

OTR.23 - Experimental strategy form identifying membrane targets to diagnostic and treatment for breast cancer

Julia Badaró Mendonça^{1*}; Nicolas Carels²; Mariana Caldas Waghabi¹; Tatiana Martins Tilli².

¹Fiocruz/IOC;
²Fiocruz/CDTS.

Introduction:

The main limitations of effectiveness of drugs currently used for the treatment of cancer include systemic toxicity, drug resistance and debilitating side effects. Effective solutions to overcome these limitations are (i) to use membrane proteins to address the delivery system of encapsulated drugs in second generation biocompatible nanoparticles and (ii) the use of monoclonal antibodies directed against specific targets of tumor cells.

Objective:

In this context, this project outlined a strategy for optimized selection of membrane proteins in tumors with focus on the development of breast cancer therapy and diagnosis.

Methodology:

Our strategy involves the use of TCGA data (The Cancer Genome Atlas Data) using transcriptome data from tumor and non-tumor breast human tissue; and several healthy tissues, such as bladder, lung, pancreas, uterus, cervix and colon. By this strategy, it was possible to identify membrane proteins with increased expression levels in tumor tissue compared with healthy tissue.

Results:

A list of seven differentially expressed target proteins (patent pending) has been proposed from this inference to 95 patients of breast tumor that includes the different molecular subtypes; Luminal A, Luminal B, HER2+ and Triple Negative. The increased expression of two selected proteins were already confirmed by immunofluorescence assay.

Conclusion:

A proof-of-concept is the next step to confirm targets overexpression at protein level, and also their correlation with clinical and pathological data. Moreover, selected binding peptides will be synthesized to perform experimental validation of the nanoparticle functionality and internalization by tumor cells. Therefore, we expect that these proteins will be suitable targets for the therapy with a lower rate of undesirable side effects and for being more effective therapeutically.

Keywords: breast cancer; therapy ; nanoparticles