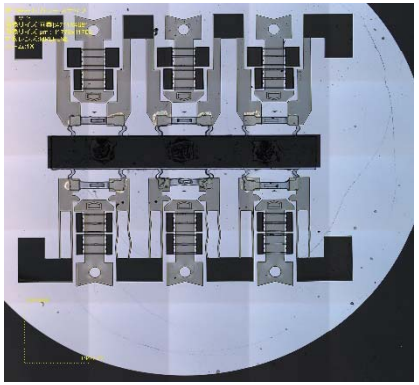
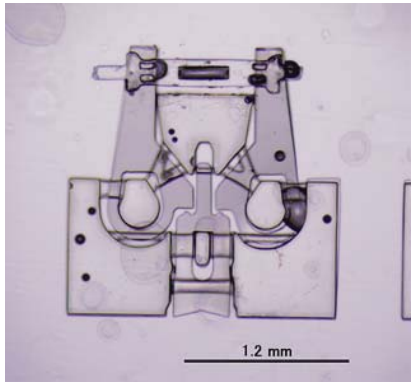
Faculty of Engineering
Tokushima University

Evaluation of cellular response to mechanical stimulus using Bio-MEMS device

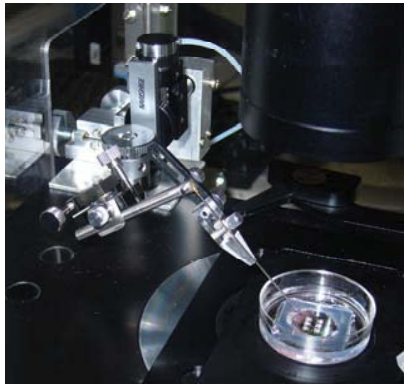
Associate Professor Katsuya Sato



Micorodevices fabricated on the cover slip



Magnified image of a cell stretching microdevice



Micorodevices are fabricated on the 35mm glass bottom dish

Fluorescent image of bone forming cell osteoslast

Content:

we developed a novel cell stretching microdevice to observe the initial cellular response to stretching deformation. Cells change their activities by sensing mechanical stimuli such as force or deformation.

With using a conventional cell-stretching device, the cellular responses that slowly arise (ex. in minutes, hours, days) after the application of stretch was observed. One factor that hinders the *in situ* observation of cellular response to stretching is the existence of large rigid displacement during the stretch. This rigid displacement makes it difficult to observe the initial cellular response to stretch with high spatial and temporal resolution.

A novel MEMS device consists of a transparent elastic microchamber and a microlinkage mechanism. To miniaturize the cell stretching chamber enables to minimize rigid displacement during stretching operation. This device can be used to observe and evaluate the initial cellular response and microstrain field on a cell membrane during uniaxial stretching.

Keywords : <Cell Biomechanics, Bone Remodeling, Regenerative Medicine, MEMS, Mechanical Stimuli>

E-mail: katsuyas@tokushima-u.ac.jp>

Tel. +81-88-656-2168

Fax: +81-88-656-2168

HP : http://www.me.tokushima-u.ac.jp/aaelab/