



Regulation of the Telomere Protein System

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Abstract:

Eukaryotic linear chromosomes culminate in nucleoprotein structures designated telomeres, which sustain the DNA ends at an appropriate length to preserve genome stability and cell viability. Classically, telomere activities have been understood through genetic approaches and cell-based studies using budding yeast as a model revealed the two critical functions for telomere-proteins, protection and extension of the DNA termini, by identifying the proteins vital to both pathways. While in vivo work discovered the factors that generate phenotypes, in vitro tactics are imperative to fully understand the system. We have taken biochemical approaches to better understand the mechanisms controlling telomere activities, which will be described. In addition to regulatory events, the telomere environment requires an efficient means to assemble and disassemble a multitude of structures to operate correctly. Challenging these operations are the common binding specificities displayed by many of the protein components for telomeric DNA, which would result in competitive DNA interactions if not controlled. Notably, we have found that the HSP90 molecular chaperone network helps avoid these obstacles and facilitates an effective operation of the telomere system.

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