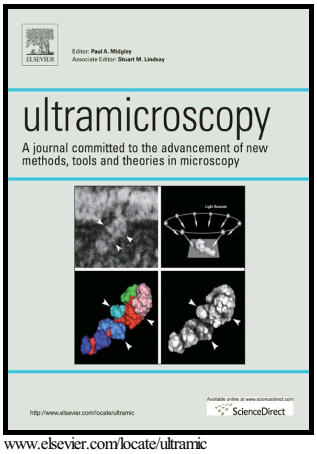

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Abstract

A method is presented for combining atomic force microscopy (AFM) force mode and fluorescence microscopy in order to (a) mechanically stimulate immune cells while recording the subsequent activation under the form of calcium pulses, and (b) observe the mechanical response of a cell upon photoactivation of a small G protein, namely Rac. Using commercial set-ups and a robust signal coupling the fluorescence excitation light and the cantilever bending, the applied force and activation signals were very easily synchronized. This approach allows to control the entire mechanical history of a single cell up to its activation and response down to a few hundreds of milliseconds, and can be extended with very minimal adaptations to other cellular