

Mammalian Mitotic Chromosome Dynamics Through Mechanical Stress Cycles

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Abstract:

In this JC, I focus on a study for mammalian mitotic chromosome morphogenesis and dynamics. In the paper by Z. Liang, *et al.*, *Cell* **161**:1124-1137, 2015 [1], they revealed that chromosomes undergo cycles of global compaction and expansion during progression from prophase to metaphase, possibly driven by chromosome mechanical stress cycles. Such a “stress hypothesis” for chromosome dynamics was also previously discussed in their study for *E. coli* chromosome dynamics during cell cycle [2]. I suspect that these results might imply the existence of unknown general mechanisms of chromosome organization, generated by chromatin looping or catenation/decatenation factors.

References:

- [1] Liang Z, Zickler D, ..., Maeshima K, & Kleckner N, Chromosome Progress to Metaphase in Multiple Discrete Steps via Global Compaction/Expansion Cycles, *Cell* **161**:1124-1137, 2015.
- [2] Fisher JK, ..., Kleckner N, Four-Dimensional Imaging of *E. coli* Nucleoid Organization and Dynamics in Living Cells, *Cell* **153**:882-895, 2013.