Studying changes in gene expression of breast cancer stem cell-like cells markers, at different stages

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Abstract

Objectives:
Recent literature and experimental data, have demonstrated the significance of cancer stem cell-like cells (CSC-like cells), as an entity of circulating tumor cells (CTCs). Nanog, Okt 3/4, SOX2, Nestin and CD34 constitute specific markers of CSC-like cells and pilot studies showed a possible relationship between these transcription factors and clinical assessment of patients. The present study aims to determine the change of the above markers in correlation with the stage of the disease.

Methods:
In the first panel of this study, CTCs from more than forty (40) patients with breast cancer in different stages, according to TNM classification system, have been isolated. The quantification of CSC-like cells in CTCs cultures followed and in the second panel, real-time qPCR has been used for molecular analysis. Gene-specific primers for each marker and for endogenous gene (18S rRNA) have been designed and evaluated in reactions with positive control samples. The analysis has been performed by using relative quantification, normalized to the reference gene.

Results:
A first evaluation of the data suggests that there is no linear relationship between the gene expression of transcription factors and the stage of the disease. In most markers, the higher value is noted in stages II-III. Nanog's expression varies, while Okt3/4 seems to be overexpressed in stage II. The lower value of Nestin has been observed in stage IV, whereas for CD34 transcription factor has been observed in stage I.

Conclusions:
CSC-like cells may generate tumors through the stem cell processes of self-renewal and differentiation into multiple cell types. There are also resistant to chemotherapy, thus making difficult the treatment. This study demonstrates the correlation between gene expression of transcriptional markers, which is expressed particular in those cells, and the stage of disease in breast cancer. Concerning the above data, the question of whether these factors might be the target of new drugs arises. Further studies to confirm the above in a larger scale of samples, need to be performed.