Abstract

Improving the ability to separate particles and cells in a continuous flow pattern facilitates faster and incessant medical diagnosis. In this paper, a modified design is presented that is capable of separating platelet cells from other blood cells in a continuous flow. The modified device achieves the separation of platelets using Dielectrophoretics (DEP) mechanism. A two dimensional finite element model was exploited to test different design parameters, including the applied separation peak to peak voltage, frequency, and speed of the flow inlet. Simulations of the modified microfluidic device showed successful separation of the red blood cells from platelets and also from other mixed blood cells. The modeling and simulation results demonstrate that cell separation can be achieved with high purity levels of platelets of up to 99.8%. The device’s optimized technology makes it suitable for portable, bedside and point-of-care testing applications.

References
32. Index Terms

Computer Science
Applied Sciences
Keywords

Microfluidics; Dielectrophoretics; Finite Element Model; Blood cell Separation; Platelets(PLTs).