

## CTCatch™ Clinical Applications in Breast Cancer

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### Diagnosis

- Mammaglobin

2

### Monitoring

- CSV

3

### Treatment

- HER2
- BRCA1, BRCA2

Consult your physicians about CTCatch™ test.

## CTCatch™ Test Process

1

Consult your physicians about CTCatch™ test



2

Collect 7.5mL whole blood



3

Analyze samples in Abnova Diagnostics Japan lab



4

Generate your report in 7 days



5

View test results under physician guidance



## CTC Liquid Biopsy for Breast Cancer

Abnova Diagnostics Japan  
CTCatch™ Test



Address: National Cancer Center Research Institute  
3F, 5 Chome-1-1 Tsukiji, Chuo-ku, Tokyo 104-0045, Japan  
Tel: + 81 3 6264 3448 Fax: + 81 3 6264 3449  
[www.abnovadx.com](http://www.abnovadx.com)

## Breast Cancer

Breast cancer is the most common cancer in women globally.

### Symptoms of Breast Cancer

- Breast lumps
- Changes in physical appearance
- Skin dimpling
- Redness and scaliness
- Nipple discharge

### Breast Cancer Metastasis

- Bone pain
- Swollen lymph nodes
- Breathing difficulties
- Jaundice

Screening increases the chances of detecting breast cancer early. For patients who are diagnosed early and received treatment, the five-year survival rate for stage 0 is 97.5%. Surgery is the most common treatment for breast cancer. However, the high risk of recurrence and metastasis leads to poor clinical outcome.

## 1 Diagnosis

### Mammaglobin

Mammaglobin (MGB) is a specific breast cancer marker for breast tissue<sup>1-4</sup>:

- Up to 80% of breast cancer patients have MGB overexpression in cancer cells in primary breast tumors, metastatic tumors and peripheral circulation.
- MGB is clinically useful in diagnosis, metastasis and immunotherapy of early breast cancer.
- MGB is a highly specific marker in circulating tumor cells (CTCs).

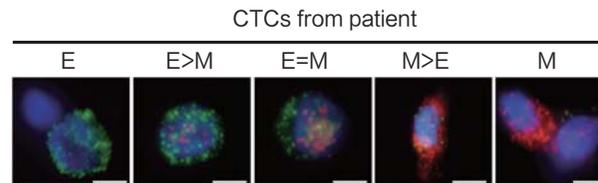
CTCcatch™ is a powerful tool to precisely detect MGB positive CTCs in breast cancer.

## 2 Monitoring

Metastasis, in which CTCs play an important role, is the leading cause of death in breast cancer. The amount of CTCs and the tumor size are significantly associated with cancer metastasis and recurrence<sup>5,6</sup>. Besides, epithelial-mesenchymal transition (EMT) is the key stage in metastasis.

- Rare primary breast tumor cells simultaneously express mesenchymal and epithelial markers, but mesenchymal cells are highly enriched in CTCs.
- Mesenchymal CTCs from breast cancer patients are highly associated with disease progression.
- Cell status will change with drug treatment and disease progression.
- Monitoring EMT CTCs can provide clinical information about drug response, recurrence and metastasis.

Cell-surface vimentin (CSV) monoclonal antibody is a highly specific marker targeting EMT cancer cells. CSV positive CTCs are associated with EMT, metastasis and recurrence in breast cancer. CTCcatch™ can isolate and enumerate CSV positive CTCs to predict the possibility of metastasis and recurrence.



EMT CTCs from breast cancer patient (E: epithelial marker; M: mesenchymal marker)

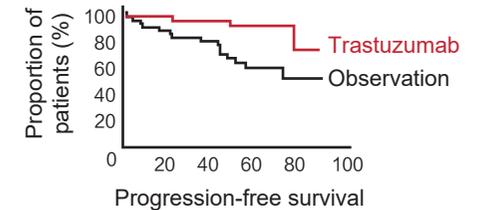
## 3 Treatments

### HER2 (Herceptin)<sup>7,8</sup>

The gene expression of human epidermal growth factor receptor 2 (HER2) can influence prognosis of breast cancer. Compared with other breast cancers, breast cancer with HER2 overexpression raises the risk of recurrence because the tumor grows faster and becomes more malignant.

- Herceptin is an anti-cancer drug used to treat early-stage and metastatic breast cancers with HER2 overexpression or HER2 gene amplification.
- Herceptin treatment significantly decreases the number of CTCs, reduces the risk of relapse, and prolongs the disease-free survival (DFS).

Monitoring the change of the CTC number during treatment can provide useful clinical information.



Correlation between taking Herceptin (trastuzumab) and progression-free survival

### BRCA1 and BRCA2 (Olaparib)<sup>9</sup>

- BRCA1 and BRCA2 are cancer suppress genes involved in DNA repair.
- BRCA1 and BRCA2 mutations are strongly associated with the progression of breast cancer.
- BRCA1 or BRCA2 genes are inherited in an autosomal dominant manner. Among hereditary breast and ovarian cancer syndrome family, there is 50% of chance for each descendent to get the mutated genes.

Therefore, it is important to test BRCA1 and BRCA2 mutations. Abnova Diagnostics Japan has developed mutaFISH™ probes which allow on-chip, *in-situ* mutation analysis of CTCs, and directly detect the gene mutations.

### Reference

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