

DNA supercoiling and the lambda bacteriophage epigenetic switch

Laura Finzi

Physics Department, Emory University, 400 Dowman Dr, Atlanta, GA 30322, U.S.A.

The effect of tension and supercoiling on CI-mediated loops that were shorter than wild type (393 bp vs. 2317 bp-long) was characterized using magnetic tweezers. The average lifetime of looped and unlooped conformations and ΔG of loop formation was measured. Loop probability was observed to decrease with tension, as expected, and increase with DNA negative supercoiling. Thus, DNA unwinding seemed to compensate for the adverse effect of tension. Furthermore, the writhe of this short CI-mediated loop was measured directly. Implications for molecular recognition and response to the energy state of the cell will be discussed.