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Conformation of nanoconfined DNA as a function of ATP, AMP, CTP, Mg^{2+}, and dye binding MAEDEH ROUSHAN, ROBERT RIEHN, North Carolina State University — DNA molecules stretch in nanochannels with a channel cross-section of 100x100 nm^2, thereby allowing analysis by observation of a fluorescent dye. The length and configuration of DNA can be directly observed, and the effect of different DNA-binding proteins on DNA configuration can be studied. Recently, we reported on the ability of T4 ligase to transiently manipulate DNA as a function of ATP and magnesium exposure. In this process we have extensively probed the interactions of dyes and enzyme co-factors with DNA under nanoconfinement. We find negligible effects if DNA is visualized using groove-binding dyes such as DAPI. However, if an intercalating dye (YOYO-1) is used, we find a significant shortening of the DNA in the presence of ATP that we attribute to an interaction of dye and ATP (as well as AMP and CTP). We did not record a noticeable effect due to Mg^{2+}.

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