

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

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Objectives

Cancer Stem Cell-like cells (CSC-like cells) are a distinct population in the tumor mass. There are cancer cells that have the ability to give rise to all malignant cell types. They have also the ability to cause relapses, metastasis and are resistant to chemotherapy. Experimental data have pointed out that CSC-like cells are a subset of circulating tumor cells (CTCs). As it has been well established, CSCs phenotype is defined by Nanog, Sox2, Oct3/4 genes as well as Nestin and CD34 genes. A recent pilot study showed a possible relationship between these transcription factors and clinical assessment of patients. The present study aims to determine the correlation of the above markers with the stage of the disease.

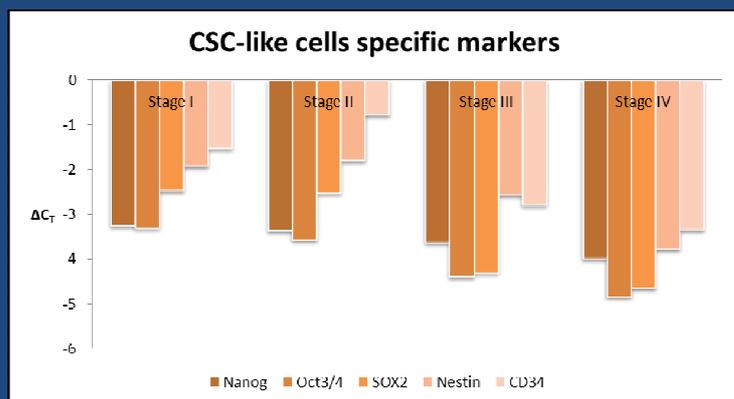


Table 1: Gene expression of transcriptional factors according to stage.

Conclusions

CSC-like cells have the capacity to differentiate into any of the three germ layers and are tumorigenic via self-renewal. There are also resistant to chemotherapy, thus making difficult the treatment. According to the previous data, there may be certain correlation between the gene expression of the transcriptional markers, that expressed in CSC-like cells and the stage of disease in breast carcinomas. Concerning all the above, the question of whether these factors might be the target of new drugs arises.

Materials & Methods

The isolation of CTCs from more than forty patients with breast cancer in different stages, according to TNM classification system, was the first experimental panel. Then followed the quantification of CSC-like cells in CTCs cultures and the inspection of them at protein and gene levels. The second panel included the molecular analysis (real-time qPCR) of the transcription factors by using gene-specific primers for each marker and for endogenous gene (18S rRNA). The analysis has been performed by using relative quantification, normalized to the reference gene, according to Livak's method.

Results

The first assessment of the results suggests that there is no linear relationship between gene expression of each marker and the stage of the disease. Oct3/4 seems to be overexpressed at stage II, while Sox2 has the higher value at stage III. The lower value of Nestin has been observed at stage IV, whereas CD34 is under expressed at stage I. Nanog's gene expression varies.

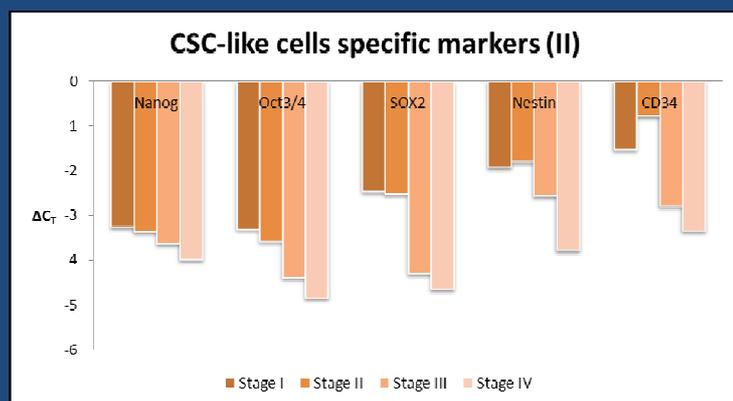
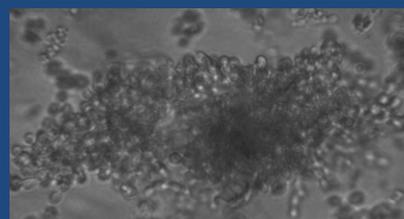


Table 2: Changes in gene expression of each transcription factor.



Breast Cancer Stem Cell-like cell line

Selected References

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