Chromatin topological transitions

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Through dynamic changes in structure resulting from chemical modifications and mechanical constraints imposed by numerous factors *in vivo*, chromatin plays a critical role in the regulation of DNA metabolism processes, including repair, replication and transcription [1,2]. Biophysical approaches such as molecular microscopy and single-molecule micromanipulation have greatly improved our understanding of the way chromatin packages our genome and participates in the regulation of gene expression [3]. Using magnetic tweezers to manipulate single nucleosomes arrays, we showed (1) that the existence of a dynamic equilibrium between different crossing statuses of the entry/exit DNAs of each nucleosomes enabled chromatin fibers to reversibly accommodate large amount of supercoiling [4] and (2) that the application of large positive torsion –mimicking the supercoiling wave produced in front of a polymerase- can trigger nucleosomes chiral transition to a metastable right-handed form [5]. *In vivo* physiological relevance of these observations will be discussed in the light of results provided by the recent literature [6,7].

References

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