Submitted to small NANO MICRO

# Microfabricated Nanotopological Surfaces for Study of Adhesion-dependent Cell mechanosensitivity

*Weiqiang Chen, Yubing Sun, and Jianping Fu**

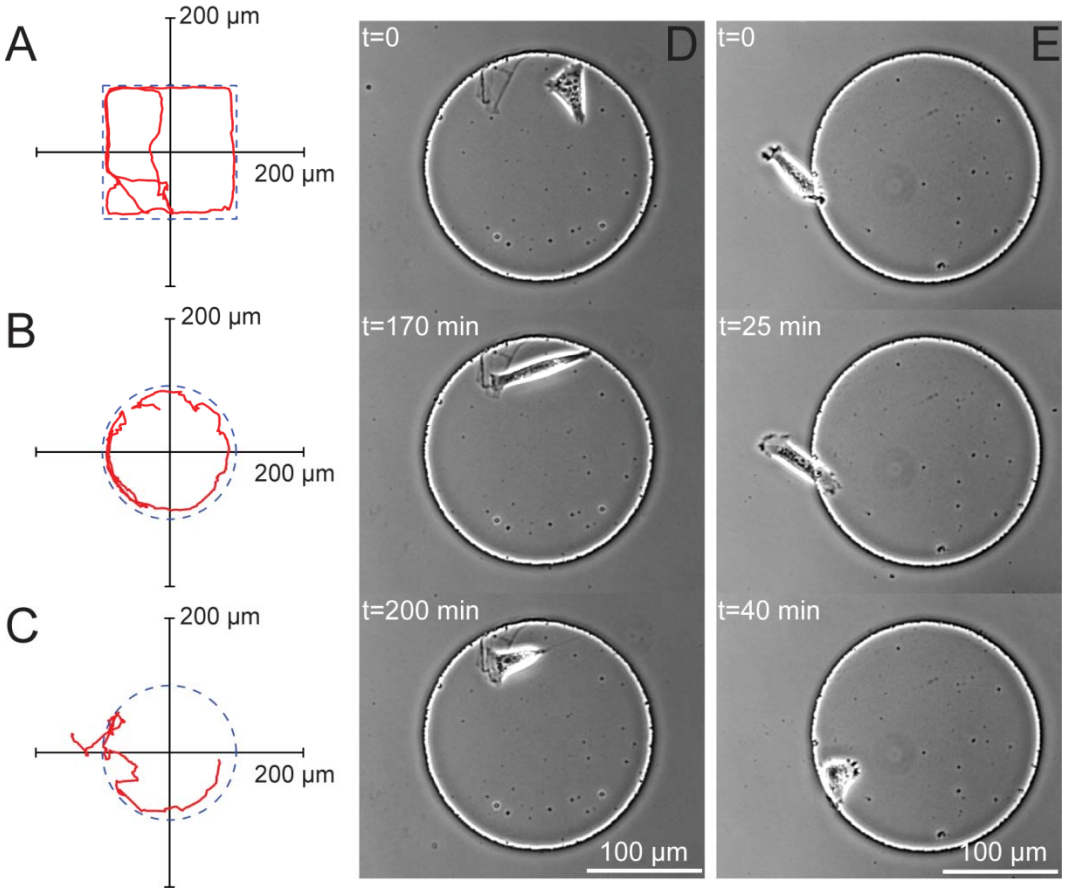
[*] W. Chen, Y. Sun, Prof. J. Fu
Integrated Biosystems and Biomechanics Laboratory
Department of Mechanical Engineering
University of Michigan, Ann Arbor, MI 48105 (USA)
E-mail: jpfu@umich.edu

Prof. J. Fu
Department of Biomedical Engineering
University of Michigan, Ann Arbor, MI 48105 (USA)

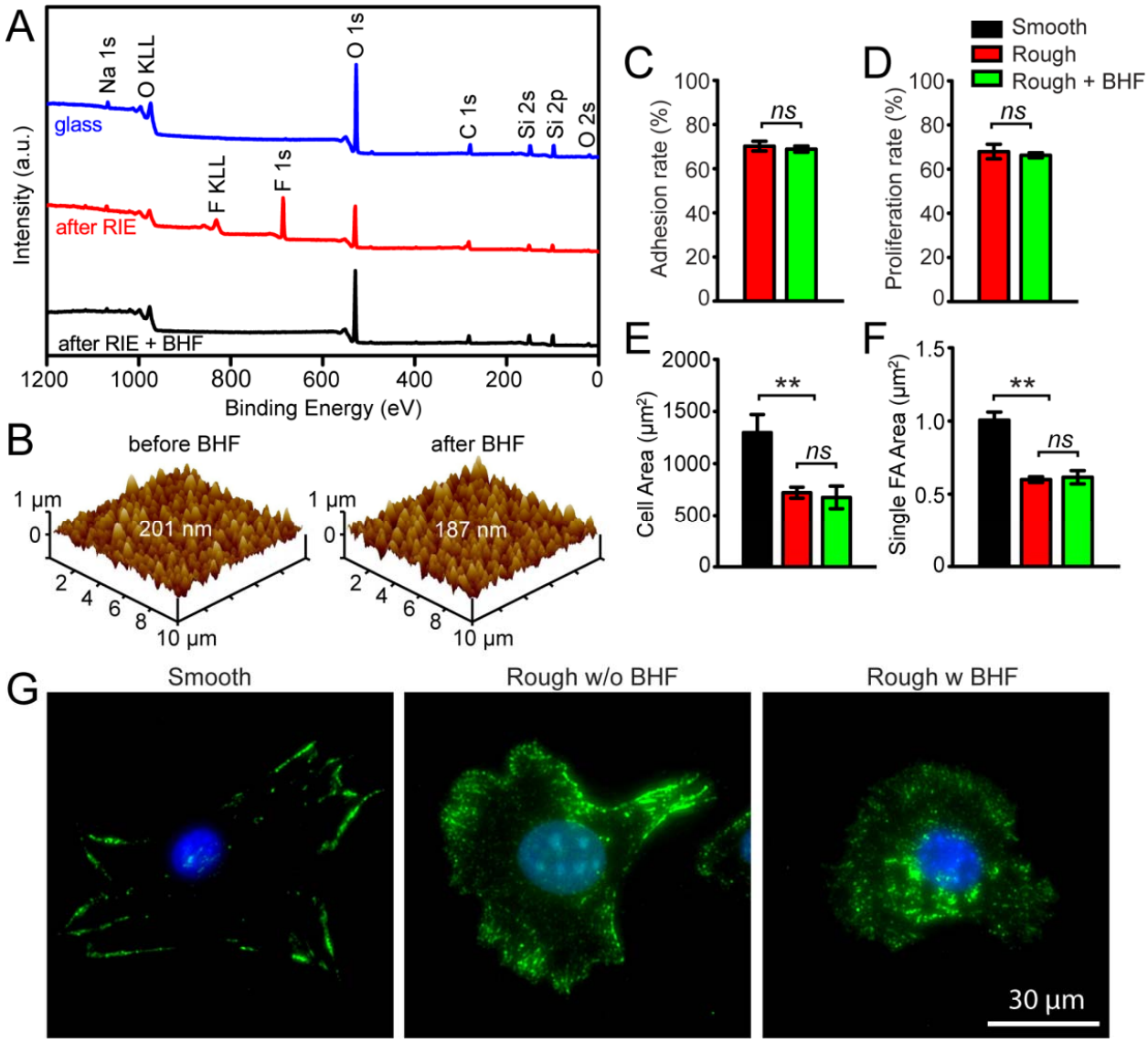
**Supporting Information**

**Supporting videos** see separate files.

**Supporting Figures**




**Supporting Figure S1:** (A-C) Migration trajectories of NIH/3T3 fibroblasts initially inside (A-B) and outside (C) a patterned nanorough island. (D-E) Snapshot images showing individual migrating NIH/3T3 fibroblasts on the patterned nanorough surface.




**Supporting Figure S2:** (A) XPS survey spectra measured for unprocessed flat (control with $R_q$ = 1 nm; *blue* curve) and RIE-etched nanorough glass surfaces (*red* and *black* curves). RIE-processed glass surfaces were treated with (*black* curve; $R_q$ = 187 nm) or without (*red* curve; $R_q$ = 201 nm) brief buffered hydrofluoric acid (BHF) etching. (B) AFM topographs of RIE-processed glass substrates with (*right*; $R_q$ = 201 nm) or without (*left*; $R_q$ = 187 nm) brief treatment with BHF. (C&D) Cell adhesion (C) and proliferation rate (D) of NIH/3T3 fibroblasts on RIE-processed nanorough glass surfaces with or without BHF etching. Data in C was collected 4 hr after initial cell seeding. Proliferation rate in D were measured after 6 hr of culture

on nanorough glass surfaces. Data in C&D represents the means ± standard error of mean (s.e.m) from three independent experiments. (E&F) Quantitative analysis of cell apread area (E) and average single FA area (F) of NIH/3T3 fibroblasts on smooth ($R_q$ = 1 nm), RIE-processed ($R_q$ = 181 nm) and RIE + BHF treated ($R_q$ = 187 nm) glass substrates after 24 hr of culture. Data in E&F represents the means ± standard error of mean (s.e.m). For each data point, the cell number $n > 30$. (G) Representative immunofluorescence images of NIH/3T3 fibroblasts on smooth ($R_q$ = 1 nm), RIE-processed ($R_q$ = 181 nm), and RIE + BHF treated ($R_q$ = 187 nm) glass substrates after 24 hr of culture. Cells were co-stained for nuclei (DAPI; *blue*) and vinculin (*green*).