

Abstract

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Shortened telomere length is associated with increased risk of cancer: a meta-analysis.

Ma H, Zhou Z, Wei S, Liu Z, Pooley KA, Dunning AM, Svenson U, Roos G, Hosgood HD 3rd, Shen M, Wei Q.

Department of Epidemiology, The University of Texas MD Anderson Cancer Center, Houston, Texas, United States of America.

BACKGROUND: Telomeres play a key role in the maintenance of chromosome integrity and stability, and telomere shortening is involved in initiation and progression of malignancies. A series of epidemiological studies have examined the association between shortened telomeres and risk of cancers, but the findings remain conflicting.

METHODS: A dataset composed of 11,255 cases and 13,101 controls from 21 publications was included in a meta-analysis to evaluate the association between overall cancer risk or cancer-specific risk and the relative telomere length. Heterogeneity among studies and their publication bias were further assessed by the χ^2 -based Q statistic test and Egger's test, respectively.

RESULTS: The results showed that shorter telomeres were significantly associated with cancer risk (OR=1.35, 95% CI=1.14-1.60), compared with longer telomeres. In the stratified analysis by tumor type, the association remained significant in subgroups of bladder cancer (OR=1.84, 95% CI=1.38-2.44), lung cancer (OR=2.39, 95% CI=1.18-4.88), smoking-related cancers (OR=2.25, 95% CI=1.83-2.78), cancers in the digestive system (OR=1.69, 95% CI=1.53-1.87) and the urogenital system (OR=1.73, 95% CI=1.12-2.67). Furthermore, the results also indicated that the association between the relative telomere length and overall cancer risk was statistically significant in studies of Caucasian subjects, Asian subjects, retrospective designs, hospital-based controls and smaller sample sizes. Funnel plot and Egger's test suggested that there was no publication bias in the current meta-analysis (P=0.532).

CONCLUSIONS: The results of this meta-analysis suggest that the presence of shortened telomeres may be a marker for susceptibility to human cancer, but single larger, well-design prospective studies are warranted to confirm these findings.

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