

Abstract

Int J Cancer. 2009 Apr 1;124(7):1637-43.

Telomere length, oxidative damage, antioxidants and breast cancer risk.

Shen J, Gammon MD, Terry MB, Wang Q, Bradshaw P, Teitelbaum SL, Neugut AI, Santella RM.

Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University, New York, NY 10032, USA.

OBJECTIVE: Telomeres play a critical role in maintaining the integrity and stability of the genome, and are susceptible to oxidative damage after telomere shortening to a critical length. In the present study, we explored the role of white blood cell DNA telomere length on breast cancer risk, and examined whether urinary 15-F(2)-isoprostanes (15-F(2t)-IsoP) and 8-oxo-7,8-dihydrodeoxyguanosine (8-oxodG) or dietary antioxidant intake modified the relationship between telomere length and breast cancer risk.

METHODS: A population-based case-control study-the Long Island Breast Cancer Study Project-was conducted among 1,067 cases and 1,110 controls. Telomere length was assessed by quantitative PCR.

RESULTS: Overall, the mean levels of telomere length (T/S ratio), 15-F(2t)-IsoP and 8-oxodG were not significantly different between cases and controls. Among premenopausal women only, carrying shorter telomeres (Q3 and Q4), as compared with the longest (Q1), was associated with significantly increased breast cancer risk. Age-adjusted OR and 95% CI were 1.71 (1.10-2.67) and 1.61 (1.05-2.45). The 5-F(2t)-IsoP and 8-oxodG biomarkers did not modify the telomere-breast cancer association. A moderate increase in breast cancer risk was observed among women with the shortest telomeres (Q4) and lower dietary and supplemental intake of beta-carotene, vitamin C or E intake [OR (95% CI) = 1.48 (1.08-2.03), 1.39 (1.01-1.92) and 1.57 (1.14-2.18), respectively], although the trend test exhibited statistical significance only within the lower vitamin E intake subgroup ($p(\text{trend}) = 0.01$).

CONCLUSION: These results provided the strongest evidence to date that breast cancer risk may be affected by telomere length among premenopausal women or women with low dietary intake of antioxidants or antioxidant supplements.

PMID: 19089916