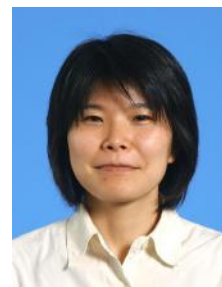


# BioMEMS for mechanical characterization and consecutive gene expression analysis of single tumor cell

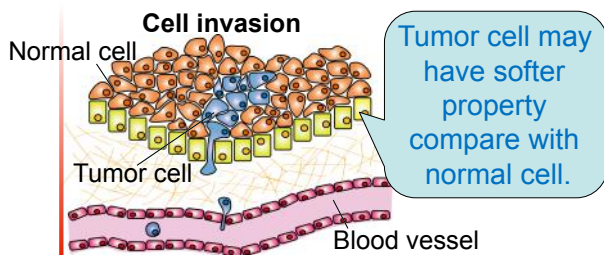
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Host Professor: Pr H. Fujita

Keywords: MEMS, Silicon nanotweezers, Mechanical characterization



## Context



Overall goal: Clarify relationship between stiffness / visco-elasticity of tumor cell and condition of inside proteins (cytoskeleton)

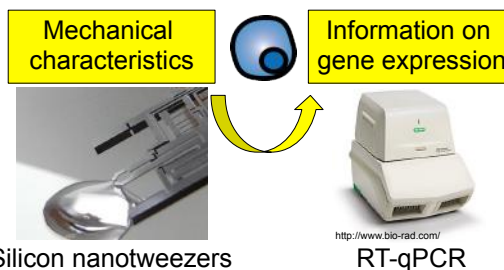
Status of consensus problems: difficulty of cell transportation

## Objectives

Establish a method for cell mechanical characterization and gene expression analysis at single cell level

Silicon nanotweezers:

- Electrically controlled mechanical tool
- Mechanical characterization
- Manipulation of biological sample

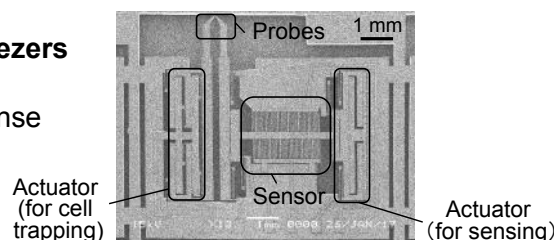


## Methods

Stiffness measurement by Silicon nanotweezers

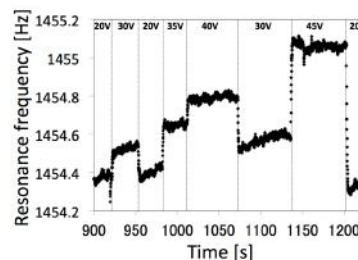
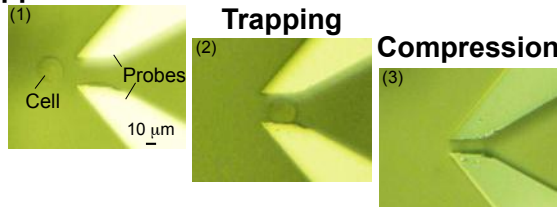
- 1) Trap single cell
- 2) Apply force and measure mechanical response
- 3) Transfer to gene expression analysis

Single cell gene expression



## Results

Approach to cell



Manipulation of single cell can be achieved. Trapped cell was characterized by resonance frequency measurement during applying force (by voltage) to the cell.

## Perspectives

- Optimize gene expression analysis
- Apply continuous workflow

## Publications

笠井直武, 久米村百子, 金田祥平, 藤井輝夫, 藤田博之,  
単一細胞の機械特性計測と遺伝子発現解析用バイオMEMS  
生産研究 5月号

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