

Mechanical properties of BiP protein determined by nano-rheology

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© 2018 The Protein Society Immunoglobulin Binding Protein (BiP) is a chaperone and molecular motor belonging to the Hsp70 family, involved in the regulation of important biological processes such as synthesis, folding and translocation of proteins in the Endoplasmic Reticulum. BiP has two highly conserved domains: the N-terminal Nucleotide-Binding Domain (NBD), and the C-terminal Substrate-Binding Domain (SBD), connected by a hydrophobic linker. ATP binds and it is hydrolyzed to ADP in the NBD, and BiP's extended polypeptide substrates bind in the SBD. Like many molecular motors, BiP function depends on both structural and catalytic properties that may contribute to its performance. One novel approach to study the mechanical properties of BiP considers exploring the changes in the viscoelastic behavior upon ligand binding, using a technique called nano-rheology. This technique is essentially a traditional rheology experiment, in which an oscillatory force is directly applied to the pro