

Validation of a novel in vitro breast cancer chemoresistance platform in neoadjuvant setting

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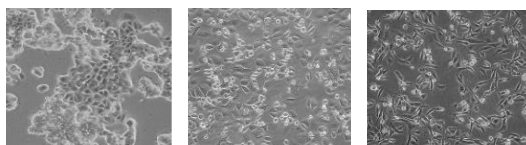
Introduction

Tumor resistance related to a preexisting condition or induced by a drug is the main cause of chemotherapy failure leading to cancer progression. The use of in vitro functional tests such as chemoresistance assays to predict tumor response to drugs used in chemotherapy allows a more efficient and less cytotoxic treatment for the patients. Currently, in Brazil, no in vitro chemoresistance test for cancer is validated for use in the clinic.

The aim of our study is a novel in vitro chemoresistance platform for two drugs commonly used in the neoadjuvant setting for breast cancer (BC).

Methods

- Three BC cell lines: MCF-7 (Luminal), SKBR3 (HER2+), MDA-MB-231 (triple-negative (TN)) were used to confirm the efficacy of the platform;



MCF-7 SKBR3 MDA-MB-231

- Patients with invasive BC and partial response to neoadjuvant chemotherapy (NAC) were included in this initial report;
- Fresh tumor samples were collected during surgery, dissociated to obtain tumor cells, cultured in the chemoresistance platform with doxorubicin and paclitaxel. After 72h the cell viability was evaluated;
- The test result is defined on cell viability as low (<40%), intermediate (40-60%), and high (>60%).

Results

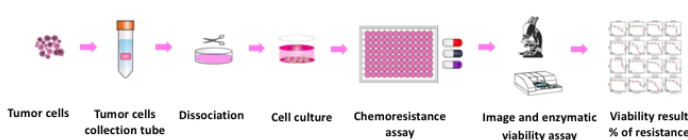
Cell lines

- ✓ All cell lines: low resistance to doxorubicin;
- ✓ MCF-7 and SKBR3: low resistance to paclitaxel;
- ✓ MDA-MB-231: intermediate resistance to paclitaxel;

Patient samples

- ✓ 10 BC patients with residual disease after NAC
- ✓ All received doxorubicin and paclitaxel as part of the treatment
- ✓ 40% Luminal
- ✓ 20% LuminalHER2+
- ✓ 10% HER2+
- ✓ 30% TN

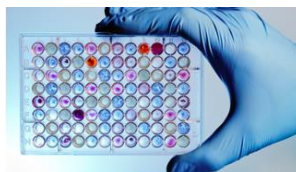
Overall rate of assay success: 100%



Chemoresistance - Patient samples

- ✓ 100% high resistance to paclitaxel
- ✓ 70% High
- ✓ 10% intermediate
- ✓ 20% low

Resistance to doxorubicin



Samples already treated with chemotherapy in NAC presented more high drug resistance than BC cell lines.

Conclusions

This preliminary result demonstrated more high resistance in tumors previously treated with doxorubicin and paclitaxel compared to BC cell lines without previous treatment, suggesting a possible role of acquired resistance during neoadjuvant chemotherapy.

These findings also highlighted the success of the in vitro chemoresistance platform to test tumor samples after neoadjuvant treatment

Contact