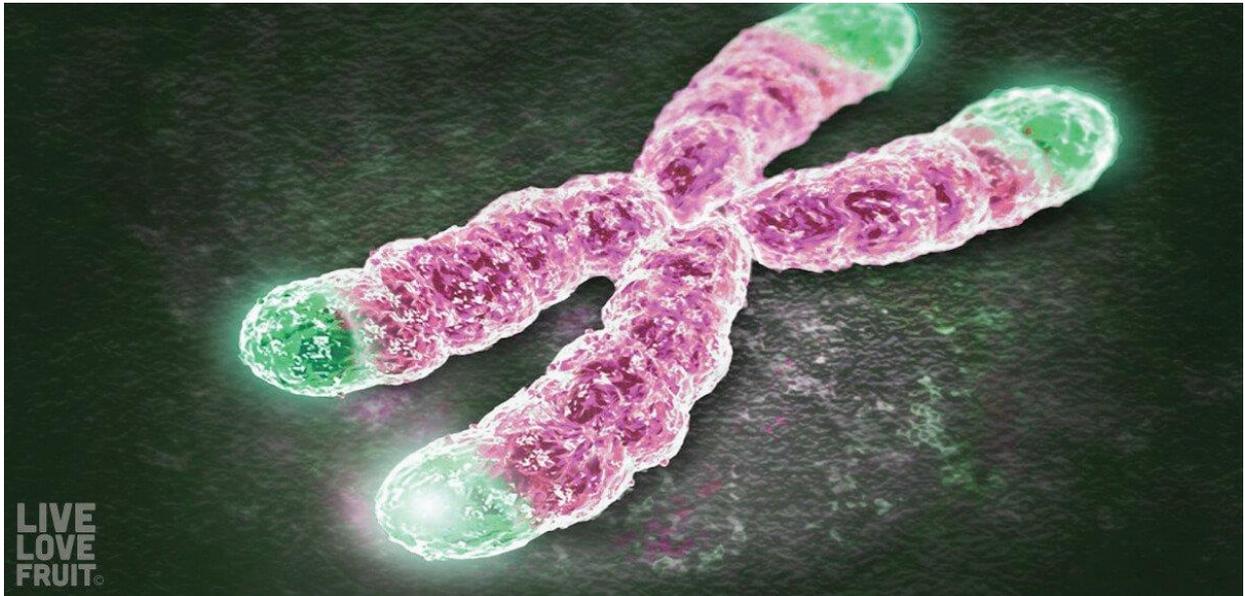


Vegan Diet Turns Off Cancer Genes and Causes More Than 500 Genes to Change in 3 Months



Our progress in understanding human genes has been an incredible one at that. While we don't have *that* many genes (about 25,000 in each cell, compared to tiny water fleas who have over 30,000!), scientists have recently discovered ways to control the very small amount we do have. Scientists call it epigenetics – how changes in gene activity can occur without changing our actual DNA.

One way we can [influence our genes](#) without changing their basic structure is through the foods we eat. Nobel Prize winner Elizabeth Blackburn found that a [vegan diet](#) caused more than **500 genes to change in only three months!** The vegan diet was found to turn ON genes that prevent disease and turn OFF genes that cause breast cancer, heart disease, prostate cancer, and other illnesses.

But, before I get into that, I want to talk about tiny caps at the end of each strand of DNA that protect our chromosomes – telomeres!

What Are Telomeres?

Telomeres are the caps of non-coding DNA at the ends of our chromosomes that protect our genetic material and make it possible for our cells to divide. You can think of them like the plastic tips at the end of shoelaces ([1](#)).

Telomeres are where the DNA replication machinery attaches during the cell division process, so that the entire DNA strand can be copied. Each time the cell divides, the telomeres get shorter. For the next cell division to happen, there must be enough room left on the telomere for the replication enzymes. If the telomere becomes *too short*, the DNA can't be copied properly, and the cell cannot divide.

To prevent excessive shortening, the enzyme telomerase rebuilds telomeres.

Telomere length is closely correlated to cellular aging: as we age, the telomeres in our cells grow shorter. Shorter telomere length is not only associated with biological aging, but lifestyle-related diseases like heart disease, diabetes, osteoporosis, cancer and premature death.

What Influences Telomere Length?

While telomere length is largely genetic, it can also be influenced by environmental factors like diet and lifestyle choices. Eating whole plant-based foods and living a healthy lifestyle are associated with greater telomere length. On the other hand, oxidative stress and chronic inflammation are linked to telomere shortening. Studies have reported factors that promote these conditions in the body, like high body mass index ([2](#)), obesity ([3](#)), a [sedentary lifestyle](#) ([4](#)), smoking ([5](#)), chronic stress ([6](#)), and a low socioeconomic status ([7](#)).

Telomeres and The Vegan Diet

Dr. Dean Ornish, M.D., the developer of the Ornish Diet, showed that heart disease is reversible ([8](#)) by making comprehensive lifestyle changes, including a healthy diet, stress management techniques, moderate exercise and social support.

[Ornish explained to HuffPost](#), “in more than 35 years of scientific research we found this diet and lifestyle program could reverse the progression of even severe coronary heart disease.” Because of this, Medicare is now covering “Dr. Ornish’s Program for Reversing Heart Disease,” the first time that Medicare has covered an integrative medicine program.

By affecting gene expression, the Ornish program turns on genes that prevent disease and turns off genes that promote breast cancer, prostate cancer, colon cancer and heart disease.



Another study showed that the Ornish diet and lifestyle program also may slow, stop, or even reverse the progression of early-stage prostate cancer (9). Dr. Ornish fed 31 men with low-grade prostate cancer a plant-based diet with fewer than 10% of calories from fat. The men were encouraged to walk, meditate, and meet in group sessions. In just three months, changes to more than 500 genes were made. While 48 genes crucial to cancer growth were found to be more active, **453 genes (ones that controlled for tumour growth and protein production) were less active in producing proteins.** Overall, blood tests for prostate cancer activity improved and tumours shrunk. Clearly, the epigenetic changes from eating a vegan diet, getting a little exercise and reducing stress were doing great things for these men.

From the same group studied above, Dr. Ornish measured the activity of an enzyme produced by genes (telomerase), which is believed to be involved in slowing the aging process. After **five years** in the [Ornish program](#), the age-related decrease in telomerase activity was *much less* in the plant-based low-fat group than a control group, and their telomeres were longer, suggesting a slowing of the aging process (10).

Another research group out of Pennsylvania studied 63 individuals with heart disease who followed the Ornish program ([11](#)), and compared them to a group of 63 people who were not following any particular program. The results? No improvement in health for the control group, but the Ornish group lost weight and blood pressure fell by about 10%.

After 12 weeks, researchers found that **26 genes** were exhibiting different activity in the Ornish group. **After one year, 143 genes were doing the same.** There were significant reductions in activity of the genes that promoted inflammation and blood vessel injury. The control group showed no improvements as their standard diet was maintained throughout the year.

Ornish, the founder and president of the non-profit Preventive Medicine Research Institute, and clinical professor of medicine at the University of California, San Francisco, explained that vegan foods, like vegetables, fruits, whole grains, legumes and soy products are the most health-promoting foods. Those that are least-healthy include red meat, deep-fried foods and trans-fats ([12](#)).

Vegan Diet Most Effective At Affecting Telomere Length

While participants in these studies underwent a complete lifestyle shift, it makes me ask the question – was it the vegan diet, stress reduction, exercise regime, or all three that affected telomere length? Or, was it the mere fact that participants lost weight that affected telomere length?

Fortunately, one study took a look at exactly that.

The study took 400 women and randomized them into four groups: (1) dietary weight loss; (2) aerobic exercise; (3) diet and exercise; (4) control. The diet was a group-based program with a 10% weight loss goal, and the exercise intervention was 45 minutes a day, 5 days a week of moderate-to-vigorous aerobic activity ([13](#)). The study took place over the course of a year.

What were the results? No change in telomere length in the control group (-0.3%), or the exercise group (-0.2%). The dietary weight loss group (-1.6%) and the diet and exercise group (+0.1%) also had no changes in telomere length (or at least, the changes were not statistically significant).

So as long as we are eating the same lousy diet, it doesn't matter how small our portions are, how much weight we lose, or how hard we exercise – after a year, they saw no benefit. Compare this to the 3-month study that Ornish and colleagues performed. The Ornish group on the plant-based diet lost the same amount of weight after just three months, exercising less than half as hard, and saw significant telomere protection. So it wasn't the exercise, or the weight loss, it was **the food**.

What about a plant-based diet is so protective? Higher consumption of vegetables (14), less butter and more fruit (15), and foods higher in fibre and vitamins (16). In other words, markers of slower biological aging with lower cholesterol.

But the key may be avoiding saturated animal fat. Swapping just 1% of saturated fat calories in the diet for anything else, can add nearly a whole year of agings worth of length onto our telomeres (17). As the authors of this study describe, it's no wonder that lifelong low cholesterol levels have been related to longer telomeres, and a smaller proportion of short telomeres.

The good news is that Even if we have been beating up on our telomeres, despite past accumulated injury leading to shorter telomere length, current healthy behaviours may help to decrease our risk of some of the consequences like heart disease (18).

This is empowering news, given that most people are fed the idea that they are a victim of their genes. We aren't helpless at all, however, and that power is largely in our hands – we just need to do a little work to help prevent disease and keep it at bay.

