

Abstract

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Chromosome 9 Arm-Specific Telomere Length and Breast Cancer Risk.

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BACKGROUND: Telomere dysfunction is involved in the development of breast cancer and very short telomeres are frequent genetic alterations in breast tumors. However, the influence of telomere lengths of specific chromosomal arms on the breast cancer risk is unknown.

METHODS: We conducted a case-control study of breast cancer to examine the associations of the telomere length on chromosome 9 short arms (9p) and long arms (9q) with risk of breast cancer. Chromosome 9 arm specific telomere lengths were measured by quantitative fluorescent in situ hybridization (FISH) using cultured blood lymphocytes.

RESULTS: Telomere length on chromosome 9p was significantly shorter in breast cancer patients than in control subjects ($P < 0.001$). Using the 50(th) percentile value in controls as a cut point, women who have short 9p telomeres had an increased risk of breast cancer (adjusted odds ratio [OR] = 2.6; 95% confidence interval [CI], 1.5 - 4.3). When the 9p telomere length was divided into quartiles, a significant inverse dose-response relationship between 9p telomere length and breast cancer risk was observed ($P(\text{trend}) < 0.001$), with a quartile ORs of 3.0 (95% CI, 1.2-7.5), 3.9 (95% CI, 1.6-9.5), and 6.6 (95% CI, 2.8-15.9) for third, second and first quartile respectively when compared with women in the fourth quartile.

CONCLUSIONS: Short telomere length on chromosome 9p is strongly associated with the risk of breast cancer. If confirmed by future studies, chromosome 9p telomere length has the potential to be incorporated into the current prediction models to significantly enhance breast cancer risk prediction.

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