

# Mostly Plants

Dean Ornish, MD<sup>a,b,\*</sup>

Eat food. Mostly plants. Not too much.

—Michael Pollan,<sup>1</sup> *The Omnivore's Dilemma*

There is a growing convergence of scientific evidence that an optimal diet is mostly plant based, consisting predominantly of fruits, vegetables, whole grains, legumes, and soy products. A healthful diet is also low in refined carbohydrates, saturated fat, and trans fats and high in complex carbohydrates with adequate omega-3 fatty acids.<sup>2</sup>

In this issue, Kottler et al<sup>3</sup> review studies indicating that a plant-based diet combined with nuts, soy, and/or fiber reduces low-density lipoprotein (LDL) cholesterol by an average of 25% to 30%. This is comparable to what can be achieved with statin drugs but without the costs and potential side effects. Last year, almost \$20 billion was spent on statin drugs in the United States. At a time when health care reform is at center stage, the potential cost savings of reducing the need for statin drugs by changing diet and lifestyle is of great interest.

When most patients are diagnosed with hypercholesterolemia, they are usually advised to follow the dietary guidelines of the American Heart Association or the National Cholesterol Education Program. However, these moderate changes in diet usually result in only modest reductions in LDL cholesterol levels,<sup>4</sup> at which point lipid-lowering drugs are usually prescribed. Most patients are not given the option of making more intensive changes in diet and lifestyle such as a plant-based diet, because of the belief that they will not follow them.<sup>5</sup>

This belief often becomes self-fulfilling. "Mr. Jones, your LDL cholesterol level is elevated. I know you wouldn't follow a plant-based diet or even a modified plant-based diet, and why would you want to when I can give you a statin drug and that will do it?" So the patient takes the drug, does not change his diet, and the doctor says, "See, I knew he couldn't change his diet."

The idea that taking a pill is easy and that most patients will adhere whereas changing diet and lifestyle is difficult if not impossible is not supported by most studies. In fact, research shows that up to 60% of patients prescribed lipid-lowering drugs are not taking them only 6 months after initiating treatment.<sup>6</sup> Why? Because patients are asked to take a pill that does not make them feel better in the hope of preventing something frightening, such as a myocardial infarction or stroke, which most people do not want to think about, so they usually do not.

However, when people make comprehensive lifestyle changes, including a plant-based diet (or a modified plant-

based diet), they often feel so much better, so quickly, that it reframes the reason for making these changes from fear of dying, which usually is not sustainable, to joy of living, which often is.

Evidence suggests that a plant-based diet is beneficial for preventing and treating a variety of chronic diseases. In addition to the effects of a plant-based diet on hypercholesterolemia, these include coronary artery disease, diabetes, hypertension, obesity, prostate cancer, breast cancer, and other conditions. In other words, it is not 1 diet for heart disease, another for diabetes, and another for hypercholesterolemia. A reason that these conditions are often associated is that they often share common diet and lifestyle origins.

The National Institutes of Health and AARP study of 500,000 subjects reported that the consumption of red meat was significantly associated with increases in total mortality, cardiovascular mortality, and cancer mortality.<sup>7</sup> Measures of cardiovascular disease such as flow-mediated vasodilation as well as LDL cholesterol and inflammation worsened on a typical Atkins diet but improved significantly on a low-fat, whole-foods, plant-based diet.<sup>8</sup>

What we include in our diet is as important as what we exclude. Plant-based foods contain  $\geq 100,000$  disease-preventing nutrients, such as phytochemicals, bioflavonoids, carotenoids, retinols, isoflavones, genistein, lycopene, polyphenols, sulforaphanes, and so on.<sup>9</sup> They are also low in disease-promoting constituents such as saturated fats, trans fatty acids, dietary cholesterol, and sugar.

For example, blueberries contain phytochemicals called anthocyanins that may improve memory. Tomatoes are rich in lycopene, an antioxidant that may help reduce the risk for coronary artery disease, breast cancer, lung cancer, and prostate cancer. Ginger contains a compound called gingerol that may lower blood pressure and increase circulation. Pomegranates are rich in phytochemicals that may help prevent prostate cancer by reducing deoxyribonucleic acid damage and may increase myocardial perfusion in those with ischemic heart disease.<sup>10</sup> Kale contains lutein, an antioxidant that protects against macular degeneration.

Studies are showing that although isolated vitamins may not be beneficial, plant-based foods that contain these vitamins often are protective. For example,  $\beta$ -carotene supplements were found to increase the risk for lung cancer in smokers, whereas foods such as carrots that are rich in  $\beta$ -carotene were found to lower the risk.<sup>11</sup>

In our studies, my colleagues and I at the nonprofit Preventive Medicine Research Institute, in collaboration with other institutions, found that a plant-based diet (along with moderate exercise, such as walking 30 minutes/day, stress management techniques such as meditation and yoga, and increased social support) was able to stop or reverse the progression of even severe coronary artery disease as measured by exercise thallium scintigraphy,<sup>12</sup> radionuclide ventriculography,<sup>13</sup> cardiac positron emission tomography,<sup>14</sup>

<sup>a</sup>Preventive Medicine Research Institute, Sausalito, California; and  
<sup>b</sup>University of California, San Francisco, San Francisco, California. Manuscript received April 20, 2009; revised manuscript received and accepted May 13, 2009.

\*Corresponding author: Tel: 415-332-2525; fax: 415-332-5730  
E-mail address: dean.ornish@pmri.org (D. Ornish).

and quantitative coronary arteriography.<sup>15</sup> There was even more improvement after 5 years than after 1 year, and there was a direct correlation between the degree of change in diet and lifestyle and the degree of improvement in percentage diameter stenosis. Also, we found 2.5 times fewer cardiac events.<sup>16</sup> We conducted a randomized controlled trial indicating that the progression of early-stage prostate cancer was slowed, stopped, or reversed in patients who followed a plant-based diet and lifestyle intervention.<sup>17</sup>

We are gaining a greater understanding of some of the genetic mechanisms by which these diet and lifestyle changes are beneficial. For example, we found that this intervention caused beneficial changes in gene expression in >500 genes in only 3 months, upregulating disease-preventing genes and downregulating oncogenes that promote breast cancer and prostate cancer and also downregulating genes that promote inflammation and oxidative stress, which often contribute to the cause and progression of coronary artery disease.<sup>18</sup> We also found that these lifestyle changes increased telomerase, the enzyme that lengthens telomeres, the ends of our chromosomes that affect longevity.<sup>19</sup> Even drugs have not been shown to do this.

Also, what's good for you is also good for our planet. Animal agribusiness generates more greenhouse gases than all transportation combined.<sup>20</sup> The livestock sector generates more greenhouse gas emissions as measured in carbon dioxide equivalent than transportation (18% vs 13.5%). Also, it accounts for 9% of the carbon dioxide derived from human-related activities. It generates 65% of the human-related nitrous oxide, which has 296 times the global warming potential of carbon dioxide. It is also responsible for 37% of all the human-induced methane, which is 23 times more warming than carbon dioxide. Nitrous oxide and methane mostly come from manure, and 56 billion "food animals" produce a lot of manure each day. Also, livestock now 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, it is a major driver of deforestation: some 70% of forests in the Amazon have been turned over to grazing.

Finally, eating lower on the food chain is a more efficient way to produce protein. It takes significantly more resources to produce meat-based protein than plant-based protein. As the earth's population continues to increase and resources decrease, choosing to eat more plant-based foods frees up more resources to help feed others. Knowing that the food choices we make each day not only help ourselves and our family but also our planet often brings a sense of meaning; for many people, this is a powerful motivator.

Many people tend to think of breakthroughs in medicine as new drugs, lasers, or high-tech surgical procedures. They often have a hard time believing that the simple choices that we make in our lifestyles—what we eat, how we respond to stress, whether or not we smoke cigarettes, how much exercise we get, and the quality of our relationships and social support—can be as powerful as drugs and surgery, but they often are. Sometimes, even better.

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