Deformation of Myoblast Cell Passing through Micro-Slit in Flow Channel Manufactured by Photolithography Technique

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The deformability of the biological cell plays an important role *in vivo*. A slit is one of the systems, which sorts biological cells *in vivo*. The sorting at the slit depends on the deformability of the cell. Several cells are able to pass very narrow slits. The photolithography technique enables manufacturing the micro-morphology in the flow channel [1]. The behavior of cells in the flow channel will be applied to the cell sorting [2]. The photolithography technique can be applied to make a micro slit [3-6]. The slit between micro cylinders was made to sort cells in previous studies [1, 2]. The deformation of the depth direction between cylinders, however, cannot be observed by the conventional optical microscope [2]. To observe the deformed cell at the direction perpendicular to the walls of the slit, the slit is designed with the combination of micro ridges in the present study. The micro slit between micro ridges has been used for observation of a biological cell passing through the micro slit *in vitro*. At the middle part of the flow channel, the slit has been made between the micro ridges on the transparent polydimethylsiloxane disk and glass disk by photolithography technique. C2C12 (mouse myoblast cells) was used in the test. The suspension of cells was injected to the slits. The deformation of cells passing through the micro slit was observed with an inverted phase-contrast microscope. For the reference, the passing speed of the porcine red blood cells through the slit was measured. The experimental results show that cells deform to the flat circular disk and pass through the micro slit. The deformation ratio, the passing velocity, and the shape index of each cell through the slit were evaluated. The designed slit between micro ridges has capability to sort the deformability of cells.

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