GENETIC TESTING
The truth behind the fiction
Jeffry Fawcett, PhD


If you knew you were at risk, you may be able to act now to avoid getting the disease. That’s the promise of genetic testing, a growing field available to health practitioners and increasingly to consumers.

It’s a thrilling promise. Yet a special commission of the US Department of Health and Human Services has grave concerns about the marketing practices and health claims of this burgeoning industry. In addition many scientists worry about the science (or lack of it) that is the foundation of genetic tests.

EXPRESS YOURSELF
A gene does its work in response to a biochemical signal. Ultimately, that signal comes from the environment: nutrients in food; the kind and quality of physical activity; psychosocial and physical stress; emotional and physical trauma; pollutants and toxins.

These signals from the environment create a biochemical cascade that starts on the surface and works its way inside—the skin, sinuses, lungs, mouth, stomach, and intestines—along with the senses, where what’s }
outside meets what’s inside. It’s called gene expression—how a gene does its work in response to a biochemical signal. It starts with the cells on the surface and works inward. In other words, genes express themselves in response to exposures in the physical and social environment. No exposure equals no biochemical cascade, no signal, and no gene expression.

Splashy news about a genetic variation that increases a health risk typically ignores this important chain of events. So does advertising for genetic testing. Instead we’re told that if we have a genetic variation, we’re at risk—so it’s off to the pharmacy. Without extreme care, using a genetic test, especially those sold directly to consumers, will send us down the path of overdiagnosis and overtreatment.

**DON'T EXPOSE YOURSELF**
Avoiding exposures that send the wrong signal to our genes seems to beg the question: exactly which exposures should we avoid? A considerable body of research tells us.

For example, studies indicate that people who live in smoggier areas are more likely to have heart attacks. A primary provocation is oxidative stress. Do we really need a genetic test to know that we can reduce our risk of a heart attack by moving to a less smoggy place and taking antioxidants?

On the other hand, we already have some good evidence in our family histories. For example, how many of our blood relatives have previously had heart attacks? After all, this is where our genetic inheritance really shows up.

Nevertheless, we still might feel better knowing. Unfortunately, much of the science that links our genes to a specific disease is not a sure guide to taking action. That’s because these studies are about an entire population. They don’t say anything about an individual’s specific risk.

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An international research consortium headquartered at the University of California, Santa Cruz, has raised further doubt. The program, named ENCODE (an acronym for Encyclopedia of DNA Elements) analyzed 1 percent of the human genome. The basic assumption of genetic research, testing, and therapy is that each gene produces a single protein that performs a specific function. What the ENCODE researchers found is that this assumption is wrong. Instead, genes work in complex, resilient, and adaptive relationships. This fundamental challenge sent a chill through financial markets concerned with a wide range of emerging industries based on gene research, including genetic testing.

So despite the promises, researchers and gene testing labs are likely far away from accurately associating genes with specific risks. Practically speaking, adopting a sensible lifestyle and avoiding risky exposures based on what you know about your family history are far more likely ways to effectively preserve your health than these genetic tests of dubious accuracy.

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