CDB SEMINAR

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Monday, October 3, 2016

17:00~18:00 Auditorium C1F

The final cut: control of progression through meiosis II

Summary

The generation of haploid gametes from diploid germ cells during meiosis depends on DNA replication being followed by two rounds of chromosome segregation, called meiosis I and –II. Whereas the mechanisms governing the segregation of homologous chromosomes in meiosis I have been studied extensively, comparatively little is known about the control of chromatid segregation in meiosis II. This is in part due to the perception of meiosis II as a "mitosis-like division". However, meiosis II differs from mitosis in fundamental aspects: in contrast to mitosis, meiosis II is preceded not by an S-phase but by an M-phase (meiosis I) and it is not followed by another S-phase but by a differentiation program that generates gametes. Furthermore, meiosis II chromosomes are unique because they consist of recombined chromatids held together solely at their centromeres by cohesin that has been protected from cleavage by the separase protease in meiosis I. Cleavage of cohesin at entry into anaphase I requires phosphorylation of its meiosis-specific Rec8 subunit. At centromeres, this phosphorylation is prevented by the phosphatase PP2A, which is recruited to kinetochores by the shugoshin protein. It is currently unclear whether cleavage of centromeric cohesin in meiosis II requires phosphorylation of Rec8 and whether this depends on the inactivation or removal from kinetochores of PP2A. A detailed understanding of meiosis II has been hampered by technical challenges. Experimental manipulation of meiosis II has to be performed without perturbing meiosis I, which requires conditional methods for protein inactivation that work in the short interval between meiosis I and –II. We use budding yeast to investigate how centromeric cohesin is cleaved at the onset of anaphase II and how this event is coordinated with exit from meiosis II and spore formation, the yeast equivalent of gametogenesis.

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