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A diet that fits your genes

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"The silver bullet never works. You have to have common sense," says José Ordovas. Credit: John Soares

The age of one-size-fits-all nutritional advice is coming to a close, thanks to the surging field of nutrigenomics. Soon, individual decisions about whether to focus on Mediterranean-style dining, low-fat foods or a salt-free diet will get easier as we learn more about our genetic makeup and how it interacts with what we eat.

Consider a study published in the September 2013 issue of *Diabetes*

Care. It found that in a group of people who carried a particular genetic risk for diabetes, and an associated higher risk of stroke, eating a Mediterranean diet negated their increased risk of stroke.

Conducted in Spain with more than 7,000 participants ages 55 to 80, the five-year study demonstrated that people who carried two copies of the genetic mutation for diabetes and who followed a low-fat diet were almost three times as likely to have a stroke as those who carried one or no copies of the mutation. In contrast, the mutation carriers who ate additional olive oil or nuts—hallmarks of a Mediterranean diet—neutralized their risk.

Study co-author José Ordovas, director of the Nutrition and Genomics Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts and a professor of nutrition and genetics at the Friedman School, talked with Tufts Now about the study, the Mediterranean diet and how close we are to putting nutrigenomics into use for the average eater.

Tufts Now: You've been examining the link between genes and diet for years. What is especially exciting to you about this latest study and its results?

José Ordovas: We have known for quite a few years that all common diseases have a genetic component. That includes cardiovascular disease, of which stroke is a form. That genetic component accounts for only 50 percent of the risk for developing the disease; the other 50 percent is environment. So far, we have been studying relationships between genes or gene variance and cardiovascular risk factors, such as high LDL cholesterol or hypertension. What is important is to reach the end point—or the disease itself—which in this case is stroke. Here, we studied the gene-diet interaction in which people with a higher genetic risk of developing the disease can control that risk by adopting a

traditional diet. In this case, the environmental factor is the Mediterranean diet.

How many people will this affect?

In this case, we're talking about 20 to 25 percent of the population.

Your study was conducted in Spain, where a Mediterranean diet is a way of life. Presumably, adding more olive oil or nuts to a typical American diet won't have the same results.

Diet is an entire context. It's not that "I do whatever I want and I do something good or I take a pill and it's going to counteract all the bad effects." You have to work with the whole context. The silver bullet never works. You have to have common sense. It has to be built around a diet that traditionally has been considered healthy.

The USDA is working on the 2015 Dietary Guidelines for Americans. What would you like to see in those guidelines to help move this country closer to a Mediterranean-style diet?

The recommendations can be more relaxed in terms of the suggested amount of fat, as long as you pay attention to the amount of saturated fat and trans fat. With the monounsaturated and polyunsaturated fats, you can be more flexible. It doesn't need to be low fat. Study after study has not shown the effects that had been expected from a low-fat diet.

Advances in nutrigenomics seem to be coming at a quicker pace. Why is that?

We have been doing the research for more than 20 years. We try to do the best with the technical resources that we have and the populations

that we have. Now we are able to do more, and there are two important aspects to that. One is that the technology is finally available to us to be able to sequence the genome, giving us access to all the different genetic variations. Second, because we are now working in large research consortiums, we are not limited as much by the sample size of the population. Before, we had to study maybe four or five thousand people. Now we can study 100,000 people, 200,000 people, because scientists are pooling the resources that they have to reach conclusions that are solid.

When you conduct these large studies, are participants reluctant to have their genetic material collected and tested?

Very few are reluctant. That is not a problem, at least not in the area we are studying, which is cardiovascular disease. Now for something like Alzheimer's disease, the response could be very different.

What are you working on right now that might shed further light on the interplay between genetics and the diet?

We're not only interested in what we eat and how much we eat. We are also interested in when we eat. Because of chronobiology—the fact that we have different chronotypes that influence how well our bodies function at different times of the day—there may be another important factor for fine-tuning personalized dietary recommendations and healthy lifestyle.

We know all the machinery that regulates our metabolism at different times of the day. We know which genes those are. It's a matter of taking

each one of those genes and dissecting the different genetic variations and seeing how that translates into more or less obesity or more or less metabolic syndrome. In time, we can educate people about how they have to distribute their meals and adapt them to their specific genetic variant based on the genes that define the biological clock. When we can add that component, we can make our dietary recommendations for individuals even more solid.

Provided by Tufts University