It's time to take your genetic destiny into your own hands.

AN EXPLORER’S GUIDE TO EPIGENETICS

BY DIANNE E. PRICE
Say your grandma handed down her special family recipe for mashed potatoes. It included two sticks of butter, a tub of sour cream, a package of cream cheese and a dose of heavy cream. Your grandma died of a heart attack. Seeking to avoid the family fate, you modify the recipe: cauliflower instead of potatoes, ghee instead of butter, cut the sour cream and cream cheese, and substitute almond milk for heavy cream. Similarly, you can alter your genetic recipe in much the same way.

You just might be stuck with that crooked nose or receding hairline, but no longer are you sentenced to cancer, diabetes, depression and other unhealthy inheritances from your forebears. The science of epigenetics is teaching us how we can alter our genes and perhaps override specific genetic tendencies.

“Epigenetics is a word that most Americans have never heard of, but five years from now everyone will know about it,” says William J. Walsh, Ph.D., president of the Walsh Research Institute in Naperville, Illinois, and a pioneer in nutrition and epigenetics. “I believe it’s the new revolution in mental and physical health.” In fact, Transparency Market Research predicts that this revolution will roll into a $5 billion global market by 2018.

The completion of the sequencing of the human genome allowed upside down the held belief that many diseases are genetic in nature. Instead, it suggested that they are epigenetic (above genetic) in nature. In fact, our environment can alter our genes.

“We are just at the beginning phases of understanding how such diverse factors as nutritional intake, cellular machinery affect the ways our genetic code gets turned on and off — and hence how environmental factors and individual past history can play a huge role in our health, well-being and longevity,” says Robert Scheeler, M.D., a family medicine specialist at the Mayo Clinic in Rochester, Minnesota.

“DNA is inside every cell in your body. It can coil and uncoil,” explains Walsh. “Genes only have one job: to make protein. But epigenetics is a different chemical mix in every part of your body for survival. Epigenetics provides the blueprint that specifies which of your genes will be turned on in each cell.”

And, of course, all of these processes are controlled by the section of the brain called the hypothalamus.

Epigenetics can potentially revolutionize our understanding of the structure and behavior of biological systems, as well as our understanding of our lives, from A to Z, as we still fall far from fully benefiting from its application in our daily lives. Contrary to what most of us think, “Genes are not fixed, predetermined blueprints passed down from generation to generation,” according to Thena Geigo Ruby, M.D., founder and medical scientist at the Ruby Institute for Integrative Medicine in Northwest, Texas. “Instead, our genome contains at least 4,000,000 ‘switches’ that can be turned on or off by life experiences and environmental influences. Scientists are now linking certain markers, or switches, to conditions such as asthma, diabetes, mental illness and even cancer.”

According to the Genetics in Primary Care Institute, “There is a mistaken belief that epigenetics is like genetics and cannot be changed, but epigenetics is actually modifiable. The likelihood that epigenetics will be used in the treatment of childhood diseases and developmental disorders in the future is greater than that for genetics.”

Scientists and some physicians are waking up to the importance of epigenetics, but it’s enlightened consumers who will change the face of medicine, pushing for answers to how they can override their own genetic processes to attain their best health. Ruby calls epigenetics “the true preventive medicine.”

This user’s guide to epigenetics seeks to provide digestible bits that will leave savvy readers to deeper exploration into their own health and well-being — and, perhaps, genomic actions.

Note: As with any health or medical advice, individuals should consult with their physician. In the case of genomic interventions, a personalized genomic profile is essential, as the treatment protocol is unique and requires distinctions based on words, what may be right for one person may be wrong for another.

Altering Alzheimer’s and engaging antioxidant protection.

Science has determined that Alzheimer’s begins decades before a clinical diagnosis is made and can be the result of oxidative stress. Paul Cole, Ph.D., director and senior scientist at the Gen Health Research Institute in San Diego, Arizona, is leading the way in the area of Alzheimer’s epigenetic research and is currently studying how manipulating certain epigenetic factors affect who gets Alzheimer’s, and is developing a blood test to detect the disease. Some studies suggest that antioxidants have no value once Alzheimer’s has been diagnosed. Other studies look to nutritional deficiencies, vitamin E, vitamin C and omega-3 fatty acids, or Triglyceride E2, could reduce the failures that occur in end stages of the disease. The antioxidant benefits of green tea are also well-documented.

Breast and other cancers: With epigenetic research, we are closer to a cure for cancer than ever before.

We’ve known for more than a century that cancer is a disease in which an otherwise normal cell’s genes go awry. It has taken decades to understand the many genes and proteins involved in this process. The role of genes in breast cancer was recently on display when actress Angelina Jolie announced her decision to have a double mastectomy because she was found to carry the harmful mutation to the BRCA1 gene (BRCA1 and BRCA2 are types of tumor-suppressing genes).

Depression and mental health.

According to Walsh, “There is considerable evidence that epigenetic effects are responsible for mental breakdowns experienced in schizophrenia, bipolar disorder, addiction disorders, OCD and the striking symptoms associated with regressive autism. Epigenetic errors can dramatically change the epigenetic chemistry and change the methylation pattern in DNA. Traumatic events in early life or adulthood can potentially alter DNA methylation and induce abnormal brain gene expression and, ultimately, depression.”

Eating and food: “Let food be thy medicine, and medicine be thy food.”

According to Walsh, without an accurate metabolic analysis, you can’t really know what foods to eat or avoid. “The best diet for one person may be the worst diet for the next person,” he explains. “For example, a person who tends toward clinical depression may have low serotonin levels. This is something you really can’t do with your diet. But a person who produces a lot of high-protein diet. Then there are people with anxiety conditions that have the opposite problem: They can’t eat meat and instead must rely on the plants in their diet. People thrive on a vegetarian diet.”

General health and habits: The effects of tobacco.

“Your genes are part of an orchestra,” says Velman, “in which each aspect of your life, the level of toxins in your environment, the quality of your diet, and the impact of trauma, will all influence your well-being, how you respond to stress, amount of inflammation, and your own belief systems can impact your outcome.”

“Do the best you can to avoid environmental insults (such as disease and infection, harmful food supply, natural disasters, water pH, levels of pollutants in soil) and strengthen your protection against them with glutathione, zinc, vitamin E and D,” says Walsh.

Methylation is important to your mental health.

“Not all genes are active at all times. DNA methylation is one of several epigenetic mechanisms that cells use to control gene expression and is highly-modifiable. Each of us is born with normal, under- or over-methylation. A simple blood test can identify an individual’s methylation profile. Your individual frame of mind is influenced by your epigenetic profile and there are interventions, we are part of that.”

Nutrients: Heal your body.

Nutrition is a key component of health and well-being. Genes are not fixed, predetermined blueprints passed down from generation to generation, according to Thena Geigo Ruby, M.D., founder and medical scientist at the Ruby Institute for Integrative Medicine in Northwest, Texas. “Instead, our genome contains at least 4,000,000 ‘switches’ that can be turned on or off by life experiences and environmental influences. Scientists are now linking certain markers, or switches, to conditions such as asthma, diabetes, mental illness and even cancer.”

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Epidogenetics continued...

mitors are nutrients — amino acids, vitamins, minerals and other natural biochemicals we obtain from food,” writes Walsh in *Nurture Power*. “Good mental health requires proper nutrition that is linked to more information, new findings and research into a range of mental disorders and to train experts. www.walshinstitute.org

United States: Build a nurturing society for better health

Researchers at the University of Alabama showed that rat mothers denied access to mates needed to make a proper nest, grew anxious and spent less time mothering their young. Pups raised by these stressed-out rat moms exhibited increased methylation, a genetic neural-growth-factor pathway. According to an essay in *Science*, this research “could have important implications for our own society. The United States has the highest levels of inequality of any developed world, and one-third of Americans suffer from extreme stress, according to the American Psychological Association. If research on epigenetics translates to humans, the implications could be far-reaching.”

Violence can be aggravated by medications

“We now know that certain forms of violence are programmed from birth,” says Walsh. More than 35 years of research has convinced Walsh that extreme violent behavior is predictable and can be prevented in most cases. He has amassed an extensive database, demonstrating a link between biochemical imbalances and mental-health disorders. These biochemical imbalances have a direct role in the malfunction of neurotransmitters, resulting in garbled signals between the brain and body. Walsh believes that drug-free natural treatments can correct these imbalances, thereby improving mental health.

Womb time is the critical time for the creation of healthy epigenetic processes

“Epigenetics is a natural procedure. Something we have to have in a alive,” explains Walsh. “Most of it happens in the first month in the womb. If you don’t have environmental insults in the womb, in a normal healthy development of a baby, the epigenetic marks are established.” These are chemical tags that are attached to your DNA and regulate those chemical. Nutrition can turn on gene expression and cause the expression of these proteins.

“The key time to make an impact is before a woman gets pregnant and during the first three months — even during the next nine months,” Walsh continues. “This is when these genetic variations get caused — autism and spina bifida and a predisposition for things like mental ill-