Laboratory of Molecular Genetics

Graduate School of Science

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(Molecular Genetics)

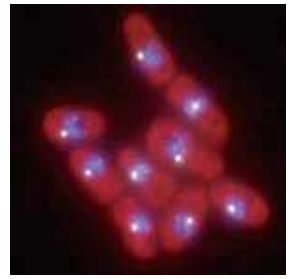
Genetics information is written in nucleotide sequence in DNA. In the nucleus, DNA binds to histones to form nucleosomes, which then come together to form chromatin and then chromosomes. Maintaining the number and size of chromosomes is critical. Chromosome aberrations can cause genetic disease such as cancer. Our goal is to elucidate the molecular mechanisms that maintain chromosomes and also cause gross chromosomal rearrangement.

Chromosomal maintenance and rearrangement

Eukaryotic genomes contain a variety of repeats, including centromere repeats and transposons. Gross chromosome rearrangement such as translocation can occur using these repetitive sequences as a glue. Using fission yeast, we identify the factors involved in chromosome maintenance and/or chromosomal rearrangement and reveal their functions.

Chromosome aberrations occurring in the centromere region

The centromere is an important chromosomal region where kinetochores are formed. Analysis of chromosome aberrations occurring in the centromere revealed that "regulation of homologous recombination" and "transcriptional regulation by heterochromatin structure" in the cell nucleus are important for the suppression of chromosome aberrations.



Images of fission yeast (red) nuclei (blue) and centromeres (white)

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