

# The scientific approach to cravings

*"The devil came to me last night and asked what I wanted in exchange for my soul. I still can't believe I said pizza. Friggin' cravings." — Marc Ostroff.*

Are you constantly plagued by food cravings? Are these cravings hampering your weight-loss efforts?

While some food cravings have psychological causes, others can be physiological or biochemical in origin, and could be caused by an imbalance in hormonal and chemical substances in your brain and nervous system. At this stage, it looks as if the neurotransmitter serotonin is often involved.

However, in research terms this is a relatively new field, which means that there are many things we don't yet know about body chemicals and their effect on food cravings. New chemicals and hormonal substances are constantly being discovered, and there's still a lot of uncertainty about which chemical triggers can affect food intake.

The biochemistry of food intake is also very complex and much more research is required before we can really solve the problem of food cravings.

## Serotonin

A study of the scientific literature shows that a chemical, or so-called neurotransmitter (a chemical that transmits messages in the brain and nervous system), called serotonin (also referred to as 5HT), may play an important role in the control of food intake.

Research has shown that serotonin regulates carbohydrate intake and that tryptophan (one of the common amino acids) increases serotonin release from the brain. When serotonin levels in the brain drop, or are deficient, we develop cravings for carbohydrate-rich foods. Any treatment that can increase brain serotonin levels will help to counteract this drop in serotonin and may help to curb carbohydrate cravings.

Most people "self-medicate" themselves when they experience a drop in brain serotonin levels by eating carbohydrate-rich foods like sugar, sweets, cake and chocolate. This often uncontrolled gorging inevitably leads to weight gain.

## The serotonin-alcohol connection

Some research has also shown that drinking alcohol increases brain serotonin levels, so that certain people suffering from alcohol addiction crave carbohydrates when they're unable to drink.

A study conducted by Moorhouse and co-workers (2000) with alcohol-dependent subjects, who were either carbohydrate cravers or non-carbohydrate cravers, found that when the carbohydrate cravers were given a low-carbohydrate diet, they suffered from pronounced mood changes and had low serotonin levels.

This would explain why this type of alcohol-dependent person would crave and possibly binge on carbohydrates when deprived of alcohol. It's simply an attempt to boost serotonin levels.

## **Serotonin, mood disorders and cravings**

Many studies have identified a link between mood changes, low serotonin levels and food cravings.

Dr Wurtman (1988, 1990, 1993) of the Massachusetts Institute of Technology has published extensively on the association between depressed serotonin levels and affective disorders such as seasonal affective disorder (SAD, characterised by bouts of depression, especially in winter), carbohydrate craving obesity (CCO) and premenstrual syndrome (PMS).

Researchers such as Wallins & Rissanen (1994) also suggest that other conditions, such as atypical depression, anorexia, bulimia and binge eating disorder, are associated with low serotonin levels that are, in turn, linked to food cravings.

In some of these conditions, the low serotonin levels lead to excessive food intake, particularly of highly refined carbohydrates (e.g. depression, bulimia and binge eating disorder), while in anorexia the disordered serotonin biochemistry causes cravings that the patient doesn't satisfy with food.

## **Food cravings and PMS**

Many women experience food cravings at certain times of their menstrual cycle. Readers often report that they can't stop themselves from gorging on sugar and sweets or from drinking litres of sugar-sweetened cold drinks at "that time of the month".

A team of South African researchers led by Buffenstein (1995) believe that cyclical fluctuations in food intake occur in women at various times during the menstrual cycle, with a drop in food intake just before ovulation and a peak just after ovulation.

In some cases, the changes in food intake in response to changes in the hormones produced by the ovaries can amount to as much as 2500kJ per day. These researchers suggest that the hormone-induced changes in food intake could contribute to excessive energy intake and weight gain.

In addition to the influence exerted by ovarian hormones, a publication by Moller (1992) from the Department of Clinical Pharmacology in Denmark suggests that serotonin participates in the regulation of mood and impulsive behaviours, including food cravings. It also governs eating patterns.

## **Solutions**

In view of the central role played by serotonin in regulating cravings for sweet carbohydrate foods and mood swings associated with depression, SAD, CCO and PMS, the question is how we can influence our serotonin levels without overeating and gaining weight as a result.

There are a number of potential solutions:

## Medication

### a) Selective serotonin re-uptake inhibitors

Many antidepressant medications contain so-called selective serotonin re-uptake inhibitors, which increase the levels of serotonin in the brain and keep these levels steady.

If you suffer from depression associated with weight gain (a common combination) or SAD, CCO or PMS, it may be a good idea to ask your doctor about the use of selective serotonin re-uptake inhibitors that control the serotonin levels in the brain.

### b) Weight-reduction medications

At present, there are only a few weight-reduction medications available in South Africa that influence serotonin levels.

One of these is Reductil, which contains sibutramine. According to the MDR, this chemical "is a serotonin (5-HT) and noradrenaline re-uptake inhibitor" that reduces weight gain by a dual action to decrease kilojoule intake and increase energy expenditure.

This medication must be used with an energy-controlled diet and is primarily indicated for obese patients (BMI exceeding 30). The recommended duration of treatment is three months if the person responds.

If a person doesn't experience weight loss with Reductil, the manufacturers recommend that treatment should be stopped.

## Dietary interventions

We know that carbohydrates and foods that contain the amino acid tryptophan boost brain serotonin levels.

If you suffer from food cravings due to low brain serotonin levels, you may be able to control your cravings by making sure you eat a diet that's rich in carbs. However, the carbs you eat should not be loaded with additional fat, or be excessively high in energy. This excludes all chocolates, cakes, pastries, cookies, tarts, biscuits, desserts and sugar-sweetened cold drinks.

Concentrate on eating carbohydrates with a high-fibre content, which are minimally processed, e.g. unsifted maize meal, Maltabella, high-fibre bran cereals, and oats for breakfast, plenty of fruit and starchy vegetables (especially sweet potatoes) and unprocessed grains such as brown rice and wholegrain wheat.

To boost your tryptophan intake, you need to have some protein, such as fat-free milk, yoghurt and cottage cheese, lean meat, fish or eggs.

Whenever you experience food cravings, try having some fat-free yoghurt, a wholewheat cracker or dried/fresh fruit.

Food cravings are caused by many different factors, some of which are [psychological in origin](#), while others are due to physiological derangements of the chemical balance in the body.

Try following a high-carbohydrate, high-fibre diet that includes some protein at each meal to prevent food cravings and mood swings, or ask your doctor for medical treatment if these food cravings are totally out of control. – (Dr Ingrid van Heerden, DietDoc, updated September 2008)

You're trying hard to shake a few kilos, but endless cravings for anything from chocolate cake to cheeseburgers are hampering your efforts.

The good news is that you're not alone: many dieters complain that they can't stick to their diets because they're constantly plagued by food cravings that sabotage their resolve to stick to a weight-loss regimen. Others report that food cravings, particularly for sweet or fatty foods, are causing them to gain weight exponentially.

## **Two approaches**

There are two major schools of thought relating to what causes, triggers and supports food cravings:

Behavioural scientists believe that food cravings are the product of psychological processes and factors, and that learnt behaviour plays an important role in the phenomenon of food cravings.

Biochemists, on the other hand, believe that some food cravings are caused by an imbalance in hormonal and chemical substances in the brain and nervous system, with particular emphasis on serotonin.

## **The psychology of food cravings**

A variety of studies have centred on the psychological factors that may play a role in making us crave sweet and fatty foods. Let's take a look at some of the most interesting findings:

### **a) Chocolate cravings**

Two studies concentrated on why people crave chocolate. One of the studies compared chocolate cravings in Spanish and American women with special emphasis on cravings experienced before the menstrual cycle. Craving chocolate is often strongest just before menstruation.

Interestingly, Zellner and co-workers (2004) discovered that the urge to eat chocolate before menstruation was stronger in American women than in Spanish women. These authors concluded that chocolate cravings have a cultural, rather than a psychological or physiological origin.

The second study by Gibson and Desmond (1999) found that hunger and a learnt response to satisfying this hunger by eating chocolate, played the most important role in chocolate cravings. In other words, individuals who often satisfy their hunger by eating chocolate, condition themselves to crave chocolate when they're hungry.

### **b) Mental images**

Harvey and co-workers (2005) studied food cravings before and after their experimental subjects were asked to either imagine a food or a holiday scenario. Their results confirm that mental images of the desired food increase the tendency to overeat this food.

If you constantly fantasise about that delicious, smooth and creamy cake or chocolate, you'll be fuelling your cravings for these foods.

### **c) Binge eating**

In another study conducted by Engelberg and co-workers (2005) 39 bulimic women were asked to monitor their eating episodes, periods of dietary restraint and binge cravings.

The results suggested that the periods of denying themselves food made the cravings worse. In other words, strict dieting was usually followed by binging on 'forbidden' foods. This is proof that unrealistic dietary restrictions can make dieters crave all the foods they're trying to avoid and therefore undermine their success.

It's far better and more sensible to use a balanced, moderately energy-restricted diet, combined with exercise, to lose weight, than to starve yourself. Periods of semi-starvation will just make the cravings worse.

### **d) Food deprivation**

Polivy and co-workers (2005) at the University of Toronto investigated how 103 chocolate-deprived, vanilla-deprived or non-deprived female volunteers would react.

The chocolate-deprived group reacted by eating more chocolate than any other group. In addition, both groups who had to curb their intakes of 'forbidden' foods experienced more cravings than the non-deprived group.

The authors concluded that being deprived of certain foods, like chocolate, leads to cravings and overeating.

However, some studies found the opposite. A study performed at the University of Vermont by Harvey et al. (1993) with 93 obese type-2 diabetics, who either used a balanced low-calorie diet of approximately 1200 calories per day, or a very-low-calorie diet (400 calories per day) for 12 weeks, found that the latter group on the 'semi-starvation' diet experienced fewer food cravings than the former group.

A second American study (Martin et al., 2006), using very-low-calorie, supplement-based diets, confirmed that this diet caused less food cravings than standard low-calorie diets.

So, here we have two opposite views. Some researchers believe that deprivation of certain foods will make individuals crave these foods, while other researchers report that extreme dieting will reduce cravings.

When researchers present us with such different findings, we unfortunately can't get a clear-cut view of what's actually going on.

Additional studies may well pinpoint why there are differences. For example, it's possible that the use of very-low-energy diets (400 calories per day), which border on starvation and can't be recommended to the general population, do eliminate cravings.

However, the use of such extreme diets is restricted to individuals who require drastic measures to reduce their weight because of direct health threats. These diets can only be followed under the strict supervision of a medical team.

For those people who don't have to lose vast amounts of weight, a balanced, moderately-energy-reduced diet is still the better option, and as mentioned in the first study in this section, such diets may well lead to cravings.

#### **e) Carbohydrate vs. protein deprivation**

Most people are aware that there are two diametrically opposed approaches to slimming: the Atkins-type high-protein, zero-carbohydrate diets, and low-fat diets that permit users to eat plenty of carbohydrates and some protein.

A study conducted in Toronto (Coelho et al., 2006) demonstrated that experimental subjects who were carbohydrate-deprived (like dieters who use a high-protein, zero-carbohydrate diet) tended to develop cravings for carbohydrate-rich foods. On the other hand, the subjects who were protein-deprived didn't develop cravings for protein foods.

These results indicate that human beings need carbohydrates if we're to function without cravings. This is understandable when we keep in mind that carbohydrates are our best source of rapidly available energy. Cutting out carbohydrates is, therefore, a recipe for creating carb cravings and isn't advisable.

The latest research studies on the psychology of food cravings indicate that learnt responses and deprivation of certain foods, particularly carbohydrates, can fuel cravings and sabotage weight-loss attempts. Apparently, very-low-energy diets such as those used to treat massively obese patients under strict supervision, lessen cravings, but are not for general use.

Compared to high-protein Atkins-type diets, which exclude most carbohydrates, a high-carbohydrate diet with a moderate protein content will cause fewer cravings and make it easier to stick to dieting.

#### **f) Eating breakfast**

Jakubowicz and co-workers (2008) from the Virginia Commonwealth University in the US have found that eating a breakfast packed with both carbohydrates and lean protein, and even a small piece of chocolate, can help lessen cravings and hunger during the rest of the day. They also found that this can lead to significant weight loss.

In the study of 94 obese, sedentary women with metabolic syndrome, half were told to eat the big breakfast diet containing about 1240 calories, while the other half ate a 1085-calorie high-protein, low-carbohydrate diet for eight months.

At the end of the eight months, those on the more restrictive low-carb diet lost an average of almost 9 pounds (just over 4kg). But those on the big breakfast diet lost nearly 40 pounds (18kg). Additionally, those on the big breakfast plan reported feeling less hungry and had fewer carbohydrate cravings.