CDB SEMINAR

Ikumi Fujita

Institute for Protein Research, Osaka University

Friday, February 22, 2013

15:00~16:00 A7F Seminar Room

Mechanism of the nuclear oscillation in fission yeast meiosis

Summary

Movement of chromosomes during meiosis is crucial for homologous pairing and meiotic recombination. In fission yeast, the nucleus led by the spindle pole body (SPB) oscillates between two poles of a cylindrical cell during meiotic prophase. In this period, all telomeres are clustered at the SPB through an interaction of the telomere protein Rap1 with the meiosis-specific SPB proteins Bqt1 and Bqt2. The nuclear oscillation is driven by cytoplasmic dynein, which generates pulling forces on astral microtubules at the cell cortex. We found that the dynein regulator dynactin is essential for cortical anchoring of dynein. The dynactin subunit Arp1 temporally localized at the dynein-accumulated foci where microtubules made contact with the cell cortex. Next, we constructed a simulation model of the nuclear oscillation based on microtubule dynamic instability. A model that considers microtubule pulling and pushing forces generated oscillation similar to that of living cells. Analysis using the simulation model and time-lapse observation of living cells revealed that frequency of the nuclear oscillation is dependent on cell length. In addition, velocity of the SPB movement was increased in *bqt1* mutant, in which telomeres are detached from the SPB, suggesting that the connection between chromosomes and the SPB affects velocity of the movement.

Host:

Fumio Matsuzaki

Cell Asymmetry, CDB

fumio@cdb.riken.jp

Tel:078-306-3216

(ext:1632)