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Program Title (English)　: Effect of geometric curvature on collective cell migration using tortuous microchannel
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1. 概要（Summary）

Collective cell migration is crucial in physiological and pathological processes such as tissue development, wound healing and cancer metastasis. Numerous studies of physical environment cue on collective cell migration have been done, however, the effect of geometric curvature on cell behaviors in a confined environment is not fully understood. In this study, we examined the collective cell migration behaviors under different curvature using a confined tortuous microchannel device. Our findings show the cells at the leading edge decreased their velocity and formed purse-string-like movement in the curvature region. These suggest that the front cells able to sense and respond to the geometric curvature.

2. 実験（Experimental）

The fabrication process of the tortuous microchannel device was carried out using photolithography and soft-lithography techniques. Before photolithography process, a photomask was patterned by Electron Beam Lithography system (ELS 3700, Ellionix, USA). UV exposure using mask aligner (SUSS MA6) and development were performed on a silicon wafer using negative photoresists, SU-8 3050 to produce a silicon mold. First, the SU-8 3050 was spin-coated on a silicon wafer to have a thickness of 50 µm, then exposure was carried out using the patterned photomask and followed by development process. After the development, the silicon mold was hard baked inside oven at 180 °C for 24 hours. To minimize adhesion effect, the surface of the silicon mold was salinized.

3. 結果と考察（Results and Discussion）

We successful to fabricate a tortuous microchannel device (Figure 1) to investigate the effect of geometric curvature on collective cell behaviors. For the device fabrication, we first patterned a photomask based on the different curvature design using Electron Beam Lithography (EBL). Then, the fabrication process followed by photolithography and soft-lithography process. The height of the device is approximately 50 µm and mounted on the thin coverslip (Matsunami, Japan) to allow cells to migrate in a confined microenvironment and the details of the channel are described in Table 1.

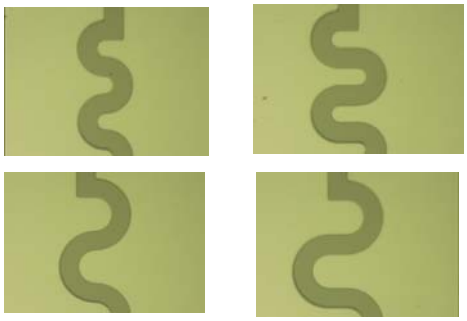

Figure 1: Pattern of tortuous microchannels after EB lithography process

Table 1: Dimension of the tortuous channels

Channel	1	2	3	4
Radius (µm)	25	25	50	50
Amplitude (µm)	75	100	100	125
Segment length (µm)	157	207	236	286
Channel length (µm)	100	100	150	150
Tortuosity index (TI)	1.57	2.3	1.57	1.91

4. その他・特記事項（Others）

I would like to thank you to Dr. Agus Subagyo for his guidance and technical assistant during the fabrication process of the tortuous microchannel.

5. 論文・学会発表（Publication/Presentation）

1) Mid Term Evaluation of Doctoral Course, 2018

6. 関連特許(Patent) *-none-*