

The Role of TGF- β Signaling in the Angiogenesis of Breast Cancer Cells

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Introduction: Stem cells are cells that eventually transform into different tissues and organs in the fetus. These cells, unlike normal cells that form their own similar cells by dividing, can alter into any type of cell in the living organism. Cancer stem cells have been defined as the cause of several types of human cancer, which have properties like stem cells, and they have been recognized and detached in leukemia and a number of solid cancers including breast, brain, and lung cancers. Embryonic signaling pathways such as Notch, WNT, Hedge hogs and TGF- β inhibitor are as signs for stem cells involved in the embryogenesis process. TGF- β inhibitor signaling induces angiogenesis by affecting angiogenic factors. Since many cancer deaths are due to angiogenesis and metastasis, the study of the angiogenesis and metastasis process is pivotal.

The aim of this study was investigation of the role of TGF- β inhibitor signaling in the angiogenesis process of breast cancer stem cells.

Materials and Methods: In this survey, three invasive specimens of breast cancer type A and B were separated from women with breast cancer from the marginal part of the tumor at Khatam Al-Anbia Hospital. These specimens were then transferred to the Genomic Research Center of Islamic Azad University in sterile conditions. Considered specimens were cultured in Flask with the method of Primary to grow and proliferate, and then, their number of cells attained the intended number, they were trypsinized and cultured individually with normal breast adipose tissue. This culture was also examined in 3 well 24 well plates on days 7, 14 and 21 as the main group with TGF- β inhibitor treatment. Immunocytochemistry was performed to assess protein expression. No expression was found for normal adipose tissue HELLA cell line, nor HELLA cell line with normal adipose tissue in the main and control groups.

Results: The results illustrate that breast cancer stem cells are mesenchymal stem cells, that expressing CD31 and VEGFR2 gene was perceived only in the cultured plates of the cancer cell, with normal adipose tissue on days 7, 14 and 21 that were not treated with TGF- β inhibitor. Hence, Targeting the TGF- β signaling pathway can avoid cancer angiogenesis.

Discussion and conclusion: Based on the studies performed with the mentioned methods in breast cancer stem cells and their comparison with control groups, it is concluded that breast cancer stem cells have easy-growing, high-potency culture properties. Depending on the expression of markers in these cells, it can be exerted as a target to block angiogenesis.

Keywords: Cancer Stem Cells, Mesenchymal Stem Cells, Angiogenesis.

Biography

Yasaman Enami Charvadeh has completed her master degree at the age of 25 years from Islamic Azad University of Medical Sciences. She has completed her bachelor degree in genetics from Islamic Azad University of Shahsavari at the age of 22. She is a research assistant at Islamic Azad University of Medical Lab, she has translated the book named cancer stem cells methods and protocols by Gianpaolo Papaccio and Vincenzo Desiderio and contributed to the translation hypoxia and cancer metastasis book by Daniele M. Gin. in person. She is interesting about cancer stem cells and cancer signaling pathway and cancer biology.

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