Students' Annual Webinar

Exploring the of role of HU and MatP in E. coli chromosome organisation and towards a high-resolution model for the E. coli chromosome

Abdul Wasim

The structure of E. coli chromosome is still unknown. In the past decade multiple attempts to understand the chromosome organisation inside the E. coli cell via various experimental studies has provided us with some degree of clarity. In regards to such experimental techniques, Hi-C provides us with a genome-wide contact probability matrix limited to a resolution. We have used recently published Hi-C data on the E. coli chromosome (Lioy et. al, 2018, Cell) and a polymer model to establish a protocol that generates chromosome structures at 5 Kilobase pair (Kbp) resolution (Wasim et. al, 2021, NAR). In the current investigation, we apply the model to two Nucleoid Associated Proteins (NAPs), namely HU and MatP. This enables us to compare, in a quantitative manner, the changes in the global and local chromosome structure upon deletion of any of the above-mentioned proteins from the E. coli cell. Using such quantifications, we sought to understand the roles of these proteins in maintaining the E. coli chromosome structure.

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10:30 AM