

Ultra-Stable, High Speed Single Living Cells Separation System

Background

Recent progress in biotechnology and nano-technology has enabled single cell sorting. To analyze these single cell characteristics, it is necessary to isolate a single cell from the original population to eliminate influences of other cells. Therefore, a technology to extract single cell from the original population and separate it into an isolated area is strongly needed. On-chip cell separation technologies have been proposed by many researchers, however, they have not been successful in maintaining high stability by utilizing vibration-induced whirling flow to transfer cells. Researchers at Nagoya University have developed an ultra-high-speed single cell sorting on-chip device that confirms its high stability.

Technology Overview

The basic principle is illustrated in Figure 1. By utilizing vibration-induced whirling flow by piezoelectric element, the cell flow stream is able to extract single cells at 50,000 events/second. Also, this invention utilizes three different direction flows to sort single cells in ultra-high-speed as described in Figure 2. As shown in Figure 3., the stability test results confirmed that it is ultra-stable for the pump to create flow at 50ms speed and with a 10 kPa pressure stability within +/- 0.005 KPa ranges.

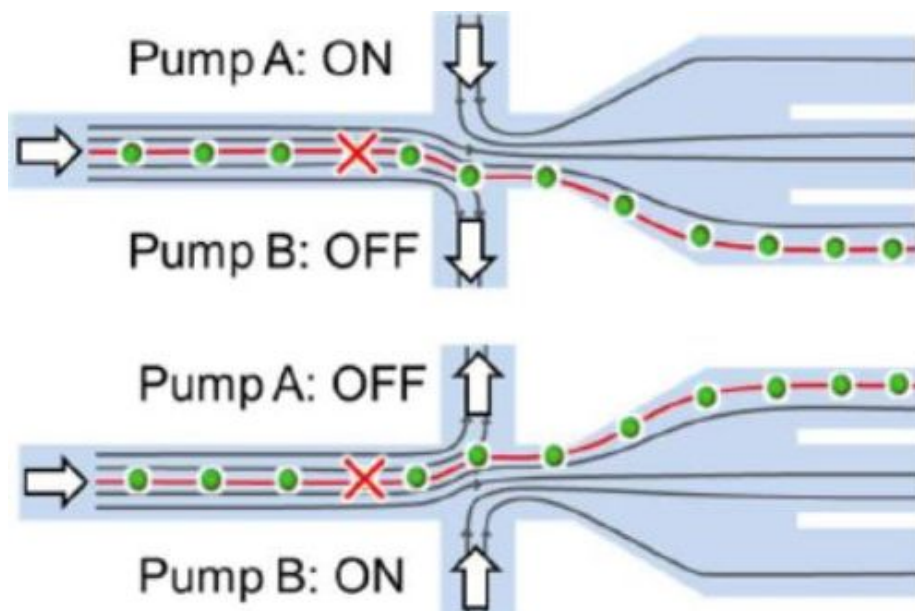


Figure 1. The basic principle

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	KD scientific stage + Gastight syringe	MFCS-FLEX-8C-1000	Our system
			
Stability of pressure (σ)	0.386 kPa (10 kPa)	0.014 kPa (10 kPa)	0.009 kPa (10 kPa)
Response time (8 -10 kPa, step)	200 msec	2020 msec	50 msec
Max. number of ports	10	8	1

Figure 2.

By utilizing vibration-induced whirling flow by piezoelectric element, the cell flow stream is able to extract single cells at 50,000 events/second. Also, this invention utilizes three different direction flows to sort single cells in ultra-high-speed.

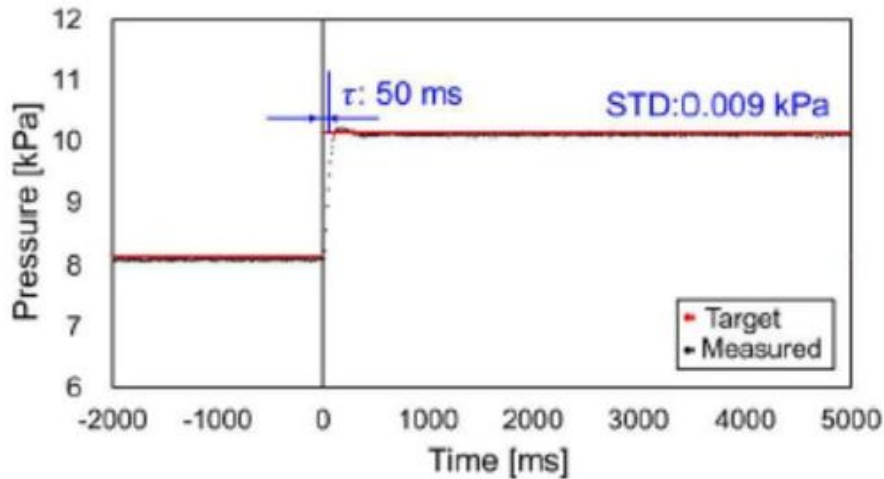


Figure 3.

The stability test results confirmed that it is ultra-stable for the pump to create flow at 50ms speed and with a 10 kPa pressure stability within +/- 0.005 KPa ranges.

Seeking

Licensing

IP Status

Patent application submitted

Patents

A patent application has been submitted in Japan

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