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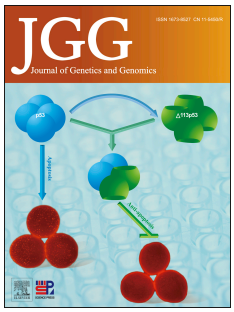

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Mid1ip1b modulates apical reorientation of non-centrosomal microtubule organizing center in epithelial cells

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ABSTRACT

In most kinds of animal cells, the centrosome serves as the main microtubule organizing center (MTOC) that nucleates microtubule arrays throughout the cytoplasm to maintain cell structure, cell division and intracellular transport. Whereas in epithelial cells, non-centrosomal MTOCs are established in the apical domain for generating asymmetric microtubule (MT) fibers and cilia in epithelial cells for the organ morphogenesis during embryonic development. However, the mechanism by which MTOCs localize to the apical domain in epithelial cells remains largely unknown. Here, we show that Mid1ip1b has a close interaction with γ-tubulin protein, the central component of MTOC, and modulates lumen opening of the neural tube, gut, intestine, and kidney of zebrafish. Knockdown or dominant negative effect of Mid1ip1b resulted in failure of lumen formation of the organs as aforementioned. Moreover, the non-centrosomal MTOCs were unable to orientate to the apical domain in *Mid1ip1b* knockdown epithelial cells, and the centrosomal MTOCs were inaccurately placed in the apical domain, resulting in defective formation of asymmetric microtubules and misplacement of cilia in the apical domain. These data uncover a molecule that controls the proper localization of MTOCs in the apical domain in epithelial cells for organ morphogenesis during embryonic development.