Abstract Submitted
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On the translocation of stiff chains ROYA ZANDI, WILLIAM GELBART, JOSEPH RUDNICK, UCLA, DAVID REGUERA, Universitat de Barcelona — We study the dynamics of the passage of a stiff chain through a pore into a cell containing particles that bind reversibly to it. Using Brownian Molecular Dynamics simulations we investigate the mean-first-passage time as a function of the length of the chain inside, for different concentrations of binding particles. As a consequence of the interactions with these particles, the chain experiences a net force along its length whose calculated value from the simulations accounts for the velocity at which it enters the cell. This force can in turn be obtained from the solution of a generalized diffusion equation incorporating an effective Langmuir adsorption free energy for the chain plus binding particles. These results suggest a role of binding particles in the translocation process which is in general quite different from that of a Brownian ratchet. Furthermore, non-equilibrium effects contribute significantly to the dynamics, *e.g.*, the chain often enters the cell faster than particle binding can be saturated, resulting in a force several times smaller than the equilibrium value.

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