The effects of green tea on weight loss and weight maintenance: a meta-analysis

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CRD summary
The authors concluded that catechins or a epigallocatechin gallate-caffeine mixture (green tea) had a small positive effect on weight loss and weight maintenance. Limitations in the review methodology mean that the overall effect size estimate was unlikely to be reliable and the conclusions should be treated with caution.

Authors' objectives
To examine the effects of catechins (epigallocatechin gallate) in green tea on weight loss and weight maintenance.

Searching
PubMed was searched for English-language publications to July 2008; search terms were reported. References from relevant articles were searched for additional studies. Full data from non-English trials published as English-language abstracts were obtained by contacting authors.

Study selection
Randomised blinded controlled trials (RCTs) that compared catechins (in green tea or capsules) with no catechins (or different doses of catechins) on weight loss and weight maintenance for at least 12 weeks were eligible for inclusion. Trials that evaluated teas or capsules that contained a mixture of epigallocatechin gallate and caffeine were included. Trials that evaluated other types of teas (for example, oolong tea) were excluded.

The baseline body mass index of trial participants varied from 18.5 to 35kg/m². Studies generally included both males and females. It appeared that the youngest trial participants were 16 years old and the oldest were 65. The studies mostly included Asian participants (Japanese, Thai, Taiwanese and Chinese); four studies were conducted in Caucasian participants. The dosage of tea consumed that contained an epigallocatechin gallate-caffeine mixture ranged from 270mg per day to 1,207mg per day across studies. Study duration ranged from 12 to 13 weeks. In all weight loss trials, randomisation occurred after a four-week low-energy diet.

It appeared that one reviewer performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
For each study, mean weight change (in kg) was calculated between the baseline and post-treatment assessment.

It appeared that one author extracted data.

Methods of synthesis
A meta-analysis examined pooled mean differences with 95% confidence intervals (CIs) calculated using the random-effects model. Heterogeneity was assessed with the I² measure. Sensitivity analyses were conducted by removal of single studies from the meta-analysis. A priori subgroup analyses were conducted by ethnicity (Asian or Caucasian), average regular caffeine intake of study participants and by dosage (<300mg compared with >300mg) of tea consumed that contained an epigallocatechin gallate-caffeine mixture. In three of the included studies, multiple effects sizes were presented for each study depending on subgroup analyses (such as males and females) presented by the trial authors.

Results of the review
Eleven RCTs were included in the review (overall sample size unclear).

The authors reported that there was a significant positive effect of catechins on weight loss and weight maintenance.
(-1.31, 95% CI -2.05 to -0.57); there appeared to be significant heterogeneity between the studies (not clearly reported).

Results were similar for all subgroup analyses exception for participants who had a moderate to high regular caffeine intake (where no significance difference between treatment groups was observed).

Authors' conclusions

Tea that contained catechins or a epigallocatechin gallate-caffeine mixture had a small positive effect on weight loss and weight maintenance.

CRD commentary

The review addressed a clear question supported by appropriate inclusion/exclusion criteria for study design, intervention, comparators and outcomes. Only one database was searched, although this was supplemented by handsearching. Translations of non-English language papers were sought, as well as unpublished data from Asian authors. It appeared that only one author was involved in selecting studies and extracting data, which introduced potential for reviewer bias. The authors did not state that they assessed the quality of the included studies, so that the trial results and any synthesis from them may not have been reliable. Details of the included studies were provided in tables. There appeared to be clinical heterogeneity between the studies. Some trials appeared to include participants with normal weights and these may not have been appropriate for the review. The trials were inappropriately synthesised; trials with different comparators and outcomes should not be combined and multiple effect sizes from one study (subgroup analyses) should not be combined.

Limitations in the review methodology mean that the overall effect size estimate was unlikely to be reliable and the conclusions should be treated with caution.

Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that further research was needed to assess whether (and to what extent) people are genetically predisposed to the effect of epigallocatechin gallate-caffeine mixtures.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.