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Review of the relationships between lifestyle behaviors, telomere length, stem cells, and cancer

Lorena Martin and **Elizabeth Barrett-Connor**
[1]Department of Family Medicine and Public Health, Division of Behavioral Medicine, University of California San Diego, USA
[2]Department of Family Medicine and Public Health, Division of Epidemiology, University of California San Diego, USA

Until recently, telomeres were thought to be inherited, and therefore genetically determined. More recent evidence demonstrates telomere length may also be associated with and potentially modified by lifestyle. Telomeres are DNA structures that have been implicated in the process of aging. The strong correlation of shorter telomeres with aging, and chronic diseases such as cancer, is well documented. However, although it may seem counterintuitive, cancer stem cells display longer telomere length, although individuals at risk for cancer show shorter telomere length. This conundrum merits additional prospective research.

During this presentation, we describe the current cross-sectional associations between certain behaviors, such as physical activity and nutrition, as well as demographic variables and their association with telomere length, vitality of stem cells, and cancer. In addition, we will provide a clearer understanding of the p16 and p21/p53 pathways. Activation of the p16 pathway is known to contribute to aging. However, the inactivation of p16 is associated with the development of several cancers, while p21 and p53 appear to extend longevity. We will discuss their dynamics related to telomere length, telomerase activity, lifestyle behaviors, and cancer. We will also present information about how stem cells compared to cancer stem cells proliferate, and the cancer-aging hypothesis. In summary, this presentation will include current research on the relationships among lifestyle, telomere length, stem cells, and cancer.

Biography:

Lorena Martin, Ph.D. is an applied behavioral scientist, quantitative methodologist, and exercise physiologist at the University of California San Diego. She is also a graduate faculty member at Northwestern University and Visiting Scientist at the Salk Institute for Biological Studies. Her research focuses on the relationships among lifestyle behaviors, telomere length, stem cells, and Cancer. Her training and expertise is transdisciplinary; such that she has been able to integrate the above mentioned topics to produce a more inclusive hypothesis for future transdisciplinary research.