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**File: ■ Green Tea (*Camellia sinensis*, Theaceae)
■ Cholesterol
■ Weight**

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RE: Clinical Trial Shows Consuming Green Tea Powder May Lower Low-density Lipoprotein Cholesterol

Igarashi Y, Obara T, Ishikuro M, et al. Randomized controlled trial of the effects of consumption of 'Yabukita' or 'Benifuuki' encapsulated tea-powder on low-density lipoprotein cholesterol level and body weight. *Food Nutr Res*. June 19, 2017;61(1):1334484. doi: 10.1080/16546628.2017.1334484.

Green tea (*Camellia sinensis*, Theaceae) is consumed worldwide and associated with multiple health benefits, including a decreased risk of cardiovascular disease (CVD). Many bioactive compounds have been reported from green tea and may explain the observed effects. One widely acknowledged risk factor for CVD is hyperlipidemia, including elevated low-density lipoprotein (LDL) cholesterol. Consumption of catechins, compounds found in tea, has been reported to result in a lowering of LDL cholesterol. This double-blind, randomized, placebo-controlled clinical trial investigated whether 2 different types of green tea would impact LDL cholesterol concentrations along with body weight.

This study, conducted at the Tokui Health Promotion Center and the Daitou Health Promotion Center in Kakegawa, Japan, between September 2009 and December 2009, incorporated subjects (both men and women) aged 30-70 years old with body mass index >23 kg/m². Other inclusion criteria were total cholesterol >200 mg/dl and LDL cholesterol >120 mg/dl. Those using drugs to treat dyslipidemia, hypertension, or diabetes, and those with pre-existing heart problems, food or drug allergies, or who were pregnant or lactating were excluded. Included study subjects (n=151) were randomly assigned to receive Yabukita green tea (n=51) or Benifuuki green tea (n=49) powder in capsules (180 mg of powder) or placebo (n=51) capsules containing 180 mg of starch. Subjects took 10 capsules per day for a total daily dosage of 1.8 g per day for 12 weeks. No mention is made about the source or processing of green tea powder. [Note: Although not mentioned in the text, it is assumed that Yabukita and Benifuuki are cultivars.]

Subjects refrained from consuming drinks containing catechin compounds 2 weeks before the study started, and primary outcomes were LDL cholesterol and body weight.

Secondary outcomes included additional lipid concentrations, fasting glucose and glycosylated hemoglobin, high-sensitivity C-reactive protein (hs-CRP), and 8-hydroxy-2'-deoxyguanosine (8-OHdG, a marker of oxidative stress). At baseline, there were no significant differences in any of the parameters; however, hs-CRP and insulin were different among groups, approaching significance ($P=0.09$ and 0.08 , respectively).

There were no adverse side effects at the study's end. Subjects in both the Yabukita green tea and Benifuuki green tea groups had significant decreases in LDL cholesterol from baseline to endpoint (149.5 ± 26.2 mg/dl vs. 138.8 ± 27.6 mg/dl, $P=0.001$ and 146.3 ± 29.1 mg/dl vs. 138.2 ± 27.6 mg/dl, $P=0.001$, respectively). The changes in LDL cholesterol seen in the green tea groups were significantly different from those of the placebo group ($P<0.05$ for both). Subjects in the placebo group had a significant increase in body weight from baseline to endpoint ($P=0.002$); however, no effect on body weight was observed in those consuming green tea.

Only the Yabukita green tea group had a significant decrease in waist circumference ($P=0.006$); significant differences in the change in this parameter were observed between the 2 tea groups ($P=0.03$, the Benifuuki group had an increase in waist circumference) and between the Yabukita green tea group and placebo ($P=0.02$, the change in weight decline was greater in the Yabukita group). Those in both the placebo and Benifuuki green tea groups had significant increases in high-density lipoprotein (HDL) cholesterol concentrations. Significant differences in the amount of increase were seen between Benifuuki and placebo ($P=0.03$, HDL cholesterol of those in the Benifuuki group increased to a greater degree) and between the 2 green tea types ($P=0.02$, HDL cholesterol in the Yabukita group decreased). 8-OHdG concentrations were significantly decreased in all groups at the end of the study ($P<0.05$ for all). Insulin was significantly increased and hs-CRP was significantly decreased only in those consuming the Benifuuki green tea ($P=0.03$ and 0.01 , respectively). The rate of 8-OHdG generation was significantly decreased in both the placebo group and the group consuming Yabukita green tea ($P=0.02$ for both).

This study suggests that consuming green tea powder may lower human blood LDL cholesterol, and that different cultivars may benefit different health outcomes. The authors mention that the results with LDL cholesterol observed here somewhat agree with other studies. The study had several parameters impacted by a placebo effect, including the marker for oxidative stress; this somewhat confounds the results. Other mentioned limitations include a lack of phytochemical characterization of the teas and information about subject diet. Despite these concerns, this study suggests that green tea potentially decreases a risk for CVD.

This study was conducted as part of The Kakegawa Study, which was supported by a research and development grant for projects promoting new policies in agriculture, forestry, and fisheries from the Ministry of Agriculture, Forestry and Fisheries, Japan (Tokyo, Japan).

—Amy C. Keller, PhD

Referenced article can be accessed at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5492083/>.

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