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Displacement of the Mitotic Apparatus Which Induces Ectopic Polar Body Formation or Parthenogenetic Cleavage in Starfish Oocytes

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Abstract

When the mitotic apparatus (MA) at meiosis I and II in starfish oocytes was detached from the animal pole and translocated to the other cortex, MA induced polar body formation, which indicates reattachment of MA to the cortex. MA attachment was so strong that MA at meiosis II was frequently broken into two parts during detachment and from the remnant part remaining at the cortex an aster derived and a nucleus derived from the detached part. When they were apart until the cleavage stage, the oocyte divided into the aster-containing and nucleus-containing blastomeres and, further, only the former blastomere divided repeatedly. This result indicates that the centrosome in the peripheral aster, which presumes to be discarded into the second polar body, always has the capacity of duplication but the centrosome in the inner aster, which stays in the oocyte interior, has not the capacity and confirms our previous report (17*Dev. Biol.* 203, 62–74). Furthermore, it is found by observing meiotic MA formation that this peculiar centrosome delivery at meiosis II is ensured by the fact that the attachment of the aster staying in the oocyte interior to the cortex occurs earlier than centrosome duplication.

Keywords

centrosome; meiosis; micromanipulation; mitotic apparatus; oocyte; polar body; starfish

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