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Designs for Health's EGCg consists of decaffeinated green tea extract from the leaves of *Camellia sinensis*. Consumption of green tea has been documented since 2700 BC, and a large body of research shows strong associations between consumption of 5-6 or more cups of green tea per day and beneficial cardiometabolic health effects.¹

EGCg (epigallocatechin gallate) is among the most extensively studied green tea polyphenols, as it has been proven to account for many of the benefits observed from dry green tea or green tea extract consumption.² It is the primary catechin in green tea, accounting for 50% to 80% of the catechin content, or about 200 to 300 mg per brewed cup of green tea (from 5 g dry green tea leaves).^{3,4}

Antioxidant and Anti-inflammatory Properties

Consumption of green tea has been shown to increase antioxidant activity in the blood.³ EGCg is a potent antioxidant that may help spare or recycle other antioxidants such as alpha tocopherol and glutathione.⁵ Regarding inflammation, green tea polyphenols inhibit pathways related to the production of inflammatory mediators such as COX2 and LOX enzymes, TNF- α and IL-1 β , and they may be beneficial for a range of chronic inflammatory conditions affecting numerous body systems.⁶⁻⁹ Research indicates that oral or intragastric administration of EGCg reduces inflammatory markers in animal models of tendinitis, rheumatoid or osteoarthritis, periodontitis, and asthma.⁸ The antioxidant and anti-inflammatory properties of EGCg may underlie the observed benefits of this compound for protecting against ultraviolet light-induced damage, photoaging, and premature aging of the skin.^{2,10} (It is noted, however, that results have been more promising in animal studies than in humans and that some of this research has been conducted using topical application of EGCg.)

Increased Energy Expenditure and Improved Fat Metabolism

EGCg may be a useful adjunct to dietary and lifestyle changes for those seeking to lose body fat. A systematic review and meta-analysis of the effect of EGCg on energy expenditure (EE) and fat oxidation (FOx) found that while the results of individual studies varied, on the whole, EGCg supplementation led to small but significant increases in both parameters, and small reductions in respiratory quotient (indicating greater fat oxidation).¹¹ EGCg may have two mechanisms of action that potentially underlie these effects. First, it may increase postprandial thermogenesis. (However, this effect was observed in a trial of a caffeinated green tea supplement so the caffeine likely played a role apart from that of EGCg.¹²) Second, green tea polyphenols may inhibit COMT, an enzyme that degrades norepinephrine. Inhibition of COMT may help prolong norepinephrine's lipolytic effect.

A study comparing the effect of green tea extract plus caffeine, caffeine alone, or placebo on 24-hour EE and FOx in healthy men in a metabolic chamber determined that the percentage of energy derived from carbohydrates was 45% in the green tea plus caffeine group versus 53% in the caffeine alone group and 55% in the placebo group. The percentage of energy derived from fat was 41.5% in the green tea group compared to 33.8% in the caffeine group and 31.6% in the placebo group. This shows that EGCg with caffeine has stronger effects than caffeine alone, suggesting that EGCg may independently have a beneficial role in supporting fat loss.¹²

A double-blind RCT showed that EGCg supplementation led to reduced fasting insulin in overweight or obese postmenopausal women with elevated fasting insulin, but no changes in body weight, BMI, or waist circumference (WC).¹³ It is possible that a reduction in insulin could have a greater impact if combined with changes in diet and physical activity, which were not part of the study protocol. Results were more favorable in a double-blind RCT evaluating high-dose green tea extract (> 800 mg EGCg plus other catechins) for weight reduction in women with central obesity. After 12 weeks, compared to those taking placebo, subjects in the extract group showed small but significant decreases in weight, BMI and WC.¹⁴ Most studies employing EGCg or green tea extracts do not call for changes to diet and exercise. Considering the difficulty many patients have with losing weight and maintaining weight loss, it is possible the modest changes induced by EGCg alone could provide a small additional advantage when combined with diet and lifestyle interventions.

Research Supported Benefits of Green Tea*:

- Antioxidant activity
- Increased energy expenditure
- Improved fat metabolism
- Support for healthy blood glucose
- Cardiovascular support
- Reduced risk of various cancers and metastasis

Normal Blood Glucose Support

Green tea components were shown to influence various metabolic pathways related to blood glucose control in animal models and human cells *in vitro*:

- EGCg inhibits intestinal glucose uptake by the sodium dependent glucose transporter.¹⁵
- Green tea supplementation ameliorates insulin resistance and increases glucose transporter IV (GLUT-4) content in a fructose-fed rat model.¹⁶
- EGCg reduces hepatic glucose output and expression of genes involved in gluconeogenesis, has insulin mimetic properties, and accelerates glucose uptake in mouse and human liver cells under conditions of insulin resistance.¹⁷⁻²⁰
- EGCg increases muscle lipid oxidation and stimulates glucose uptake in insulin-resistant skeletal muscle.²¹

A randomized controlled trial of EGCg in pregnant women diagnosed with gestational diabetes showed that compared to placebo, EGCg supplementation during the third trimester led to significant reductions in fasting glucose, insulin and HOMA-IR as well as in neonatal complications, including hypoglycemia and both low birth weight and macrosomia.²²

Cardiovascular Support

A randomized trial showed that among postmenopausal women, supplementation with green tea extract led to significant decreases in triglycerides, total cholesterol (TC) and LDL-C within just 4 weeks.²³ A systematic review and meta-analysis looking at the effects of green tea catechins and blood pressure also noted significant reductions in TC and LDL-C, along with mild reductions in systolic and diastolic blood pressure.²⁴ EGCg stimulates nitric oxide production from vascular endothelial cells²⁰ and supplementation acutely improved endothelial function in patients with coronary artery disease (assessed via brachial artery flow-mediated dilation).²⁵

Reduced Risk of Cancer Development and Metastasis

Green tea has been called “nature’s defense against malignancies”³² owing to the suppressive effects of EGCg on carcinogenesis, proliferation and metastasis. EGCg appears to work via multiple mechanisms in the fight against cancer, such as protection against mutagenic substances (e.g., smoking, UV light, dietary carcinogens), enhanced detoxification, increased antioxidant status, reduced angiogenesis, and reduced cell growth, proliferation and metastasis while increasing apoptosis in cancer cells but sparing healthy cells.²⁶⁻³² The following types of cancers showed reduced incidence and severity in association with green tea consumption in animal and human epidemiological studies: lung, stomach, colon, pancreas, liver, breast, prostate, and skin. In a trial involving patients with high-risk premalignant oral lesions, high-dose EGCg was shown to reduce levels of vascular endothelial growth factor (VEGF, an angiogenic stimulus for tumors).²⁸ It has also been shown to reduce other growth factors and delay appearance of prostate cancer in men with high-grade prostatic neoplasms, as well as to suppress growth and metastasis of colorectal cancer in human cells *in vitro* and in mice *in vivo*.^{28,29,33}

Testosterone Metabolism

Testosterone is converted by 5-AR (5-alpha reductase) to DHT (dihydrotestosterone) in various cells in the body, such as epidermal and prostate cells. DHT is thought to contribute to the development of male pattern baldness, acne, hirsutism (excessive facial/body hair in females), as well as prostate enlargement and cancer. Some popular pharmacological agents used for hair loss inhibit only 5-AR type 2, expressed in prostate cells, with no effect on epidermal cells, which express 5-AR type 1. Green tea polyphenols inhibit 5-AR type 1, which makes green tea a good complement to these hair loss formulas and a good candidate for helping to reduce the occurrence and reoccurrence of male pattern baldness, acne and hirsutism.⁷

Supplement Facts

Serving Size 1 capsule

Amount Per Serving	% Daily Value
Epigallocatechin gallate (EGCG) [from decaffeinated green tea (<i>Camellia sinensis</i>) leaf extract]	225 mg *

*Daily Value not established.

Other Ingredients: Cellulose (capsule), microcrystalline cellulose, vegetable stearate.

Recommended Use:

- Take one capsule per day with a meal, or as directed by your health care practitioner.

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/techsheet-references/egcg-references.pdf>

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Healthcare practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage. Any product containing botanical substances has the potential for causing individual sensitivities. Individual monitoring, including liver function tests, may be appropriate.

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

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