

Seminar



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The forceful play of cells with extracellular matrix and bacteria

How do cells and bacteria exploit the nanomechanics of proteins, and are there lessons to be learned for engineers? Recent research revealed multifaceted mechanisms by which bacteria and cells can exploit proteins as nanoscale switches that are able to convert mechanical forces into biochemical signals. While such mechanotransduction processes regulate many cell functions, the first underpinning mechanisms are only gradually emerging. Cells exploit mechanical forces to regulate their adhesion to substrates, and to sense topographical and mechanical aspects of their environments. Also bacteria take advantage of mechano-regulated processes, particularly in the design of their adhesins. The interactions of the adhesins that *Staphylococcus aureus* utilizes to bind to extracellular matrix fibers, for example, can be broken by stretching the fibers. Deciphering how proteins can serve as mechano-chemical signalling switches is thus not only essential to learn how cells probe and respond to their environments, but it has far reaching implications in tissue engineering, systems biology and medicine. Insights into the mechanical designs might also stimulate new thoughts how to engineer switches at the nanoscale and integrate them into materials and devices.

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Hörsaal Makromolekulare Chemie, Stefan-Meier-Str. 31

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