

THE CELLULAR MEMORY OF TRANSCRIPTIONAL STATES

Mentor: Arthur J. Lustig, Ph.D.
Department of Biochemistry, SL-43
Tulane University Health Sciences Center
(504) 584-3688
E-mail: alustig@tulane.edu

Description:

The long-term goal of studies in my laboratory is to understand the multiple functions of telomeres using the yeast *Saccharomyces cerevisiae* as a model eukaryotic system. Telomeres, the protein-DNA structures present at the termini of chromosomes, serve essential functions involved both in the initiation of oncogenesis and in the aging process. One of these functions is the ability of telomeres to confer transcriptionally quiescent states onto adjacent genes. This process, termed telomeric silencing, is used as a measure of the influence of telomere structure on adjacent genes.

The proposed project is part of our ongoing efforts that use telomeric silencing as a model system for cellular memory. Cellular memory, the ability of a cell to perpetuate a specific transcription state through multiple generations, is a central characteristic of variegation and differentiation. We have recently discovered a relationship between cellular memory and alterations in telomere structure. On the basis of these studies, we have proposed a structural switch in the telomere that triggers a molecular communication between telomeric and adjacent sequences.

Objectives:

The major goal of the student's project will be to investigate this potential switch using novel methods, developed in our laboratory, that measure telomeric chromatin states through accessibility of the telomere to DNA modifying agents *in vivo*. Specifically, the student will use this accessibility assay in specific mutants that influence telomeric silencing. These studies should lead to a better understanding of the components of the telomere that are involved in the switching of transcriptional states at the telomere.

Prerequisites:

General Biology course, Genetics course and laboratory familiarity.