Dynamic Separation of Circulating Tumor Cells

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Technology description

Researchers at the University of Georgia have created a new method of separating circulating tumor cells from the blood. Unlike other methods, this novel approach that uses magnetism to separate the cells preserves their viability and does not alter their chemical structure. Testing methods based upon the new method will be efficient and minimally invasive. They also hold the potential to decrease cost and may provide a platform and test format that would be useful in low resource settings.

Problems Addressed

Marker based systems for identifying and separating circulating tumor cells, or CTCs, are expensive and difficult to perform outside of a laboratory. Alternatively, by moving a mixture of blood and a magnetically active solution across a magnetic field, the new procedure is capable of not only showing the presence of CTCs but also preserving them for further study. Without the need for complicated biochemical interactions, ferrohydrodynamic separation is less complicated and more readily adaptable than traditional tests.

Technology Summary

The developed technology consists of a biocompatible ferrofluid-based device. Ferrofluids are stable magnetic nanoparticle suspensions used as sorting media for both particles and cells. When a stream of the sample combined with the ferrofluid passes over a simple permanent magnetic, a flow containing the CTCs separates and departs down a collecting channel. The biocompatible ferrofluid can sustain the viability of target cells for up to several hours, preserving them for study by a pathologist.

Inventors

Dr. Leidong Mao, Professor in the College of Engineering, received his Ph.D. from Yale and has been teaching at UGA since 2008. His research is focused on very small devices for biological and biomedical applications

Dr. Carsten Schroeder has both an M.D. and a Ph.D. and is an experienced thoracic surgeon. He has conducted research fellowships at both Vanderbilt and the University of Maryland. His research interests include lung cancer and metastasis to the lung.

Institution

University of Georgia

Inventors

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