

## Multiple-Channel Coulter Counter for Cell Sizing and Enumeration

**Authors :** Yu Chen, Seong-Jin Kim, Jaehoon Chung

**Abstract :** High throughput cells counting and sizing are often required for biomedical applications. Here we report design, fabrication and validating of a micro-machined Coulter counter device with multiple-channel to realize such application for low cost. Multiple vertical through-holes were fabricated on a silicon chip, combined with the PDMS micro-fluidics channel that serves as the sensing channel. In order to avoid the crosstalk introduced by the electrical connection, instead of measuring the current passing through, the potential of each channel is monitored, thus the high throughput is possible. A peak of the output potential can be captured when the cell/particle is passing through the microhole. The device was validated by counting and sizing the polystyrene beads with diameter of 6  $\mu\text{m}$ , 10  $\mu\text{m}$  and 15  $\mu\text{m}$ . With the sampling frequency to be set at 100 kHz, up to 5000 counts/sec for each channel can be realized. The counting and enumeration of MCF7 cancer cells are also demonstrated.

**Keywords :** Coulter counter, cell enumeration, high through-put, cell sizing

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