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Electrostatic effects on hyaluronic acid configuration JOHN BEREZNEY, OMAR SALEH, University of California, Santa Barbara — In systems of polyelectrolytes, such as solutions of charged biopolymers, the electrostatic repulsion between charged monomers plays a dominant role in determining the molecular conformation. Altering the ionic strength of the solvent thus affects the structure of such a polymer. Capturing this electrostatically-driven structural dependence is important for understanding many biological systems. Here, we use single molecule manipulation experiments to collect force-extension behavior on hyaluronic acid (HA), a polyanion which is a major component of the extracellular matrix in all vertebrates. By measuring HA elasticity in a variety of salt conditions, we are able to directly assess the contribution of electrostatics to the chain's self-avoidance and local stiffness. Similar to recent results from our group on single-stranded nucleic acids, our data indicate that HA behaves as a swollen chain of electrostatic blobs, with blob size proportional to the solution Debye length. Our data indicate that the chain structure within the blob is not worm-like, likely due to long-range electrostatic interactions. We discuss potential models of this effect.

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