

# Achieving Optimal Weight

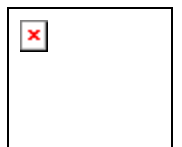
Evidence-Based, Natural Medicine  
"A Critical Review"



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# Statistics/Background

## **About two-thirds**

of the adult  
U.S. population  
is overweight.

## **In the**

1990s,  
rates of obesity  
more than doubled,  
and are currently  
rising by over 5% per year.

## **Excess body weight is implicated**

as a risk factor for many different disorders,  
including heart disease, diabetes, several cancers  
(such as breast cancer in postmenopausal women, and cancers  
of the uterus, colon, and kidney), prostate enlargement (BPH)  
, female infertility, uterine fibroids, and gallstones  
, as well as several disorders of pregnancy.

[JAMA](#). 1999 Dec 8;282(22):2136-42.

## **A prospective study of weight change and health-related quality of life in women.**

OBJECTIVE: To investigate, prospectively, the association between weight change and health-related quality of life in women. A cohort of 40098 women grouped according to 3 patterns of weight change over the 4-year period: women whose weight remained within 2.25 kg (5 lb) of their baseline weight, women who lost 2.25 kg (5 lb) or more, and women who gained 2.25 kg (5 lb) or more. Weight gain was associated with decreased physical function and vitality, and increased bodily pain regardless of baseline weight. Weight loss in overweight women was associated with improved physical function and vitality as well as decreased bodily pain. The impact of weight change, especially weight gain, was just as strong in women 65 years and older as in women younger than 65 years.

[Arch Intern Med](#). 1994 Jun 27;154(12):1325-30.

## **Medical, metabolic, and psychological effects of weight cycling.**

Repeated bouts of weight loss and regain, known as weight cycling or yo-yo dieting, are highly prevalent, occur in males and females, and are common in both overweight and non-overweight individuals. There are strong and consistent links between body weight variability and negative health outcomes, particularly all-cause mortality and mortality from coronary heart disease. Weight cycling may also have negative psychological and behavioral consequences; studies have reported increased risk for psychopathology, life dissatisfaction, and binge eating. The bulk of epidemiologic research shows an association of weight variability with morbidity and mortality, although the mechanisms are not clear at present.

## **The health at any size paradigm for obesity treatment: the scientific evidence.**

Traditional weight loss (TWL) treatments have been unsuccessful at reducing the prevalence of obesity in the population. Health-care professionals and consumers have criticized TWL treatments as being detrimental to the obese person's health. Consequently, an alternative approach to obesity treatment, the health at any size (H@AS) paradigm, has been proposed. The H@AS paradigm is based on the philosophy that once diet restrictions and barriers to activity have been removed, the individual will develop healthier eating and activity patterns that lead to a naturally healthy body weight. This paper reviews the philosophical foundation and the scientific data that support and oppose the H@AS paradigm and compares it with that of TWL treatments.

## **What is ideal weight?**

### **Body Mass Index (BMI)**

$$\text{BMI} = \frac{\textit{weight (kg)}}{\textit{height} \times \textit{height (m} \times \textit{m)}}$$

$$\text{BMI} = 703 \frac{\textit{weight (lb)}}{\textit{height} \times \textit{height (in} \times \textit{in)}}$$

less than 20 = underweight

over 25 = overweight

over 30 = obese

### **Body Fat Percentages**

Measured with Calipers/skin fold or water measurements

| <b>Description</b> | <b>Women</b> | <b>Men</b> |
|--------------------|--------------|------------|
| Essential fat      | 10-13%       | 2-5%       |
| <u>Athletes</u>    | 14-20%       | 6-13%      |
| <u>Fitness</u>     | 21-24%       | 14-17%     |
| Acceptable         | 25-31%       | 18-24%     |
| <u>Obesity</u>     | 32%+         | 25%+       |

**Absolute Waist Circumference** >102 cm in men and >88 cm in women  
**Waist-Hip Ratio** >0.9 for men and >0.85 for women

## **Gestalt**

Both doctor and patient can see "by eye" whether excess fat is a concern.

## **Medical options**

Dextroamphetamine (Dexedrine)

Methamphetamine (Desoxyn)

Orlistat (Xenical)

Phentermine (Fastin, Ionamin)

Sibutramine (Meridia)

Caffeine

## **DIETS (...starts with the word 'die')**

## **Breast-feeding**

Lancet. 2002 Jun 8;359(9322):2003-4.

### **Breastfeeding and lowering the risk of childhood obesity.**

Breastfeeding might confer protection against obesity later in life, but the evidence is inconclusive. We tested the hypothesis that breastfeeding is associated with a reduced risk of obesity in a population-based sample of 32200 Scottish children studied at age 39-42 months in 1998 and 1999. Obesity was defined as body-mass index (BMI) at the 95th and 98th percentiles or higher. The prevalence of obesity was significantly lower in breastfed children, and the association persisted after adjustment for socioeconomic status, birthweight, and sex. The adjusted odds ratio for obesity (BMI > or = 98th percentile) was 0.70 (95% CI 0.61-0.80). Our results suggest that breastfeeding is associated with a reduction in childhood obesity risk.

## **Calorie restriction**

Med Sci Sports Exerc. 1999 Aug;31(8):1129-34.

**How effective are traditional dietary and exercise interventions for weight loss?**

The purposes of this paper were to examine the history and effectiveness of diet and exercise in obesity therapy and to determine the best future approach for health promotion in the obese population. A brief survey of the most popular dieting techniques used over the past 40 yr shows that most techniques cycle in and out of popularity and that many of these techniques may be hazardous to health. Data from the scientific community indicate that a 15-wk diet or diet plus exercise program produces a weight loss of about 11 kg with a 60-80% maintenance after 1 yr. Although long-term follow-up data are meager, the data that do exist suggest almost complete relapse after 3-5 yr.

## **Low-fat, low-calorie** **Low-carbohydrate, high-protein diets**

[Am J Med.](#) 2002 Jul;113(1):30-6.

### **Effect of 6-month adherence to a very low carbohydrate diet program.**

To determine the effect of a 6-month very low carbohydrate diet program on body weight and other metabolic parameters. Fifty-one overweight or obese healthy volunteers who wanted to lose weight were placed on a very low carbohydrate diet (<25 g/d), with no limit on caloric intake. Forty-one of the 51 subjects attended visits through 6 months. In these subjects, the average body weight decreased 10.3% +/- 5.9% from baseline to 6 months (body weight reduction of 9.0 +/- 5.3 kg and body mass index reduction of 3.2 +/- 1.9 kg/m<sup>2</sup>). Serum total cholesterol level decreased 11 +/- 26 mg/dL, low-density lipoprotein cholesterol level decreased 10 +/- 25 mg/dL, triglyceride level decreased 56 +/- 45 mg/dL, high-density lipoprotein (HDL) cholesterol level increased 10 +/- 8 mg/dL, and the cholesterol/HDL cholesterol ratio decreased 0.9 +/- 0.6 units .

Recently, three controlled trials found people using low-carbohydrate, high-fat diets lost more weight in six months than those using diets low in fat and calories. In one of these trials continued for an additional six months, at the end of which there was no longer a significant difference in weight loss between the two diet groups.

[N Engl J Med.](#) 2003 May 22;348(21):2082-90.

### **A randomized trial of a low-carbohydrate diet for obesity.**

We conducted a one-year, multicenter, controlled trial involving 63 obese men and women who were randomly assigned to either a low-carbohydrate, high-protein, high-fat diet or a low-calorie, high-carbohydrate, low-fat (conventional) diet. Professional contact was minimal to replicate the approach used by most dieters. The low-carbohydrate diet produced a greater weight loss (absolute difference, approximately 4 percent) than did the conventional diet for the first six months, but the differences were not significant at one year. The low-carbohydrate diet was associated with a greater improvement in some risk factors for coronary heart disease. Adherence was poor and attrition was high in both groups. Longer and larger studies are

required to determine the long-term safety and efficacy of low-carbohydrate, high-protein, high-fat diets.

[Prev Cardiol.](#) 2002 Summer;5(3):110-8.

### **The effect of high-, moderate-, and low-fat diets on weight loss and cardiovascular disease risk factors.**

One hundred men and women followed one of four dietary programs for 1 year: a moderate-fat program without calorie restriction; a low-fat diet; a Moderate Fat, calorie-controlled diet; and a high-fat diet. The Medium fat diet resulted in a 2.6% decrease in weight compared with 18.4% decrease in patients on a low fat diet, 12.6% (p=0.0085) decrease in patients on a Moderate Fat, calorie-controlled diet, and 13.7% (p=0.025) decrease in those on the High Fat diet. Only patients following HF diets showed a worsening of each cardiovascular disease risk factor (LDL-C, Triglycerides, Total Cholesterol, HDL-C, TC/HDL ratio, Homocysteine, Lipoprotein(a), and fibrinogen) despite achieving statistically significant weight loss.

[Angiology.](#) 2000 Oct;51(10):817-26.

### **The effect of high-protein diets on coronary blood flow.**

Individuals receiving the same medical treatment but following a high-protein diet showed a worsening of independent risk factors, in addition to progression of Coronary Artery Disease (CAD). These results would suggest that high-protein diets may precipitate progression of CAD through increases in lipid deposition and inflammatory and coagulation pathways.

In obese people with insulin resistance, weight loss was greater with a low-carbohydrate (40% of calories), high-fat (40% of calories) diet than with a high-carbohydrate (60% of calories), low-fat (20% of calories) diet. In contrast, obese people who did not have insulin resistance lost more weight on the high-carbohydrate, low-fat diet.

## **Low-glycemic-index foods**

[Arch Pediatr Adolesc Med.](#) 2000 Sep;154(9):947-51.

### **A low-glycemic index diet in the treatment of pediatric obesity.**

**Spieth LE, Harnish JD, Lenders CM, Raezer LB, Pereira MA, Hangen SJ, Ludwig DS.**

To examine the effects of a low-glycemic index (GI) diet compared with a standard reduced-fat diet in the management of pediatric obesity. A total of 64 patients received the low glycemic index diet and 43 received the reduced-fat diet for 4.3 vs 4.2 months' mean duration of follow-

up, with 3.3 vs 3.3 mean number of visits, respectively. Body mass index and body weight decreased more in the low-GI group compared with the reduced-fat group.

## **Fiber**

[Nutr Rev.](#) 2001 May;59(5):129-39.

### **Dietary fiber and weight regulation.**

Under conditions of fixed energy intake, the majority of studies indicate that an increase in either soluble or insoluble fiber intake increases postmeal satiety and decreases subsequent hunger. The observed changes in energy intake and body weight occur both when the fiber is from naturally high-fiber foods and when it is from a fiber supplement. In view of the fact that mean dietary fiber intake in the United States is currently only 15 g/day (i.e., approximately half the American Heart Association recommendation of 25-30 g/day), efforts to increase dietary fiber in individuals consuming <25 g/day may help to decrease the currently high national prevalence of obesity.

### My General Lifestyle Recommendations:

- 1) Exercise
- 2) Less calories
- 3) More fiber
- 4) Good Fats
- 5) Whole grains
- 6) Breakfast
- 7) Be Consistent

## **SUPPLEMENTATION**

### **Multiple vitamin/minerals**

### **Pyruvate**

Pyruvate is a compound that occurs naturally in the body. It is the output of the metabolism of glucose known as glycolysis. One molecule of glucose breaks down into two molecules of pyruvic acid, which are then used to provide further energy. Provided that sufficient oxygen is available, pyruvic acid is converted into acetyl-coenzyme A, which is the main input for a series of reactions known as the Krebs cycle.

Am J Clin Nutr. 1994 Feb;59(2):423-7.

### **Pyruvate supplementation of a low-cholesterol, low-fat diet: effects on plasma lipid concentrations and body composition in hyperlipidemic patients.**

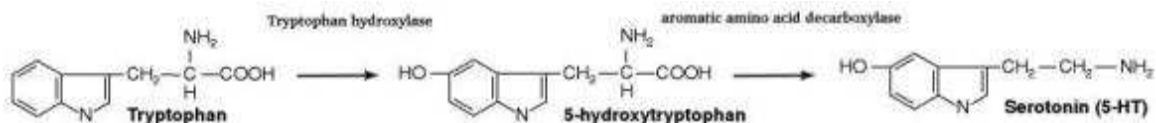
The effects of pyruvate on plasma lipid concentrations and body composition were evaluated in hyperlipidemic patients consuming a low-cholesterol, low-fat diet. After consuming the above diet for 4 wk, during which time plasma lipid concentrations decreased, 34 subjects were randomly assigned to receive either 22-44 g pyruvate (n = 17) or 18-35 g polyglucose (placebo, Polycose, n = 17), iso-energetically substituted for a portion of carbohydrate energy for 6 wk. Despite greater weight and fat losses with pyruvate (P < 0.05), plasma concentrations of cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride were not different between the two groups of subjects. We conclude that subsequent to diet-induced reduction in plasma lipid concentrations, pyruvate supplementation of a low-cholesterol, low-fat diet enhances body weight and fat losses.

Nutrition. 1999 May;15(5):337-40.

### **The effects of pyruvate supplementation on body composition in overweight individuals.**

A 6-wk, double-blinded, placebo-controlled study was done to ascertain the effects of pyruvate supplementation (6 g/d) on body weight, body composition, and vigor and fatigue levels in healthy overweight Caucasian men and women. Twenty-six individuals were randomly assigned to a placebo group (seven men, seven women) and a pyruvate-supplemented group (three men, nine women). In addition, all subjects participated in a 3 d/wk exercise program, which consisted of a 45-60 min aerobic/anaerobic routine. After 6 wk of treatment, there was a statistically significant decrease in body weight (-1.2 kg, P<0.001), body fat (-2.5 kg, P<0.001), and percent body fat (23.0% pre versus 20.3% 6 wk post) in the pyruvate group. Furthermore, Profile of Mood States fatigue and vigor scores improved significantly for the pyruvate group (P<0.05) at 6 wk (vigor) and 4 and 6 wk (fatigue). There was no significant change in total lean body mass in the pyruvate group. Thus, the ingestion of 6 g of pyruvate for 6 wk, in conjunction with mild physical activity, resulted in a significant decrease in body weight and fat mass.

### **5-hydroxytryptophan (5-HTP)**



5-hydroxytryptophan (5-HTP), the precursor to the chemical messenger (neurotransmitter) serotonin, has been shown in three short-term controlled trials to reduce appetite and to promote weight loss.

[J Neural Transm.](#) 1989;76(2):109-17.

### **The effects of oral 5-hydroxytryptophan administration on feeding behavior in obese adult female subjects.**

Nineteen obese female subjects with body mass index ranging between 30 and 40 were included in a double-blind crossover study aimed at evaluating the effects of oral 5-hydroxytryptophan administration on feeding behavior, mood state and weight loss. Either 5-hydroxytryptophan (8 mg/kg/day) or placebo was administered for five weeks during which patients were not prescribed any dietary restrictions. Feeding behavior was investigated by means of a questionnaire designed to establish the onset of anorexia and related symptoms. Food intake was evaluated using a three-day diet diary. The administration of 5-hydroxytryptophan resulted in decreased food intake and weight loss during the period of observation.

[Am J Clin Nutr.](#) 1992 Nov;56(5):863-7.

### **Eating behavior and adherence to dietary prescriptions in obese adult subjects treated with 5-hydroxytryptophan.**

Previous observations have shown that oral administration of 5-hydroxytryptophan (5-HTP) without dietary prescriptions causes anorexia, decreased food intake, and weight loss in obese subjects. To confirm these data over a longer period of observation and to verify whether adherence to dietary restriction could be improved by 5-HTP, 20 obese patients were randomly assigned to receive either 5-HTP (900 mg/d) or a placebo. The study was double-blinded and was for two consecutive 6-wk periods. No diet was prescribed during the first period, a 5040-kJ/d diet was recommended for the second. Significant weight loss was observed in 5-HTP-treated patients during both periods. A reduction in carbohydrate intake and a consistent presence of early satiety were also found. These findings together with the good tolerance observed suggest that 5-HTP may be safely used to treat obesity.

## **DHEA (dehydroepiandrosterone)**

[Clin Endocrinol \(Oxf\).](#) 1998 Oct;49(4):421-32.

### **The effect of six months treatment with a 100 mg daily dose of dehydroepiandrosterone (DHEA) on circulating sex steroids, body composition and muscle strength in age-advanced men and women.**

Healthy non-obese age-advanced (50-65 yrs of age) men (n = 9) and women (n = 10) were randomized into a double-blind placebo-controlled cross-over trial. Sixteen subjects completed the one-year study of six months of placebo and six months of 100 mg oral DHEA daily. In both sexes, a 100 mg daily dose of DHEA restored serum DHEA levels to those of young

adults. In women, but not in men, serum A, T and DHT were increased to levels above gender-specific young adult ranges. In men, but not in women, fat body mass decreased 1.0 +/- 0.4 kg and knee muscle strength as well as lumbar back strength increased. In women, but not in men, an increase in total body mass of 1.4 +/- 0.4 kg was noted. No significant adverse effects were observed. These differences in response to DHEA administration may reflect a gender specific response to DHEA and/or the presence of confounding factor(s) in women such as oestrogen replacement therapy.

## **7-KETO**

The ability of 7-KETO (3-acetyl-7-oxo-dehydroepiandrosterone), a substance related to DHEA, to promote weight loss in overweight people has been investigated in one double-blind trial.

Curr Ther Res 2000;61:435–42

### **A randomized, double-blind, placebo controlled study of 3-acetyl-7-oxo-dehydroepiandrosterone in healthy overweight adults.**

A randomized, double-blind, placebo controlled study followed overweight people who consumed a 1,800 calorie per day diet and exercised three times per week for 45 minutes, as well as those given placebo. Patients taking 7-KETO had an average fat loss of 6.34 pounds, versus 2.1 pounds for those taking placebo. This is a threefold increase in weight loss. The 7-KETO group also had a 1.8% reduction in body fat, vs. only 0.57% in the placebo group-another threefold difference. The increased weight loss in the 7-KETO group was associated with a significant increase in levels of T3 (a thyroid hormone that plays a major role in determining a person's metabolic rate), although the levels of T3 did not exceed the normal range. At a dose of 100 mg twice daily, no adverse effects were reported.

## **Calcium**

Obes Res. 2004 Apr;12(4):582-90.

### **Calcium and dairy acceleration of weight and fat loss during energy restriction in obese adults.**

Increasing 1,25-dihydroxyvitamin D in response to low-calcium diets stimulates adipocyte Ca<sup>2+</sup> influx and, as a consequence, stimulates lipogenesis, suppresses lipolysis, and increases lipid accumulation, whereas increasing dietary calcium inhibits these effects and markedly accelerates fat loss in mice subjected to caloric restriction. Patients assigned to the standard diet lost 6.4 +/- 2.5% of their body weight, which was increased by 26% on the high-calcium diet and 70% (to 10.9 +/- 1.6% of body weight) on the high-dairy diet. Fat loss was similarly augmented by the high-calcium and high-dairy diets, by 38% and 64%, respectively. Increasing dietary calcium significantly augmented weight and fat loss secondary to caloric

restriction and increased the percentage of fat lost from the trunk region, whereas dairy products exerted a substantially greater effect.

[J Clin Endocrinol Metab.](#) 2004 Feb;89(2):632-7.

### **Effect of calcium supplementation on weight and fat loss in women.**

Data suggest that a diet deficient in calcium is associated with higher body weight and that augmenting calcium intake may reduce weight and fat gain or enhance loss. Analysis as separate trials also found no significant differences between the placebo and the calcium groups. Calcium supplementation did not significantly affect amount of weight or fat lost by women counseled to follow a moderately restricted diet for 25 wk. Nevertheless, the magnitude and direction of the differences for group means are consistent with a hypothesized small effect.

## **Conjugated Linoleic Acid (CLA)**

CLA is a fatty acid found naturally in animal tissues and food sources, including ruminant meats, poultry, eggs and dairy products, such as cheeses, milk and yogurt that have undergone heat processing treatments.

[Int J Obes Relat Metab Disord.](#) 2001 Aug;25(8):1129-35.

### **Conjugated linoleic acid (CLA) reduced abdominal adipose tissue in obese middle-aged men with signs of the metabolic syndrome: a randomised controlled trial.**

Abdominal obesity is strongly related to metabolic disorders. Recent research suggests that dietary conjugated linoleic acid (CLA) reduces body fat and may improve metabolic variables in animals. Twenty-five abdominally obese men (waist-to-hip ratio (WHR), 1.05 $\pm$ 0.05; body mass index (BMI), 32 $\pm$ 2.7 kg/m<sup>2</sup> (mean $\pm$ s.d.)) who were between 39 and 64-y-old participated in a double-blind randomised controlled trial for 4 weeks. Fourteen men received 4.2 g CLA/day and 10 men received a placebo. The main endpoints were differences between the two groups in sagittal abdominal diameter (SAD), serum cholesterol, low-density lipoprotein, high-density lipoprotein, triglycerides, free fatty acids, glucose and insulin. After 4 weeks there was a significant decrease in SAD (cm) in the CLA group compared to placebo. These results indicate that CLA supplementation for 4 weeks in obese men with the metabolic syndrome may decrease abdominal fat, without concomitant effects on overall obesity or other cardiovascular risk factors.

## **Fiber**

Fiber supplements are one way to add fiber to a weight-loss diet. Several trials have shown that supplementation with fiber from a variety of sources accelerated weight loss in people who were following a low-calorie diet.

[Acta Medica \(Hradec Kralove\)](#). 2000;43(4):129-32.

### **Long-term effect of fibre supplement and reduced energy intake on body weight and blood lipids in overweight subjects.**

A weight-reducing potential has been ascribed to high dietary fibre intake. To investigate the practical reliability of this hypothesis, fifty-three moderately overweight females (BMI > 27.5 kg/m<sup>2</sup>) on reduced energy intake (1200 kcal/day) were treated for 24 weeks with a fibre supplement on a randomly, double-blind, placebo-controlled basis. The fibre was administered as an initial dose of 6 g and a maintenance dose of 4 g. Body weight and blood pressure were recorded weekly during the first 3 months and thereafter every second week. Blood samples were drawn at start and at end of the study. Initial body weights were 75.6 +/- 1.6 kg in the fibre group versus 75.5 +/- 1.6 kg in the placebo group. After treatment, mean weight loss in the fibre group was 8.0 kg versus 5.8 kg in the placebo group.

[Nutr Rev.](#) 2001 May;59(5):129-39.

### **Dietary fiber and weight regulation.**

Under conditions of fixed energy intake, the majority of studies indicate that an increase in either soluble or insoluble fiber intake increases postmeal satiety and decreases subsequent hunger. The observed changes in energy intake and body weight occur both when the fiber is from naturally high-fiber foods and when it is from a fiber supplement. In view of the fact that mean dietary fiber intake in the United States is currently only 15 g/day (i.e., approximately half the American Heart Association recommendation of 25-30 g/day), efforts to increase dietary fiber in individuals consuming <25 g/day may help to decrease the currently high national prevalence of obesity.

## **Glucomanan**

Glucomanan, which is also classified as a soluble dietary fiber, is derived from konjac flour. Konjac flour itself is derived from the *Amorphophallus* species, plants which are related to the common philodendron house plant and which grow in only certain parts of the world, including some regions in China and Japan.

[Med Sci Monit.](#) 2005 Jan;11(1):PI5-8.

### **Experiences with three different fiber supplements in weight reduction.**

One hundred and seventy six men and women were included to receive either active fiber

substance or placebo in randomized placebo-controlled studies. The fiber supplements consisted of the viscous fibers glucomannan (Chrombalance), glucomannan and guar gum (Appe-Trim) and glucomannan, guar gum and alginat (Glucosahl). RESULTS: All fiber supplements plus a balanced 1200 kcal diet induced significantly weight reduction (1.7 Pounds/wk) more than placebo and diet alone, during a five week observation period.

Pediatr Med Chir. 1992 Mar-Apr;14(2):195-8.

### **[The use of highly purified glucomannan-based fibers in childhood obesity]**

To evaluate the effectiveness of highly purified glucomannan in childhood obesity a study has been carried out in 23 obese children (12 boys and 11 girls, aged 5.2-15.8 years), with excess weight of 51 +/- 16%, treated with 2-3 caps twice a day of glucomannan fibres, and in 30 obese children (aged 5-18 years) with excess weight of 51 +/- 10%, studied as controls. Excess weight and triglycerides levels were significantly decreased in treated obese patients than in obese controls 4 months after the beginning of the study. A decrease of cholesterol levels was also observed in treated obese patients. No important side-effects were observed in treated patients.

## **Hydroxycitric acid (HCA)**

(-)-Hydroxycitric acid (HCA), extracted from the rind of the *Garcinia cambogia* fruit grown in Southeast Asia, has a chemical composition similar to that of citric acid (the primary acid in oranges and other citrus fruits). Preliminary studies in animals suggest that HCA may be a useful weight-loss aid.

Physiol Behav. 2000 Oct 1-15;71(1-2):87-94.

### **Effects of (-)-hydroxycitric acid on appetitive variables.**

Eighty-nine mildly overweight females were prescribed 5020-kJ (1300 cal) diets for 12 weeks as part of a double-blind, placebo-controlled parallel group study. Forty-two participants ingested 400-mg caplets of *Garcinia cambogia* 30-60 min prior to meals for a total dose of 2.4 g/day (1.2 g/day HCA). Forty-seven participants ingested matched placebos. Weight and body composition were assessed at baseline and every other week for 12 weeks. Food intake and appetitive variables were assessed at baseline and monthly for 12 weeks. Both groups lost body weight with the active group achieving a significantly greater reduction (3.7 +/- 3.1 kg versus 2.4 +/- 2.9 kg). No effects of the HCA were observed on appetitive variables.

## **Chitosan**

Chitosan is a fiber-like substance extracted from the shells of crustaceans such as shrimp and crab. Chitosan contains more than 5,000 glucosamine units, respectively.

Animal studies suggested that chitosan supplementation reduces fat absorption, but controlled human trials have found no impairment of fat absorption from supplementation with 2,700 mg of chitosan per day for seven days or 5,250 mg per day for four days. A double-blind study in Poland found that people taking 1,500 mg of chitosan three times per day during a weight-loss program lost significantly more weight than did people taking a placebo with the same program. Other studies using smaller amounts of chitosan have reported no effects on weight loss.

## **Chromium**

The mineral chromium plays an essential role in the metabolism of carbohydrates and fats and in the action of insulin. Chromium is found in many foods, typically in small amounts. Good food sources of chromium include whole grains, cereals, spices (black pepper, thyme), mushrooms, brown sugar, coffee, tea, beer, wine and meat products. Brewer's yeast is also a good source of chromium.

[Int J Obes Relat Metab Disord.](#) 2003 Apr;27(4):522-9.

### **Chromium picolinate for reducing body weight: meta-analysis of randomized trials.**

The aim of this meta-analysis was to assess the evidence of chromium picolinate for reducing body weight. To be included, studies were required to state that they were randomized, double-blind and placebo-controlled, and report on body weight. Ten trials met all inclusion criteria and provided data, which were suitable for statistical pooling. For body weight a significant differential effect was found in favour of chromium picolinate. In conclusion, our meta-analysis suggests a relatively small effect of chromium picolinate compared with placebo for reducing body weight. The clinical relevance of the effect is debatable and the lack of robustness means that the result has to be interpreted with caution.

## **L-carnitine**

The amino acid L-carnitine is thought to be potentially helpful for weight loss because of its role in fat metabolism. L-carnitine transports long-chain fatty acids across the inner mitochondrial membranes in the mitochondria, where they are processed by beta-oxidation to produce biological energy in the form of adenosine triphosphate or ATP. In a preliminary study of overweight adolescents participating in a diet and exercise program, those who took 1,000mg of L-carnitine per day for three months lost significantly more weight than those who took a placebo.

[Int J Sport Nutr Exerc Metab.](#) 2000 Jun;10(2):199-207.

### **L-Carnitine supplementation combined with aerobic training does not promote weight loss in moderately obese women.**

For 8 weeks the L-C group ingested 2 g twice daily of L-C, while the placebo (P) group ingested the same amount of lactose. All subjects walked for 30 min (60-70% maximum heart rate) 4 days/week. Five of the L-C group experienced nausea or diarrhea and consequently did not complete the study. Eight weeks of L-C ingestion and walking did not significantly alter the total body mass or fat mass of overweight women, thereby casting doubt on the efficacy of L-C supplementation for weight loss.

## **Cayenne**

Research has suggested that incorporating cayenne pepper into the diet may help people lose weight. Controlled studies report that adding 6 to 10 grams of cayenne to a meal or 28 grams to an entire day's diet reduces hunger after meals and reduces calories consumed during subsequent meals.

## **Green tea**

Green tea extract rich in polyphenols (epigallocatechin gallate, or EGCG) may support a weight-loss program by increasing energy expenditure or by inhibiting the digestion of fat in the intestine. Must use 270mg of EGCG and 150mg of caffeine per day.

[Int J Obes Relat Metab Disord.](#) 2000 Feb;24(2):252-8.

### **Green tea and thermogenesis: interactions between catechin-polyphenols, caffeine and sympathetic activity.**

The thermogenic effect of tea is generally attributed to its caffeine content. We report here that a green tea extract stimulates brown adipose tissue thermogenesis to an extent which is much greater than can be attributed to its caffeine content per se, and that its thermogenic properties could reside primarily in an interaction between its high content in catechin-polyphenols and caffeine with sympathetically released noradrenaline (NA). Since catechin-polyphenols are known to be capable of inhibiting catechol-O-methyl-transferase (the enzyme that degrades NA), and caffeine to inhibit transcellular phosphodiesterases (enzymes that break down NA-induced cAMP), it is proposed that the green tea extract, via its catechin-polyphenols and caffeine, is effective in stimulating thermogenesis by relieving inhibition at different control points along the NA-cAMP axis. Such a synergistic interaction between catechin-polyphenols and caffeine to augment and prolong sympathetic stimulation of thermogenesis could be of value in assisting the management of obesity.

[Am J Clin Nutr.](#) 2005 Jan;81(1):122-9.

### **Ingestion of a tea rich in catechins leads to a reduction in body fat and malondialdehyde-modified LDL in men.**

A 12-wk double-blind study was performed in which the subjects ingested 1 bottle oolong

tea/d containing 690 mg catechins (green tea extract group; n = 17) or 1 bottle oolong tea/d containing 22 mg catechins (control group; n = 18). Daily consumption of tea containing 690 mg catechins for 12 wk reduced body fat, which suggests that the ingestion of catechins might be useful in the prevention and improvement of lifestyle-related diseases, mainly obesity.

## **Hoodia**

One small, double-blind clinical study in humans found that hoodia latex and inner plant can significantly reduce food intake. Available products are of unknown quality and much more work remains to be done to determine if hoodia will be a sustainable, safe way to reduce appetite.

## **Bitter orange**

Although historically used to stimulate appetite, bitter orange is frequently found in modern weight-loss formulas because synephrine is similar to the compound ephedrine, which is known to promote weight loss.

## **Guaraná**

The herb guaraná contains caffeine and the closely related alkaloids theobromine and theophylline; these compounds may curb appetite and increase weight loss. Caffeine's effects are well known and include central nervous system stimulation, increased metabolic rate, and a mild diuretic effect. In a double-blind trial, 200 mg per day of caffeine was, however, no more effective than a placebo in promoting weight loss. Because of concerns about potential adverse effects, many doctors do not advocate using caffeine or caffeine-like substances to reduce weight.

## **Guggul**

Coupled with exercise in a double-blind trial, a combination of guggul, phosphate salts, hydroxycitrate, and tyrosine has been shown to improve mood with a slight tendency to improve weight loss in overweight adults. Daily recommendations for guggul are typically based on the amount of guggulsterones in the extract. A common intake of guggulsterones is 25 mg three times per day. Most guggul extracts contain 5 to 10% guggulsterones and can be taken daily for 12 to 24 weeks.

## **A Few Words About Monosodium Glutamate**

[An R Acad Nac Med \(Madr\)](#). 2005;122(2):341-55; discussion 355-60.

**Effect of monosodium glutamate given orally on appetite control (a new theory for the obesity epidemic)**

[Eur J Clin Nutr](#). 2006 Jan;60(1):25-31.

## **Obesity, voracity, and short stature: the impact of glutamate on the regulation of appetite.**

**BACKGROUND:** World-wide obesity has risen to alarming levels. We present experimental support for a new and very challenging hypothesis linking obesity, voracity, and growth hormone (GH) deficiency, to the consumption of elevated amounts of the amino-acid glutamate (GLU). Supraphysiological doses of GLU are toxic for neuronal cells. **METHODS:** Human data were obtained from 807,592 German conscripts born between 1974 and 1978, and from 1,432,368 women of the German birth statistics (deutsche Perinatalerhebung) 1995-1997. The effects of orally administered monosodium glutamate (MSG) were investigated in 30 pregnant Wistar rats and their offspring. Pregnant animals either received no extra MSG, or 2.5 g MSG, or 5 g MSG per day, up to the end of the weaning period. In all, 2.5 g, respectively 5 g, MSG accounted for some 10%, respectively 20%, of dry weight of the average daily food ration. After weaning, MSG feeding was continued in the offspring. **FINDINGS:** Morbid obesity associates with short stature. Average stature of conscripts progressively declines when body mass index increases above 38 kg/m<sup>2</sup>. Also morbidly obese young women are shorter than average though to a lesser extent than conscripts. Oral administration of MSG to pregnant rats affects birth weight of the offspring. Maternal feeding with 5 g MSG per day results in severe birth weight reduction ( $P < 0.01$ ). Weight increments remain subnormal when MSG feeding to the mothers is maintained during weaning ( $P < 0.01$ ). GH serum levels are affected in animals that received MSG during prenatal life via maternal feeding. Animals that are kept on high MSG diet (5 g MSG per day) continue to show serum GH levels that are as low or even lower than those of MSG injected animals ( $P < 0.05$ ), both at day 30 and at day 90 of life. Animals that were kept on medium MSG diet (2.5 g MSG per day) showed low serum GH levels at day 30 of life ( $P < 0.01$ ), but seemed to partially recover before day 90. Almost identical results were observed in IGF-1 serum levels. Oral MSG resulted in dose dependent voracity. The animals fed 5 g MSG per day increased water uptake by threefold ( $P < 0.01$ ), and food uptake by almost two-fold ( $P < 0.01$ ). The influence of MSG is in general more marked in males than in females. **Interpretation:** GLU is a widely used nutritional substance that potentially exhibits significant neuronal toxicity. Voracity, and impaired GH secretion are the two major characteristics of parenterally administered GLU-induced neuronal damage. GLU maintains its toxicity in animals even when administered orally. Males appear to be more sensitive than females. The present study for the first time demonstrates, that a widely used nutritional monosubstance--the flavouring agent MSG--at concentrations that only slightly surpass those found in everyday human food, exhibits significant potential for damaging the hypothalamic regulation of appetite, and thereby determines the propensity of world-wide obesity. We suggest to reconsider the recommended daily allowances of amino acids and nutritional protein, and to abstain from the popular protein-rich diets, and particularly from adding the flavouring agents MSG.

# Functional Tests to Consider

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## Peering through the Windows of Metabolic Health

- (1) Thyroid Assessment  
(TSH, Free T4, reverse T3)
- (2) Basal Body Temperature (BBT)
- (3) Fasting Insulin
- (4) Hemoglobin A1C
- (5) Fructosamine
- (6) Food Sensitivities
- (7) Triglycerides/HDL ratio
- (8) Cortisol levels (AM and PM)
- (9) DHEA levels
- (10) Neurotransmitter levels

(11) Functional Intracellular Vitamin Analysis (Spectracell®)

## **Metabolic Syndrome**

Three or more of the following criteria:

- ❖ Central Obesity as measured by waist circumference:  
Men: >40 inches  
Women: >35 inches
- ❖ Fasting Triglycerides:  
150mg/dl or more
- ❖ HDL:  
Men: <40 mg/dl  
Women: <50 mg/dl
- ❖ Blood Pressure: 130/85 mmHg or greater
- ❖ Fasting Glucose: 100mg/dl or more