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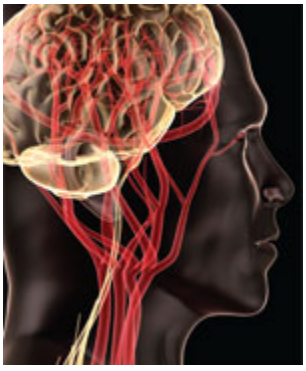
Report

Block Food Cravings At Their Molecular Root

By Michael Downey



Dieting alone is ineffective for most overweight adults, and even those who successfully lose weight often gain it back soon afterward. The snacking impulse is a common source of weight-loss sabotage.

Scientists have discovered that the inability to lose weight often stems from the powerful effects of emotional stress and depression on the brain. This chemically triggers strong *cravings* for comfort foods and snacks. If this is your problem, you may be suffering from an **abnormal increased appetite for consumption of food** known as **reactional hyperphagia**. Simply put, emotional stress causes brain-chemical and hormonal changes that decrease feelings of *satiety* (fullness) and promote—and "reward"—the compulsion to snack, especially on *comfort foods*.

In this article, you will learn how a **saffron** extract targets appetite dysregulation at the ***neurotransmitter*** level, inhibiting the compulsion-reward cycle and reducing the snacking impulse.

In one small 4-week study, a decrease in between-meal snacking was reported by women taking a proprietary extract of saffron!1 And in another human study using the same extract, the overall *number* of snacking episodes was reduced within 8 weeks—by **55%**!2

The restrictions of dieting often generate stress, anxiety, and depression. In some people, the resultant changes in ***neurotransmitters*** and ***hormones*** create an overwhelming impulse to seek out what scientists call "*highly palatable*," or *comfort*, foods.3-12

Surrendering to this impulse then triggers brain activity associated with reward, which temporarily alleviates stress, anxiety, and depression. This off-diet eating may result in weight gain, guilt, and renewed dieting—all stressors that perpetuate the cycle.3-10,13

If this sounds like your dieting pattern, your brain and hormones may be sabotaging your weight-loss attempts, and leaving you with undeserved guilt and frustration.

You may have stress-induced **reactional hyperphagia, which is defined as the abnormal increased appetite for consumption of food.**8,13,14

Many people who are not dieting still experience emotional stress from other sources and experience the same *compulsive-addictive* form of emotion-based overeating. This "stress-snacking" feedback cycle can eventually lead to weight gain and more stress. It is no coincidence that high obesity rates have become an escalating health concern during this era of chronically high stress levels.3-14

To maintain a healthy weight *comfortably*, it is important to interrupt and block this sabotaging **hyperphagic** cycle.

The good news is that scientists have developed a botanical formulation that helps break this pattern.

Saffron is a spice that is constituted from the red stigmas of *Crocus sativus* L. In randomized, placebo-controlled research on humans, a standardized and proprietary extract of saffron reduced the desire to snack, diminished the *craving* for comfort foods, produced satiety, and facilitated weight loss—without any stimulant effect, side effect risk, or unrealistic level of continuous willpower.

The 'Feed-Feedback' Cycle

Many weight-loss drugs that are meant to reduce appetite are dangerous. For example, phenylpropanolamine is associated with hemorrhagic stroke.17

However, a particular extract of saffron appears to be *unique* in its ability to target the *neurochemical pathways* underlying the craving for comfort foods and the compulsion to eat between meals (**reactional hyperphagia**).

Growing research has been shedding light on these pathways of compulsive snacking, and how they set up a ***feed-feedback cycle*** that is essentially stress, stress-relief, stress, stress-relief, and so on.

Early research showed that the food restrictions of weight-loss diets are major sources of stress and anxiety. Some people respond to this greater stress by developing *cravings* for specific (comfort) foods associated with *stress relief*, making them more susceptible to obesity than others.3-6

In 2004, a rodent study demonstrated that during chronic stress, ***glucocorticoids*** —hormones that are generated by the hypothalamus-pituitary-adrenal (HPA) axis and that predominantly affect metabolism—often stimulate activities in the brain that induce a preference for comfort food. Rats under stress consumed no more calories than the placebo group, but showed a distinct desire for getting a greater proportion of their calories from *comfort food*. Ingestion of comfort food diminished the signs of stress, creating a reward feedback—completing the *feed-feedback cycle*.7

A study in 2007 reviewed earlier research on both animals and humans, and proposed a theory termed ***Reward Based Stress Eating***. Evidence indicated that during stress, ***cortisol*** (a glucocorticoid), together with the body's *reward circuitry*, causes dysregulation of the finely tuned balance of appetite control. Cravings increase stress, which triggers an increase in the *reward value* of highly palatable (comfort) food. The result is an increased intake of high-calorie snack food, and a greater accumulation of visceral fat.8

Then, in 2009, researchers found that—in response to glucocorticoid-induced increases in comfort food intake—***circulating insulin levels*** rise. These increases, as well as greater deposition of abdominal fat, are directly and specifically linked to higher consumption of comfort-foods—rather than to higher consumption of calories from any source. These insulin effects appeared to dampen the response to stress, thus providing *reward feedback* (stress relief) for eating comfort foods.9

In a landmark study published in 2010, researchers found that the ***dysregulated brain reward pathways*** that trigger drug and alcohol addiction are identical to the *biomolecular mechanisms* behind comfort-food cravings.10

In a 2011 study, scientists discussed the *circular relationship* between **hyperphagia** (increased appetite), comfort food intake, and obesity. They suggested that in some individuals, the presence of this feed-feedback cycle at an early age may lead directly to obesity later in life. They further suggested that *obesity itself* may increase signaling along inflammatory, oxidative, and mitochondrial stress pathways—altering normal reward functions and promoting compulsive snacking.18

On the heels of these findings, and with obesity at epidemic levels, scientists searched in earnest for a way to safely break the feed-feedback cycle.

WHAT YOU NEED TO KNOW: CUT CRAVINGS WITH SAFFRON

- Stress, anxiety, or depression can induce a biomolecular mechanism that causes the comfort-food *cravings* and compulsive snacking that sabotage many weight-loss programs.
- Normal *brain reward pathways* are disrupted by this unbalancing of hormones and neurotransmitters, resulting in the *feed-feedback cycle* that causes food cravings and emotion-based snacking.
- A study recently found this negative cycle, known as **reactional hyperphagia**, to be virtually identical to the mechanism underlying drug addiction.10
- An extract of **saffron** (*Crocus sativus*) uniquely targets this *appetite dysregulation* at the ***neurotransmitter*** level and inhibits the snacking compulsion.
- Placebo-controlled studies found that **176.5 mg** a day of a proprietary saffron extract decreased snacking events by an average of **55%**!1,2

Targeting the Biochemistry of Appetite

In the quest for a novel intervention to block **reactional hyperphagia** and the cycle of compulsive snacking, attention quickly turned to the active components in **saffron** —and for a number of good reasons.

First, now that dieting and stress had been found to increase the reward value of comfort food for many people,8 it was natural to examine agents believed to modulate stress in order to identify those that might beneficially affect the appetite and snacking impulse. In ancient medical systems, saffron has traditionally been used to reduce anxiety, relieve stress, and enhance mood.19

Second, no effective FDA-approved *drug* is available that can regulate the neurochemistry of appetite without substantially dangerous side effects,20 which have been found to include *pulmonary hypertension* and *heart valve disease*.21 Scientists realized that—if verified to be effective in inhibiting the snacking compulsion in placebo-controlled studies on humans— saffron would constitute a safe and natural alternative.

Third, neurotransmitter imbalance, particularly low levels of serotonin, has been shown to increase vulnerability to overeating, food cravings, and depression.22 A number of journal-published studies had shown that ***safranal*** and ***crocin***, active constituents of saffron, have demonstrated effects comparable to prescription medications in mitigating the symptoms of depression.23-25 One of the most commonly prescribed group of anti-depressant medications are the ***selective serotonin reuptake inhibitors*** (SSRI), which are well known to produce a number of adverse side effects, including sedation, weight gain, sexual dysfunction, and suicidal thoughts.26-28 This improved serotonin-enhancing activity suggested that saffron may be a safe and potent weapon to break the feed-feedback cycle and inhibit **reactional hyperphagia** —for several reasons:

1. Stress increases levels of ***cortisol***, which can cause dysregulation of appetite—serotonin, through ***serotonergic neurons***, regulates appetite.12
2. Stress activates the entire HPA axis, which is involved in the feed-feedback cycle—and serotonin regulates and normalizes HPA activity.29
3. Compulsive snacking and **reactional hyperphagia** are strongly related to depression, anxiety, and mood—and serotonin can improve all of these snacking-related emotional states.30
4. Stress increases levels of glucocorticoids, which can diminish the *transport efficiency* of serotonin, in turn lowering serotonin activity and negatively affecting both mood and appetite31 —promoting serotonin activity would be a natural way to counter this transport effect and favorably modulate both mood and appetite.

In subsequent animal and human studies, saffron extracts proved highly effective in safely managing depression and anxiety32-35 —the same emotional disorders that trigge**reactional hyperphagia**.

However, this constituted only an indirect link between saffron and modulation of the snacking compulsion. Scientists still needed to prove that saffron's powerful ability to modulate stress would in turn translate into a significant reduction in hyperphagic snacking, both in terms of desire and behavior.

For the gold standard in scientific proof, this would demand investigating the effects of saffron extract—*specifically* on

snacking desire and frequency—by conducting ***randomized, placebo-controlled, double-blind studies on humans***.

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Inhibiting the Snacking Impulse in Humans

To corroborate that a proprietary extract of saffron targets the neurochemistry at the root of compulsive eating, scientists first conducted a small placebo-controlled, double-blind pilot study on a small group of **16** women. Half of the women were given the proprietary saffron (*Crocus sativus*) daily for extract for **4 weeks**, while the other half took placebo.

Remarkably, **all** of the women taking the saffron extract decreased their between-meal snacking, while women taking the placebo experienced no improvement! Equally noteworthy, the women in the saffron group reported decreased feelings of hunger at lunch and dinner. There was an average weight loss, largely in the form of fat from the thighs, of **3.63 pounds**.1

Following these findings, scientists launched a full-scale, randomized, double-blind, placebo-controlled clinical trial, enlisting 60 mildly overweight, female volunteers ranging in age from 25 to 45. This time, however, at least half of the women selected suffered from ***compulsive between-meal snacking behavior,*** although participants were not assessed specifically for their level of anxiety or stress. Women were excluded if they had any history of cancer, diabetes, gastric surgery, pathological eating disorders (such as anorexia and bulimia nervosa), abnormal liver or kidney function or were currently using any medications (such as antidepressants) or supplements that might interfere with the results.

As before, half of the subjects were given **daily** doses of **176.5 mg** of patented saffron extract—but this time, for a full **8 weeks** —while the others took an identical-looking placebo. All subjects were instructed to otherwise maintain their *normal* dietary and lifestyle habits, and all between-meal food consumption was recorded.

The saffron extract significantly reduced the frequency of snacking events to a degree that the journal-published study described as "most striking." At the beginning of the study, both groups indulged in an average of **12** between-meal snacks per week. After 8 weeks, the number of snacking events for the placebo group fell somewhat to **8.9** per week, a decrease of **28%**. By comparison, between-meal snacks for the saffron group decreased to just **5.8** per week, a snacking decrease, over 8 weeks—of **55%**!2

The reduction in snacking events among the saffron-extract group paralleled an *increase* in satiety sensation. These women reported

INHIBITING THE BIOCHEMISTRY OF COMFORT-FOOD CRAVINGS

- Dieting and other stressors often disrupt levels of certain hormones and neurotransmitters.
- This triggers an increase in the biochemical reward value of comfort food.
- The result is a mechanism known as **reactional hyperphagia**, involving intense

significantly *reduced* feelings of hunger before meals, and a reduced feeling of the "need" to snack between meals. These saffron subjects experienced significantly greater feelings of alertness and energy.

The key objective of the study was to assess the effect of saffron extract on the frequency of snacking, and because the volunteers were only mildly overweight, substantial weight loss was not expected. Still, the increased satiety and **55% decreased** snacking had an effect on weight. The saffron group experienced an average weight loss of over **2** pounds during this **8-week** period of eating normally!2

While no conclusions could be reached regarding the mechanism of action for saffron extract, the study team did note that new saffron research data suggests that the benefits could be related to saffron's impact on mild-moderate anxiety.2 This finding was upheld in the current study when during the administration of a global health survey at the end of supplementation, those in the saffron group reported feeling significantly more alert and energetic than those in the placebo group. This same trend continued on follow up several weeks after completion of supplementation.2 This modest weight loss shows why more than just reduced calorie consumption is needed to produce meaningful fat loss. Taking standardized green coffeeberry extract before each meal resulted in 17.6 pounds of weight loss in a study published in 2012.36

food cravings.

- These irresistible compulsions increase snacking, comfort-food intake—and as a consequence, weight.
- The abnormal *feed-feedback cycle* promotes more dieting, more stress—and more cravings.
- No *drug* is available that can safely rebalance the neurochemistry of appetite.
- Constituents in **saffron** extract are believed to increase *serotonin* activity in the brain, which then normalizes the biochemistry of appetite regulation.
- Restored appetite regulation results in improved mood, increased satiety, and a decrease in between-meal food cravings.1,2

Broader Benefits

In addition to its ability to target the *biochemical root* of compulsive snacking, saffron has been shown to exert a wide range of other protective health effects. The mechanisms behind these broader benefits are not yet clear, but they may stem from the ability of saffron's constituents to modulate the HPA axis, as well as serotonin and other neurotransmitters.

Cancer is a growing health concern worldwide, causing more than **7.5 million** deaths each year.37 Botanical extracts have been one of the main sources for development of chemopreventive agents.38 Recent scientific evidence, both *in vitro* and *in vivo*, has suggested that saffron extract and its main active constituents, can help inhibit carcinogenesis and tumorigenesis.39-42 Rodent studies demonstrate that saffron can reduce the side effects of the anticancer drug Cisplatin® (*cisplatinum*).43,44 These findings have prompted extensive current research on saffron and its components, including *safranal* and *crocin*, as promising chemopreventive agents.

The mechanism for saffron's anticancer potential is not known but may be related to its demonstrated high free-radical scavenging activity.45-47

Saffron is thought to have some action in supporting the serotonergic system in the brain and is well supported through research as a natural anti-anxiety and antidepressant agent that does not include the side effects of pharmaceutical options.32-35,48 In fact, this same potential serotonin effect is believed to be largely behind its ability to inhibit comfort food impulses, compulsive snacking, and sugar cravings, as well as to promote weight loss.1,2,49

Another benefit, research has suggested, is the potential of saffron to slow the progress of the eye conditions, macular degeneration and retinitis pigmentosa.50-52

In traditional and folk medicine, saffron is used for many medical benefits, including as a remedy for pain (an analgesic), poor digestion, high blood pressure, high cholesterol, respiratory diseases, and Alzheimer's disease.53

Saffron is a spice derived from the flower of the *Crocus sativus* plant, which is indigenous to southwest Asia. It is the most expensive spice in the world by weight—and for good reason.

Each plant holds a maximum of four flowers, and each flower holds three deep crimson *stigmas*. The tiny stigma, and the thin filament stalk connecting it to the flower, are harvested—by hand—and dried to make saffron.

There has been a great deal of scientific interest in the many complex metabolites found in saffron. Although saffron is estimated to contain over 150 chemical compounds, only about 40 to 50 constituents have so far been identified, two of which have been extensively studied.54-77 The two main, *pharmacologically active* compounds in saffron are ***crocin*** and ***safranal***. Crocin is a saffron-colored, water-soluble carotenoid, which provides saffron's color.58 Safranal is the volatile oil responsible of the odor that is characteristic of saffron.54 Other constituents include proteins, sugars, vitamins, flavonoids, amino acids, mineral matter, gums, and other chemical compounds.78

Saffron has a long history of medicinal use in traditional folk medicine. Studies have concluded that extract of saffron combats depression, anxiety, and emotional stress.19,23-25 Some research suggests saffron's constituents have anti-carcinogenic (cancer-suppressing) and antioxidant properties.39-42,45,46

Placebo-controlled studies on humans have recently established that a proprietary extract of saffron containing crocin and safranal uniquely targets appetite dysregulation at the *neurotransmitter* level. This substantially improves mood, and reduces food cravings and between-meal snacks.1,2

Summary

Scientists have discovered that there is a stress-induced mechanism behind the comfort-food *cravings* and compulsive snacking that sabotage many weight-loss programs.

Unbalanced hormones and neurotransmitters disrupt the normal *brain reward pathways*. The result is an induced *feed-feedback cycle*, known as **reactional hyperphagia**, which causes food cravings.

A study recently found this cycle to be all but identical to the mechanism underlying drug addiction.10

A proprietary extract of **saffron** (*Crocus sativus*) uniquely targets this *appetite dysregulation* at the ***neurotransmitter*** level, inhibiting the snacking compulsion.

Placebo-controlled studies found that a **daily** dose of **176.5 mg** of a proprietary saffron extract decreased the average number of snacking incidents by **55%** and decreased between-meal snacking—for **all** of the women taking saffron!1,2

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

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