

Atomic Force Microscopy-based Platform for Investigating Single Cell Mechanics

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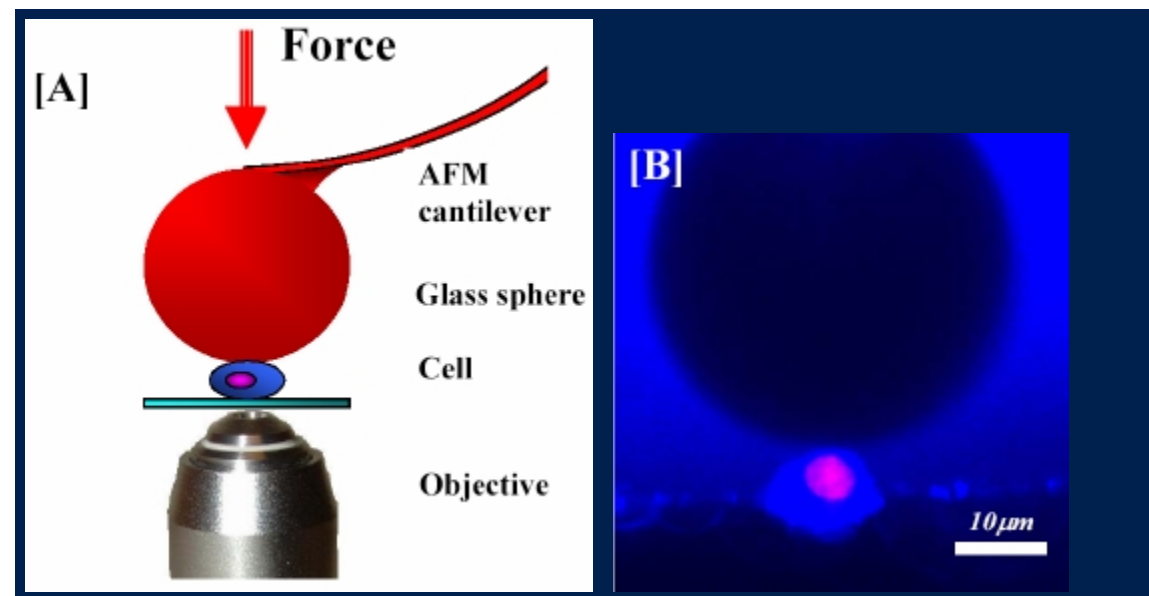
ABSTRACT

Atomic Force Microscopy-based Platform for Investigating Single Cell Mechanics

FULL DESCRIPTION

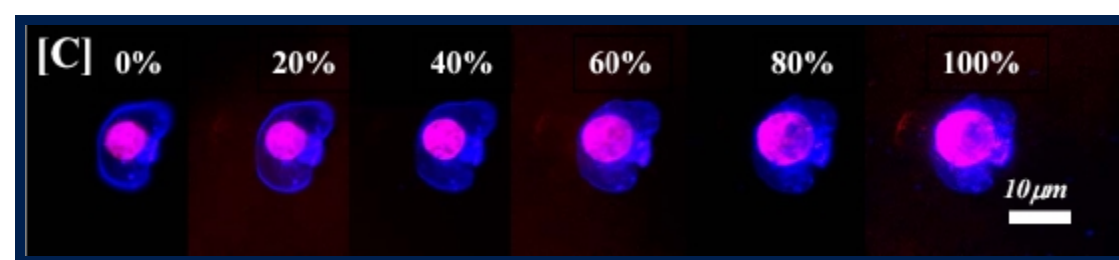
Researchers at UC Davis have invented a new methodology to measure single cell mechanics. The new method utilizes atomic force microscopy (AFM) to perform single cell compression. Large sphere glued to the end of AFM probe compresses cell with independent displacement and force detection in wide range from 1 nN up to 50 μ N. A high-resolution bright field or fluorescent microscopy guides the location of the probe and monitors the deformation of cell and cell organelles during the load cycle. Many previously developed methods probe only limited local deformation of membrane providing knowledge about local membrane properties. In contrast, in our scheme the indenter compresses the *whole* cell for 100%. In developed method *whole* cell compression together with optical recording of compression cycle contains information about membrane and cytoskeleton structure, integrity of cell, cell sensitivity to chemical treatment or gene over expression and cell viability.

IMAGES



Schematic of developed methodic

Side view schematic of developed methodic



Bottom view of compressed cell. Numbers represent relative cell compression.

SUGGESTED USES

- ▶ Cell biology
- ▶ Tissue analysis

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- ▶ **Biotechnology**
- ▶ Bioinformatics

RELATED CASES

2006-727-0

FEATURES/BENEFITS

The main advantage of cell compression method is reliability of data. Individual cell biology is described by statistical parameters rather than by results of single experiment. Cell compression method allows compressing up to 50 cells per hour *in situ* providing an easy statistical analysis of cell mechanical behavior. This method also requires minimum modification of widely used AFM setup, and therefore is inexpensive.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,323,920	12/04/2012	2006-727

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Generic Method for Controlled Assembly of Molecules
- A New Methodology for 3D Nanoprinting