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利用形態 : 機器利用
利用課題名(日本語) : MEMS カンチレバーアレイを用いた細胞の振動の計測
Program Title (English) : MEASUREMENT OF CELL SURFACE VIBRATION WITH PIEZORESISTIVE CANTILEVER ARRAY
利用者名(日本語) : パク ヒジユン¹⁾, グエン タン ヴィン¹⁾, 平山佳代子¹⁾, 塚越拓哉¹⁾, 野田健太郎¹⁾, 高畑智之¹⁾, 松本潔²⁾, 下山勲¹⁾
Username (English) : H Park¹⁾, N. Thanh-Vinh¹⁾, K. Hirayama¹⁾, T. Tsukagoshi¹⁾, K. Noda¹⁾, T. Takahata¹⁾, K. Matsumoto²⁾ and I. Shimoyama¹⁾
所属名(日本語) : 1) 東京大学大学院情報理工学系研究科, 2) 東京大学 IRT 研究機構
Affiliation (English) : 1) Graduate School of Information Science and Technology, The University of Tokyo, 2) IRT research initiative, The University of Tokyo

1. 概要(Summary)

This research is about a method to measure vibration occurring on the membrane of a mammalian cell which is subjected to ultrasound. The measurement is based on an array of piezoresistive MEMS force sensors. Experimental results with the fabricated sensors showed a change in frequency response to the ultrasound-induced vibration of NIH3T3 cells adhered to the fabricated sensor.

2. 実験(Experimental)

【利用した主な装置】

高速大面積電子線描画装置、高速シリコン深掘りエッチング装置

【実験方法】

A force sensor array composed of 13 individual piezoresistive force sensors was fabricated. The mask for the force sensor array was fabricated with the EB from nanotech platform. And with the fabricated mask the sensor array of 5 μm distance and 2 μm gap was etched with the DRIE from nanotech platform. With this force sensor array the vibration of cell was measured under the applied ultrasound.

3. 結果と考察(Results and Discussion)

We demonstrated that frequency response of the sensor array changed when cells adhered to the

sensor array, which indicates the ability of the sensor array to measure the vibration of the cell.

Our proposed method is expected to be useful for simultaneous investigation of the local mechanical properties such as stiffness or viscoelasticity at multiple points of a single cell.

4. その他・特記事項(Others)

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5. 論文・学会発表(Publication/Presentation)

(1) H. Huijun, N. Thanh-Vinh, K. Hirayama, T. Tsukagoshi, K. Noda, T. Takahata, K. Matsumoto and I. Shimoyama, "MEASUREMENT OF CELL SURFACE VIBRATION WITH PIEZORESISTIVE CANTILEVER ARRAY", *Micro Electro Mechanical Systems (MEMS), 2016 29th IEEE International Conference on Physical Sensors*, Shanghai, China, 2016.

6. 関連特許(Patent)

なし