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Stretch Moduli of Ribonucleotide Embedded Short DNAs HSIANG-CHIH CHIU, School of Physics, Georgia Institute of Technology, KYUNG DUK KOH, School of Biology, Georgia Institute of Technology, ELISA RIEDO, School of Physics, Georgia Institute of Technology, FRANCESCA STORICI, School of Biology, Georgia Institute of Technology — Understanding the mechanical properties of DNA is essential to comprehending the dynamics of many cellular functions. DNA deformations are involved in many mechanisms when genetic information needs to be stored and used. In addition, recent studies have found that Ribonucleotides (rNMPs) are among the most common non-standard nucleotides present in DNA. The presences of rNMPs in DNA might cause mutation, fragility or genotoxicity of chromosome but how they influence the structure and mechanical properties of DNA remains unclear. By means of Atomic Force Microscopy (AFM) based single molecule spectroscopy, we measure the stretch moduli of double stranded DNAs (dsDNA) with 30 base pairs and 5 equally embedded rNMPs. The dsDNAs are anchored on gold substrate via thiol chemistry, while the AFM tip is used to pick up and stretch the dsDNA from its free end through biotin-streptavidin bonding. Our preliminary results indicate that the inclusion of rNMPs in dsDNA might significantly change its stretch modulus, which might be important in some biological processes.

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