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A portable circulating tumor cell capture microdevice

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Sensitive detection of earliest metastatic spread of tumors in a minimally invasive and user-friendly manner will revolutionize the clinical management of cancer patients. The current methodologies for circulating tumor cell (CTC) capture and identification have significant limitations including time, cost, limited capture efficiency and lack of standardization. We have developed and optimized a novel parylene membrane filter-based portable microdevice for size-based isolation of CTC from human peripheral blood. Following characterization with a model system to study the recovery rate and enrichment factor, a comparison of the microdevice with the commercially available system using blood from cancer patients demonstrated superior recovery rate and the promise of clinical utility of the microdevice. The development of the microdevice and its potential clinical applicability will be discussed.