

# Comparison between circulating and disseminated tumor cells in breast cancer

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**Background:** The presence of disseminated tumor cells in bone marrow (BM) of breast cancer patients is an independent prognostic factor. The role of circulating tumor cells (CTC) in blood is not yet defined. Since BM aspiration is less accepted by patients compared to blood drawing, it would be highly desirable to replace bone marrow aspiration by blood analysis. Therefore, the purpose of the present study was:  
to examine the presence of tumor cells in peripheral blood,  
to evaluate how surgery affects the presence of CTC,  
to assess the correlation between results in blood and in BM.

**Materials and Methods:** 314 blood samples from breast cancer patients were collected. 130 patients underwent blood sampling both pre- and postoperatively. All aspirates underwent immunomagnetic enrichment using AdnaTest BreastCancerSelect within 4 hours after blood withdrawal followed by RNA isolation and subsequent gene expression analysis by reverse transcription and Multiplex-PCR in separated tumor cells using AdnaTest BreastCancerDetect. Three breast cancer associated tumor markers and one control gene were amplified: GA733-2, Muc-1, Her-2 and  $\beta$ -actin (internal PCR control). Furthermore bone marrow aspirates from 176 of these patients were analyzed by immunocytochemistry (pancytokeratin antibody A45-B/B3) using ACIS system (Chromavision) according to the ISHAGE evaluation criteria.  
Results: 184 patients could be included in to this study. 10% of these patients had detectable tumor cells in the bloodstream. To assess the influence of surgery, 130 blood samples were analyzed both pre- and postoperatively. The positivity rates postoperatively were slightly higher but did not differ significantly (13% preoperatively and 17% postoperatively). It seems therefore that surgery or invasive procedures (core cut biopsy) do not influence positivity rates in the blood. The positivity rate in the bone marrow was 11%. The correlation between both compartments (blood and BM) in these patients was 80%.

**Conclusions:** Circulating tumor cells can be detected in primary breast cancer. Surgery does not influence significantly the tumor cell load in the blood stream. Positivity rates obtained from both compartments (blood and BM) correlate highly. However, the prognostic significance of CTCs has to be further evaluated.