

Investigating Structure-Function of Myosin 19

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Myosin 19, a novel class of myosin, is an actin-based molecular high-duty motor protein involved with the movement and positioning of mitochondria through binding to the MyMOMA tail region. It is important to biological systems as problems with mitochondrial localization can lead to a wide range of diseases in humans, most of them neuronal in nature. While the residue sequence of MYO19 is known, currently there is no experimental structure. The Quintero and Parish research groups seek to discover how binding ATP, ADP, and ADP+Pi to the nucleotide active site affects the structure of the MYO19 motor region and lever arm. Theoretical structures of MYO19 have been created by threading the MYO19 residue sequence on the Lorenz-Holmes Model of MYO2 and PDB 1w7j MYO5 using Phyre2, along with post-threading filling of missing sequences using Maestro 11. Nucleotide induced conformational changes will be understood through molecular dynamics simulations (MD) and data analysis of MYO19 using the AMBER 16 suite. A deeper understanding of how nucleotide binding impacts the structure and function of MYO19 will lead to a greater knowledge of the causation of various mitochondrial diseases. These findings will be presented in a poster showing structural changes over time through visualization and graphs of resultant MD calculations.