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QBiC CDB JOINT SEMINAR

CDB
RIKEN Kobe since 2000

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National Institute of Genetics

Date & Location

Monday, January 29, 2018, 16:00 - 17:00
Kobe CDB A7F seminar room
(2-2-3 Minatojima-minamimachi, Chuo-ku, Kobe)

Title

Dynamic organization of chromatin domains revealed by super-resolution live-cell imaging

Abstract

How is the long strand of genomic DNA organized in the cell? Recent studies have suggested that chromatin forms numerous domains as functional units of the genome. However, questions remain how they form, are distributed, and behave in living cells. Here, by combining super-resolution imaging photoactivated localization microscopy and single nucleosome tracking, we developed a novel nuclear imaging system that allowed us to visualize the spatial organization of chromatin domains along with their dynamics in living mammalian cells. We have clearly demonstrated the quantitative relations between the epigenetic state and dynamics: more heterochromatic regions show less chromatin movement. With cell differentiation, the domains became more apparent with reduced dynamics. Furthermore various perturbation experiments, indicated that they are organized by many factors, including electrostatic force and molecular crowding as well as cohesin complex and nucleosome-nucleosome interactions. Notably, we observed the chromatin domains during mitosis, suggesting that they act as Lego blocks of chromosomes to retain epigenetic information throughout the cell cycle.

[Reference]

Maeshima et al., Liquid-like behavior of chromatin. *Current Opinion in Genetics and Development*. (2016) 37:36–45

Nozaki et al., Dynamic organization of chromatin domains revealed by super-resolution live-cell imaging. *Molecular Cell*. (2017) 67:282-293.

Host

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