BDR SEMINAR (Kobe & online hybrid)

Bungo Akiyoshi

Wellcome Centre for Cell Biology, University of Edinburgh

Friday, July 7, 2023

16:00-17:00

1F Auditorium, DB Building C, Kobe / Broadcast online via Zoom

Zoom meeting URL will be announced on the event day by e-mail.

※Non-BDR members: Please register from the following link.

https://krs1.riken.jp/m/bdrseminarregistration (Registration deadline July 3)

Understanding the mechanism of chromosome segregation: lessons from diversity

Summary

Kinetochores are the macromolecular protein complex that drives chromosome segregation in eukaryotes. They do so by interacting with centromeric DNA and capturing spindle microtubules during mitosis and meiosis. Given the essential nature of kinetochores in genetic inheritance, it was widely thought that the structural core of kinetochores would be common to all eukaryotes. However, no canonical kinetochore components have been identified in a group of organisms called kinetoplastids, which are evolutionarily divergent from yeast or human. To reveal how kinetoplastids achieve chromosome segregation, we identified 25 kinetochore proteins in Trypanosoma brucei (a kinetoplastid parasite that causes African sleeping sickness) and discovered that they constitute kinetochores that are specifically found in kinetoplastids. We are currently characterizing these "unconventional" kinetochore proteins using a variety of techniques to understand how they carry out conserved kinetochore functions, such as binding to DNA and microtubules as well as error correction and cell cycle control. By revealing how kinetoplastids segregate their chromosomes, we aim to understand fundamental principles of the chromosome segregation machinery. Our work also provides insights into the longstanding problem of the position of the root of the eukaryotic tree of life as well as the origin of mitosis/meiosis in eukaryotes.

Host: Tomoya Kitajima
Laboratory for Chromosome Segregation, BDR
tomoya.kitajima@riken.jp

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