The Grand View League Funded Postdoctoral Fellowship 2017

The American Cancer Society's mission is to save lives, celebrate lives, and lead the fight for a world without cancer.

Types of Cancer:
Kaposi's Sarcoma, Gastric Cancer, Nasopharyngeal Carcinoma, Lymphomas
Cancer Initiation – Alterations in Chromosomes
Exogenous Factors in the Origin and Cause of Cancer

Less than 2% of the human genome encodes for protein, the biomolecules responsible for performing a wide variety of functions in our cells. The majority of the remaining sequences, often referred to as "junk DNA," are billions of letters comprising repetitive elements called retrotransposons.

Retrotransposons are pieces of DNA that can copy and paste themselves throughout our genomes, and their high copy numbers reflect their evolutionary success at this activity. The amplification of retrotransposons can be harmful to our cells, either through the dysregulation imposed by their RNA intermediates or the generation of mutations when retrotransposons insert into the genome.

Normally, our cells silence retrotransposons to eliminate this danger, but stress such as a viral infection can trigger the expression of these elements.

Human gammaherpesviruses include Kaposi's Sarcoma Associated Herpesvirus and Epstein-Barr Virus, and like all herpesviruses are incurable and result in life-long infection.

Interestingly, this group of viruses are oncogenic and are associated with the incidence of a variety of human cancers, including Kaposi's Sarcoma, gastric cancer, nasopharyngeal carcinoma, and a growing list of lymphomas.

Dr. Tucker's lab utilizes a murine model of gammaherpesviruses called MHV68 as an invaluable tool for understanding the intricacies of life-long infection by these viruses in a living organism. Importantly, they found that infection with MHV68 results in the robust expression of the short interspersed nuclear element (SINE) class of retrotransposons.

Dr. Tucker hypothesizes that the induction of SINE retrotransposons contributes to the pathogenesis associated with MHV68 infection. She and her lab propose to define the SINE profile activated by MHV68 infection in B cells, which are immune cells with persistent infection and the source of virus-induced lymphomas.

They are also interested in the molecular signals involved in turning these SINEs on and how this may globally alter host gene expression. Finally, they want to investigate if SINE stimulation by MHV68 results in mutation of the host genome by retrotransposon amplification. **This proposed work will reveal the role of retrotransposon stimulation during gammaherpesvirus infection and perhaps its associated oncogenicity.**

Institution:
University of California, Berkeley

Investigator:
Jessica M. Tucker, PhD

Project Title:
Retrotransposon Stimulation During Gammaherpesvirus Infection

Active Through:
12/31/2020

Total Funding:
$163,500

Kristi Cole | Community Development Manager, Grand View League | 408.688.0089 | Kristi.Cole@cancer.org | cancer.org