

Genes Are Only Part of the Story

In most cases, diet and lifestyle changes trump DNA if you're willing to make big enough changes.

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Two studies published last week in the journal *Science* revealed that three common variations in genes more than doubled the risk of having a heart attack in men who were less than 50 years old and women less than 60 years old. [In the first study](#), scientists at deCODE Genetics in Iceland examined blood samples from more than 17,000 people and compared those who had heart disease with those who did not. They found that there were very small gene variations in those who had heart disease—just single letters of the DNA code, called SNP's (pronounced "snips"), or single nucleotide polymorphisms. People with this variant on both chromosomes rather than on just one—20 percent of Caucasians—had more than double the risk of developing heart disease at an early age.

[In the second study](#), also published in the same issue of *Science* (it's interesting how different investigators in other parts of the world often make the same discovery at the same time), researchers at the University of Ottawa Heart Institute in Canada looked at DNA changes in more than 28,000 people. They identified another SNP on the same chromosome as the Iceland group that increased the risk of developing early heart disease. People of European descent who had this DNA variant on one chromosome had a 25 percent greater risk of developing heart disease at an early age, and those who had it on both chromosomes had a 40 percent increased risk. In both studies, this increased risk of heart disease was not found in those of African descent.

[Another recent study](#) identified seven SNP variants that increase the risk of diabetes. Interestingly, the people who are at highest risk for diabetes also may show the most improvement from making comprehensive lifestyle changes. More research is likely to identify other genes that are associated with an increased risk of illness.

Not surprisingly, genes appear linked to obesity as well. [In a study published a month ago](#), researchers at the University of Oxford found that another common gene variation markedly increased the risk of obesity. Approximately 50 percent of white Europeans have one defective copy of the gene, which increased the risk of obesity by about one third. However, approximately 16 percent of people have two altered copies of this gene, and these people have a 70 percent increased risk for obesity and were an average of 6.6 pounds heavier.

These findings are consistent with a classic study of adoptees conducted in Denmark and [a study of](#)

twins conducted in Sweden. Researchers led by Dr. Albert Stunkard found that there was a strong relation between the weight of adoptees and their biological parents, but not between adoptees and their adoptive parents. They also found that the body-mass index of twins reared apart was only slightly lower than those reared together, whereas there was more variation in fraternal twins who share only some of the same genes.

So, what does this mean to you? Some people may say, "Well, looks like it's all in my genes, there's not much I can do about it." It's tempting to take a nihilistic view since it absolves us of any personal responsibility. But it also means we're powerless, and I don't like feeling that way. Besides, it's not true. Our genes are only part of the story.

I discussed this with Dr. James Hill, director of the Center for Human Nutrition at the University of Colorado Health Sciences Center. "Telling people it's all in their genes is a devastating message," he said. "There are a few rare individuals in whom genes are just so bad that the amount of work to maintain a healthy weight is not feasible. But for most people, their genes allow them to maintain a healthy weight if they're willing to make sufficient changes in diet and lifestyle. Some have to work harder than others, and exercise becomes even more important for those who are genetically disadvantaged."

According to Ryan Phelan, founder and CEO of DNA Direct (a company that offers genetic testing), "It's about putting your genes in context, in perspective—your overall health with the conditions within which you live, including stress, the environment, all of the other lifestyle factors. It's important not to overstate the role of genetics. My hope is that this is really the beginning of personalized medicine for the masses. It's crazy the way our health-care system has had to treat us all like we're one and the same person. We're all completely unique. We respond differently to diet, we respond differently to medications—and some small part of that, some people say as much as 20 percent—can be linked to our genetic differences. So to me the challenge is to find where that genetic variance is—to help people use it as a motivational factor—not as a deterrent."

To be responsible is not to blame ourselves, it's to empower us. If we're just victims of our bad genes, or bad karma, bad fate or bad luck, then there's not much we can do about it other than to suffer our destiny. But to the degree we realize that we can do something about it, then we're free to change our fortune. These new genetic discoveries can help us understand how much we might need to change in order to accomplish our goals and to stay healthy and feeling good. How much you want to change your diet and lifestyle—if at all—is a very personal decision.

While there is a genetic predisposition to chronic diseases such as coronary heart disease, diabetes and obesity—and, in all likelihood, to many other illnesses as well—in almost all cases, it is just a predisposition, not a death sentence. For example, even if your mother and father and sister and brother and aunts and uncles died from coronary heart disease, it doesn't mean that you ever need to. However, it probably means that you have to make bigger changes in diet and lifestyle than someone who has better genes.

According to Dr. David Heber, director, UCLA Center for Human Nutrition, "Genes load the gun, but environment pulls the trigger. The idea that it's all in your genes is nonsense. The human genome changes only one half of one percent every million years. The obesity epidemic is only about 30 years old, so changes in genes do not explain the recent dramatic rise in obesity, not only in this country but also worldwide."

During the past 30 years, my colleagues and I at the nonprofit Preventive Medicine Research Institute conducted a series of randomized controlled trials and demonstration projects proving, for the first time, that the progression of coronary heart disease may be reversed by making comprehensive changes in diet and lifestyle.

When I first began doing these studies, I thought that younger patients with milder disease who didn't have a strong family history of heart disease would be more likely to show improvement, but I was wrong. The primary determinant of the degree of improvement was not age, disease severity or genetics; it was the degree of change in diet and lifestyle. **In other words, the more people changed, the better they got.** We found **similar findings with prostate cancer.**

In short, you have a spectrum of nutrition and lifestyle choices. Your genes are only one factor that determines where you are on this continuum.

For example, how efficiently—or inefficiently—your body can get rid of dietary saturated fat and cholesterol is regulated in part by your genes. Some people are genetically lucky; they are so efficient at metabolizing the saturated fat and cholesterol in their diet that it almost doesn't matter what they eat. Their blood cholesterol levels remain low even on a high-fat diet. On the other end of the spectrum are those who are so inefficient, they have high cholesterol levels even when they eat an optimal diet. In the middle of this spectrum are most everyone else.

So, let's say your doctor tells you that your cholesterol level is elevated. You can begin by making moderate changes in your diet (eat a little less saturated fat, trans fats, dietary cholesterol and refined carbohydrates), exercise a little more, practice a few minutes a day some stress-management techniques, and spend a little more time with your friends, family and other loved ones. If that's enough to get your cholesterol level down far enough, great; if not, then you can make progressively bigger changes until you achieve your goal. Or, you can start taking cholesterol-lowering drugs such as Lipitor.

If you're trying to reverse heart disease or prevent the recurrence of cancer, you may need the "pound of cure"—bigger changes in diet and lifestyle than someone who just wants to lower their cholesterol levels a few points. If you have a strong family history, or if genetic testing shows you to be at higher risk, then this information can be a powerful motivator to make bigger changes in diet and lifestyle than you might have otherwise made. Also, it may be possible to tailor pharmacologic interventions more effectively and efficiently.

If you're like me, basically healthy, then you can thrive on the "ounce of prevention." And if you're somewhere in between—if you have some worrisome risk factors for heart disease (high cholesterol, high blood pressure)—then you can begin by making moderate changes in diet and lifestyle, progressively more intensive as needed.

In summary, genetics does play an important role in health and well-being, and for some, more so than for others. However, in most cases, diet and lifestyle modifications can override genetics if you're willing to make big enough changes. Most of the time, nurture trumps nature, but it's not always easy.

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