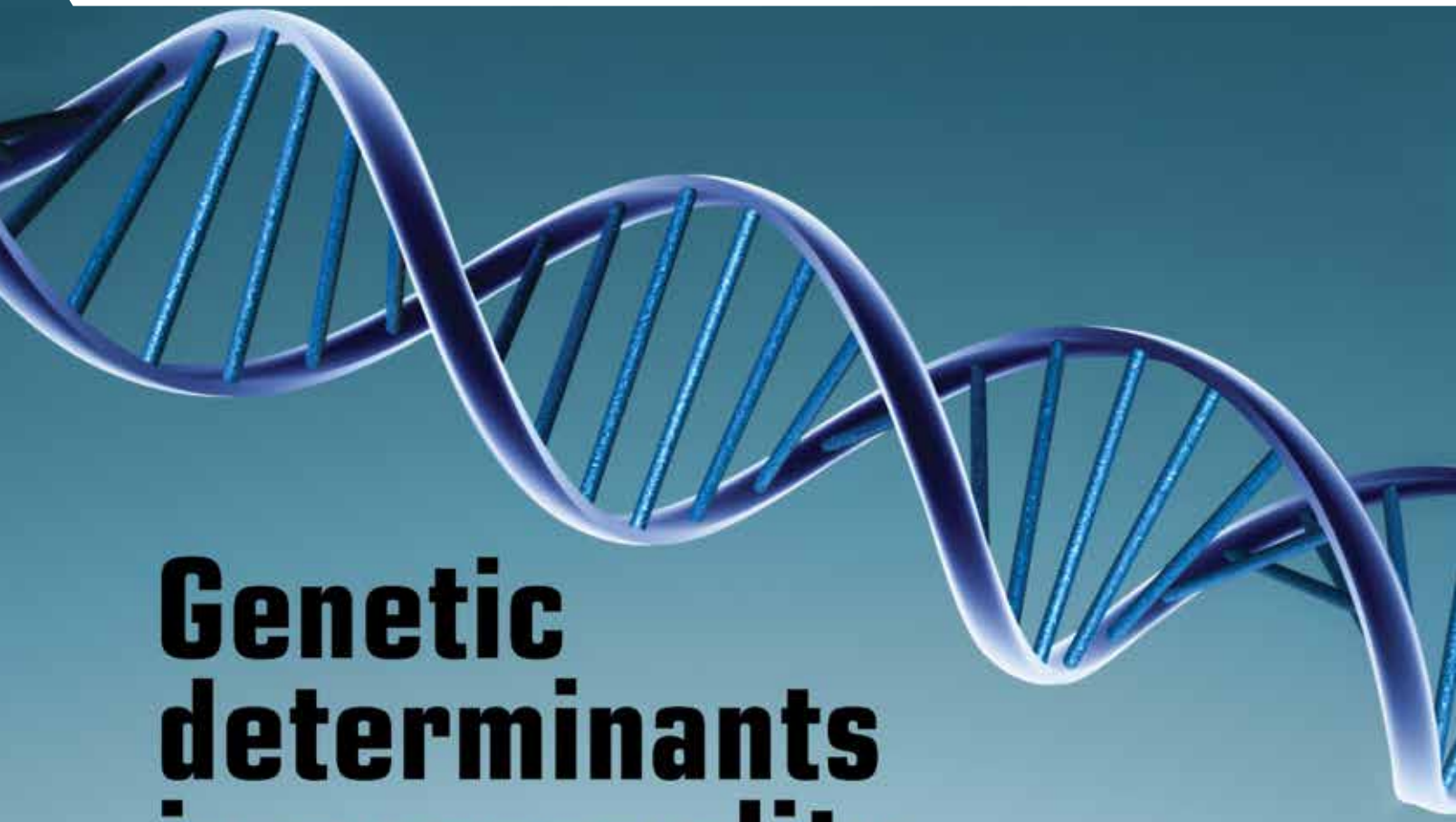

Genetic determinants in personality

By Alexis Artwohl, Ph.D.

We are all familiar with the nature versus nurture debate about what is more powerful in determining who we are: our genes or our environment. When I was in graduate school many years ago, the dominant view was that nurture played the more powerful role. I was taught that we are born as a blank slate and that our environment, especially our early parenting, determines who we turn out to be. Even devastating mental illnesses such as severe autism, schizophrenia, bipolar disorder, chronic alcoholism and anorexia were said to be caused by faulty parenting.

The prevailing idea from that era told us that even families who appeared normal but had a child with one of these mental disorders had some sort of hidden pathology, and the child was the "identified patient" who was acting this out. That never made any sense to me. We have all known people who overcame childhood abuse and deprivation and grew up to be normal, productive people. Conversely, we also know parents who are clearly not abusive, yet who have a child with severe emotional/behavioral problems. There has to be something else going on. That something is turning out to be genes.

EPIGENETICS

As is often the case, the truth is somewhere in the middle. We are all a complex combination of our genetic predispositions and the sum total of life experiences. These genetic predispositions interact with everything in the environment we are exposed to, from

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conception to the grave, in highly complex ways we are only beginning to understand. The study of this interaction is called *epigenetics*, and it is a fascinating subject.

The complexity of these interactions can be mind-boggling. Many of us tend to think of genetics as being fairly straightforward, such as genes that determine eye color. You might recall studying inheritance charts from school that showed dominant and recessive genes which predicted what percentage of children of two parents will inherit what color of eyes. However, in most cases, the influence of genes is far more complex.

One complication is that our genetic makeup is not as simple or straightforward as the eye color chart. Although we obviously inherit genes from our ancestors, we can also develop our own spontaneous genetic mutations resulting in traits not commonly seen in our families. And get this: Things that happen to both men and women in their lives, including behavioral choices such as what they eat, can result in epigenetic factors that get passed on to their descendants, even more than one generation removed. What a surprising and sobering finding.

Another complication is that many of our traits are determined by multiple genes, instead of just one or two, and all these genes interact with each other in complex ways. For instance, people could inherit genes that predispose them toward a disease such as cancer, but they can also inherit genes that protect them.

As if this weren't complicated enough, environmental factors can influence the manner in which a genetic predisposition expresses itself. Genes are influenced by biological processes that can switch the gene on or off. Even if you inherit a gene, it may or may not ever express itself depending on what other genes you have and/or whether environmental factors switch any one of them on or off.

Many traits that we have, such as our tendency to become obese, our response to exercise, how long we are likely to live, our broad personality tendencies, susceptibility to mental illness, and so much more, have significant genetic components. An Internet search on the topic of epigenetics will take you to many studies on this important and emerging area of research.

EPIGENETICS IN DAILY LIFE

What are some of the implications for this research in our daily lives? Here are some of my observations:

• "There but for the genetic grace of biology go I." As I became more aware of this area of research, I became increasingly more humble and compassionate toward the less genetically fortunate. When I see substance abusers and mentally ill people sleeping under bridges, I realize that one of the reasons I'm not there with them is a lucky roll of the genetic dice. This can help combat cynicism and contempt in emergency services personnel who deal with human misbehavior and tragedy every day.

• Members of the New Age crowd often like to preach that all people can be all things if they just try hard enough and think good thoughts, and that "talent doesn't matter." I am all for positive thinking and giving your best effort, but no, you cannot be anything you want to be, and talent sometimes does matter.

One example is response to exercise. Multiple researchers have found that genes determine the extent to which you can improve your maximum oxygen consumption, or VO^2 max, in response to aerobic exercise. About 15 percent of people are "super responders," who can very rapidly increase their VO^2 max in response to exercise and they have the potential be become world-class athletes in sports requiring aerobic capacity. About 20 percent of people are "non-responders" who will show little or no gains in VO^2 max no matter how much they exercise, and they will never be world-class athletes in aerobic sports. The rest of us are somewhere in between.

It should be noted that whether or not you increase your VO^2 max, exercise has terrific benefits for everybody, including a greatly improved health profile and help with weight control. It should also be noted that no matter how much genetic talent you might inherit, you still have to put in the hard work to achieve your goals. If your job or life in general requires you to be good at something that does not genetically

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come naturally, you will have to suck it up and work harder than those who lucked out with better genes. Accepting that there are genetic differences can help us not blame ourselves or others for "just not trying hard enough."

• It is advisable to strive to be realistic in our efforts to understand and control human behavior. I feel badly for all the good parents who not only must cope with children who are autistic, schizophrenic or drug abusers or have other challenges, but who also blame themselves or are blamed by others for the problems their children have. It is certainly true that parental influences are very powerful, but sometimes even the best parenting might be overwhelmed by devastating genetic tendencies with which their children were born.

One of the reasons alcoholics are called "recovering" rather than "recovered" is because the genes that contribute to their craving for alcohol cannot be ignored. They are always lurking in the background, waiting to sabotage a recovering alcoholic's sobriety if the person does not develop and adhere to a lifelong plan to control them. The same is true for many other human struggles such as drug addiction, overeating, gambling and controlling a bad temper.

A fascinating book on the topic of genetic determinants in personality is "The Psychopath Inside" by neuroscientist Dr. James Fallon. Fallon was conducting a study on the brain activity of serial killers, who have a distinctively abnormal brain activity pattern that sets them apart from less violent human beings. He was also doing a different study of brain activity seen in patients with Alzheimer's disease and recruited some of his family members, including himself, to be the normal control subjects.

One day while looking at the brain patterns of those normal control subjects, he came across a brain pattern which he assumed was from the serial killer study, mistakenly mixed in with the Alzheimer's study. Fallon was stunned to discover that it was his own scan, and he had the brain pattern of a psychopathic serial killer.

He struggled to accept this fact, but over time he admitted to himself that he possessed many of the same personality traits, without engaging in violent criminal activity. He attributes his success in life and his managing to dodge a life of crime to outstanding and loving parenting. His high IQ no doubt helps as well. However, he describes himself as a "prosocial psychopath" who has multiple traits of psychopaths, such as being a chronic (but petty) scofflaw and acting with callous disregard for the feelings of others. Like outwardly successful psychopaths, he also describes himself as cunning, charming, ruthless and willing to exploit others often just for the fun of it. His personal journey into his dark side is interlaced with the science of the genetic influences on personality and expositions on the nature/nurture debate.

• Genetics do not always dictate destiny or absolve us of responsibility. We all possess genetically influenced physical and personality traits, whether we like what we have or not. Some will predispose us toward health and success, and others can put us at risk for failure, dysfunctional personality traits, substance abuse or mental illness. The former we can rejoice in; the latter will definitely require more caution and hard work on our part. How we cope with our gifts and flaws will be unique to each person and it is well worth the effort to find out what works for us. Maybe we can't be all that we want to be, but we can still strive to be the best that we can be.

• Keep in mind that your children, spouse, employees, friends, co-workers, etc., are also unique genetic human beings who will require different approaches to help them be the best they can be. If their genes are quite different than yours it will be more challenging to empathize and give them what they need, rather than what you want to give them. However, making the effort to understand and act accordingly is a noble and worthy gift and will make you, and them, a better person.

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