

## Why losing weight and keeping it off is so difficult

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If you're carrying more weight than is comfortable for you, you're not alone. Over 50% of the adult Australian population is overweight and obese. While carrying excess weight increases your risk of lifestyle diseases such as diabetes, heart disease and certain cancers, and while losing even just 5% of your body weight can significantly reduce your risk of such diseases, losing weight and keeping it off is never easy. Most people who lose excess weight by lifestyle interventions gain the weight back within a few years.

**The overall aim of my team's research at Garvan is to determine why losing weight is so difficult for so many people, and to find more effective weight management strategies so that more people can attain and maintain a healthy body weight.**

There are many contributors to attrition in weight loss strategies. These include emotional factors such as overeating related to stress or sadness and environmental factors such as large serving sizes, long working hours, and the ready abundance of highly processed foods. However, many people find that losing weight and keeping it off remains an elusive goal even when they manage the emotional and environmental factors that contribute to excess weight. That's because *physiological* factors are an equally important contributor to attrition in weight loss strategies.

### **Did you ever hit the wall while trying to lose weight?**

Did you ever lose a few kilos at the start of a weight loss program, only to see your weight loss come to a grinding halt several weeks later despite your continuing to do all the right things? While some weight loss plateaus may be due to non-adherence with the

program (e.g. eating a bit more or exercising a bit less), in many cases it's due to a series of physiological changes that collectively hinder further weight loss. For ease of discussion, I call these physiological changes the 'famine reaction'. The famine reaction is a survival mechanism that helps protect you from wasting away in times of scarcity, and that includes weight loss programs.

The famine reaction is controlled by a part of your brain called the hypothalamus. When you lose weight by any means – be it by diet, by diet plus physical activity or by physical activity alone – sooner or later your hypothalamus senses that you've lost weight. This leads to a change in the balance of natural brain chemicals in your hypothalamus, bringing on the effects of the famine reaction.

If you're like some people, such as healthy young men, your famine reaction will only kick in once you've dropped under a healthy weight. In that case, the famine reaction can save your life. For the majority of people, however, the famine reaction kicks in after losing as little as 8% of your body weight, often well before reaching a healthy body weight. It's then that the famine reaction is a real problem: it brings on a host of effects that make it progressively more difficult to continue losing weight and even harder to keep the weight off.

### **Three ways to tell if your famine reaction has been activated**

1. **Nagging hunger and cravings for substantial food.** The first sign that your body has gone into famine mode as you're trying to lose weight is that you may start to feel hungrier than usual. Not only that, you may also start to crave rich, fattening foods. This is your body's way of pushing you to eat, of protecting you from losing any more weight. Many people blame this increase in hunger and temptation on themselves (e.g. 'I'm so weak, I just don't have enough willpower'), but when your body is having a famine reaction, the chemical changes in your hypothalamus trigger an incredibly powerful desire to eat. If our predecessors didn't have a strong drive to

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eat when their fat stores started to dwindle, the human race would have died out years ago.

2. **Lethargy.** A second sign that your famine reaction has been activated when you're trying to lose weight is that you may start to feel inexplicably lethargic. Research shows that the same chemical changes in the brain that bring on the nagging hunger of a famine reaction can also reduce your propensity to move about as you lose weight. This is another ploy your famine reaction uses to protect you from losing more weight, by slowing you down so you don't waste precious energy on non-essential tasks.
3. **Feeling cold.** It's often assumed that if you just used willpower to resist your hunger and continued with your exercise plan despite feeling lethargic, then you will continue losing weight. If you've ever struggled to lose weight, you'll know that this is wrong. Research shows that even people who continue to follow a weight loss program eventually hit a plateau, where weight loss slows down or stalls. That's because the famine reaction doesn't only make you feel hungry and lethargic, it also slows your metabolic rate, by as much as 4000 kilojoules (900 calories) per day. This effect of the famine reaction can make you feel cold, because a drop in metabolic rate has been shown to cause a significant drop in body temperature.

These three major effects of the famine reaction – increased hunger, lethargy, and reduced metabolic rate – make it very difficult to adhere to a weight loss plan and continue losing weight, and they contribute to difficulties in keeping the weight off once you finish your diet.

### **The conventional method of weight loss exacerbates the famine reaction**

The conventional method of losing weight is to eat less, move more, *and keep going until you reach your ideal weight*. While the first part of this equation is correct (the only way

to start losing weight is to eat fewer kilojoules than you burn), continuing with a weight loss program despite having to resist physical hunger can exacerbate the famine reaction and make it harder for you to continue losing weight.

For instance, if you've ever struggled with hunger or plateaus as you lost weight, you may have tried to get around the problem by drinking more water to mask your hunger, to fill up on low kilojoule foods such as watery vegetables, to do more exercise to increase your metabolic rate, or to eat even less.

As a neuroscientist researching how the brain controls body weight, it's clear that these conventional methods for dealing with hunger and plateaus are ineffective ways to tackle the physical cause of resistance to weight loss (the famine reaction). For instance, it's been shown that if you're having a famine reaction and you fill up on low-kilojoule bulky foods such as carrot and celery sticks, it does absolutely nothing to alleviate the chemical changes in your brain that cause the famine reaction. As another example, it's been shown that if you're having a famine reaction during a weight loss plan and you add more exercise to your program *without also eating more*, the increased effort can actually exacerbate the chemical changes in the brain that cause the famine reaction. Another common method of getting over the famine reaction is to eat even less (e.g. by following a low kilojoule liquid diet). Research clearly shows that the less you eat while trying to lose weight, the stronger the famine reaction becomes.

### **How to deactivate the famine reaction to lose weight more effectively**

In my research at Garvan, my team and I are investigating different ways to deactivate the famine reaction so that more people can attain and maintain a healthy body weight.

For instance, my team and I are trying to decipher what exactly are the chemical changes in the brain that cause the famine reaction, and to determine whether we can block those chemical changes with novel substances that could become new weight loss drugs.

One of the most exciting things emerging in weight loss research is that you can deactivate the famine reaction with something much simpler and more enjoyable than drugs, and that's called food.

In studies in people who have lost weight and are exhibiting classic signs of the famine reaction (such as reduced metabolic rate), all of the observed effects of the famine reaction can be completely normalized within one to twelve weeks of eating more than a weight loss diet would allow.

This is likely due to the fact that eating enough to keep hunger at bay and to feel satisfied (as opposed to continued adherence to kilojoule-restricted weight loss plans) has been shown to completely deactivate the chemical changes in the brain that cause the famine reaction.

It's therefore likely that by incorporating periods of greater food intake into a weight loss plan, people would be able to lose weight more effectively because they wouldn't constantly be working against their body's famine reaction.

### **Practical implications of this research**

If you're following a weight loss plan and you suddenly start feeling really hungry, new scientific evidence suggests that an effective strategy for overcoming that barrier is to eat, choosing the *types and amounts* of mostly nutritious foods that make you feel genuinely satisfied.

People often worry that they'll gain weight if they eat more than their diet allows. It's important to note that eating to deactivate a famine reaction is very different from throwing in the towel and eating anything. When eating your way out of a famine reaction, choose nutritious foods (for instance, lasagne, salad, wholegrain bread and

perhaps a piece of chocolate instead of a burger, chips, and a chocolate mud cake). That's because studies show that adequate nutrients are important for keeping the famine reaction under control. It's also important to eat *only* if you feel comfortably and physically hungry, and to stop when you feel genuinely satisfied, not over satisfied. In addition, when eating your way out of a famine reaction, studies show that regular physical activity will not only help you keep the weight that you already lost off, but may also help to deactivate the famine reaction.

Eating your way out of famine reactions is a novel way of losing weight that is backed by new scientific insights into weight regulation. This year, my collaborators and I were awarded a major grant from the National Health and Medical Research Council of Australia in order to investigate this strategy in a randomized control trial, the first of its kind in the world. This strategy has the potential to revolutionize the way we our society approaches weight management.

### **For Further Reading and a list of scientific references**

*The Don't Go Hungry Diet* by Dr Amanda Sainsbury-Salis, PhD. Bantam Australia. ISBN 798 1 86325 523 3.

### **For Questions**

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