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Directional sliding of histone octamers caused by DNA bending
PENG-YE WANG, WEI LI, SHUO-XING DOU, PING XIE, Laboratory of Soft Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100080, China — Chromatin-remodeling complexes such as SWI/SNF and RSC of yeast can perturb the structure of nucleosomes in an ATP-dependent manner. Experimental results prove that this chromatin remodeling process involves DNA bending. We simulate the effect of DNA bending, caused by chromatin-remodeling complexes, on directional sliding of histone octamers by Brownian dynamics simulation. The simulation results show that, after a DNA loop being generated at the side of a nucleosome, the histone octamer slides towards this DNA loop until the loop disappears. The DNA loop size is an important factor affecting the process of directional sliding of the histone octamer. A model for directional sliding of histone octamers induced by chromatin-remodeling complexes is suggested. (This research was supported by National Natural Science Foundation of China, and the Innovation Project of the Chinese Academy of Sciences.) (Email: pywang@aphy.iphy.ac.cn)

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