Mechanism of unusual flexibility of DNA TATA-box

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During functioning, DNA undergoes deformations, which magnitudes and features cannot be explained using the elastic rod model. The detail analysis of DNA deformations shows the molecule can undergo significant transformation due to the conformational polymorphism of specific sequences, which can exist in more then one conformations [1,2]. In the order to include the conformational impact in addition to elastic components (bending, twisting), the deformation model includes the following features: conformational changes, anisotropy, and the coupling between components. Conformational changes can be monitored through a specific change in the shape of sugar rings according to sequence. We have shown that the induced untwisting of double helix can: 1) make conformational states become equivalence; 2) provide effective soften rigidity of bend, that makes conformationally induced bending and unwinding advantageous, according to the conditions presented in [3]. Accordance of suggested scenario of deformation with experimental data [1] confirms important role of conformational polymorphism in DNA functioning.

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