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Development of a Microfluidic Device to Sort Sperm based on Rheotaxis Effect AFROUZ ATAEI, ANDY W.C. LAU, WASEEM ASGHAR, Florida Atlantic University — The first step of in-vitro fertilization is to sort out the motile sperm from the non-motile ones. Currently, centrifugation based sperm swim-up and density gradient separation are common methods to sort sperm. However, these methods reduce sperm quality during the repetitive centrifugation steps and isolate sperm with high DNA fragmentation. In this work, we construct a microfluidic device based on the observation that motile sperm can swim against the flow within a specific range of flow rates. This sperm sorting device consists of two chambers, separated by a filter. After 45 minutes the sorted motile sperm are collected from the top retrieval chamber and is placed on a glass slide for visual inspection and data collection. We find that 1) the most motile and functional sperm pass selectively through the micropores against the flow, 2) the optimum flow rate gives the highest concentration of motile sperm, the lowest DNA fragmentation and higher percentage of morphologically normal sperm compared to stock sample. Taken together, our device provide an efficient way to sort sperm without centrifugation

Afrouz Ataei
Florida Atlantic University

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