

P002 Evaluating the roles of the chromosomal passenger- and centralspindlin complexes during cytokinesis in sea urchin embryos

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Micromanipulation experiments have demonstrated that overlapping astral microtubules are sufficient for cleavage plane determination in echinoderm eggs. Other models implicate that the Chromosomal Passenger Complex (CPC) indirectly activates RhoGTP to form the contractile ring. Because experiments performed in echinoderm eggs have demonstrated that cleavage plane determination is independent of the central spindle, we are focusing on evaluating the CPC during cytokinesis in echinoderm embryos. Inhibition of Aurora B activity resulted in furrow regression, despite normal myosin II activation, astral microtubule elongation and furrow initiation. Inhibition of Aurora B activity also suggested a lack of organized microtubule arrays, normally associated with the ingressing furrow, and a loss of MKLP1 localization (and microtubule bundling). To further analyze the CPC model in establishing a cleavage plane, we eliminated the central portion of the spindle using (T24N) RanGTPase, which ablated polar and kinetochore microtubule formation without affecting astral microtubules. Preliminary studies indicate that while T24N Ran-injected cells failed to form a central spindle, they were capable of anaphase-B like pole separation and furrow initiation. These results suggest that in cells where astral signaling specifies the cleavage plane, the CPC and centralspindlin are required for furrow microtubule array organization but not for furrow initiation.