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## **Lifestyle Choices Can Change Your Genes**

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MADISON—If your parents or grandparents had heart disease, you may believe your fate is sealed because of your genes.

That may not be so.

Lifestyle choices may actually reduce the chance of repeating your family's history of poor health, according to a concept that is picking up steam in the medical community.

According to Dr. David Rakel, director of integrative medicine at the University of Wisconsin School of Medicine and Public Health, a concept known as "epigenetics" empowers people to take control of their health by making choices that may override their genetic code.

Rakel says behavior and environment can affect how those genes are "expressed," that is, how the information in a gene gets translated into proteins.

"Epigenetics means 'around the gene' or if you will, the soup in which we bathe our genes that is determined by human choice," he explains. "We are the cooks of our soup that influences if our genes are healthy or diseased."

"For example, if your brother or your dad had prostate cancer, there's probably an area in your genetic code that puts you at high risk for prostate cancer," he added. "Research is telling us even if your family has a history of cancer, there are things you can do to bathe that gene in a way to keep it from expressing itself. This means your genes may produce healthy prostate tissue instead of tissue that is diseased or cancerous."

So what can people do to minimize their risk of cancer, high blood pressure, heart disease, diabetes or other illnesses that may be part of their genetic predisposition?

Rakel says changes in diet, exercise, and personal attitude could actually influence the genetic code and reduce the chances for declining health. While this advice may not seem different from what your doctor says during a routine checkup, Rakel says the concept of epigenetics espouses that lifestyle choices can influence genetic expression.

"We have a choice to bathe our genes with joy, happiness, exercise, and nutritious foods, or we can bathe them with anger, lack of hope, junk food and sedentary lifestyle," he says. "This area

of research holds so much potential and gives us the hope to say ‘Even if my genes indicate a history of family illness, I can make positive lifestyle choices that can keep a gene from being expressed as a disease.’”

Rakel cites a 2007 review by Dr. Steven Schroeder of the University of California-San Francisco. Schroeder’s study concluded that the largest influence on the risk of death in America is attributed to personal behavior, such as smoking, obesity, and stress. The paper adds that, even if top-notch health care were available to everyone, only a small fraction of lives (10 percent) can be saved with these high-tech interventions. The largest reduction in death -- 40%-- will result from the adoption of healthier habits.

“Human attitude has a tremendous influence on health,” says Rakel. “If you are happy, you are more likely to go out jogging or adopt positive lifestyle behaviors because you have hope. You see what’s good in the world instead of what’s bad. If I’m seeing what’s bad in the world, I won’t have the hope that encourages positive lifestyle choices.”

Studies of laboratory rats with a gene that increases the risk of diabetes further build the case for epigenetics. When the pregnant mothers of genetically identical rats who had this gene ate foods that influence gene expression (garlic, beets, onions), their offspring did not develop diabetes. But when mothers were fed a diet that did not include these foods, the offspring became obese and developed diabetes. What the mothers ate influenced the expression of genes in their offspring. This and evolving research are teaching us that epigenetic influences leave an imprint on our genetic code that is passed down to future generations.

“If I choose to eat fruits and vegetables versus high-fat foods, if I choose to fill my heart with compassion versus hate and hostility, this can leave a mark in my code that can be passed on,” says Rakel. “The question is not who you are now, but who do you want to become? And who do you want your kids and your kid’s kids to become? Choices now may influence future generations.”

Rakel says epigenetics also advocates less dependence on drugs and greater reliance on recruiting self-healing mechanisms.

“If I have 10 minutes with a patient, I could write them a prescription to lower their cholesterol. But I’m just treating one thing,” he says. “If I encourage them to exercise and eat better, I’m doing much more than lowering their cholesterol. I’m reducing their risk of cancer, Alzheimer’s disease, diabetes...the list goes on. Epigenetics impacts the whole body, but drugs are geared toward one specific disease.”

While Rakel admits it is easier said than done to take an optimistic attitude and change one’s

behavior, sometimes little things can lead you down the path to better health.

“It could be a matter of forgiving that person who has made you angry for 30 years,” he says. “If you can do that, maybe your shoulders feel lighter or that ache in your gut doesn’t feel as bad. Maybe you stop getting headaches or neck pain. That’s an epigenetic example of how that choice, forgiveness, results in tremendous change in your overall outlook, well-being and physical health.

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