

# Telomeres: Chromosome's End or Cancer's Beginning? †

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**Abstract:** Cancer represents the most prominent medical, social, and financial burden regarding cause-specific Disability-Adjusted Life Years (DALYs) among all human pathologies. Given its multifactorial etiology, cancer has been related to various risk factors such as exogenous, endogenous, and individual, including genetic predisposition. Given that telomeres represent a crosslink connecting numerous inter and intracellular pathways, great attention has been paid to their potential role in cancer development. Telomeres are specific repetitive DNA sequences (5'-TTAGGG-3') located at the end of chromosomes which, together with shelterin proteins, facilitate the maintenance of chromosomes' stability and protect them from degradation and damage. Many studies have indicated a correlation between telomere length status and cancer but do not reach a consensus, suggesting that long and short telomeres are associated with a high risk of cancer incidence. This review comprehensively examines different types of cancer, focusing on telomere length and cancer incidence association. When evaluating risk associations between cancer and telomere length, a disparity seems to be emerging. In some cases, shorter telomeres seem to be associated with a higher risk of cancer, while in others, longer ones. However, it is demonstrated that both short and long telomeres could promote carcinogenesis, suggesting that the association with cancer risk would vary among telomere length distribution and not be linear. Further studies are needed to detect specific associations and establish telomere length as a cancer-type specific risk marker.

**Keywords:** telomeres; cancer; cancer risk.

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