Role of RbAp46/48^{LIN-53} in holocentromere assembly in Caenorhabditis elegans

Date: 16\textsuperscript{th} May, 2017 (Friday)
Time: 15:00 – 15:30
Venue: Room 6N11, Kadoorie Biological Sciences Building
Speaker: Mak Ka Ho Jason (MPhil Candidate)
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ABSTRACT

The centromere is a region on chromosome which directs proper chromosome segregation during cell division. Across many eukaryotes, the common feature of centromere is defined by substituting histone H3 in canonical nucleosomes by a histone H3 variant, CENP-A, which forms a characteristic CENP-A nucleosome at the centromere region. However, the centromere location on DNA is restricted to specific chromosome regions for many organisms. Except in some plants, insects and nematodes such as Caenorhabditis elegans, the location of centromere on chromosomes is not restricted to specific regions, but is diffused along chromosomes, and this characteristic centromere is termed as holocentromere.

After each round of DNA replication, a specific CENP-A histone chaperone serves to load CENP-A onto chromosome regions, in order to reassemble the centromeric nucleosome on the newly synthesized DNA. In Caenorhabditis elegans, the knowledge on holocentromere assembly is still limited due to the “promiscuous” nature of centromere region and that a CENP-A-specific histone chaperone has yet been identified to date.

Recently, our group has revealed the identity of a histone chaperone RbAp46/48^{LIN-53} in holocentromere assembly pathway. RbAp46/48^{LIN-53} is required for CENP-A^{HCP-3} localization and depletion of RbAp46/48^{LIN-53} is shown to cause chromosome missegregation. Using an in vitro system for reconstituting CENP-A^{HCP-3} nucleosomes, our study aims to further investigate the potential interactions between RbAp46/48^{LIN-53} and CENP-A^{HCP-3} in directing holocentromere assembly.

Overexpression of CENP-A has been known to promote genomic instability in cancers. Conversely, defects in centromere assembly have also been shown to result in chromosome missegregation and errors during cell cycle progression. Understanding the molecular mechanisms of holocentromere assembly will help to advance our knowledge on key players in this assembly pathway, and defects can be specifically targeted for corrections as potential cancer therapeutics.

---All are welcome---