



Circulating Tumor Cell Assay Using Simple Blood Draw

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WARF: P130171US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing the first fully integrated assay for the capture, purification and comprehensive analysis of circulating tumor cells.

Overview

Circulating tumor cells (CTCs) are cells shed from tumor deposits that flow into the bloodstream. They are detected at a frequency of about one CTC per one billion surrounding blood cells. The great hope in CTC research is to avoid painful, invasive biopsies and access these rare cells via a single blood draw. This method can be thought of as a ‘fluid biopsy.’

Unfortunately, methods to isolate and study CTCs require long, costly procedures that result in sample loss. The only approved CTC assay is useful for cell enumeration, but not purification or nucleic acid analysis.

UW–Madison researchers previously developed a low-waste microfluidic device for isolating cells from biological samples (WARF reference number P120222US01). With this device a sample can be combined with a reagent and magnetically drawn through a series of purifying wells. Harnessing such a platform, called verIFAST, a new and much improved CTC assay could transform patient care and cancer research.

The Invention

The researchers now have developed the first fully integrated CTC assay that could eliminate the need for painful biopsies. The device leverages verIFAST technology to capture, purify and molecularly analyze CTCs from a single blood sample.

The sample is deposited in a first well and then magnetically drawn through a second well containing an isolation buffer like oil or wax. The increasingly purified cells are drawn into a final well for extraction or further treatment.

The device includes new technical features and is combined with downstream techniques for staining rare cells like CTCs.

Applications

- The VerIFAST CTC assay could be used as a ‘fluid biopsy’ for patients with solid tumors.
- Analysis of tumor cells taken from conventional biopsies

Key Benefits

- Eliminates the need for painful and invasive tumor biopsy
- Integrates cell capture, purification and molecular analysis
- Most comprehensive tool of its kind
- Requires a single sample and as few as 1-10 cells

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- Low sample loss and contamination
- Simpler and more efficient than other methods

Stage of Development

The technology currently is being used to purify CTCs from patients with prostate, renal, lung and breast cancer. It also is being integrated with existing automated liquid handlers for high-throughput patient processing.

Additional Information

For More Information About the Inventors

- [David Beebe](#)
- [Joshua Lang](#)

Related Technologies

- [For more information about VerIFAST technology for low-waste, low-contamination isolation of cells, see WARF reference number P120222US01.](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Microfluidics](#)
- [Research Tools : Detection](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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