

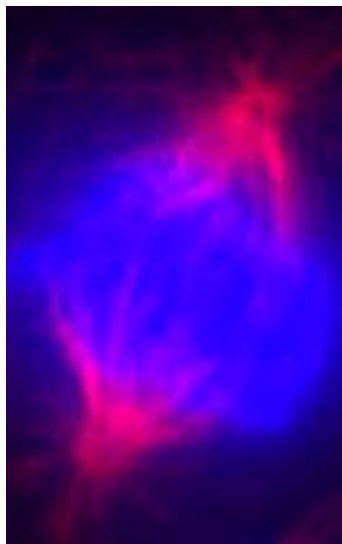


INSTITUTE FOR CELLULAR ENGINEERING

Molecular Motors: Critical Proteins in Spindle Assembly

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Our research focuses on the cellular and molecular mechanisms of spindle assembly during mitosis, the process of cell division. This area of biology is widely studied due to the well-known correlation between errors in chromosome segregation during mitosis and various types of cancers and tumors.

Spindle assembly involves the organization of microtubules into a bipolar spindle structure, which aligns the chromosomes at the metaphase plate and subsequently moves the chromosomes towards the poles and finally into the two nascent daughter cells. It is driven by numerous proteins that function both individually as well as in complexes. We focus on motor proteins as well as microtubule-associated proteins (MAPs) that have been identified as critical for assembling the spindle into a bipolar structure. It is thought that the motor proteins may act antagonistically to each other as different motor proteins generate oppositely directed forces. My research specifically focuses on the potential interactions of MAPs with known motor proteins, as well as the unknown functions that they, as a complex and individually, may play in spindle assembly and other stages of mitosis.

This research provides a basis of knowledge in the specific area of mammalian cell division, which can then be harvested to develop novel drug and small molecule therapies.

LLCPK cell in metaphase. Shown: Microtubules arranged in a spindle (red); Chromosomal DNA (blue) lined up at the metaphase plate. Image by Janel Pariseau.