

Development of a separation system for circulating tumor cells (CTC)

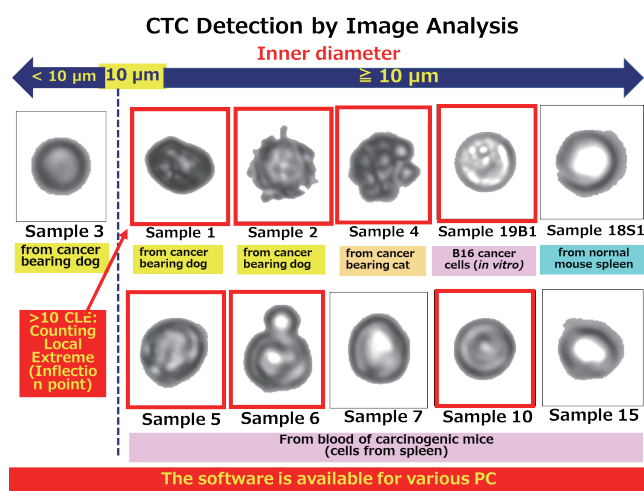
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Purpose of Research

Circulating tumor cells (CTCs) are cancer cells that leak into the blood from primary tumor sites. CTCs are considered to be deeply involved in cancer malignancy, such as metastasis and recurrence. The detection and analysis of CTCs are difficult as there is only a small number of them in the body. The purpose of our research is the development of convenient and efficient methods to *detect, trap, and reculture CTCs*, to elucidate their nature, to test anticancer drugs against the trapped CTCs, and to remove CTCs from patients' blood.

Summary of Research



- (1) A new algorithm has been developed to detect cancer cells from blood cells using their size and shape (marker-free detection).
- (2) Convenient and efficient methods have been developed to separate and culture cancer cells.

Comparison with Conventional or Competitive Technology

- This technology is independent of a CTC's antigens and the results of CTC detection are not affected by surface proteins.
- The biological & immunological properties of CTCs can be analyzed.
- The recovery rate of CTCs is ca. 80%–90%, with only minor damage to both CTCs and red blood cells.

Expected Applications

- Cancer diagnosis by CTC detection and evaluation of therapeutic efficacy for personalized cancer therapies.
- Diagnosis of primary tumor by analysis of CTCs.
- Development of anticancer drugs targeting CTCs.
- New cancer treatments (prevention of metastasis) by filtration of CTC from cancer patient's blood.
- The detection of cancer cells spiked in animal blood has been successful and CTC detection in cancer-bearing animals is now in progress.
- The detection accuracy up to greater than 95% would be required.

What We Expect from Companies

- This technology would be useful for companies that develop PC software and plan new entry to medical markets.
- Collaboration with companies that are strong at dialysis, apheresis (human, animal) technologies is highly appreciated.

Points

- Cancer cells can be detected from cell images taken on various microscopies
- Trapping and reculturing of cancer cells are possible under physiological conditions

Future Developments

The detection, isolation (reculture), and filtration of CTCs from cancer patients (animal and human).

- Patent Process: Underway
- Collaboration: Welcome
- Prototype: Available for rent

