defecation: Effects of coffee use and nicotine on rectal tone and visceral sensitivity. *Scan J Gastroenterol*, 40:808-813.
24. Simren M. et al. (2001) Food-Related Gastrointestinal Symptoms in the Irritable Bowel Syndrome. *Digestion*, 63:108-115.
25. Barthel C. et al. Patients perception on the impact of coffee consumption in inflammatory bowel disease: friend or foe? *Nutr J*, 14:78.
26. Leitzmann M.F. et al. (1999) A prospective study of coffee consumption and risk of symptomatic gallstone disease in men. *JAMA*, 281:2106-2112.
27. Leitzmann M.F. et al. (2002) Coffee intake is associated with lower risk of symptomatic gallstone disease in women. *Gastroenterol*, 123:1823-1830.
28. Ruhl C.E. et al. (2000), Association of coffee consumption with gallbladder disease. *Am J Epidemiol*, 152:1034-8.
29. Douglas B.R. et al. (1990), Coffee stimulation and cholecystokinin release and gallbladder contraction in humans. *Am J Clin Nutr* 52:553-6.
30. Saab S. et al. (2014) Impact of coffee on liver disease a systematic review. *Liver Int*, 34(4):495-504.
31. Loomis D. et al. (2016) Carcinogenicity of drinking coffee, maté, and very hot beverages. *The Lancet Oncology*, 17(7):877-878.
32. Lee H.S. and O'Mahony M. (2002) At What Temperatures Do Consumers Like to Drink Coffee?: Mixing Methods. *J Fd Sci*, 67(8):2774-2777
33. Brown F. and Diller K.R. (2008) Calculating the optimum temperature for serving hot beverages. *Burns*, 34(5):648-54.
34. Botelho F. et al. (2006) Coffee and gastric cancer: systematic review and meta-analysis. *Cad Saude Publica*, 22:889-900.
35. Sanikini H. et al. (2015) Total, caffeinated and decaffeinated coffee and tea intake and gastric cancer risk: results from EPIC cohort study. *Int J Cancer*, 136(6):E720-30.
36. Yu X. et al. (2011) Coffee consumption and risk of cancers: a meta-analysis of cohort studies. *BMC Cancer*, 15:11-96.
37. Tavani A. et al. (2004) Coffee, decaffeinated coffee, tea and cancer of the colon and rectum: a review of epidemiological studies 1990-2003. *Cancer Causes Control*, 15:743-57.
38. Giovannucci E. (1998) Meta-analysis of coffee consumption and risk of colorectal cancer. *Am J Epidemiol*, 147:1043-52.
39. Galeone C. et al. (2010) Coffee consumption and risk of colorectal cancer: a meta-analysis of case-control studies. *Cancer Causes Control*, 21:1949-59.
40. Nie J.-Y. et al. (2017) Beverage consumption and risk of ulcerative colitis: A systematic review and meta-analysis of epidemiological studies. *Med*, 96(49):e9070.
41. Larsson S.C. et al. (2007) Coffee consumption and liver cancer: a meta-analysis. *Gastroenterol*, 132:1740-1745.
42. Bravi F. et al. (2007) Coffee drinking and hepatocellular carcinoma risk: a meta-analysis. *Hepatol*, 46:430-435.
43. WCRF (2007) 'Food, Nutrition, Physical Activity and the Prevention of Cancer: A Global Perspective' Available at: <http://www.dietandcancerreport.org/>
44. Luo J. et al. (2007) Green tea and coffee intake and risk of pancreatic cancer in a large-scale, population-based cohort study in Japan (JPHC study). *Eur J Cancer Prev*, 16:542-8.

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45. Dong J. et al. (2011) Coffee drinking and pancreatic cancer risk: a meta-analysis, *World J Gastroenterol*, 17(9):1204-10.
46. Turati F. et al. (2011) A meta-analysis of coffee consumption and pancreatic cancer. *Annals Oncol*, 23(2):311-8.
47. Turati F. et al. (2011) Coffee, decaffeinated coffee, tea, and pancreatic cancer risk: a pooled-analysis of two Italian case-control studies. *Eur J Cancer Prevention*, 20(4):287-292.