Cryo-EM structures of eukaryotic SMC complexes, cohesin and condensin.

Structural maintenance of chromosomes (SMC) complexes are essential drivers of chromosome organisation in all domains of life. In eukaryotes, condensin organises DNA into rod-shaped chromatids during mitosis, and cohesin mediates sister chromatid cohesion and interphase chromosomal organisation. They function through the entrapment and active translocation of DNA, but the underlying conformational changes are largely unclear. To obtain molecular insights, we investigated the structures of budding yeast cohesin and condensin using cryo-EM. In this talk, I will present the various cryo-EM structures of cohesin and condensin obtained in the absence and presence of ATP and DNA, and discuss how drastic conformational changes allow to build DNA structures.