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INVITED COMMENTARY

ONLINE FIRST

Holy Cow! What's Good for You Is Good for Our Planet

Is red meat bad for you? In a word, yes. In this issue, Pan et al[1] describe the outcomes from more than 37 000 men from the Harvard Health Professionals Follow-Up Study and more than 83 000 women from the Harvard Nurses Health Study who were followed up for almost 3 million person-years.

This is the first large-scale prospective longitudinal study showing that consumption of both processed and unprocessed red meat is associated with an increased risk of premature mortality from all causes as well as from cardiovascular disease and cancer. In a related study by Pan et al,[2] red meat consumption was also associated with an increased risk of type 2 diabetes mellitus.

Substitution of red meat with fish, poultry, nuts, legumes, low-fat dairy products, and whole grains was associated with a significantly lower risk of mortality. We have a spectrum of choices; it's not all or nothing.[3]

Plant-based foods are rich in phytochemicals, bioflavonoids, and other substances that are protective. In other words, what we *include* in our diet is as important as what we *exclude*, so substituting healthier foods for red meat provides a double benefit to our health.

Pan et al[1] reported that adjustment for saturated fat, dietary cholesterol, and heme iron accounted for some but not all of the risk of eating red meat. Thus, other mechanisms such as nontraditional risk factors may be involved.

For example, a recent study by Smith[4] found that high-fat, high-protein, low-carbohydrate (HPLC) diets (which are usually high in red meat, such as the Atkins and Paleolithic diets) may accelerate atherosclerosis through mechanisms that are unrelated to the classic cardiovascular risk factors. Mice that were fed an HPLC diet had almost twice the level of arterial plaque as mice that were fed a Western diet even though the classic risk factors were not significantly different between groups. The mice that were fed the HPLC diet had markedly fewer circulating endothelial progenitor cells and higher levels of nonesterified fatty acids (promoting inflammation) than mice that were fed the Western diet.[5]

Therefore, studies of HPLC diets that only examine their effects on changes in weight, blood pressure, and lipid levels may not adequately reflect the negative influence of HPLC diets on health outcomes, such as morbidity and mortality.

There is an emerging consensus among most nutrition experts about what constitutes a healthy way of eating:

- little or no red meat;
- high in "good carbs" (including vegetables, fruits, whole grains, legumes, and soy products in their natural forms);
- low in "bad carbs" (simple and refined carbohydrates, such as sugar, high-fructose corn syrup, and white flour);
- high in "good fats" (ω-3 fatty acids found in fish oil, flax oil, and plankton-based oils);

• low in "bad fats" (trans fats, saturated fats, and hydrogenated fats);
• more quality, less quantity (smaller portions of good foods are more satisfying than larger portions of junk foods, especially if you pay attention to what you are eating).

In addition to their health benefits, the food choices we make each day affect other important areas as well. What is personally sustainable is globally sustainable. What is good for you is good for our planet.

HEALTH CRISIS

More than 75% of the $2.6 trillion in annual US health care costs are from chronic diseases. Eating less red meat is likely to reduce morbidity from these illnesses, thereby reducing health care costs.

In the European Prospective Investigation into Cancer and Nutrition (EPIC) study,[6] patients who adhered to healthy dietary principles (low meat consumption and high intake of fruits, vegetables, and whole-grain bread), never smoked, had a body mass index (calculated as weight in kilograms divided by height in meters squared) less than 30, and had at least 30 minutes per day of physical activity had a 78% lower overall risk of developing a chronic disease. This included a 93% reduced risk of diabetes, an 81% lower risk of myocardial infarction, a 50% reduction in risk of stroke, and a 36% overall reduction in risk of cancer, compared with participants without these healthy factors. In addition to lowering the risk of developing cardiovascular disease, a plant-based diet (when combined with moderate exercise, stress management techniques, and social support) may reverse the progression of even severe coronary heart disease.[7]

GLOBAL WARMING CRISIS

Many people are surprised to learn that animal agribusiness generates more greenhouse gases than all forms of transportation combined.[8] The livestock sector generates more greenhouse gas emissions than transportation as measured in carbon dioxide equivalent (18% vs 13%). It is also responsible for 37% of all the human-induced methane, which is 23 times more toxic to the ozone layer than carbon dioxide, as well as generating 65% of the human-related nitrous oxide, which has 296 times the global warming potential of carbon dioxide. Nitrous oxide and methane mostly come from manure, and 56 billion food animals produce a lot of manure each day.

Also, livestock use 30% of the earth's entire land surface, mostly for permanent pasture but also including 33% of global arable land to produce feed for them. As forests are cleared to create new pastures for livestock, it is a major driver of deforestation: some 70% of forests in the Amazon have been turned over to grazing.

ENERGY

More than half of US grain and almost 40% of world grain is being fed to livestock rather than being consumed directly by humans. In the United States, more than 8 billion livestock are maintained, which eat about 7 times as much grain as is consumed directly by the entire US population.[9]

Producing 1 kg of fresh beef requires about 13 kg of grain and 30 kg of forage. This much grain and forage requires a total of 43 000 L of water.

A quarter-pound burger with cheese takes 26 oz of petroleum and leaves a 13-lb carbon footprint. This is equivalent to burning 7 lb of coal.[10]

At a time when 20% of people in the US go to bed hungry each night and almost 50% of the world's population is malnourished, choosing to eat more plant-based foods and less red meat is better for all of us—ourselves, our loved ones, and our planet.

In short, don't have a cow!

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