Telomere, Telomerase and The Aging Heart

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Background

Aging is a physiological process in all populations with time and finally leads to cellular senescence and organ dysfunction. Telomere's primary function is the protection of DNA with the help of the telomerase enzyme. Telomerase activity declines with time, and with each cell division, telomere length decreases.

Objectives

To review the association between short telomere and aging-related heart diseases.

Methods

The previous literature was narratively reviewed.

Results and Conclusions

Overview of telomere length and cardiovascular diseases. Unique variations of telomere length are affected by genetic and non-genetic factors. Genetic and environmental factors cause individual variation in telomere length (TL). A healthy lifestyle as a healthy diet and physical activity maintains TL, while hypertension, diabetes, atherosclerosis, Hepatitis C virus, and human immune deficiency virus are cardiovascular risk factors that increase oxidative stress, induce endothelial inflammation, and accelerate telomere shortening. Telomere shorting plays an essential role in the pathogenesis of aging-associated heart diseases. Short telomeres cause cellular senescence and dysfunction, contributing to atherogenesis and decreasing repair and regenerative capacity in the cardiovascular system. Telomere and telomerase are associated with heart aging. However, Telomerase and telomere-associated proteins, which regulate TL, may participate in the therapeutic strategies for ischemic heart diseases and heart failure.

Keywords

Telomere; Telomerase; Aging Heart; Aging Theories; Telomere Length; Cardiac Changes.