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External Seminar Series

Tuesday May 14, 2024
11:00AM CRCM Library

Hosted by the Genome Integrity Department (GID)

Romain Koszul, PhD

Head of the lab
« Spatial Regulation of Genomes »
Institut Pasteur, Paris

Sequence-dependent activity and compartmentalization of foreign DNA in a eukaryotic nucleus

Genomic sequences co-evolve with DNA-associated proteins to ensure the multiscale folding of long DNA molecules into functional chromosomes. In eukaryotes, different molecular complexes organize the chromosome's hierarchical structure, ranging from nucleosomes and cohesin-mediated DNA loops to large scale chromatin compartments. To explore the relationships between the DNA sequence composition and the spontaneous loading and activity of these DNA-associated complexes in the absence of co-evolution, we characterized chromatin assembly and activity in yeast strains carrying exogenous bacterial chromosomes that diverged from eukaryotic sequences over 1.5 billion years ago. We show that nucleosome assembly, transcriptional activity, cohesin-mediated looping, and chromatin compartmentalization can occur in bacterial chromosomes in a eukaryotic host, and that two different chromatin archetypes are formed for two highly divergent genomes. These results are a step forward in understanding how foreign sequences are interpreted by a host nuclear machinery during natural horizontal gene transfers, as well as in synthetic genomics projects. In addition to this study, I will also show how long random DNA sequences can be used to learn about transcription regulation and processivity.

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