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Entropic Elasticity in the Giant Muscle Protein Titin IAN MORGAN, OMAR SALEH, University of California Santa Barbara — Intrinsically disordered proteins (IDPs) are a large and functionally important class of proteins that lack a fixed three-dimensional structure. Instead, they adopt a conformational ensemble of states which facilitates their biological function as molecular linkers, springs, and switches. Due to their conformational flexibility, it can be difficult to study IDPs using typical experimental methods. To overcome this challenge, we use a high-resolution single-molecule magnetic stretching technique to quantify IDP flexibility. We apply this technique to the giant muscle protein titin, measuring its elastic response at low forces. We present results demonstrating that titin's native elastic response derives from the combined entropic elasticity of its ordered and disordered domains.

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