



You are here:HomeNewsClearbridge claims ClearCell System to monitor cancer

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Clearbridge BioMedics introduces a novel approach to cancer management and treatment.

Many diagnostic approaches are based on the principle of separating healthy cells from diseased ones, with cancer therapy being at the forefront of using such a technique. Now Clearbridge Biomedics, based in Singapore, have created a new device, named the ClearCell, which will have dramatic implications on clinical prognostics by improving the way that cancer is both diagnosed and treated.

The system, comprising of both the CTChip and the ClearCell Unit, is based on detecting circulating tumour cells (CTCs) in the peripheral blood. This is seen as the most reliable method of indicating the degree of malignancy and development of the disease, as well as being an accurate technique in understanding the phenotypic and genotypic expressions of cancer cells.

The micro device is based on the patent-pending microfluid technology, developed at the National University of Singapore, Singapore, where CTChips can detect and isolate intact, viable CTCs in the blood at low concentrations. The ClearCell System separates these specific CTCs by exploiting their different physical properties, such as size and deformability, from normal blood cells. Viable isolated cells are also obtained, giving a greater understanding of the metastatic process.

The ClearCell System not only has the potential to operate functionally on a clinical level, but visually the system operates effectively as well. Its optical transparency means that the device is simple to integrate into existing laboratory microscopes and immunofluorescence staining can be performed in situ to distinguish cancer cells from hematopoietic cells. This enhances cost-effectiveness as it eliminates the use of otherwise expensive staining reagents.

Speaking to **Bioanalysis Zone**, Chwee Teck Lim, Founder of Clearbridge BioMedics, says, "We hope that the current ClearCell System will be able to empower clinicians and scientists in their CTC research and discovery, accelerate the understanding of metastatic pathways and even assist drug companies in identifying molecular targets in CTCs for the development of anti-cancer drugs."

This methodology of isolation characterizes the device as particularly unique – providing the only micro device in the field that offers both a mechanistic and an efficient means of label-free isolation of viable cancer cells. Demonstrating isolation efficiencies of up to 80% mean that researchers and clinicians can diagnose and monitor cancer development more accurately, as well as validating the chosen cancer therapies used for their patients.

When asked where he predicts the technology of this system will lie in the future, Lim states, “The next generation ClearCell System will be developed as a cancer management clinical diagnostic tool that will potentially provide clinicians with rapid, accurate prognostic information, improving patient care and enabling personalized medicine.”

All images kindly courtesy of Clearbridge BioMedics Pte Ltd.

Sources: Tan SJ, Lakshmi RL, Chen P, Lim WT, Yobas L, Lim CT. Versatile label free biochip for the detection of circulating tumor cells from peripheral blood in cancer patients. *Biosens. Bioelectron.* 26(4),1701–1705 (2011); Tan SJ, Yobas L, Lee GY, Ong CN, Lim CT. Microdevice for the isolation and enumeration of cancer cells from blood. *Biomed. Microdevices* 11(4), 883–892 (2009).