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## Red meat and colon cancer

Although the results vary, studies from around the world have suggested that a high consumption of meat is linked to an increased risk of colon cancer. In all cases the worry is confined to red meat, not chicken.

The best evidence comes from a pair of large 2005 studies, one from Europe, the other from the United States. The European research tracked 478,000 men and women who were free of cancer when the study began. The people who ate the most red meat (about 5 ounces a day or more) were about a third more likely to develop colon cancer than those who ate the least red meat (less than an ounce a day on average). Their consumption of chicken did not influence risk one way or the other, but a high consumption of fish appeared to reduce the risk of colon cancer by about a third.

The U.S. study added important information about the effects of long-term meat consumption. The subjects were 148,610 people between the ages of 50 and 74. A high consumption of red and processed meats was linked with a substantial increase in the risk of cancer in the lower colon and rectum. Conversely, the long-term consumption of large amounts of fish and poultry appeared protective.

These two studies are impressive, and they don't stand alone. A meta-analysis of 29 studies of meat consumption and colon cancer concluded that a high consumption of red meat increases risk by 28%, and a high consumption of processed meat increases risk by 20%.

### Seeing red

Scientists have offered a number of explanations for the link between red meat and colon cancer. One theory blames *heterocyclic amines* (HCAs), chemicals produced when meat is cooked at high temperatures. HCAs may play a role, but since high levels can also be present in cooked chicken, they are unlikely to be the whole explanation. Preservatives have also been implicated in the case of processed meats; *nitrates* are a particular worry, since the body converts them to *nitrosamines*, which are carcinogenic.

Scientists from England have offered a new explanation. Their investigation recruited healthy volunteers. The volunteers ate one of three test diets for a period of 15 to 21 days. The first diet contained about 14 ounces of red meat a day, always prepared to minimize HCA formation. The second diet was strictly vegetarian, and the third contained large amounts of both red meat and dietary fiber.

Stool specimens from the 21 volunteers who consumed the high-meat diet contained high levels of *N-nitroso compounds* (NOCs), which are potentially cancer-causing chemicals. The 12 volunteers who ate vegetarian food excreted low levels of NOCs, and the 13 who ate meat and high-fiber diets produced intermediate amounts.

These results are interesting enough on their own, but the researchers went one step further. They were able to retrieve cells from the lining of the colon that are shed into the stool. The cells from people eating the high-meat diet contained a large number of cells that had NOC-induced DNA changes; the stools of vegetarians had the lowest number of cells with damaged genetic material, and the people who ate high-meat, high-fiber diets produced intermediate numbers of damaged cells.

### Where's the beef?

The study from England showed that large amounts of red meat can produce genetic damage to colon cells in just a few weeks, but it does not prove that red meat causes cancer. None of the cells were malignant, and the body has a series of

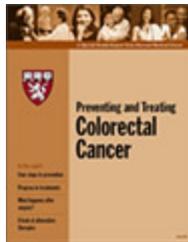
mechanisms to repair damaged DNA.

Still, the research fits with earlier epidemiologic data raising a red flag about red meat. Instead of counting on your body to repair your damaged DNA, do everything you can to prevent damage in the first place.

In the case of colon cancer, there is quite a lot you can do. Keep your caloric intake reasonable and exercise regularly. Avoid tobacco in all its forms, and if you choose to drink, limit yourself to an average of no more than two drinks a day. Eat foods that have been associated with protection from colon cancer: calcium from dairy products (low- or nonfat); vitamin D; fruits; vegetables; whole grains; and fish appear best. Low-dose aspirin may also reduce risk. But even with all this, be sure to get the colon cancer screening tests that are appropriate for your age, family history, and risk factors.

You don't have to give up red meat to be healthy, but the evidence suggests that you'd be wise to limit your consumption. Two 4-ounce portions a week should be safe; even then, choose lean cuts, trim away excess fat, and avoid charring your meat on a grill. Limit processed, cured, and salted meats as much as possible.

*March 2008 update*



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## [Preventing and Treating Colorectal Cancer](#)

Prospects look good for preventing and treating colon cancer, the third most common form of cancer in men and women. New, more accurate screening tests make it possible to prevent this disease by removing colon polyps. Scientists are homing in on risk factors such as eating red meat and living a sedentary lifestyle that are possible to change. Learn everything you can about the prevention and treatment of the disease in the Preventing and Treating Colorectal Cancer Report. [Read more](#)

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