

BubR1- and Polo-coated DNA tethers facilitate poleward segregation of acentric chromatids.

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Public Summary:

The mechanisms that safeguard cells against chromosomal instability (CIN) are of great interest, as CIN contributes to tumorigenesis. To gain insight into these mechanisms, we studied the behavior of cells entering mitosis with damaged chromosomes. We used the endonuclease I-Cre1 to generate acentric chromosomes in *Drosophila* larvae. While I-Cre1 expression produces acentric chromosomes in the majority of neuronal stem cells, remarkably, it has no effect on adult survival. Our live studies reveal that acentric chromatids segregate efficiently to opposite poles. The acentric chromatid poleward movement is mediated through DNA tethers decorated with BubR1, Polo, INCENP, and Aurora-B. Reduced BubR1 or Polo function results in abnormal segregation of acentric chromatids, a decrease in acentric chromosome tethering, and a great reduction in adult survival. We propose that BubR1 and Polo facilitate the accurate segregation of acentric chromatids by maintaining the integrity of the tethers that connect acentric chromosomes to their centric partners.

Scientific Abstract:

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