

Unzipping DNA at controlled force

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Single molecule studies, at constant force (CF), of DNA unzipping may provide information relevant to the dynamics of DNA replication¹. Controlled force experiments can be performed with optical tweezers by using a force feedback^{2,3}. Here we show experimental data of the Force Distance Curve (FDC) at CF. The unzipping/rezipping curves show strong hysteresis, a typical feature of relaxation processes in non-equilibrium systems with rough free energy landscape. Also, the experimental data fits quite well with the scaling predictions of theoretical studies of mesoscopic models of DNA⁴.

¹ C. Danilowicz, V.W. Coljee, C. Bouzigues, D.K. Lubensky, D.R. Nelson, M. Prentiss, *DNA unzipped under a constant force exhibits multiple metastable intermediates*, Proc Natl Acad Sci U S A, **100**(4), 1694-1699 (2003)

² J.M. Huguet, *Statistical and thermodynamic properties of DNA unzipping experiments with optical tweezers*, PhD thesis, University of Barcelona (2010).

³ N. Forns, S. De Lorenzo, M. Manosas, K. Hayashi, J. M. Huguet and F. Ritort, *Improving Signal/Noise Resolution in Single-Molecule Experiments Using Molecular Constructs with Short Handles*, Biophysical Journal, **100** 1765-1774 (2011)

⁴ D.K. Lubensky, D.R. Nelson, *Single molecule statistics and the polynucleotide unzipping transition*, Phys. Rev. E, **65**, 031917 (2002).

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