KANSAS STATE UNIVERSITY

Division of Biology Presents:

The Rise and Fall of the Epithelial Phenotype: Mitotic Polarity Oscillation Drives Tumor Progression

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The majority of human cancers originate from epithelial cells including the lining of the gut, breasts, and lungs. Using Drosophila as a model, we have investigated the machinery that controls the structural integrity of epithelia for many years. Apical-basal cell polarity is a core architectural feature of epithelial cells which needs to be maintained to prevent tumor progression in most cancers. A second crucial aspect of tumor development is cell division which is accelerated in tumors and increases the number of cancer cells. Therefore, increased cell division and loss of cell polarity are two main drivers of epithelial cancer. How do cell division and epithelial polarity interact to promote tumor progression? We amplify the notion of a mitotic polarity oscillation - the transient loss of epithelial polarity during cell division, which severely challenges epithelial structure. Cell division similar to other morphogenetic processes exerts a stress on the epithelium that requires a more engaged polarity machinery to maintain tissue integrity. Our findings support two conclusions: First, the different levels of morphogenetic stress seen in different epithelia explain the large phenotypic variability resulting from the loss of individual polarity factors. Second, cell division not only increases tumor size but also promotes tumor progression from hyperplastic (adenoma-like) growth to neoplastic (adenocarcinoma-like) growth.

If you would like to visit with Dr. Ulrich Tepass, please contact Nirupama Kotian at nirupamakotian@ksu.edu.

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