Nano-Micro Devices for Analysis of Single Cells and Single Molecules

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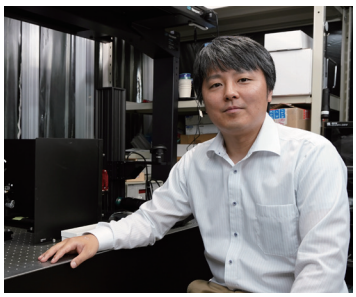
Research topics

Our group forcuses on the applications of nano-micro structures in the research fields of biology and medical science. The research topics are 1) manipulation of single cells and single molecules using optically driven nanotools in combination with microfluidic devices, 2) “mechanical” processing of single cells with nano-structures, and 3) cell reponse analysis on microfluidic devices reporoducing in-vivo situation. The goal of our researches is to contribute the biological fields through the developement of nanotechnology-oriented methodology.

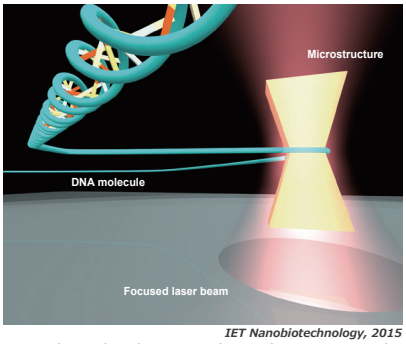


keywords: nano/microfabrication, microfluidics, BioMEMS, single cell biology, single molecule analysis, regenerative medicine, bionanotechnology

Single Cells and Single Molecules

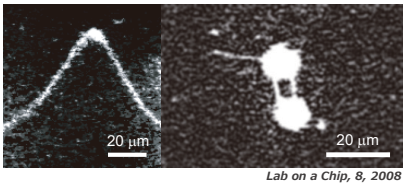
Manipulation

DNA molecular manipulation



IET Nanobiotechnology, 2015

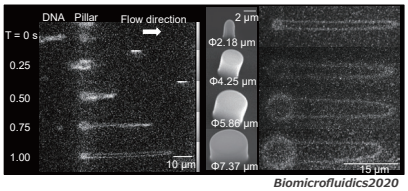
Single molecule manipulation by a microtool



Lab on a Chip, 8, 2008

Picking-up and winding of a DNA molecule

DNA trap and extension

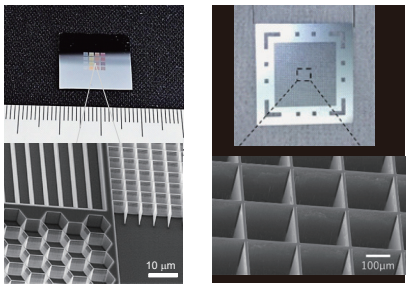


Biomicrofluidics2020

Molecular ring toss of circular DNA

Processing

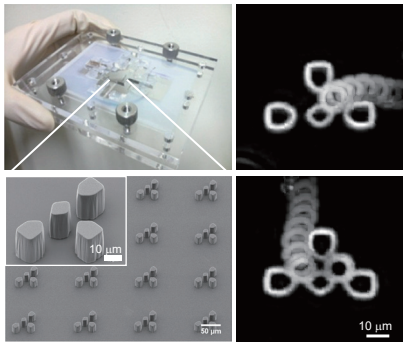
Dissection of cells and organs



MEMS2017

Nano-micro blade array for cutting cells/organs

Single cell assembly

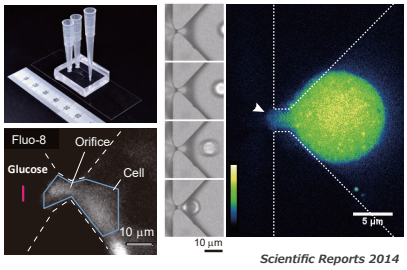


Lab on a Chip, 11, 2011

Cell positioning for cell interactin studies

Analysis

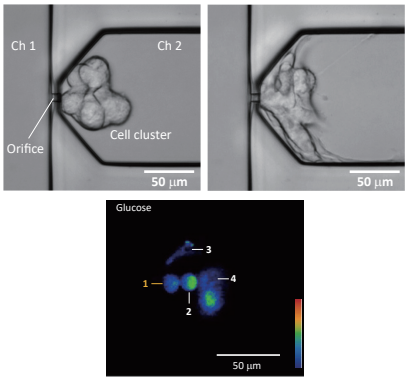
Chemical stimulation



Scientific Reports 2014

Response to drug stimulation mimicking in vivo situation

Responses in pseudo organs



Pacifichem2015

Measurement of response propagation