

## Green tea for the prevention of cancer: evidence of field epidemiology

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### **Abstract**

**Background:** Tea is derived from the leaf of *Camellia sinensis*, a natural beverage widely consumed around the world. Geological and botanical evidence suggests that the tea plant originated from China. Varying methods of processing tea leaves lead to green tea, black tea, or Oolong tea, which differ in their concentrations of polyphenols. Green tea polyphenols appear to have anti-tumorigenic properties, and form 30-40% of the dry weight of green tea compared with only 3-10% of black tea. Numerous studies in multiple animal models and different cancer cell lines have demonstrated the anti-tumorigenesis by green tea polyphenols. Despite the consistency of laboratory results, evidence of this effect occurring in humans has been inconclusive to date.

**Objective:** To investigate if green tea consumption was associated with longer survival rates in ovarian cancer patients, and a lower risk of ovarian, breast, and colorectal cancer, in addition to adult leukemia

**Methods:** We have conducted one prospective cohort study in ovarian cancer patients, and five case-control studies in ovarian, breast, and colorectal cancers, and leukemia over the past decade. Tea consumption was measured using a structured questionnaire by face-to-face interviews. The validity and reliability of the questionnaire was assessed in a preliminary study, and then evaluated by a test-retest. Cox proportional hazards regression models were used to obtain hazard ratios(HRs), 95% confidence intervals(95% CIs), and were adjusted for age at diagnosis, locality, body mass index(BMI), parity, International Federation of Gynecology and Obstetrics (IFGO) stage, histologic grade of differentiation, cytology of ascites, residual tumour, and chemotherapeutic status. Odds ratios(ORs) and 95% CIs were obtained using logistic regression analyses, which accounted for demographic, lifestyle, hormonal and family cancer factors, and potential confounders.

**Results:** Higher green tea consumption was consistently observed as being associated with a lower risk of mortality due to ovarian cancer, and a decreased risk of ovarian, breast, and colorectal cancers, and adult leukemia occurrences in our observational studies. The adjusted HR and 95% CI for case mortality from ovarian cancer was 0.40(0.18-0.90) in the patients who consumed green tea at the highest level compared with non-tea drinkers. Compared with never or seldom tea drinkers, the adjusted ORs ranged from 0.07 to 0.61 for ovarian, breast, and colorectal cancers, and adult leukemia in those who consumed green tea at the highest level. Significant inverse dose-response relationships were also observed for quantity, duration, and frequency of green tea consumed.

**Conclusion:** We concluded that regular consumption of green tea enhanced survival of ovarian cancer, and decreased risks of ovarian, breast, and colorectal cancers, and adult leukemia. Evidence from our observational studies supported the protective effect of green tea against cancers, and this evidence will provide a knowledge platform from which to launch interventional studies for cancer prevention in the next stage.

**Key words:** Green tea, nutrition epidemiology, case-control studies, cohort studies, risk factor, cancer survival, breast cancer, colorectal cancer, adult leukemia, ovarian cancer