

P051 Differential recruitment of cytokinetic factors in cells containing monopolar spindles

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Current models for cleavage plane determination rely on an antiparallel microtubule array, although it has been recently shown that cleavage furrows may be induced in sea urchin eggs and cultured cells containing monopolar spindles. To investigate what factors require a bipolar array for cytokinesis, we have developed a reproducible assay where cells with monopolar spindles are forced into mitotic exit and cytokinesis with the CDK1 inhibitor flavopiradol. HeLa cells manipulated in this manner rapidly exited mitosis, formed a polarized microtubule array, and developed ectopic furrows at the cell periphery. Placement of ectopic furrows in spherical HeLa cells appeared to be random, with cells often exhibiting multiple sites of furrowing and membrane blebbing. Normally sequestered at the centromere prior to anaphase onset, Aurora B and INCENP were found along microtubules as early as five minutes post-induction, and could be found on the cortex at sites of ectopic furrowing. MKLP-1 was found at microtubule plus ends, but was not enriched at the cortical cytoskeleton like Aurora B and INCENP. In contrast, Plk1, was not recruited to microtubule plus ends or the site of ectopic furrows, and was dispensable for Aurora B/INCENP/MKLP-1 localization. Thus, while Aurora B and Plk1 both localize to the cell equator and are required for cytokinesis, the mechanisms by which they arrive at the cell equator differ.