

What's the beef?

It's linked to cancer, heart disease and obesity. So will quitting meat save our bacon? Linda Geddes reports



BACON causes breast cancer; chops clog your arteries. The headlines are clear – if you care about your health, you shouldn't be eating meat. Once considered the star attraction of a balanced, healthy plate of food, meat is now linked to obesity, heart disease and cancer. Add the environmental concerns over a growing global appetite for meat, and it seems meat should now be an occasional guilty pleasure rather than a daily staple, or so we are told.

Yet the evidence isn't quite as clear-cut as the headlines suggest, and not everyone is convinced of the perils of tucking into a juicy steak. A growing body of research – which is, perhaps unsurprisingly, being championed by the meat industry – suggests that recommendations to cut down on or give up meat altogether are too restrictive and could even be doing us more harm than good. Who should we believe, and are the dire warnings about the health risks of eating meat justified?

BRAVE NEW MEAT

It's probably time to cut down on preservative-laden processed meats like cured sausages (see main story). But you could soon be tucking in to a safer hot dog, one in which cancer-causing preservatives are replaced by new, plant-derived antioxidants. They have already been shown to prevent microbes from growing in meat. What's more, the produce had a shelf life acceptable to meat producers, with the right colour and texture. It will be a while before these phytochemical sausages hit the shops, though, as they need to be safety-tested.

In the meantime, how about heading out for a cricket burger? The first edible insect farm opened in the US last year and the critters are protein-rich and easy on the environment. They can be reared in a fraction of the space needed for farmyard animals, their waste contains

less polluting ammonia, and they emit fewer greenhouse gases.

There is still the yuck factor to overcome, of course, and for now, buying insects that taste nice costs far more than buying the equivalent amount of steak.

Others would rather do away with whole animals, pinning their hopes instead on lab-grown cuts, which would require less than 1 per cent of the land, consume about 4 per cent of the water and about half the energy as the same amount of farmed beef. But many doubt whether lab-grown meat will ever be cheap enough to produce commercially. Plus, unlike meat from an animal, the lab-grown stuff has no in-built immune system, so contamination is a potential issue. Lab-produced meat also requires a product of cattle slaughter – fetal calf serum – to grow.

The first hints that meat isn't all it's cut out to be came in the 1970s, says Denis Corpet, who studies the role of diet in cancer at the University of Toulouse in France. "Surveys started to show that countries that eat a lot of meat see more colorectal cancer than countries where people eat very little."

That link to cancer was more firmly established in 2007, with a World Cancer Research Fund (WCRF) report which pulled together the results of 14 studies, concluding that red and processed meats were "convincing causes of colorectal cancer". It suggested cutting out processed meat altogether and eating no more than 500 grams of red meat per week, prompting newspaper headlines such as "a sausage a day can increase bowel cancer risk". For most other cancers, the evidence is less convincing, says epidemiologist Teresa Norat at Imperial College London. "The evidence is really for colorectal, and probably stomach cancer."

Of course, meat has gained its unhealthy reputation for other reasons as well. Two large studies published in 2012 found that the risk of dying from all causes – including bowel cancer and heart disease – during the study follow-up period was 13 per cent higher for people eating 85 grams of red meat per day, and 20 per cent for those eating 85 grams of processed meat. That would translate to roughly a year off life expectancy for a 40-year-old man who eats a burger a day.

If these studies are to be believed, that's a lot of lives potentially being shortened by meat-eating. UK dietary surveys show that 4 in 10 men and 1 in 10 women eat more than 90 grams of red and processed meat a day on average.

But matters are complicated by the fact that studying exactly what people put in their mouths is notoriously tricky. For the most part researchers have had to go on what people say they eat, which can be unreliable. And diet is intricately linked to other lifestyle factors that affect health, not to mention the fact that studies vary in the way they are carried out: many don't make a distinction between >

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different kinds of meat, for example.

Some of the most recent, large-scale research that does take these factors into account has found little or no connection between meat consumption and cancer or heart disease. In 2013, results emerged from two such studies. One was the EPIC trial, which followed half a million people in 10 European countries over 12 years, and as well as distinguishing between consumption of red meat, white meat and processed meat, it also controlled for factors such as smoking, fitness, body mass index and education levels, all of which might be correlated with high meat consumption.

Red alert

The study found no association at all between fresh red meat and ill health, but the link with processed meat remained. It found that for every 50 grams of processed meat people consumed each day, their risk of early death from all causes increased by 18 per cent (see also page 32). And a US study of almost 18,000 people taking part in the National Health and Nutrition Examination Survey (NHANES) found no association between deaths from cancer or cardiovascular disease and the consumption of meat – even processed kinds.

The NHANES findings were surprising, says Sabine Rohrmann of the University of Zurich, Switzerland, who was involved in both NHANES and EPIC. “It was an outlier, because most studies have shown an association.” One explanation could be that the dietary questionnaire used in NHANES was too crude. It didn’t ask people about portion sizes, simply how often they consumed red meat, so people who said they frequently ate meat might only have been eating small amounts.

On the other hand, there could genuinely be no association between meat consumption and deaths in this population. “At this stage, I don’t think we have enough evidence to say that people should avoid meat,” says Rohrmann. “It’s an important food, it contains B vitamins, iron, zinc and other minerals and micronutrients. But meat consumption shouldn’t be too high.”

Contrary to the advice being dished out by the WCRF, based on her findings she wouldn’t advocate abstaining from processed meats, at least until more data is available: “My recommendation would also be to limit it.”

Even those singing the praises of meat agree with the idea of cutting down on the processed forms. But for fresh meat, they also point to

RED MEAT CAN BE GREEN

Make no bones about it, current global meat consumption is a disaster for the environment, and still consumption is rising in many developing nations. As much as 32 per cent of greenhouse gas emissions come from rearing livestock, a third of the world’s cultivated land is used to grow animal feed, and it takes 15,500 litres of water (a small swimming pool) to produce 1 kilogram of beef. But eliminating meat – or substituting beef for chicken or pork – isn’t necessarily the greenest option.

“There’s this view that meat is vile from an environmental perspective, but there’s lots of pastureland around the world that can’t be used to grow crops, and if it’s grazed properly it could be grazed forever. We can’t digest that cellulose, but cows and sheep can,” says Vaclav Smil of Manitoba University in Winnipeg, Canada, author of *Should We Eat Meat?* The same goes for crop residues, such as the straw and bran from grain. Smil calculates that if we used only sustainable grazing and fed livestock on crop residues, we could still raise about two-thirds of the meat we do now.

Grazing cattle and sheep also contribute to biological diversity and are often vital components of rural livelihoods and communities, says Vicki Hird, senior campaigner for land, food and water at Friends of the Earth in London. Chicken and pork produce fewer greenhouse gases, but these animals eat grain and other sources of protein that could be eaten by people instead. “The evidence makes clear that we really just need to eat less meat, and better,” Hird says.

the turning tide of evidence around saturated fat, once viewed as public enemy number one. Its supposed heart-harming effect was one of the reasons people were told to cut meat consumption in the 1970s. But recent studies hint that saturated fats aren’t as bad for the heart as previously thought. There are numerous benefits from eating fresh meat too, they say, not least as the most readily available source of dietary iron.

Besides, over the last few decades, cuts of beef have become much leaner. More than 60 per cent of beef cuts now meet the US government guidelines for lean meat,

“People who eat no meat at all are at higher risk of early death”



FRANK DUJENZ/DPA/CORBIS

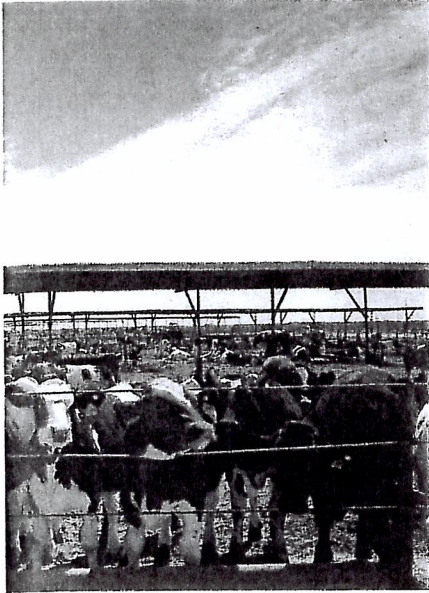


MARTIN PARR/MAGNUM PHOTOS

says Shalene McNeill, a nutritionist at the National Cattlemen’s Beef Association in Denver, Colorado.

Ironically, though, it’s the iron-rich component in unprocessed red meat, rather than its fat content, which is now generating concern. For a long time, Corpet had been trying to understand why in his studies it was only red meat that seemed to induce pre-cancerous changes in the bowels of mice; poultry didn’t, and fish even seemed to be protective. Then he realised the thing that makes red meat stand out from the rest: haem.

Haem is the iron-rich, non-protein component of haemoglobin – the substance that carries oxygen around in blood, and it is what gives meat its red colour. To test whether haem could be the missing link, Corpet added powdered haemoglobin to rats’ food. “It had the same effect as feeding them beefsteak – it promoted tumour growth,” he says. Chicken,



How do you eat yours? Eating less meat, but of a higher quality, is good for your health and the environment

which contains very little haem, did not.

Haem seems to produce carcinogenic molecules by oxidising fats it comes into contact with – both in the meat, and in vegetable oils. “Even if I eat a very lean red meat like liver, the haem will oxidise whatever fat I have in my salad dressing, for example,” says Corpet.

Other problems could arise not from the meat itself, but how it reacts with microbes in the gut to produce potentially artery-clogging compounds (see page 32). The way we cook meat could also make a difference. Barbecuing and frying it could contribute to ill health, since charring produces carcinogenic compounds, and some people might be more susceptible than others. For instance, smokers with certain genetic mutations are at greater risk of colorectal cancer if they eat a lot of well-cooked meat compared with non-smokers eating the same amount.

So if even fresh, lean meat might be risky, is there any reason to eat the stuff, besides it being tasty?

The nutritional components of meat can certainly be obtained from other sources, even if it's more of a challenge. For example, essential amino acids are found in small quantities in foods such as peas and rice. Even so, the evidence goes against cutting out meat altogether. Perhaps the most surprising finding from the EPIC study was that those

who ate no meat at all had a higher risk of early death from any cause than those who ate a small amount of red meat. “What we see from studies is that people who eat small amounts of meat are as healthy, or maybe healthier, than vegetarians,” says Rohrmann.

Cold potato

Why is that? For a start, vegetarians don't always make healthy food choices. And it's true that because meat has a high protein content and contains all the essential amino acids, you need to eat less of it than plant-based foods to get your quota. “In order to get 25 grams of protein from beef you would need to eat around 150 calories' worth,” says McNeill. “You'd have to eat about 550 calories of peanut butter to get the same amount of protein. Even beans, you'd have to eat double the calories.” Reducing, rather than removing, meat from your diet works from an environmental perspective too (see “Red meat can be green”, left).

Indeed, for those trying to lose weight or reduce cholesterol, incorporating a little lean red meat can help you stick to your guns: you're perhaps more likely to keep to your diet because meat is tasty, and the high protein content also makes you feel fuller.

All this goes against the accusation that meat must be fuelling the rise in obesity. What's more, studies have shown that you can reduce cholesterol levels even if you eat lean red meat every day.

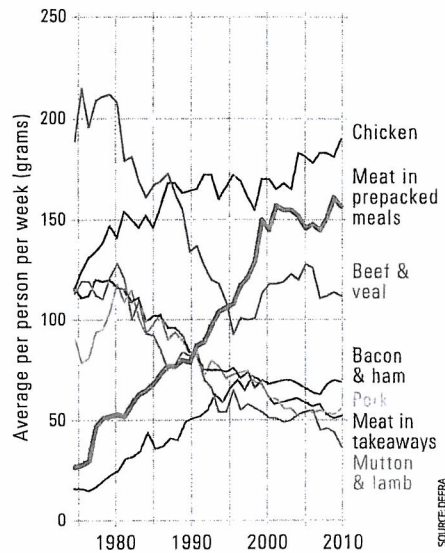
There may also be simple ways to minimise the risks. The EPIC trial found that the early death risk for meat eaters who reported consuming lots of fibre was lower than for



ED KASHI/VI

Meat market

UK consumption of fresh beef and lamb is falling while sales of meaty frozen and chilled meals are going through the roof. Could this adversely affect health?



SOURCE: DEFRA

those who ate very little meat. Similarly, last year, a study found that when people ate cold potatoes with their meat, a certain kind of starch called butyrylated resistant starch, which is produced when potatoes are cooked and then left to cool, seemed to protect them against the DNA damage to gut cells that is associated with colorectal cancer.

Such culinary tweaks could help, but they shouldn't detract from the fact that there do seem to be genuine risks associated with red meat – particularly the processed variety – at least when it is consumed in abundance. “Our recommendation is that you should not eat more than 70 grams red meat per day – which is something like eating a portion two or three times per week,” says Norat. Whether it's better to eat a little meat each day or to save up your credits for a weekend steak splurge remains unclear.

You might try introducing meat-free Mondays into your week, pledging not to eat any meat or dairy food after 6 pm; or trying to use meat just for flavouring, rather than as a key ingredient in meals. As for how you eat it, it seems we had it right all along: go for fresh meat and two veg, just make sure it's not chargrilled. And while you're at it, don't forget potatoes are a dish best served cold. ■

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