Mike Overton: Why your brain doesn't want you to go on a diet

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For more on reaching and maintaining a healthy weight, go to http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/index.htm.

I want to put a slightly different twist on a popular New Year's resolution. Even if we're at a healthy body weight, we need to keep our daily physical activity level high and avoid excessive calories.

Let's face it: There's no shortage of convenient, calorie-packed food available for daily consumption. The problem goes back to middle-school science class, when you learned the law of conservation of energy. In spite of all of the gadgets and gimmicks for weight loss, stored energy does not just melt away. Actually, to quote Tom Cruise in "Mission: Impossible," it's much worse than you think.

As a physiologist, I've studied the process of homeostasis for more than 30 years. Homeostasis is achieved by complex biologic regulatory systems that maintain critical physiologic variables within a range compatible with life. Translation: Our fat stores can provide energy in case we face starvation. When we consume food, we extract the energy for immediate use. If we consume excess energy, we store it for later. Most of us never need it later. That's an equation for an obesity epidemic.

So it would seem that all we have to do is eat less and use up that stored energy. Unfortunately for dieters, those fat cells produce a biologic signal (a hormone) called leptin. Leptin levels are monitored by a master control center in your brain called the hypothalamus. If you start to use up your stored fat, leptin levels in the blood go down. This is a warning signal to the brain that you're dipping into your energy reserves and may be at risk for starvation.

The homeostatic response is to protect your body fat. The brain does not care if you have plenty of stored energy in adipose tissue available for use. If you start to use up this energy, the brain will take action. Metabolic processes slow down; hunger signals in the brain are amplified. No wonder it's so tough to lose weight!

Indeed, the simple arithmetic of weight loss is flawed. Many of you know that a pound of adipose tissue is about 3,500 calories of energy. So it's easy (but not very logical) to suggest that, if you cut 500 calories a day, you'll lose a pound per week. The hypothalamus is just not going to let that weight loss happen for very long. Published controlled clinical trials verify this, and a National Institutes of Health website is available to predict expected weight response to long-term dieting (http://bwsimulator.niddk.nih.gov).

In addition to restraining our intake of calories, our best shot at maintaining a healthy body weight is physical activity. Find a friend who can help you stay committed and get moving — but please see your physician first.

Finally, let's not lose sight of the endgame. First, obesity is much easier to prevent than to reverse. Second, the evidence is overwhelming that most chronic diseases (particularly heart disease and type II diabetes) are preventable. So in 2013, start preventing chronic disease for yourself and your family.

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