

Abstract Submitted  
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**Inferring the *in vivo* looping properties of DNA.** JOSE VILAR, Memorial Sloan-Kettering Cancer Center, LEONOR SAIZ, Memorial Sloan-Kettering Cancer Center, MIGUEL RUBI, University of Barcelona — The free energy of looping DNA by proteins and protein complexes determines to what extent distal DNA sites can affect each other [1]. We inferred its *in vivo* value through a combined computational-experimental approach for different lengths of the loop [2] and found that, in addition to the intrinsic periodicity of the DNA double helix, the free energy has an oscillatory component with about half the helical period. Moreover, the oscillations have such an amplitude that the effects of regulatory molecules become strongly dependent on their precise DNA positioning and yet easily tunable by their cooperative interactions. These unexpected results can confer to the physical properties of DNA a more prominent role at shaping the properties of gene regulation than previously thought. [1] J.M.G. Vilar and L. Saiz, *Current Opinion in Genetics & Development*, 15, 136-144 (2005). [2] L. Saiz, J.M. Rubi, and J.M.G. Vilar, *Proc. Natl. Acad. Sci. USA*, 102, 17642-17645 (2005).

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