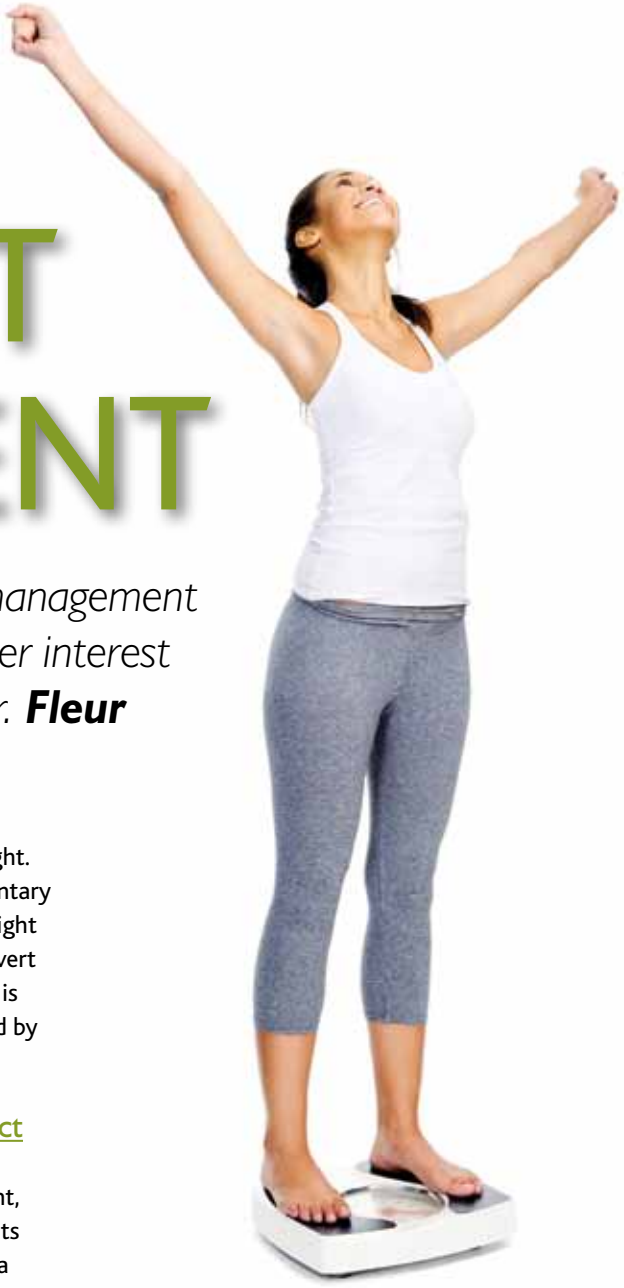
TOP TEN FOR WEIGHT MANAGEMENT



The potential side-effects of prescription weight management drugs, not to mention the cost, has led to a greater interest in natural products as a means to getting slimmer. ***Fleur Borrelli*** *explores the options…*

In recent decades the world has seen an unprecedented rise in the prevalence of overweight and obesity. The World Health Organization's latest projections are that globally, 2.3 billion adults will be overweight and 700 million obese by 2015[1]. In an effort to get to grips with the problem, the American Medical Association has recently reclassified obesity as a disease. This may undoubtedly provide more scope for pharmacological interventions; existing approaches include the suppression of appetite, the prevention of absorption of macronutrients and more currently, an anorectic drug which also acts as a 5-HT receptor agonist[2]. In stark contrast, natural approaches tend to target metabolism.

METABOLIC STIMULATION THROUGH THERMOGENESIS

Thermogenesis, or heat production, accounts for approximately 10 per cent of the energy output of an active person, compared to up to 80 per cent in a sedentary one[3]. Because of central heating we tend to live a 'thermo-neutral life', so thermogenesis is, therefore, not necessary. Absence of thermogenesis reduces Brown Adipose Tissue (BAT), which plays a major role in the maintenance of a healthy body weight. This brings with it the risk that sedentary people may have a higher risk of weight gain[4]. The function of BAT is to convert energy from food into heat and this is controlled by noradrenaline, released by the sympathetic nervous system.

1. Green Coffee Bean Extract (GCBE)

Extracted from the green coffee plant, GCBE is rich in the active components chlorogenic acid and caffeic acid. In a systematic review and meta-analysis of randomised, clinical trials, researchers concluded that the use of green coffee shows promising results and may be considered a weight loss tool[5]. Another study has shown that a particular extract could help to reduce blood sugars after a meal, possibly due to the inhibition of glucose-6-phosphatase which regulates blood glucose levels by catalysing the final step in gluconeogenesis[6]. And in a further study, the same extract also favoured the breakdown of fat reserves[7].

2. Green Tea Extract (GTE)

GTE has a long history of use in supporting a healthy metabolism. A placebo-controlled trial showed a significant effect on body weight and a reduction in total fat and white fat by activation of extra thermogenesis, through a bioactive combination of supplements, including GTE and caffeine from green tea[8]. Catechin, found in green tea, may inhibit the breakdown of noradrenaline, while caffeine decreases the production of AMP and ATP, increasing heat production and consumption of free fatty acids and glucose by brown adipose tissue[9].

3. Capsaicin Extract (CE)

Capsaicinoids are known for giving chilli peppers their fiery heat. They too may play a role in thermogenesis, by stimulating the enzyme tyrosine hydroxylase, which converts the precursor amino acid L-tyrosine into noradrenaline[10].

For non-users of spicy food, capsiate found in sweet peppers may be a more

palatable alternative. In a systemic review of both capsaicin and capsiate, evidence seems to indicate that both increase energy expenditure and enhance fat oxidation[11]. In addition, weight is given to the fact that both may suppress orexigenic sensation and therefore reduce appetite.

ANTI-FAT NUTRIENTS THAT TARGET THE BRAIN

Researchers at the Department of Neuroendocrinology at the University of Luebeck in Germany, put a different slant on weight gain and obesity. They present the novel view that the brain is the master controller of metabolism and the brain allocates an 'energy-on-request' system, which uses three behavioural strategies. The first is designed to allocate energy from the body to the brain. Failing this, it will encourage a search in the immediate environment for food and if this is not successful, will encourage foraging behaviour in the distant environment for food[12]. Any disruptions in this energy request pathway are those, for example, that remove the need to move to find food; high meal frequency or eating ahead of hunger. This, apparently, is critical to the development of excessive weight. It seems logical, therefore, to include nutrients that provide energy to the brain and encourage foraging behaviour.

4. L-Glutamine

Glutamine is involved in more metabolic processes than any other amino acid. It is involved in, for example, the metabolism of protein, fat and carbohydrates and is a fuel source for the cells lining the intestine. In the central nervous system it is converted into both the excitatory neurotransmitter glutamate and the calming one, Gamma Aminobutyric Acid (GABA). GABAergic neurons depend on glutamatergic neurones being 'overfed' before they receive their energy supply. For this reason, glutamine may offer protection against food cravings caused by a lack of energy in the brain. Indeed, the Whitehall II study has found a link between those who are overweight or insulin-resistant, with an increased chance of depression and other mental disorders[13].

5. Crocus Sativus extract

Crocus Sativus is the plant from which saffron is produced. Saffron contains, among many substances, the water-soluble carotenoids known as crocins. It has recently been shown that saffron and other active constituents can help recover insulin sensitivity in muscle cells and hyperinsulinemia, effectively regulating blood sugar[14]. By restoring insulin signalling in muscle cells, foraging behaviour can begin and energy can be allocated from the periphery to the brain. Because of its influence on receptors and enzyme function, crocins may influence multiple pathways related to diseases, including type II diabetes and metabolic syndrome[15].

FAT TO MAKE YOU THIN

Research results from the 1960s and 70s showed that fats were bad for health and people should eat as little as possible. As a consequence, margarine and vegetarian butters became increasingly popular, alongside a number of other 'light' products. A later analysis of that same research revealed that the studies pertained to the overall consumption of fat and no distinction had been made between the different types of fat[16]. It is now current opinion that many fats, in their correct ratios, are vital for maintaining health and may even aid fat loss in the body.

6. Extra virgin olive oil

Extra virgin olive oil contains a polyphenolic compound, Hydroxytyrosol (HT), which has long been considered a potent antioxidant. But according to a team of researchers from China, HT may also stimulate mitochondrial biogenesis and, as a consequence, the functioning of the mitochondria. They bring together mitochondrial biogenesis and the Phase II antioxidant system, suggesting that HT might not only work as an antioxidant, but also as a phase II enzyme inducer[17]. Mitochondrial function can, therefore, act more efficiently due to the suppression of reactive oxygen species and subsequent strengthening of the cell. The effect of all of this is that it may enhance fatty acid oxidation and therefore reduce the risk of weight gain, obesity and diabetes.

7. Coconut oil

Coconut oil contains Medium-Chain Triglycerides (MCT). Because MCTs are readily-absorbed, even without lipase activity, they are pre-eminently suited to providing an energy source for beta-oxidation. Beta-oxidation is the process by which fatty acid molecules are broken down in the mitochondria to generate energy. On account of its high performance-enhancing, ergogenic value, coconut oil is often used by sport practitioners.

According to a study by the American Society of Nutritional Sciences, MCTs can be readily-oxidised by the liver and because of their faster rate of oxidation, lead to greater energy expenditure and less body weight gain[18]. This also means that the size of fat deposits

is also decreased and they have a greater satiating effect than their counterparts, long-chain triglycerides, which can help to facilitate weight control.

8. L-Carnitine

L-carnitine plays an essential role in the conversion of fatty acids into energy in the mitochondria. In fact, it is the only substance capable of transporting long-chain fatty acids, found in animal fats and full-fat dairy products, into the inner mitochondrial membranes to undergo beta-oxidation. A diet containing high amounts of saturated fats will prompt the liver to produce more cholesterol (LDL cholesterol). A study conducted by the American Diabetes Association has found that carnitine may improve insulin sensitivity and glucose disposal in both healthy subjects and those with type 2 diabetes[19].

TARGETING METABOLISM VIA THE IMMUNE SYSTEM

Both the metabolism and immune system are essential for our survival. A highly-integrated and optimal functioning of one is therefore dependent on the other. As a consequence, a link is thought to exist between obesity, chronic low grade inflammation, insulin-resistance and endothelial dysfunction in the gut[20]. Additional studies have suggested that the microbial landscape in our gut may play an important role in the way energy is disposed of or stored in adipocyte tissue[21].

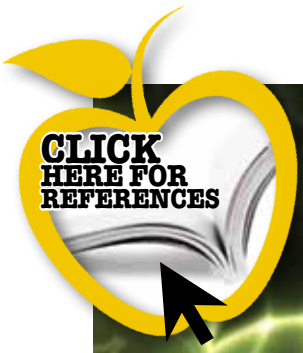
9. Probiotics

Because our gut ecology may be instrumental in the modulation of our immune system and inflammatory status associated with obesity, current research on obesity has focused on this area. A very recent study published in the *British Journal of Nutrition* conducted by scientists from the Milk Science Research Institute, showed that consuming a fermented milk product containing a lactobacillus strain had caused an 8.5 per cent decrease in abdominal fat in 12 weeks. The randomised,controlled trial used 210 Japanese adults with a large visceral fat area. Other measures included BMI, waist and hip circumferences and body fat mass which had all seen significant decreases. However, the study also showed that supplementation should be continued for the effect to be maintained[22].

10. Resveratrol

Resveratrol is a type of salvestrol, which is an antibody produced by plants to protect them against fungi and insect damage. It can mainly be found in red grapes and in low concentrations in red wine. Studies into the health effects of resveratrol are currently undergoing explosive growth. The power of resveratrol lies in the fact that it imitates calorie restriction. Both the former and the latter activate SIRT1, a protein that regulates metabolism in various tissues. Higher SIRT1 activity may inhibit the formation and also stimulate the breakdown of white adipose tissue and genes that stimulate fat storage[23]. In addition, a clinical trial involving patients with type 2 diabetes revealed that glucose tolerance may improve after administration of resveratrol[24].

Far from being a disease, weight increase and obesity may simply be a natural reaction to an abundant environment. Using the model suggested by the Department of Neuroendocrinology at the University of Luebeck[25], abundance means never having to go and forage for food and the brain, in overweight and obese subjects, may have lost its 'pulling' power. In other words, the systems regulating their energy metabolism, have been disturbed. By introducing healthy eating and exercise alongside supplements that target the metabolism, practitioners may have a better chance of success.



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