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HMGB binding to DNA: comparisons between single and double box motifs MICAH J. MCCAULEY, Department of Physics, Northeastern University, JEFF ZIMMERMAN, L. JAMES MAHER III, Department of Biochemistry and Molecular Biology, Mayo Clinic College of Medicine, MARK C. WILLIAMS, Department of Physics, Northeastern University — High Mobility Group B (HMGB) proteins contain two HMG box domains known to bind non-sequence specifically into the DNA minor groove, slightly intercalating base pairs and producing a strong bend in the DNA backbone. These proteins are believed to alter DNA elasticity, making DNA more accessible for transcription in vivo. To probe the effects of HMG proteins on DNA elasticity, we use optical tweezers to measure the forces required to stretch single DNA molecules, alone and in the presence of HMGB proteins at varying solution conditions. Experiments quantify the binding constant of HMGB to DNA, as well as changes in the flexibility and stability of the double helix. Previous results from a protein fragment containing a single HMG box suggested significant flexibility changes in the double helix but did not show helix stabilization, while a double box protein from rat HMGB–1 appears to significantly stabilize the DNA helix.

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