

Green Tea

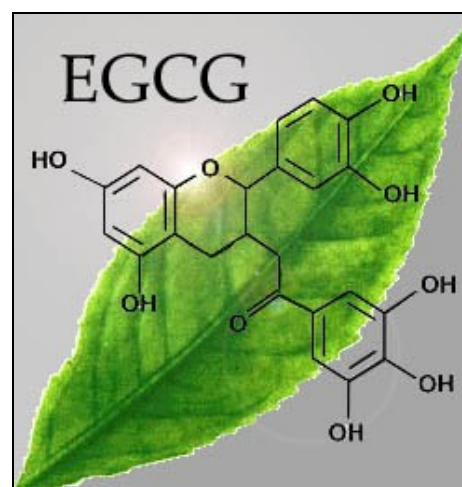
Metabolic influences



- Green tea is one of four types of tea (white, green, black, and oolong) that come from the plant *Camellia sinensis*.
- White tea is the least processed form of tea, while black tea leaves are fermented. Green tea leaves are steamed, not fermented and hence preserve more polyphenols.
- The **beneficial effects** of green tea are attributed to the polyphenols, particularly the catechins, which make up 30% of the dry weight of green tea leaves.
- These catechins are present in **higher quantities** in green tea than in black or oolong tea, because of differences in the processing of tea leaves after harvest.

More on Green Tea

- There are several polyphenolic catechins in green tea:
 - (1) (-) epicatechin (EC)
 - (2) (-) epicatechin-3-gallate (ECG)
 - (3) (-) epigallocatechin (EGC)
 - (4) (-) epigallocatechin-3-gallate (EGCG)**
 - (5) (+) catechin, and
 - (6) (+) gallocatechin (GC).
- **EGCG** is the most abundant catechin in green tea, accounting for about 65% of its catechin content.
- Most of the research on green tea has been done on the **isolated catechins** or powdered supplement.
- One cup of green tea generally contains **100–200 mg** of EGCG.



Also, note that all varieties of tea contain caffeine which is unaffected by the different processing methods

Obesity in the United States

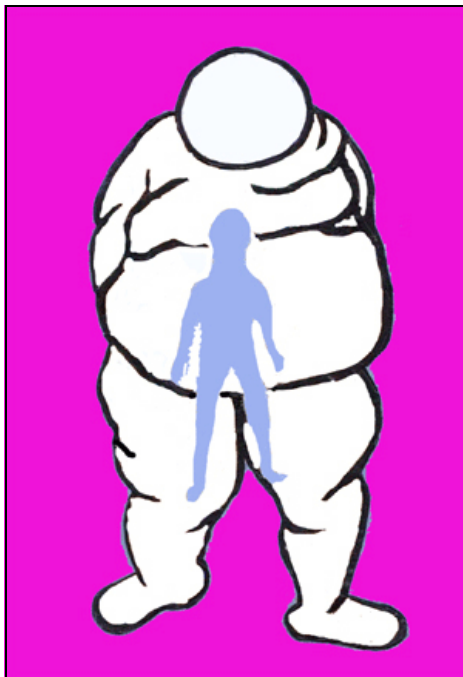
Obesity: What is it?

Overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height.

How is it determined?

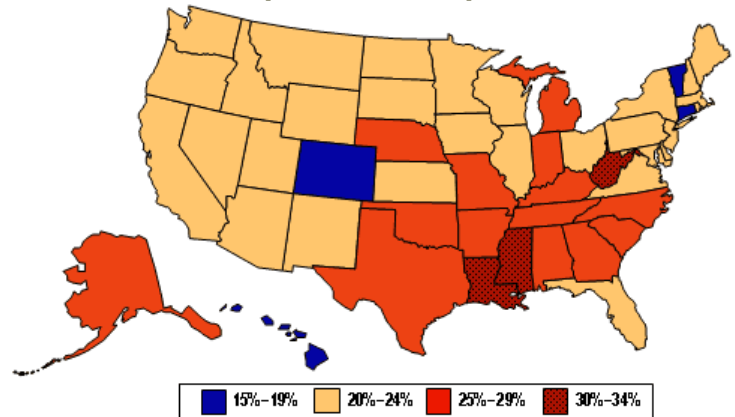
For adults, overweight and obesity ranges are determined by using weight and height to calculate a "body mass index" or BMI. This index correlates well with the amount of body fat that a person has.

- An adult with a BMI between 25 and 29.9 is considered **overweight**
- An adult with a BMI of 30 or higher is considered **obese**.



Currently, 66% of U.S. adults ages 20 or older are considered overweight or obese.

Obesity Prevalence by State



2005

Overweight and obese individuals are at increased risk for many diseases and health conditions including:

- Hypertension (high blood pressure)
- Osteoarthritis (a degeneration of cartilage and its underlying bone within a joint)
- Dyslipidemia (for example, high total cholesterol or high levels of triglycerides)
- Type 2 Diabetes
- Coronary Heart Disease
- Stroke
- Gallbladder disease
- Sleep apnea and respiratory problems
- Some cancers (endometrial, breast and colon)

What's the Cause?

- Overweight and obesity are a result of an energy imbalance over a period of time (energy in > energy out). Weight gain occurs when a person is consuming more calories (energy in) than he or she uses or requires (energy out) at a certain activity level.
- The cause of energy imbalance for each individual may be due to a combination of several factors. Individual behaviors, environmental factors, and genetics all contribute to the complexity of the obesity epidemic.

Green Tea and Weight Loss

Recent studies have suggested a role for catechins in promoting weight loss. Catechins make up 30% of green tea leaves by weight and are therefore a concentrated source of EGCG.

How does green tea promote weight loss?

Catechins influence metabolism in several ways:

- Inhibiting intestinal lipases
- Decreasing fat absorption
- Increasing fat excretion
- Increasing uncoupling proteins
- Increasing thermogenesis
- Decreasing lipogenic enzymes
- Suppressing appetite

A Review of the Literature

Human Studies:

Intake of green tea was found to increase thermogenesis. The thermogenic effect was found to be greater than that due to the amount of caffeine found in the tea.

A study in 10 subjects found that compared to placebo, green tea extract resulted in a significant (4%) increase in energy expenditure. In addition, the excretion of norepinephrine was higher during treatment with the green tea extract than with placebo. This supports the finding that there was an increase in thermogenesis due to increased norepinephrine levels in the body.

⇒ Researchers then treated the subjects with caffeine in amounts equivalent to those found in the green tea extract (50 mg) and found that caffeine had no effect on energy expenditure or fat oxidation.



Animal Studies:

- One study supplemented a group of female laboratory mice with green tea (from 1% to 4% of their diets) for 4 months to determine which effects it may have on food intake and weight. At the end of the study, researchers found that green tea supplemented mice had significantly decreased food intake, body weight gain, and fat mass. Levels of cholesterol and triglycerides were also lower. In addition, serum leptin levels were shown to be lower.
 - Another animal study supplemented green tea catechin EGCG (50-100mg/kg) in pure form and found that it, but not other green tea catechins, reduced or prevented an increase in body weight in lean and obese Zucker rats.
- ⇒ This was an effect that appeared to be reversible and associated with a reduction in food intake.

In Summary

Research on green tea and its components shows an impact on obesity and weight gain in both laboratory animals and human subjects. Green tea has an impact on food intake, body weight, and body fat, and cholesterol, triglycerides, and glucose levels. With the high rates of overweight and obesity seen in the US, green tea could prove to be a valuable natural treatment option.

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