MECHANISM OF SPINDLE ASSEMBLE IN THE ABSENCE OF CHROMATIN

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Abstract: During mitosis the cell assembles the spindle that ensures equal segregation of genetic material into two daughter cells. The spindle is composed of microtubules (MTs) and many associated proteins to ensure that the spindle is assembled properly. Although many studies have investigated the molecules involved, the relative contribution of centrosomes, chromatin, and kinetochores in spindle assembly is not clearly understood. In order to understand the function of molecules that are targeted in therapeutics to treat cell cycle related disorders, it is crucial to understand the contribution of these MT nucleating factors to spindle assembly. We hypothesized that it is the kinetochores that contribute to the assembly of spindles. To gain understanding of the contribution of kinetochores to spindle assembly in the absence of chromatin, we will utilize the Mitosis with Unreplicated Genomes (MUG) system to ask what requirements of the Chromosome Passenger Complex (CPC) (if any) are necessary and/or sufficient for spindle assembly. The CPC consists of Aurora B, INCENP, Survivin, and Borealin proteins; which is concentrated at the inner centromere. The CPC protein INCENP is required in mitosis for condensation of chromosomes and attachment of spindles.

Keywords: Mitosis, microtubules, spindle, kinetochores, CPC, MUG

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