



## CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:  
RP150224

Project Title:  
Discovering the molecular mechanisms that determine replicative lifespan

Award Mechanism:  
Individual Investigator

Principal Investigator:  
Tyler, Jessica

Entity:  
The University of Texas M.D. Anderson Cancer Center

### Lay Summary:

Aging remains indisputably the most significant risk factor for cancer development worldwide. In other words, it is the changes to our bodies that occur during aging that cause cancer. So only by understanding the basis for aging will we ever be able to reduce cancer occurrence. Although numerous attempts have been made to understand the molecular and genetic causes behind the age-related changes at the cellular and organismal level, there are still huge gaps in our understanding of the aging process. Discovering the causes of aging is imperative in order to increase our health-span to allow us to live longer and prevent all cancers in the future. Because eukaryotic organisms share all the basic biological processes, we use budding yeast as our model organism to expedite our aging studies and transfer the knowledge we gain from this system to multicellular eukaryotes. Unparalleled studies from our laboratory, funded by a CPRIT Rising Star recruitment award, demonstrated that aging is accompanied by a loss of the protein building blocks that package our DNA into chromosomes. Moreover, we showed this deterioration in chromosome packaging is a cause of aging. Our recent experiments have shown that this loss of chromosome packaging that occurs during aging leads to global changes in how our DNA information is used, as well as causing the DNA to becoming fragile, causing them to break. These DNA breaks, and alterations in how the DNA information is used, are the fundamental causes of cancer. We are now uniquely situated to understand, for the first time, how these molecular changes cause aging, and how we can reverse these changes to extend lifespan. The ultimate goal is to apply this information to humans in order to extend lifespan and prevent or delay all cancers.