



# QBiC CDB JOINT SEMINAR



## Takeshi Sugawara, Ph.D.

Research Center for the Mathematics on Chromatin Live Dynamics (RcMcD),  
Hiroshima University

### Date & Location

Monday, April 3, 2017

15:00 - 16:00

RIKEN Kobe CDB A7F Seminar Room

(2-2-3 Minatojima-minamimachi, Chuo-ku, Kobe)

There will be a TV broadcast at RIKEN Osaka A3F seminar room.

### Title

## Stagnant, itinerant chromatin dynamics

### Abstract

In mammals and other higher animals, interphase chromosomes remain separated from each other and compartmentalized into chromosome territories. In plants and yeast, chromosomes adopt a Rab1 conformation, with arms extending from centromeres tethered on one nuclear periphery to telomeres at the opposite nuclear envelope. These global organizations generally constrain the movement of chromatin loci, and locate genes within limited regions of the nucleus. However, activated genes in the course of cell-cycle progression or development can escape from such physical constraints and be located at active regions such as transcription factories and nuclear pores. In spite of extensive studies for these phenomena, how gene loci sustain and change their positioning during cell cycle remains still unclear.

In order to elucidate interphase chromatin dynamics, we visualized and tracked the positions of gene loci on a longer time scale than conventional one in fission yeast *Schizosaccharomyces pombe*. The statistical analysis of tracking data indicated that the movement of the gene loci is constrained by tethering of centromeres and telomeres on the nuclear envelope, which can be a natural result of the Rab1 conformation. However, careful observation of individual time-lapse data revealed that the loci not only stay at multi-locations but also often transit among them. Such “*itinerant*” dynamics among “*stagnant*” locations were validated through an analysis using Hidden Markov Model, and therefore interpreted as dynamic itinerancies among distinct intra-nuclear locations referred as “*gene territories*”. Quantitative analysis of the cell morphology changing during the cell growth indicated that the itinerant/stagnant chromatin dynamics could occur in a cell cycle-dependent manner. Therefore, the observed chromatin dynamics is quite different from simple diffusive behaviors reported so far, that can be a novel characteristic of chromatin dynamics during cell-cycle progression.

### Host

Tatsuo Shibata

Laboratory for Physical Biology

[tatsuo.shibata@riken.jp](mailto:tatsuo.shibata@riken.jp)

Tel: 078-306-3264