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Label-free microfluidic blood cells micro-separator (Conference Paper)

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Abstract

Blood cells separation is of great interest in many biomedical applications because of its importance in sample preparation for both clinical diagnosis and therapeutic research. In this work, the **micro-separator** uses the combination of magnetophoresis with hydrodynamics in order to separate white **blood cells** (WBCs) and red **blood cells** (RBCs) by taking into account the magnetization of the ferromagnetic elements and fluidic forces on the **cells**. The **microfluidic** devices can achieve **label-free**, continuous separation of WBCs and RBCs with relatively high efficiency. The **micro-separator** utilizes hydrodynamic force acting on **cells** within laminar flow, coupled with magnetophoresis force in novel U-shaped **micro**-channel. Here, we report the separation efficiency of the **microfluidic** device in continuous flow based on results of a 3D model simulation conducted in COMSOL Multiphysics. The proposed device enables **label-free** cell separation and thus, it can be a useful **microfluidic** component for lab-on-a-chip system and integrated biological and biomedical applications. © 2016 IEEE.

Author keywords

Bio-Analysis; Cell Separation; Hydrodynamic; Magnetophoresis; **Microfluidic**; Multiphysics; Simulation

Indexed keywords

Engineering controlled terms: Bioassay; Biochips; Classifiers; Diagnosis; Efficiency; Fluid dynamics; Fluidic devices; Hydrodynamics; Laminar flow; Medical applications; Microarrays; Microfluidics; Separators

Bioanalysis; Cell separation; Magnetophoresis; Multi-physics; Simulation

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