

## Red Blood Cell Quantification Microfluidic Chip Using Polyelectrolytic Gel Electrodes

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We reports on a novel microfluidic chip with polyelectrolytic gel electrodes (PGEs) used to rapidly count the number of red blood cells in diluted whole blood. The number and amplitude of dc impedance peaks provide the information about the number and size of red blood cells, respectively. This system features a low-voltage dc detection method and non-contact condition between cells and metal electrodes. The performance of this PGEs-based system was evaluated in three steps. First, in order to observe the size-only dependence of the impedance signal, three different sizes of fluorescent microbeads were used in the experiment. Second, the cell counting performance was evaluated by using 7.2  $\mu\text{m}$  fluorescent microbeads, similar in size to red blood cells, in various concentrations and comparing the results with an animal hematoanalyzer (MS 9-5, Melet schloesing laboratories, France). Finally, in human blood sample tests, intravenously collected whole blood was just diluted in a phosphate buffered saline without centrifuge or other pretreatments. The PGEs-based system produced almost identical numbers of red blood cells in over 800-fold diluted samples to the results from a commercialized human hematoanalyzer (HST-N402XE, Sysmex corp., Japan).

### References

[1] H. G. Chun, T. D. Chung, and H. C. Kim, *Anal. Chem.* vol. 77, pp. 2490-2495(2005).

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