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特別セミナー

New mitotic regulators released from chromatin

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要旨：

In mitosis, chromosomes are more than passive passengers segregated by spindle microtubules. They actively drive spindle assembly by producing the GTP bound form of the RanGTPase in their vicinity. Ran-GTP binds to the heterodimeric nuclear transport receptor importin and dissociates nuclear localization signal (NLS)-containing proteins from the importins. Liberated NLS proteins, such as TPX2, play distinct roles in spindle microtubule assembly.

To comprehensively identify novel Ran-regulated spindle assembly factors, I sequentially purified NLS proteins and microtubule-associated proteins (MAPs) from Xenopus egg extracts, and identified ~150 proteins (Yokoyama et al., 2009). Among the proteins identified were the chromatin-remodeling ATPases, CHD4 and ISWI. Surprisingly, I have been able to show that both function as bona-fide MAPs. The two proteins dissociate from chromatin in mitosis and re-localize to the spindle. Their mitotic functions are, however, temporally distinct: CHD4 is a Ran-GTP dependent microtubule stabilizer essential for spindle assembly (Yokoyama et al., in press), while ISWI specifically stabilizes microtubules in anaphase to maintain the spindle and ensure chromosome segregation (Yokoyama et al., 2009). I could show that the functions of CHD4 and ISWI are independent of chromatin remodeling, and are conserved in Xenopus egg extracts and human cells.

My data establish a new principle, that chromosomes drive not only spindle assembly but also other mitotic processes essential for their own segregation. The direct function of chromosomes is not only to produce Ran-GTP but in addition to release important mitotic regulators that are chromatin-associated in interphase.

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アクセスマップ：http://www.u-tokyo.ac.jp/campusmap/cam01_06_02_j.html