Preclinical breast cancer biology

**IS IT POSSIBLE TO TAILOR BREAST CANCER TREATMENT BY USING BREAST CANCER STEM CELLS AS A CELL MODEL?**

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**Background:** Cancer stem cells (CSCs) have attracted big attention in recent pre-clinical studies because of their special characteristics including their role in promoting metastasis and resistance to chemotherapy. For the former reasons SCS is currently a main focus of cancer research especially in Breast cancer which is the first cancer in women.

**Objective:** This study aims at establishing a CSC cellular model, which might enable both researchers and medical oncologists testing both new and traditional agents in lab and translate the results into clinical practice.

**Material and methods:** Tumor cells were obtained from primary breast cancer Syrian patients having a metastatic disease after signing an informed consent. cells were cultured and breast cancer stem cells were isolated by means of serial dilution of cells, and the characterization of these cells by flow cytometry based on their morphology, surface antigen profile (CD44\(^+\)/high/CD24\(^-/\)low). Isolated cells were manipulated by single agents of Doxorubicin and Docetaxel and then by combination. On the other hand, patients were treated with the same combination which is the standard of care as first line metastatic disease.

**Results and discussion:** It was possible to isolate CSCs from primary breast tumor with high purity exceeding 90%, and we showed their CSC characteristics, which included: i) CD44\(^+/\)high/CD24\(^-/\)low profile, ii) their ability to form tumor spheres, iii) and their ability of resisting chemotherapy. Resistant cells were proved to be breast cancer stem cells after passage in flow cytometry; furthermore, high population with CSCs in plates was associated with poor response to chemotherapy in 20 studied cases.

**Conclusions:** Isolating breast (CSCs) represents a cell model for every patient that might enable researchers to better understand mechanisms lying behind resistance to chemotherapy and might help to establish a cornerstone in making breast cancer treatment more tailored if we are able to establish a cell line for every patient taking into consideration the phenotype of the breast cancer cell (estrogen, progesterone and Her-2 status)

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