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VALIDATION OF A NOVEL IN VITRO BREAST CANCER CHEMORESISTANCE PLATFORM IN NEOADJUVANT SETTING

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Objective: The aim of this study was to validate 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+); and MDA-MB-231 (triple-negative) were used to confirm the efficacy of the platform. Patients with invasive BC and partial response to neoadjuvant chemotherapy were included in this initial report. Fresh tumor samples were collected during surgery and dissociated to obtain the tumor cells. The tumor cells were cultured in the chemoresistance platform with doxorubicin and paclitaxel and after 72-h cell viability was evaluated. The test result is defined based on cell viability as low (<40%), medium (40–60%), and high (>60%) resistance. **Results:** The three BC cell lines presented low resistance to doxorubicin, MCF-7 and SKBR3 cells also presented low resistance to paclitaxel, whereas MDA-MB-231 has intermediate resistance. Samples from 10 BC patients with partial response to neoadjuvant chemotherapy were tested in the novel chemoresistance platform. All the patients received doxorubicin and paclitaxel as part of the treatment. The overall rate of assay success was 100%. Regarding molecular subtypes, 40% were Luminal, 20% Luminal HER2, 10% HER2, and 30% triple-negative. The 10 samples presented 100% high resistance to paclitaxel. High resistance to doxorubicin was observed in 70% of the samples, intermediate in 10%, and low in 20%. The chemoresistance platform demonstrated that samples already treated with paclitaxel and doxorubicin in a neoadjuvant setting presented more high resistance to the drugs compared to the BC cell lines. **Conclusion:** This preliminary result demonstrated more high resistance in tumors previously treated with doxorubicin and paclitaxel compared to BC cell lines without previous treatment and highlighted the success of the in vitro chemoresistance platform to test tumor samples after neoadjuvant treatment.

Keywords: Breast neoplasms. Neoadjuvant therapy. Neoplasm drug resistance.