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Genetics and Weight Loss: Part 3

This is a continuation of the series on genetics and weight loss I began two weeks ago. The first two messages contain some background material that I'm not going to repeat, but I will say for the last time that I'm not a geneticist. I'm giving you a simplified explanation of what these genes do and what role they can play in controlling your weight and getting fit. This is not an exact science; there are many genes involved in losing weight and getting fit. But if you know how you process energy and the best type of exercise for your genetics, you can eat and exercise to be consistent with your genes, and that may help you lose the weight you want to lose—especially that last 30 pounds.

ADRB2 and ADRB3

ADRB2 stands for beta-2 adrenergic receptor. Last week I talked about how it relates to fat storage. This week, I'm going to talk about it and another gene, the ADRB3, and how they relate to exercise. As you might expect, ADRB3 stands for a beta-3 adrenergic receptor. Remember, adrenergic receptors respond to classes of hormones called catecholamines such as epinephrine and norepinephrine.

The Heritage Study has produced an extensive examination of the role of genes in obesity and diabetes. The researchers have also examined the role that exercise can play in weight loss (1). When subjects were put on an exercise program designed to keep them working at 75% of their maximal fitness levels throughout the study, subjects with genetic patterns corresponding to the ADRB2 ARG 16 and ADRB3 ARG 64 polymorphisms lost more abdominal fat than subjects with other genetic variations; all subjects lost abdominal fat, but those with the variation lost more. The type of exercise in this study was strenuous. It may be that people with this genetic pattern may respond better to more intense exercise rather than slow and steady exercise.

The question is why that would happen. In a study of elite endurance athletes compared with sedentary controls, the elite athletes tended to have the ADRB2 ARG 16 polymorphism, leading researchers to conclude that this allele—this genetic variation—may be associated with improved performance in response to intense exercise (2). Were the athletes attracted to endurance events because they responded better to intense exercise, or did they rise to the top over all the others who tried these forms of exercise because of their genetic advantage? That wasn't answered in this study.

Here's a couple of interesting studies that may help explain some of this. Stroke volume is the amount of blood your heart pumps per beat. Cardiac output is the amount of blood your heart pumps in a minute—it's simply a calculation of your heart rate times your stroke volume. Researchers have found that subjects with the ADRB2 ARG 16 had a lower heart rate at the fatigue level during isometric exercise while maintaining the same cardiac output compared to subjects without that allele (3). In another study, subjects with this genetic variation had increased ADRB2 receptors on lymphocytes (4). So what's the big deal?

If the subjects did have more beta-receptors, they would have a better response to catecholamines than those with fewer receptors. They would pump more blood at a lower heart rate. That means that they would respond to more-intense exercise better because their bodies would be able to handle it well and be able to do more of it. Think of it as one more gear in a car. The RPMs would be lower at a higher speed—it would be less strain on the engine and the engine would be able to continue at the higher speed longer. It would also mean that people with that genetic pattern would burn fat better.

What if you don't have that gene pattern? It means that instead of running, maybe walking would be more effective for you, or a long, slow bike ride instead of a spinning class. It doesn't mean you wouldn't benefit from

more strenuous exercise, but it might be more comfortable for you to walk. And of course, the more comfortable the exercise is, the more likely you are to actually do it often.

The Bottom Line

ADRB2 and ADRB3 seem to have a role to play in the type of exercise that will benefit us most. What we don't know is this: what triggers those genes to be expressed (turned on)? What down regulates them (turns them off)? It makes sense that it would be the type of exercise itself that would do it, but we don't know. It may work even better if we eat according to our genes.

In the next few messages, I'm going to briefly talk about three diets for each of the three genetic patterns. What does "low fat" mean? What about "high carbohydrate"? But when it comes to which exercise benefits each pattern most, it's not going to be simple because there are so many factors involved. It would literally take a small book to do it justice.

As a result, I've decided to do a webinar about it called **Effective Exercise for Weight Loss and Fitness**. This webinar will explain exactly how you should exercise to get the fitness and fat loss you want. It will held on Sunday, March 21, at 3 p.m. Eastern Time, which is noon Pacific Time—that will give people on the West Coast a chance to get home from church or at least to get up and be completely awake. You can sign up for the webinar beginning Sunday, March 14; it will close one hour before the webinar begins. The cost will be \$19.95. If you've been frustrated with exercise and how you respond to it, this is one event you won't want to miss.

Finally here are the results of the genetic tests for Paula and myself: it turns out that we both have similar patterns. We should both eat a lower-fat diet and perform high-metabolic exercise. So starting March 1, that's the way I'm going to eat; my cast-iron Polish stomach can handle anything, so I've never had to adjust what I ate to accommodate my digestive system. Paula already does a good job of keeping her fat intake low, not because she's such a health nut, but because like her dad's side of the family, she gets indigestion from too much fat—hmmmm, maybe that was a clue. As for exercise, more swing, salsa, and cha-cha for both of us.

You can get your genetic test to see which eating and exercise pattern will be most successful for you. Check out Inherent Health's website through your business or directly online.

What are you prepared to do today?

Dr. Chet

References:

1. *International Journal of Obesity* (2003) 27, 389–393.
2. *Metabolism*. 2007 Dec;56(12):1649-51.
3. *Physiol Genomics*. 2004 Feb 13;16(3):323-8.
4. *Med Sci Sports Exerc*. 2006 May;38(5):882-6.

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