INTERPLAY BETWEEN TOPOLOGY AND STATISTICAL PROPERTIES OF DNA: A POLYMER PHYSICS APPROACH

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The talk will present how to use DNA of various topological forms (linear, circular and knotted DNA) in order to study polymer physics. On the other side, I will show the benefits of this approach for the study of DNA and its function inside the cell and what it can be gained from polymer physics.

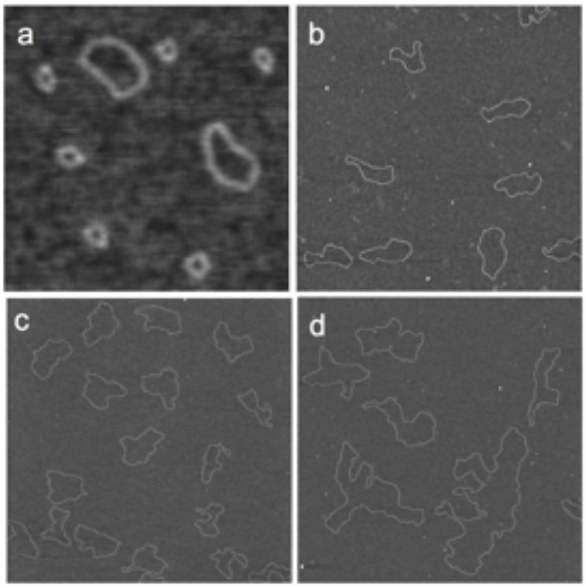

Figure 1: Circular DNA of various lengths imaged by Atomic Force Microscope. (a) 350 nm image size; (b) 2 μm image size; (c) 3 μm image size; (d) 2.5 μm image size.

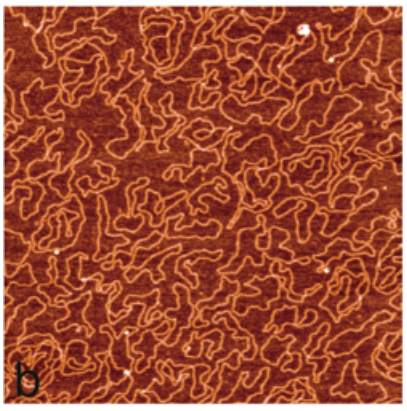

Figure 2: Concentrated "solution" of circular DNA.

Examples will be presented for linear DNA of various lengths, circular DNA as isolated molecules and in concentrated forms, and knotted DNA. For these studies, Atomic Force Microscopy (AFM) images of DNA were analyzed and interpreted using polymer physics concepts. It turns out that AFM images deliver a wealth of detailed data never available before and that now it is possible to compare theoretical predictions for linear, circular and knotted polymers with real polymers.

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