

Cell Elevator: A Novel Technique for Cell Sorting and Circulating Tumor Cell Detection and Discrimination

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Abstract : A methodology for cells sorting and circulating tumor cell detection and discrimination is presented in this paper. The technique is based on Dielectrophoresis and microfluidic device theory. Specifically, the sorting of the cells is realized by adjusting the relation among the sedimentation forces, the drag force provided by the fluid, and the Dielectrophoretic force that is relevant to the bias voltage applied on the device. The relation leads to manipulation of the elevation of the cells of the same kind to a height by controlling the bias voltage. Once the cells have been lifted to a position next to the bottom of the cell collection channel, the buffer fluid flashes them into the cell collection channel. Repeated elevation of the cells leads to a complete sorting of the cells in the sample chamber. A proof-of-principle example is presented which verifies the feasibility of the methodology.

Keywords : cell sorter, CTC cell, detection and discrimination, dielectrophoresis, simulation

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