

Description for the general public

Cohesin complex is a molecular glue that holds sister chromatids in close proximity from S-phase to anaphase of mitosis. This prevents premature separation of sister chromatids and unequal segregation of chromosomes between mother and daughter cell. Moreover, cohesins play other important roles throughout the cell cycle including preservation of stability of ribosomal DNA as well as DNA damage repair. Interestingly, latest research revealed that cohesin interacts physically with many other proteins that regulate many aspects of cohesin activity. On the other hand, cohesin may be responsible for spatiotemporal regulation of its binding partners. Taken into account these reports, we decided to investigate protein interactome of cohesin. For this purpose, we will identify cohesin binding partners using tandem affinity purification. Next, we will select several interesting interactors and use other techniques to confirm its interaction with cohesin. Finally, we will characterize the role of these interactions in sister chromatid cohesion, rDNA stability and DNA damage response. Since disruption of cohesin and cohesin regulators was shown to lead to cancer and developmental disorders, it is of great importance to elucidate mechanisms of cohesin regulation. Characterization of these processes at the molecular level in budding yeast will certainly lead to better understanding of similar processes in other organisms, including humans. Unveiling the mechanisms integrating different pathways for maintaining genome stability is not only important for broadening of basic biological knowledge but also may constitute a good starting point for further research projects and contribute to better understanding of cancer biology.