Int. J. Epidemiol. Advance Access published March 2, 2005

International Journal of Epidemiology
doi:10.1093/ije/dyh211

Black tea and cardiovascular disease

From SHINKAN TOKUDOME,[1]* IMAEDA NAHOMI,[2] CHIHO GOTO,[3] YUKO TOKUDOME[3] and MALCOLM A MOORE[4]

Dr Sesso *et al.*[1] could not detect a significant association between black tea consumption and risk of cardiovascular disease using well-established cohorts for the study on health and physical activity. Dr Poole *et al.*[2] have commented on the paper with regard to the concept of causation. We would like to add another view based on nutritional epidemiology and biological pathogenesis.

Potential protective effects of black tea against cardiovascular disease and cancer are attributed to polyhenol compounds and flavonoids/flavonols, including catechin/EGCG and theaflavin. The authors admit that they lacked a data-based approach[3] for selecting foods/beverages contributory to certain nutrients in order to assess intake of flavonols/theaflavins from black tea.

We can assume from the literature[4] that black tea is a major source of catechin/EGCG, but comparisons within several cups of black tea may not have enough power to detect any favourable effects of catechin/EGCG. In other words, a dose–response relationship could not be proven even after taking into account confounding coffee consumption. Although thus far inconsistent, some beneficial effects have been experienced with large intakes of black/green tea, such as ≥10 cups/day.[5–8] We need a wide range of comparisons for cups of black tea to evaluate possible protective effects, if any, on cardiovascular disease.

The concentrations of catechin/EGCG in black tea are rather less than in green tea.[4] In addition, antioxidant activity of black tea scored by oxygen radical absorbing capacity (ORAC) is lower than that for green tea. Furthermore, flavenoids are supplied to a greater extent by vegetables and fruit than several cups of black tea. Thus the authors should, at least, adjust for effects of consumption of vegetables and fruit.

Finally, it is known that folate is antiangiogenic because it is a cofactor in the metabolism of homocysteine to methionine. According to our recent study,[9] folate is supplied by green tea along with vegetables and fruit; however, its content in black tea is far less than in green tea. Black tea thus seems generally less anticarcinogenic, antimutagenic, and antiangiogenic than green tea. Moreover, any fluids/beverages, including water, black/green tea, and coffee, may be important in terms of blood viscosity and excretion/dilution of mutagenic and carcinogenic substances.[10,11]

[1] Department of Health Promotion and Preventive Medicine, Nagoya City University Graduate School of Medical Sciences, Mizuho-ku, Nagoya, Japan.

[2] Medical Welfare Center Kouseiin, Meito-ku, Nagoya, Japan.

[3] Nagoya Bunri University, Inazawa, Japan.

[4] Division of Experimental Pathology and Chemotherapy, National Cancer Center, Research Institute, Chuo-ku, Tokyo, Japan.

* Corresponding author. Department of Health Promotion and Preventive Medicine, Nagoya City University Graduate School of Medical Sciences, Mizuho-ku, Nagoya 467-8601, Japan. E-mail: tokudome@med.nagoya-cu.ac.jp

References

[1] Sesso HD, Paffenbarger Jr RS, Oguma Y, Lee I-M. Lack of association between tea and cardiovascular disease in college alumni. *Int J Epidemiol* 2003;**32:**527–33.

[2] Poole C, Peters U, Il'yasova D, Arab L. Commentary: this study falied. *Int J Epidemiol* 2003;**32:**534–35.

[3] Willett W. *Nutritional Epidemiology. 2nd Edn.* Monograph in Epidemiology and Biostatistics, Vol. 30. New York, Oxford University Press, 1998.

[4] Henning SM, Fajardo-Lira C, Lee HW, Youssefian AA, Go VLW, Heber D. Catechin content of 18 teas and a green tea extract supplement correlates with the antioxidant capacity. *Nutr Cancer* 2003;**45:**226–35.

[5] Kono S, Ikeda M, Tokudome S, Kuratsune M. A case-control study of gastric cancer and diet in northern Kyushu, Japan. *Jpn J Cancer Res* 1988;**79:**1067–74.

[6] Yu GP, Hsieh CC, Wang LY, Yu SZ, Li XL, Jin TH. Green-tea consumption and risk of stomach cancer: a population-based case-control study in Shanghai, China. *Cancer Causes Control* 1995;**6:**532–38.

[7] Imai K, Suga K, Nakachi K. Cancer-preventive effects of drinking green tea among a Japanese population. *Prev Med* 1997;**26:**769–75.

[8] Peters U, Poole C, Arab L. Does tea affect cardiovascular disease? A meta-analysis. *Am J Epidemiol* 2001;**154:**495–503.

[9] Imaeda N, Goto C, Tokudome Y, Ikeda M, Maki S, Tokudome S. Folate intake and food sources in Japanese female dietitians. *Environ Health Prev Med* 2002;**7:**156–61.

[10] Chan J, Knutsen SF, Blix GG, Lee JW, Frase GE. Water, other fluids, and fatal coronary heart disease: the Adventist Health Study. *Am J Epidemiol* 2002;**155:**827–33.

[11] Moore MA. Awash with alcohol in the world of prevention. *Asian Pacific J. Cancer Prev* 2000;**1:**91–93.