

## FACT Caught in the Act of Manipulating the Nucleosome

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In almost all eukaryotes, the nucleosome profoundly affects all DNA-related processes such as RNA transcription and DNA replication. To pass through as well as maintain the nucleosome during these processes, a histone chaperone called FACT (Facilitate Chromatin Transcription) is required [1]. For decades, the mechanism on how FACT promotes chromatin transaction while maintaining the nucleosome integrity was elusive. The talk will focus on the structure determination of FACT on a partially disassembled nucleosome [2]. By conquering the “water-air” interface problem, we obtained two cryo-EM structures of human FACT on its substrates. Hydrogen-deuterium exchange (HDX) assay validated the structures in solution. The structures revealed how FACT engages with the nucleosomal DNA and all histones simultaneously. The findings reconciled discrepancies regarding the many roles of FACT and underscored the dynamic interactions between histone chaperones and the nucleosomes.

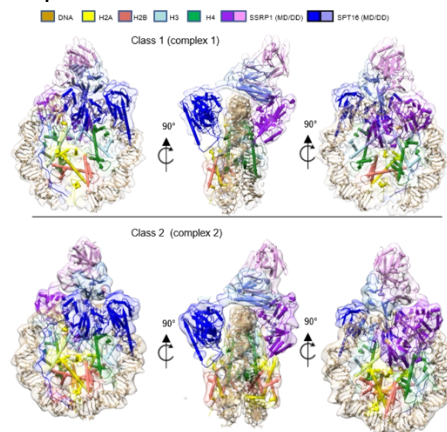


Figure 1. Two cryoEM structures of FACT in complex with “sub-nucleosomes”.

### References:

[1] Gurova, K., Chang, H. W., Valieva, M. E., Sandlesh, P. & Studitsky, V. M. Structure and function of the histone chaperone FACT—resolving FACTual issues. *Biochim. Biophys. Acta. Gene Regul. Mech.* 1861, 892–904 (2018).

[2] Yang Liu\*, Keda Zhou\*, Naifu Zhang, Hui Wei, Yong Zi Tan, Zhening Zhang, Bridget Carragher, Clinton S Potter, Sheena D’Arcy, Karolin Luger, (2020), FACT caught in the act of manipulating the nucleosome. *Nature.* 577, 426-431.