



# simfo

Spezielle Immunologie  
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## **The number of tumorspheres cultured from CETCs in breast cancer patients is directly related to stage of the disease and obtaining chemotherapy.**

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**Background:** Breast cancer is one of the leading causes of cancer death for women worldwide. Major hurdles for a successful treatment are cancer metastasis, resistance to therapy and disease recurrence. The presence of CETCs is closely related to metastasis formation, but the mechanisms through which CETCs promote recurrence of disease are still unclear. Therefore, the aim of this study was to determine the proliferative capacity of CETCs by analyzing the frequency of tumorsphere formation with subsequent phenotypic characterization of the spheres arising in breast cancer patients.

**Methods:** CETCs were cultured under conditions favoring growth of tumorspheres from 72 patients with breast cancer, including a subpopulation of 23 patients with metastatic disease. Cell viability, stem cell marker expression and ALDH 1 activity was evaluated by fluorescence scanning microscope (Olympus Scan®R).

**Results:** Sphere formation was observed in 79 % of patients with breast cancer. In the current study we found that the number of tumorspheres depended on stage of disease. Patients in stage IV had statistically significant more tumorspheres compared to patients in stage I (median 6 vs. 2;  $p=0.002$ ). The most important factor for growing of tumorspheres is obtaining chemotherapy. Patients with chemotherapy treatment had lower numbers of tumorspheres compared to patients without chemotherapy (median 2 vs. 5;  $p=0.002$ ). Interestingly, patients with HER2 positive primary tumor had higher number of tumorspheres with median 10. Analysis of surface marker expression profile of tumorspheres showed that spheres cultured from CETCs had typical phenotype of cancer stem cells with a high enzymatic activity for ALDH 1. There was no sphere formation in a control group with 50 healthy donors.

**Conclusion:** This study demonstrates that a small fraction of CETCs has proliferative activity. Identifying the CETC subset with cancer stem cell properties may provide more clinically useful prognostic information. Chemotherapy is the most important component in cancer therapy because it frequently reduces the number of tumorspheres.

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