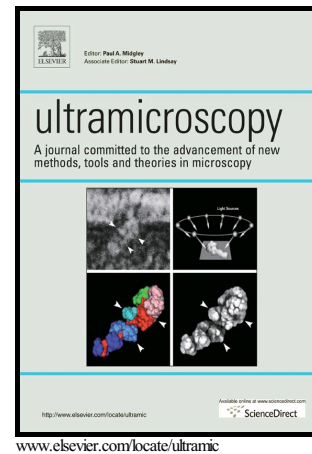


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Synchronizing atomic force microscopy force mode and fluorescence microscopy in real time for immune cell stimulation and activation studies

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13

14 Abstract

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

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