Developing the VTX-1 liquid biopsy system: Fast and label-free enrichment of circulating tumor cells

January 22 2018

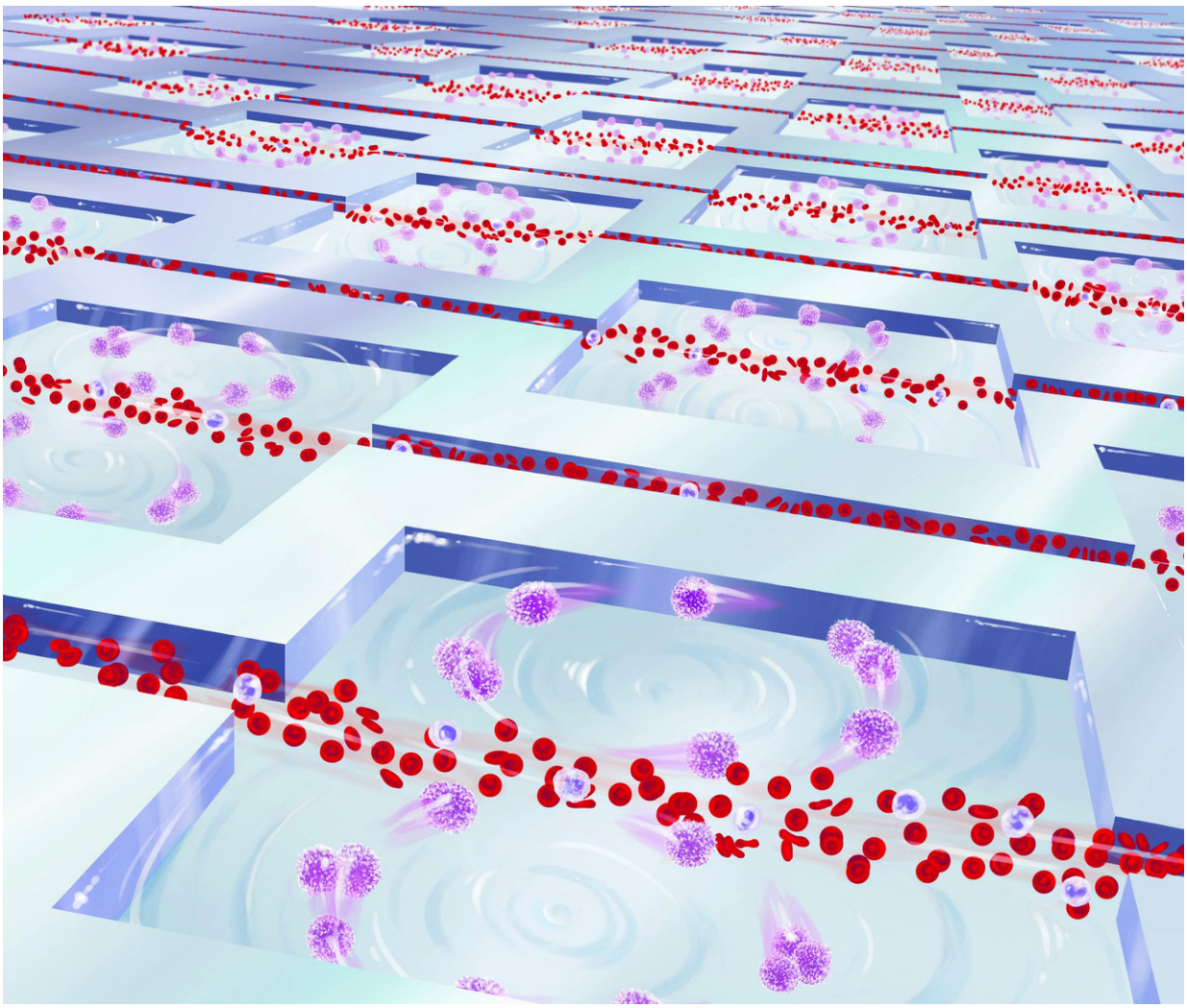

Diagram of how the Vortex Biosciences technology works. A blood sample flows down the micro-channels in the Vortex chip which is designed to form

micro-vortices. These micro-vortices trap and retain the CTCs while the blood cells flow past. Once isolated, the CTCs can be released for downstream analysis. Credit: Marc Lim.

A new article in the February 2018 issue of *SLAS Technology* describes a new platform that could change the way cancer is diagnosed and treated by automating the isolation of circulating tumor cells (CTCs) directly from cancer patient blood. Entitled Fast and Label-Free Isolation of Circulating Tumor Cells from Blood: From a Research Microfluidic Platform to an Automated Fluidic Instrument, VTX-1 Liquid Biopsy System, this article provides unique insight into the development of a commercial system that has the potential to change the standard of care in cancer diagnosis and treatment.

CTCs can be isolated from a simple blood draw and may be representative of the diverse cancer patient biology because tumor cells are circulating in the blood stream from multiple tumor sites. The VTX-1 Liquid Biopsy System was designed to automate the isolation of clinically relevant CTC populations, making the CTCs available for easy analysis by a variety of techniques. In this publication, the transition from a cutting-edge microfluidic innovation in the research setting to a commercial, automated system for isolating CTCs directly from whole blood is outlined.

A number of improvements are reviewed as the technology transitioned into a commercial product. These improvements include better material for the microfluidic fabrication, automating the fluid processing in the chip, and the optimization of isolation protocols. The commercial VTX-1 Liquid Biopsy System is shown to recover spiked breast and lung cancer cell lines at a rate of 69% and 79.5% respectively while achieving a purity as low as