

Roger Kamm Title and Abstract

Forcing the issue: Mechanical stimulation and its influence on biological function

Cells are exquisitely sensitive to mechanical force, and respond in a variety of ways, both beneficial and pathological. While biologists have contributed enormously to our understanding of the biochemical signaling pathways that transmit these responses, little progress has been made in identifying the initiating event in which a mechanical force is first transduced into a biochemical signal. Several mechanisms have been proposed, and some have been characterized, but there is still much to learn. In the process of studying the interactions between force and biology, a new field, “mechanobiology,” has emerged at their interface, and a new term has been coined, “mechanomics,” to encompass the state of stress and its biological consequences. This talk will address some of the theories of mechanical force transduction, the role of mechanics at multiple length-scales, and some computational models that can help aid in our understanding of these essential phenomena.