

FluidFM for single-cell extraction followed by molecular analysis

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The FluidFM is a force-controlled nanopipette, combining AFM technology and nanofluidics [1, 2]. A fluidic channel is incorporated directly in a hollow AFM cantilever. 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.

Using hollow pyramidal tips with a triangular aperture close to the apex, we have just demonstrated the quantitative and subcompartmental femto-picoliter extraction from single cells in vitro. 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 [3].

References

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