RAPID ISOLATION OF TARGET BACTERIA FROM COMPLEX MATRICES

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ABSTRACT

The long term goal of the research effort in our group was to develop a new rapid diagnostic process for sepsis. The specific project described in this work aims to obtain these "pure" isolates of the infectious bacteria within a total time of less than 1.5 hours. The proposed isolation process consists of 2 steps: (a) a novel kinetically limited density differential centrifugation step that serves as a "coarse" method, and (b): a dielectrophoresis (DEP) based sorting technique that serves as a "polishing" step.

Kinetically Limited Density Differential Centrifugation enables us to convert a mixture in which the bacteria are an extremely small fraction of the particles to a suspension where bacteria constitute the majority of the particles. It is expected that the sample yielded by this separation technique can be "polished" using flow through dielectrophoresis (DEP). We also measured the DEP properties of target bacteria and RBC to determine the experiment condition for further purification. Besides that, we designed and fabricated the MEMS device for Flow-Through Dielectrophoresis (DEP) to obtain pure isolates of bacteria.