

James & Esther King Biomedical Research Program

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Medicine
University of Miami

2009 Program
New Investigator (3-year project)

Project Title: DNA Damage Proteins and Telomerase Activity in Tumor Cells

Project Summary: Telomeres are specialized structures found at the extreme ends of chromosomes that preserve genomic stability and maintain cell-proliferative capacity. Telomeric shortening occurs in most human cells as an inevitable consequence of normal cell division. Critical shortening of telomeres produces dysfunctional telomeres that are recognized as damaged and thus halt cell division. In cancer cells, telomere loss can be counteracted by the activity of an enzyme called telomerase, which elongates the telomeres and thus confers to the cells an “immortal” state. This process is illustrated by the finding of recent reports showing that telomerase activity is essential for both small and non-small cell lung cancer cell formation and maintenance. We know that the telomere elongation by telomerase is restricted to cells that are dividing. However, we don't know at what moment of the cell division telomerase is recruited at the telomeres or which proteins could be controlling its activity. This research aims to study how and when the telomerase is loaded to the chromosome ends. For this purpose, we will use molecular and cellular biology techniques that will reveal when and which proteins are located at the telomeres when the telomerase is elongating our chromosome ends. From these studies, we expect to arrive at a molecular model that reveals how tumor cells maintain their telomeres.