

A force-controlled pipette with simultaneous ion current recording for perturbation of single cells in vitro

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Presentation language is English, Free entrance, guests are welcome

Abstract

FluidFM is a force-controlled nanopipette, combining AFM technology and microfluidics [1]. A fluidic channel is incorporated directly in a hollow AFM cantilever (Figure 1a). This channel ends in an aperture at the apex of the AFM tip, allowing for local dispensing of soluble molecules in air and in liquid, while retaining the inherent imaging capabilities and force feedback of an AFM system. We have just demonstrated the quantitative and subcompartmental femto-picoliter injection [2] and extraction [3] from single cells in vitro. In particular, we showed the integrity of proteins and transcripts as well as versatility of molecular analyses by high-resolution TEM imaging, minute enzyme assays and qPCR of cytoplasmic and nucleoplasmic extracts from distinct or even the same cell. Finally, an electrode can be implemented in the fluidic circuit enabling simultaneous force and ionic current measurements toward force-controlled patch clamp [4] and scanning ion conductance microscopy [5].

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