

ASIAN INNOVATION AWARDS

Technology Detects Cancer in Blood

Research Is Continuing Into Circulating Tumor Cells, Which Can Provide Clues About the Spread of the Disease



BY GAURAV RAGHUVANSHI

As doctors and scientists around the world continue to seek more effective ways to fight cancer, some researchers believe that clues are found in circulating tumor cells—stodgy cancer cells that tend to spill out of the malignant tumor and flow into the bloodstream.

A cancer, or a “malignant neoplasm” in medical terminology, is a disease in which cells grow uncontrollably and form tumors. The disease spreads to more distant parts of the body through the lymphatic system or the bloodstream.

Scientists say studying circulating tumor cells, or CTCs, in the bloodstream can provide clues about the spread of cancer and possibly help manage the disease. Some believe it can also help in early detection, a key for a patient’s survival.

Still, the problem is that CTCs are extremely rare. A milliliter of a cancer patient’s blood may have just one to 10 such cells, while it will have millions of normal cells, according to scientists.

Singapore-based Clearbridge BioMedics Pte., one of the 12 finalists for The Wall Street Journal’s Asian Innovation Awards, says it has developed a way to isolate CTCs from blood.

“Circulating tumor cells are foreign to the blood and they are very, very small in number—it’s the proverbial needle in the haystack problem,” said Andrew Wu, the general manager of Clearbridge. “The big challenge is being able to find CTCs and capture enough of them to do robust medical research.”

The company’s ClearCell biochips use recent advancements in nanotechnology—the technique of building or manipulating microscopic structures—to physically trap CTCs

using structures that are of the same size as a cell or even smaller.

The company has developed a prototype for the microfluidic biochip—a device employing electronic industry technology, but with human blood cells running through it instead—and has been using it for research purposes over the past two years.

Clearbridge—spun off from the National University of Singapore, which provided funding to the company—said it hasn’t yet run clinical trials, but added that it will begin to do so in coming years as it moves from focusing on research to using the technology in hospitals.

Blood screening tests to detect and isolate CTCs would help clinicians, said Anil Kumar Dhar, director of medical Oncology at Fortis Memorial Research Institute in Gurgaon, India. (Neither Dr. Dhar nor the medical institution, run by Indian hospital-chain operator Fortis Healthcare Ltd., is affiliated with Clearbridge. “Currently we conduct only imaging tests to detect cancer,” he said.)

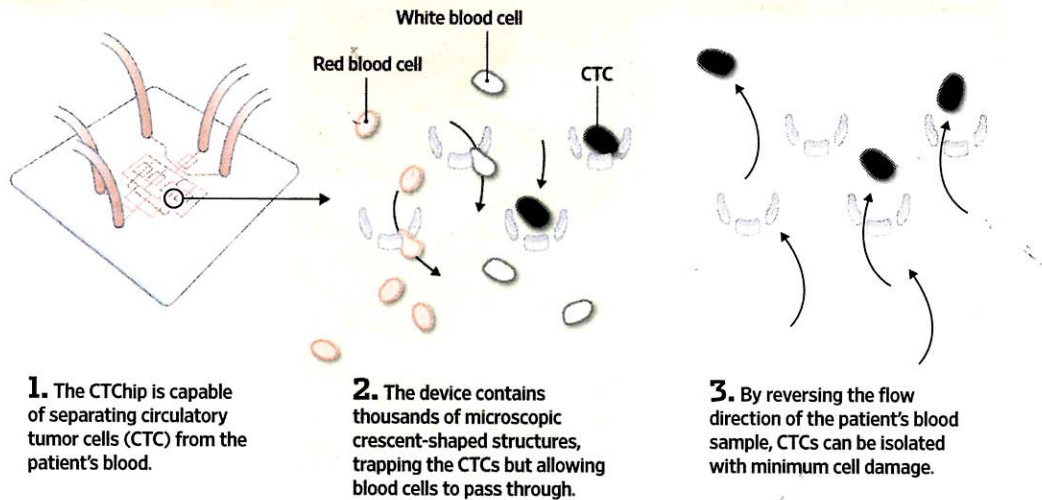
Doctors in the U.S., too, currently rely largely on imaging studies to evaluate the extent of spread of a cancer, though obtaining a tissue sample for a definitive diagnosis is still considered the best way to determine whether a patient has cancer.

According to Mr. Wu, CTCs are larger and stiffer than blood cells and are therefore more likely to get trapped in the pillar-like structure of the ClearCell biochip, while blood cells squeeze through it.

Mr. Wu said the company’s biochip method of physically separating cancer cells is simpler than an existing process that uses antibodies that attach to specific types of cancer cells and are then separated magnetically. Antibodies, which are for specific types of cancer cells, may not be effective in detecting tumor cells if cancer itself mutates over time, Mr. Wu said.

In the U.S., the only technology that has been cleared by the Food and Drug Administration for isolating circulating tumor cells in whole blood is the CellSearch system,

Screening Tool | How Clearbridge’s CTChip works



Source: Clearbridge BioMedics

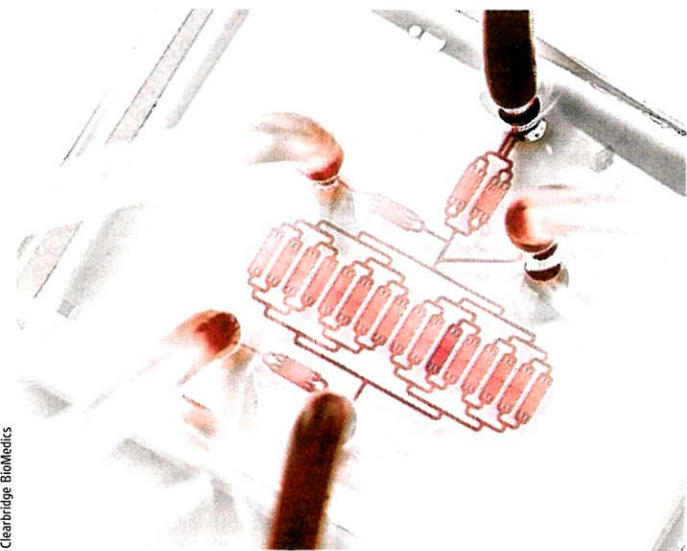
The Wall Street Journal

which is sold by Veridex LLC, a unit of Johnson & Johnson. An FDA spokeswoman declined to say whether the agency was evaluating any other technologies for approval, citing confidentiality of the process.

J&J spokeswoman Kellie McLaughlin said that it is difficult to make comparisons between the CellSearch system and other methods. FDA approval “required extensive analytical and clinical validation, which is why no other technology holds these designations,” she said.

If doctors are able to detect circulating tumor cells, study them and understand how they work, they may be able to design medicines to specifically target these cancer cells, said Mr. Wu. By understanding the process by which cancer spreads, medical professionals may also find clues for combating the disease in its early stage, he said.

Cancer, if detected early, doesn’t necessarily lead to a death. Still, most types of cancer are often diagnosed only when they have spread across the body. Mr. Wu said he believes that his company’s technol-



Clearbridge BioMedics claims its CTChip, shown here, can isolate circulating tumor cells from blood taken from cancer patients.

ogy could help doctors not only find cancer before it becomes too late, but also develop a routine laboratory test to predict the likelihood of the patient getting cancer.

“That’s the holy grail for circulating tumor cell technology development and clinical use,” he said.
 —Shibani Mahtani
 contributed to this article.