Abstract

Human ear receives varying forces in the form of sound waves creating oscillations in the inner ear fluid. Oscillations in fluid deflect stereocilia located atop of hair-cells. Adjacent stereocilia are connected to each other with tip-links at their tip. Tip-links is formed by a pair of proteins. It is hypothesized that tip-links that serve as gated-spring in the hearing, pull open ion-channels in response to force as sound stimuli. The opening of ion-channel is delicately balanced between the viscoelastic property of the tip-links and wide variations in force experienced by tip-links due to varying intensity of sound. The overall objective of my work is to understand the molecular elasticity of tip-links in the presence of tensile force. We developed a new method of making polyproteins. We use single molecule force spectroscopy with Atomic force microscope to study the force-dependent molecular elasticity of tip-links.