

Associations of tea consumption with the prostate-specific antigen concentration in Japanese men

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[Background] Recent epidemiological studies have shown an association between green tea consumption and a lower risk of prostate cancer, but the evidence for a preventive effect of green tea on prostate cancer is inconsistent. McLarty *et al.* reported that tea polyphenols reduced serum prostate-specific antigen (PSA) levels in patients with prostate cancer. Few studies have reported the relationship between tea consumption and serum PSA levels among male adults without prostate disease.

The Shizuoka Study (http://www.med.nagoya-u.ac.jp/yobo/jmicc_shizuoka/) is a part of the Japan Multi-Institutional Collaborative Cohort (J-MICC) Study (<http://www.jmicc.com/>) examining gene-environment interactions in lifestyle-related diseases, especially cancers. We investigated the associations of the consumption of green, black, and oolong tea with the serum PSA level in apparently healthy men using data from the Shizuoka Study.

[Methods] Baseline data on 2,167 men (mean \pm SD age, 57 ± 6 years; range 35-69 years) were analyzed. The study participants had been enrolled from among health checkup examinees seen at the Seirei Preventive Health Care Center in Hamamatsu, Japan, between 2006 and 2007. We excluded subjects who had evident prostate disease, or whose serum PSA level exceeded 4.0 ng/ml or were missing data on tea consumption.

The laboratory data on serum PSA levels obtained through the health checkups were collected at enrollment. Information on the frequency and amount of tea intake was obtained from a self-administered questionnaire.

Exposure to green tea was classified using the categories <1, 1-3, 4-6, or ≥ 7 cups/day. Exposure to black and oolong tea was classified using the categories <1, 1-2, or ≥ 3 cups/day.

The geometric mean serum PSA was computed by category after adjusting for age and other covariates by analysis of covariance. The *P*-values for trend were calculated.

[Results] The mean \pm SD and median PSA were 1.1 ± 0.7 and 0.9 ng/ml, respectively, overall. In total, 931 men (43.0%) had a PSA greater than 1.0 ng/ml and 284 (13.1%) had a PSA exceeding 2.0 ng/ml. The geometric mean PSA increased with age (trend $P < 0.001$). Green tea

Table 1. Serum levels of PSA according to tea consumption, Shizuoka study

		Tea consumption (cups/day)				trend- <i>P</i> [§]
		<1	1-3 (1-2) [†]	4-6 (≥ 3) [‡]	≥ 7	
Green tea	No. of subjects (%)	76 (3.5)	948 (43.7)	747 (34.5)	396 (18.3)	–
	Mean age \pm SD	55.5 \pm 7.0	56.1 \pm 6.3	57.5 \pm 5.8	58.0 \pm 6.0	<0.001
	PSA [mean* (pg/ml)] (95% CI)	0.83 (0.72-0.95)	0.96 (0.92-1.00)	0.95 (0.91-0.99)	0.95 (0.90-1.01)	0.071
Black tea	No. of subjects (%)	2101 (97.0)	48 (2.2)	18 (0.8)	–	–
	Mean age \pm SD	56.9 \pm 6.2	56.3 \pm 6.7	58.8 \pm 6.1	–	0.183
	PSA [mean* (pg/ml)] (95% CI)	0.95 (0.92-0.97)	1.03 (0.87-1.22)	0.83 (0.63-1.10)	–	0.351
Oolong tea	No. of subjects (%)	1995 (92.1)	104 (4.8)	68 (3.1)	–	–
	Mean age \pm SD	57.1 \pm 6.2	54.9 \pm 5.9	54.2 \pm 5.9	–	<0.001
	PSA [mean* (pg/ml)] (95% CI)	0.95 (0.92-0.97)	0.93 (0.83-1.04)	0.97 (0.84-1.11)	–	0.804

* Geometric mean adjusted for age

[†] Exposure to black tea and oolong tea using the category of 1-2 cups/day.

[‡] Exposure to black tea and oolong tea using the category of ≥ 3 cups/day.

[§] Trend-*P* values for the association between the extent of tea consumption and the geometric mean of serum PSA
SD, Standard deviation; CI, Confidence interval

consumption was inversely correlated with that of oolong tea (Spearman's rank correlation coefficient, -0.06 ; $P = 0.006$).

No statistical differences in the PSA levels were detected between the groups exposed to green, black, or oolong tea after adjusting for age (Table 1). The geometric mean PSA level in the subjects who consumed <1 cup/day of green tea was slightly lower than in those who consumed ≥ 7 cups/day (0.83 vs. 0.95 ng/ml, $P = 0.37$).

The intake of green, black, or oolong tea was not significantly associated with PSA levels on the multivariate analysis after adjusting for age, body mass index, and physical activity.

[Conclusion] Our findings indicated that the PSA concentration was not significantly associated with tea consumption among apparently healthy Japanese men.

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