

**New Jersey State Commission on Cancer Research  
LAY ABSTRACT OF RESEARCH PROJECT**

NAME OF PRINCIPAL INVESTIGATOR/PROGRAM DIRECTOR: **Yongkyu Park**

Project Title: **Cis-spreading mechanism of MSL complex in chromatin**

Description: **The molecular analysis of epigenetic changes in male X chromosome of *Drosophila* will help us understand new aspects of cancer etiology and advance our ability to treat human cancer.**

Proper gene regulation in eukaryotes is a key process throughout the entire developmental process of an individual organism. Gene expression can be modulated by alterations in chromatin structure, which is regulated by histone modifications, and transcriptional activation of the genes in their chromosomal context. In human cancer, the abnormal epigenetic changes of chromatin organization happen through DNA methylation and histone tail modification, followed by changes of transcriptional expression in cancer-related genes. Understanding these epigenetic changes of chromatin organization in tumor cells may be key to the successful treatment of many cancers. The *cis*-spreading model, in which chromatin modifying factors bind small initiation sites and spread *in cis* into neighboring regions, can explain these epigenetic changes very well. Dosage compensation of the male X chromosome in fruitflies is an excellent *cis*-spreading model system, useful in understanding several aspects of chromatin organization and gene regulation in eukaryotes. We believe that the molecular analysis of epigenetic changes in male X chromosome of *Drosophila* will help us understand new aspects of cancer research and advance our knowledge of the etiology of human cancer.