Receptor protein analysis of single cell using centrifugal microfluidic device

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Cell membrane receptor proteins play important roles as a mechanism for receiving cell signals. FACS is widely used to analyze them, but it cannot simultaneously detect all receptor proteins on single cell's membrane and requires many cells. Therefore, we are developing microfluidic devices that totally analyze expressed receptor proteins in single cell level and can analyze small cell population.

In our experimrnts, the microfluidic devices that analyze expressed receptor proteins in single cell level from small cell population were developed. Using them, expressed receptor proteins were analyzed in single cell level. Two types of cells were distinguished by this method. Agreement of the result of it and that of FACS showed the reliability of developed analysis method. During the experiments, we use the new outsoucred software to analyze the intensity of the single cell. We divide the chosen square of the single cell into 4624 pixels and analyze the intensity of each pixel to calculate the whole intensity of the single cell. The outsoucred software could visually shows the background of the whole design and optimize the threshold of the fluorescence signal in order to decrease the noise. You can also create the template for the trap design to realize automatic and the large number calculation of the single cell simultaneously. Since the data from the software is very reliable, we will try to find the baseline for the healthy single cell through analyzing the intensity of 10^5 cells and apply it to the cell detection in the future.

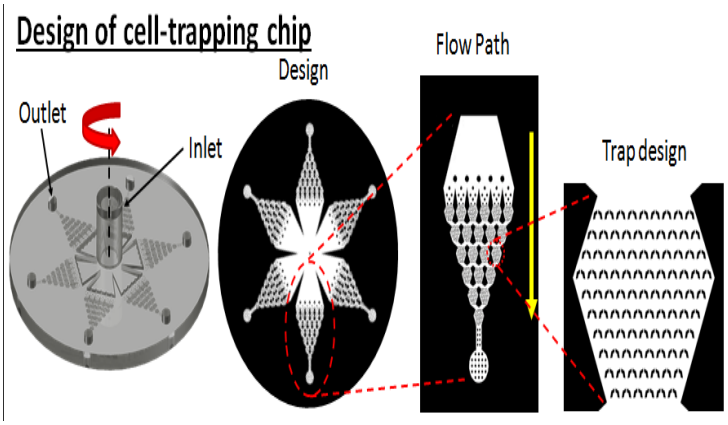

Fig.1 Design of the microfluidic device

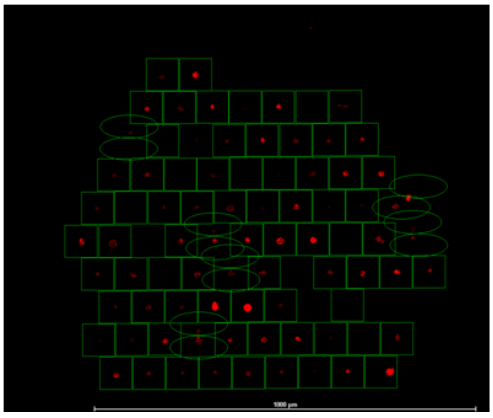

Fig.2 Fluorescence analysis of single cell