

Single molecule imaging of cohesin-DNA interactions on DNA curtains

Johannes Stigler

Columbia University, USA

Abstract:

The cohesin complex is essential for the hierarchical organization of the eukaryotic genome and plays key roles in many aspects of chromosome biology. However, the conformation of cohesin bound to DNA remains poorly defined, leaving crucial gaps in our understanding of how cohesin fulfills its biological functions. Here we use single molecule microscopy to directly observe the dynamic and functional characteristics of cohesin bound to DNA. We show that cohesin can undergo rapid one-dimensional diffusion along DNA, and probe the size of cohesin's DNA binding pore in collision experiments with protein obstacles. We further demonstrate that DNA motor proteins can readily push cohesin along DNA, but they cannot pass through the interior of the cohesin ring. Together, our results reveal that DNA-bound cohesin has a central pore that is substantially smaller than predicted by prevalent models. These findings have direct implications for understanding how cohesin and other SMC proteins interact with and distribute along chromatin.

Friday, December 18th, 2015, 13:00

Room PH 127

Contact: Matthias Rief, matthias.rief@mytum.de, phone: 089-289-12471