

The 114th iCeMS SEMINAR

CeMI Seminar Series 30

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10:30-12:00

How is a long strand of genomic DNA organized into a nucleus or chromosome?

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Venue: Room #119 Research Bldg No. 1/Project Lab
(Building #32), Kyoto University

How is 2-m-long genomic DNA organized into a mitotic chromosome or nucleus? The nucleosome fiber has long been assumed to be folded into a 30-nm chromatin fiber, and further helically folded larger fiber. However, when we observed frozen hydrated human mitotic cells using cryoelectron microscopy (cryo-EM), no higher-order structures including 30-nm chromatin fibers were found. To further investigate the bulk structure of mitotic chromosomes, we performed small-angle X-ray scattering (SAXS) at SPring-8. No structural feature larger than 11 nm was detected, even on a chromosome-diameter scale ($\sim 1 \mu\text{m}$). We also found a similar scattering pattern in interphase nuclei of HeLa cells in the range up to ~ 275 nm. Our findings suggest a common structural feature in interphase and mitotic chromatin: compact and irregular folding of nucleosome fibers occurs without a 30-nm chromatin structure.

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Hosted by: iCeMS (Institute for Integrated Cell-Material Sciences), Kyoto University
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