



Universität
Basel

Research Project

A mechano-optical microscope for studying force transduction in living cells

Third-party funded project

Project title A mechano-optical microscope for studying force transduction in living cells

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Organisation / Research unit

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Project start 01.04.2018

Probable end 31.03.2022

Status Completed

The atomic force microscope (AFM) has emerged as a powerful tool to quantify cellular nanomechanics at the cellular and molecular level. Nevertheless, in the context of *in vivo* cellular studies, AFM is limited in terms of resolving (i) the biochemical identity of biological structures, (ii) subcellular structures, and (iii) their dynamic responses to external force. To circumvent these limitations, AFM is often combined with fluorescence microscopy to image cellular shape and labeled cellular proteins while making force measurements. However, this typically provides “in-plane” (XY) views of the sample parallel to the surface plane. Yet, the most significant cellular deformations and cytoskeletal rearrangements are aligned perpendicular to the surface plane (XZ). Hence, specific sub-cellular conformational changes along the loading direction can be directly correlated to the applied AFM load by fluorescence imaging in the XZ plane. This will enable us to dissect and assign the mechanical contributions of the intra- and inter-cellular components to mechano-phenotypes of living cells.

Financed by

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