

THE ROLE OF GENETICS IN DISEASE

“Genetics may load the gun, but environment pulls the trigger.”

—Pamela Peeke, M.D., M.P.H., *Fight Fat After Forty* (2000)

Everyday we are bombarded with new reports about genes and the promises of gene therapy. Many people are convinced because a family member developed a disease that they will as well. The resulting fear and loss of control in ones life is, in my opinion, a travesty. The really sad part about this is the fact that genes have very little to do with the development of disease.

HOW DO GENES ACT TO CAUSE DISEASE?

In the July 13, 2000 issue of *The New England Journal of Medicine* it was stated that, “Inherited genetic factors make a minor contribution to susceptibility to most types of neoplasms.” In order for genes to cause a disease a number of events need to occur; a protooncogene (a gene promoting cancer) must be turned on by toxins, and other lifestyle decisions. Next a cancer suppresser gene must be turned off, again by toxins and lifestyle decisions. If this doesn't occur you will not get cancer.

Genes give us a set of rules we need to live our lives by, if we break these rules we will develop illnesses. I am convinced that the cancers that may display some genetic component are more due to the fact that these individuals share a lifestyle with common toxic exposures and dietary habits.

LET'S LOOK AT GENES ANOTHER WAY.

Let's compare them to an off-road, four wheel driving experience. If you take the family sedan for a ride through fields, over rocks and through streams it isn't going to hold up too well. However, if you drive it on paved roads and well maintained it will last a long time and not give you any major problems. Some people's genes are like this; as long as they don't expose themselves to harmful toxins, exercise and eat properly they can and will live a long time without any major problems. If they are exposed to toxins and do not take care of themselves they will get cancer or other diseases.

Now let's look at a SUV. It can take a lot more abuse, yet it still needs to be maintained or it will come to a shortened life span. I think you can make the correlation to human health now. The third type of gene would be a Hummer type of gene. It can take a lot of abuse and doesn't require quite much maintenance for a long life. This would be a person like George Burns. He could smoke everyday and have a drink or two of liquor and still he lived to be a 102.

If you are born with the family sedan type of genes you need to take care of yourself. I would strongly encourage you to eat organic foods when possible, drink pure water, exercise, get adequate sunlight, control the effects of stress, etc. If you do not you are headed for a collision with disease and illness. If you do not make time for your health now, then you had better make time for disease later.

Genetic expression is how your genes are manifested. We can coax the genes for disease to lie dormant by following the healthful suggestions in the section, *Optimizing Health*. Our gene expression might be quite different should we take care of ourselves. Let's take a look at some of the ways science has proven that gene expression can be improved with the guidance of a holistic doctor.

WHAT FACTORS AFFECT GENE EXPRESSION?

Genes have the ability to express themselves in a number of different ways. Most of the factors that cause that gene to be activated are under ones control, if you choose to exercise it. Unfortunately for many the road to health is too demanding, so they choose a lifestyle that is life-shortening. When a protooncogene (cancer promoting) gene is activated an individual will develop cancer. Cancer is not the only disease for which the genes can be controlled by you. Let's take a look at the modifiable factors which control gene expression:

1. **Free radical oxidation** is extremely amenable to nutritional therapy. Free radicals are molecules that are missing an electron which go through the body seeking an electron. This is a very unstable state and can cause a great deal of cellular damage. Many chronic diseases are associated with free radical damage. Be weary of using synthetic antioxidants in trying to alleviate this problem as they have been shown to magnify the damage.
2. **Impaired detoxification** is greatly enhanced with proper nutrition. As was discussed in the Toxicity section, toxicity is probably one of the greatest threats to good health. A build up of toxins not only affects organs directly, it can cause an increase in free radical formation. A qualified individual like myself can help you with nutritional programs to aid your body in ridding itself of toxins.
3. **Chronic stress** has been shown to activate negative genes in the body. The physiological effects of stress cause various organ and body functions to be altered and diminished. Immune system dysfunction is a big problem with chronic stress. A holistic physician can help you reduce some of the damaging physiological effects.
4. **Chronic inflammation** is another controllable modifiable factor. Modern medicine has been recommending the taking of an aspirin daily to help prevent heart attacks. The reason this works is that it acts to lower inflammation in the body. Chronic low-grade inflammation is generally a disturbance in the digestive system. Unfortunately, aspirin as it reduces inflammation it eventually causes problems in the digestive tract. A holistic can easily correct chronic inflammation.
5. **Methylation** is a pathway that proper nutrition is highly effective at controlling. This abnormal process involves adding a methyl group within the gene, which alters its genetic expression. Methylation is associated with homocysteine formation, which was virtually unheard of 10 years ago. Now it is considered a bigger risk factor for heart disease than the traditional factors of obesity, smoking and high blood pressure. Abnormal homocysteine levels are also associated with Alzheimer's and the breakdown of female hormones. It can be controlled and maintained with adequate supplementation of certain B vitamins.
6. **Dysglycemia** or faulty sugar metabolism is another controllable factor. Sixty-one percent of all Americans are now overweight. Heart disease, diabetes, high cholesterol, as well as a number of other illnesses are associated with abnormal blood sugar levels. 25% of normal weight individuals have a problem with sugar metabolism as well. A knowledgeable holistic physician will be able to help you determine if you are at risk and prescribe a nutritional program accordingly.
7. **Poor immune function** is a reflection of an individual's nutritional status. According to the National Academy of Sciences, a faulty immune system is a direct result of poor nutrition. I constantly hear people deny that there is a link between immune function and nutrition despite the fact research has proven that adequate nutrition will allow an immune function to function properly. A healthy immune system is far more than downing vitamin C and zinc. It requires a number of minerals, vitamins, phytochemicals, enzymes and other vitamin cofactors to function at peak efficiency and protect your health.
8. **Hormones**, and in particular the sex hormones, have either a negative or a positive effect on gene expression. When the body metabolizes (uses) the hormones and then breaks them down, new forms of the hormone are formed. Because of pesticides and hormones in our food supply, we are exposed to hormones and hormone-like compounds

as never before. Young girls are exhibiting signs of puberty at eight and nine years of life. These same hormone metabolites can cause breast, uterine and prostatic cancers. A good holistic physician can help design a nutritional program to minimize the ill effects.

As it becomes clear that genes are not just lurking in the body waiting to cause disease. You can see the importance in finding a physician trained in the sciences to understand the complex metabolic pathways and recommend appropriate interventions. Genes can be kept in check and are not something to fear