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28561 – A NOVEL IN VITRO BREAST CANCER CHEMORESISTANCE PLATFORM

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Introduction: Breast cancer (BC) is a highly heterogeneous disease characterized by distinct molecular subtypes and prognoses. Tumor resistance is the main cause of treatment failure, leading to cancer progression. Despite the knowledge of different drug resistance mechanisms in BC cells, overcoming resistance is still challenging. Therefore, predicting resistance before initiating chemotherapy is valuable for increasing treatment benefits. Functional precision medicine is an innovative treatment strategy in which drugs are tested on the patient's cancer cells, cultured outside the body, to understand tumor resistance and match the most appropriate treatment. Some methods are available worldwide, offering personalized drug testing services; however, in Brazil, no in vitro chemoresistance test for cancer is validated for use in the clinic. Chemoresistance assays use supra-therapeutic doses of chemotherapeutic drugs to identify ineffective agents to which the tumor is resistant, with a high level of accuracy, approximately 90%. Previous findings have demonstrated the efficacy of chemoresistance assays in predicting a patient's response to chemotherapy and selecting the most appropriate therapy regimen. However, few studies demonstrated a significant association between these assays and breast cancer patient prognoses. We developed a novel in vitro tumor resistance platform aiming at an individualized and precise treatment in oncology. Our in vitro resistance test has the advantage over other chemoresistance assays to exhibit the drug's stability within the platform, eliminating pipetting errors and reducing costs associated with the drugs. **Methodology:** Patients with primary invasive BC were included in this report. Fresh tumor samples were collected during surgery or biopsy and dissociated to obtain the tumor cells. The tumor cells were cultured in the chemoresistance platform with several cytotoxic drugs used for BC treatment, including taxanes, anthracyclines, platin, and cyclophosphamide, and, after 72 hours, cell viability was evaluated. The test result is defined based on cell viability as low (<40%), medium (40%–60%), and high (>60%) resistance. **Conclusion:** This finding showed the capacity of the chemoresistance platform to demonstrate different patterns of drug resistance in accordance with the tumor's molecular biology. The increased number of patients undergoing neoadjuvant chemotherapy and the need to understand the best treatment strategy highlighted the importance of functional precision medicine to avoid the use of inefficient drugs, improving and personalizing breast cancer treatment.