

# Red and Processed Meat Products: The New Tobacco?

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Meat consumption around the world is at a record high despite guidelines from experts, governments, and organizations recommending to eat less of it. In the United States, meat is a very common part of the diet. Americans ate more meat than ever before in 2021. The average American is expected to eat around 220 pounds of meat each year. Beef makes up nearly 60 pounds of that total.<sup>1</sup> Processed meat makes up another nearly 36 pounds.<sup>2</sup> Processed meats have been preserved or altered in color, taste, or durability. This is usually done with additives. Examples of processed meats include bacon, deli meat, sausage, and hot dogs. We keep learning more reasons both red and processed meat are bad for health. One of the best things you can do for your health is to stop eating them.

## What Makes These Meat Products So Dangerous?

Red and processed meats harm your body in a few ways. The dangerous parts of meat include compounds that your body turns into N-nitroso compounds (NOCs). These are heme iron, heterocyclic amines, saturated fat, and sodium. Your body turns these into NOCs when you eat them, and you get them mostly from red meat and especially processed meat. Once formed, NOCs can lead to cancer by damaging DNA in your body. Nitrites are also present in grains and some vegetables, but these don't turn into NOCs. This is because nutrients like vitamin C, vitamin E, and polyphenols (which are abundant in plant foods) protect your body from converting nitrites into NOCs. Red meat, on the other hand, also contains heme iron. Heme iron actually causes your body to form even more NOCs.<sup>3,4</sup>



Heterocyclic aromatic amines (HAAs) work a lot like NOCs. They are made when meat gets cooked. Parts of meat like protein and sugars react to form HAAs. HAAs can cause a lot of damage to DNA.<sup>5,6</sup>

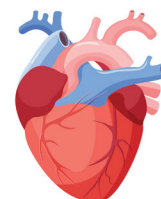
Lastly, saturated fat and sodium pose serious health risks. Saturated fat can increase risk of cardiovascular disease, obesity, and insulin resistance (which can contribute to diabetes).<sup>7,8,9</sup> Preserved and processed meats include a lot of sodium. Sodium is also frequently added to poultry. Most people get 70% of their

total sodium from processed foods. Eating too much sodium contributes to high blood pressure and increases the risk of heart disease.<sup>10,11</sup> Many Americans would be healthier if they ate less saturated fat and sodium and would have the added benefit of reducing their risk of complications from viral infections like COVID-19.<sup>12</sup>

## Cardiovascular Disease

Cardiovascular disease is the leading killer of Americans, but it doesn't have to be.<sup>13</sup> Eighty percent of premature cases of heart disease and stroke are preventable, mostly through diet and lifestyle changes.<sup>14</sup> Eating less red and processed meat will help reduce saturated fat and sodium (both of which increase the risk of heart disease).

Many studies support the idea that avoiding red and processed meat is healthy. Between 1985 and 2016, researchers in the United States tracked 29,682 people's diet and health. They found that people who consumed more red and processed meat (and poultry) had higher rates of heart disease and were more likely to die.<sup>15</sup> Other studies have similar findings. The European Prospective Investigation into Cancer and Nutrition (EPIC) was a very large and famous study that followed 448,568 participants. In 2013, researchers from this study found that eating more processed meat increased the risk of dying from cardiovascular disease. People who ate more than two servings (160 grams) of processed meat per day had a 30% greater chance of dying from heart disease than people who only ate between 10 and 20 grams per day.<sup>16</sup>



## Diabetes

Eating a lot of red meat can lead to diabetes. This happens because obesity and unhealthy diets cause fat to accumulate within muscle cells. This can lead to inflammation and insulin resistance.<sup>17</sup> Insulin resistance can turn into type 2 diabetes because it means insulin doesn't work well and sugar accumulates in the blood. A buildup of fat can also cause insulin resistance in the brain. This is a big problem because insulin is one way the brain knows when we are full. When the insulin doesn't work on the brain, the brain stops being able to tell when the stomach is full. Without

a regulated appetite, a person can overeat and gain more weight. More weight means even more insulin resistance, creating a vicious circle.<sup>9</sup> In addition, eating a lot of sodium (like from processed meat) can also increase risk of diabetes. Plant-based diets, on the other hand, reduce risk of diabetes.<sup>12</sup>

Many studies over the years have looked at Seventh-day Adventists, who are often vegetarian or vegan. Very few use tobacco, alcohol, or caffeine. This lets researchers do very high-quality experiments that compare plant-based diets with omnivorous diets. Tens of thousands of Seventh-day Adventists have been followed over long periods of time, sometimes decades. The findings are always the same: People who eat red meat are more likely to develop diabetes than vegetarians. Some of these studies have even shown that an increase of more than half a serving a day of red meat increases a person's risk for diabetes by 48%.<sup>18</sup>

## Cancer

In 2015, the International Agency for Research on Cancer, an arm of the World Health Organization, declared processed and red meat to be “carcinogenic” and “probably carcinogenic to humans,” respectively.<sup>19</sup> Red and processed meat products can increase risk for cancers, including pancreatic, stomach, bladder, colon, breast, endometrial, esophageal, lung, nasopharyngeal, oral, prostate, and most significantly, colorectal cancer.<sup>20–25</sup> Processed meats increase risk of these cancers the most, but unprocessed red meat also raises these risks.

The more red meat a person eats, the higher their cancer risk. One study found that for each additional serving of red meat a woman eats each day, her risk of breast cancer increases by 13%.<sup>26</sup>

## Conclusions

Eating red or processed meat can increase a person's risk for many diseases. These include cardiovascular disease, diabetes, and cancer. Avoiding these foods altogether offers the greatest protection against disease. One study tried to figure out if it really was the avoidance of meat or maybe something else about what vegetarians were eating that was helping their health. Researchers asked participants who had been eating a standard Western diet to replace meat and other sources of saturated fat from their diet with walnuts, while keeping everything else the same. The people who made this change improved their blood pressure and cholesterol levels.<sup>11</sup> In light of this study and everything else we know, it's safe to say you should avoid red meat and look to plant foods for your nutritional needs. Carbohydrates are abundant in plant foods and keep you fueled. The healthiest sources of protein are soy, beans, and legumes. These foods give you just the right amount of fat, and not much of it is saturated. And most importantly, on a plant-based diet, you'll worry a lot less about meat products harming your health or shortening your life.



## References

1. U.S. Department of Agriculture. Per capita red meat and poultry consumption expected to decrease modestly in 2022. Accessed February 1, 2023. <http://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=103767>
2. Frank SM, Jaacks LM, Batis C, Vanderlee L, Taillie LS. Patterns of red and processed meat consumption across North America: a nationally representative cross-sectional comparison of dietary recalls from Canada, Mexico, and the United States. *Int J Environ Res Public Health*. 2021;18(1):357. doi:10.3390/ijerph18010357
3. Zheng J, Daniel CR, Hatia RI, et al. Dietary N-nitroso compounds and risk of hepatocellular carcinoma: a US-based study. *Hepatology*. 2021;74(6):3161-3173. doi:10.1002/hep.32046
4. Dubrow R, Darefsky AS, Park Y, et al. Dietary components related to N-nitroso compound formation: a prospective study of adult glioma. *Cancer Epidemiol Biomarkers Prev*. 2010;19(7):1709-1722. doi:10.1158/1055-9965.EPI-10-0225
5. Nadeem HR, Akhtar S, Ismail T, et al. Heterocyclic aromatic amines in meat: formation, isolation, risk assessment, and inhibitory effect of plant extracts. *Foods*. 2021;10(7):1466. doi:10.3390/foods10071466
6. Ward HA, Whitman J, Muller DC, et al. Haem iron intake and risk of lung cancer in the European Prospective Investigation into Cancer and Nutrition (EPIC) cohort. *Eur J Clin Nutr*. 2019;73(8):1122-1132. doi:10.1038/s41430-018-0271-2
7. Hooper L, Martin N, Jimoh OF, Kirk C, Foster E, Abdelhamid AS. Reduction in saturated fat intake for cardiovascular disease. *Cochrane Database of Systematic Reviews*. 2020;(8). doi:10.1002/14651858.CD011737.pub3
8. Livingstone KM, Sexton-Dhamu MJ, Pendergast FJ, Worsley A, Brayner B, McNaughton SA. Energy-dense dietary patterns high in free sugars and saturated fat and associations with obesity in young adults. *Eur J Nutr*. 2022;61(3):1595-1607. doi:10.1007/s00394-021-02758-y
9. Ono H. Molecular mechanisms of hypothalamic insulin resistance. *Int J Mol Sci*. 2019;20(6):1317. doi:10.3390/ijms20061317
10. Bricarello LP, de Almeida Alves M, Retondario A, de Moura Souza A, de Vasconcelos F de AG. DASH diet (Dietary Approaches to Stop Hypertension) and overweight/obesity in adolescents: the ERICA study. *Clinical Nutrition ESPEN*. 2021;42:173-179. doi:10.1016/j.clnesp.2021.02.001
11. Tindall AM, Petersen KS, Skulas-Ray AC, Richter CK, Proctor DN, Kris-Etherton PM. Replacing saturated fat with walnuts or vegetable oils improves central blood pressure and serum lipids in adults at risk for cardiovascular disease: a randomized controlled-feeding trial. *J Am Heart Assoc*. 2019;8(9):e011512. doi:10.1161/JAHA.118.011512
12. Brown RB. Low dietary sodium potentially mediates COVID-19 prevention associated with whole-food plant-based diets. *Br J Nutr*. Published online August 1, 2022;1-6. doi:10.1017/S0007114522002252
13. Centers for Disease Control and Prevention. Leading Causes of Death. Last reviewed January 18, 2023. Accessed February 1, 2023. <https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm>

## References (continued)

14. Centers for Disease Control and Prevention. Prevent 1 Million Heart Attacks & Strokes. Updated November 29, 2018. Accessed February 1, 2023. <https://www.cdc.gov/vitalsigns/million-hearts/index.html>
15. Zhong VW, Van Horn L, Greenland P, et al. Associations of processed meat, unprocessed red meat, poultry, or fish intake with incident cardiovascular disease and all-cause mortality. *JAMA Intern Med.* 2020;180(4):503-512. doi:10.1001/jamainternmed.2019.6969
16. Rohrmann S, Overvad K, Bueno-de-Mesquita HB, et al. Meat consumption and mortality - results from the European Prospective Investigation into Cancer and Nutrition. *BMC Medicine.* 2013;11(1):63. doi:10.1186/1741-7015-11-63
17. Sears B, Perry M. The role of fatty acids in insulin resistance. *Lipids Health Dis.* 2015;14:121. doi:10.1186/s12944-015-0123-1
18. Pan A, Sun Q, Bernstein AM, Manson JE, Willett WC, Hu FB. Changes in red meat consumption and subsequent risk of type 2 diabetes mellitus. *JAMA Intern Med.* 2013;173:1328-1335.
19. Domingo JL, Nadal M. Carcinogenicity of consumption of red meat and processed meat: a review of scientific news since the IARC decision. *Food Chem Toxicol.* 2017;105:256-261. doi:10.1016/j.fct.2017.04.028
20. Gianfredi V, Ferrara P, Dinu M, Nardi M, Nucci D. Diets, dietary patterns, single foods and pancreatic cancer risk: an umbrella review of meta-analyses. *Int J Environ Res Public Health.* 2022;19(22):14787. doi:10.3390/ijerph192214787
21. Maddineni G, Xie JJ, Brahmbhatt B, Mutha P. Diet and carcinogenesis of gastric cancer. *Curr Opin Gastroenterol.* 2022;38(6):588-591. doi:10.1097/MOG.0000000000000875
22. Dianatinasab M, Wesselius A, de Loeij T, et al. The association between meat and fish consumption and bladder cancer risk: a pooled analysis of 11 cohort studies. *Eur J Epidemiol.* 2021;36(8):781-792. doi:10.1007/s10654-021-00762-4
23. Contreras García E, Zaragoza-Martí A. [Influence of food or food groups intake on the occurrence and/or protection of different types of cancer: systematic review]. *Nutr Hosp.* 2020;37(1):169-192. doi:10.20960/nh.02588
24. Huang Y, Cao D, Chen Z, et al. Red and processed meat consumption and cancer outcomes: umbrella review. *Food Chem.* 2021;356:129697. doi:10.1016/j.foodchem.2021.129697
25. Rada-Fernandez de Jauregui D, Evans CEL, Jones P, Greenwood DC, Hancock N, Cade JE. Common dietary patterns and risk of cancers of the colon and rectum: analysis from the United Kingdom Women's Cohort Study (UKWCS) [published correction appears in *Int J Cancer.* 2021 Apr 15;148(8):E8]. *Int J Cancer.* 2018;143(4):773-781. doi:10.1002/ijc.31362
26. Farvid MS, Cho E, Chen WY, Eliassen AH, Willett WC. Dietary protein sources in early adulthood and breast cancer incidence: prospective cohort study. *BMJ.* Published online June 10, 2014.