NEW TRENDS FOR ANTIMALARIAL DRUGS: SYNERGISM BETWEEN ANTINEOPLASTICS AND ANTIMALARIALS ON BREAST CANCER CELLS

DIANA DUARTE [1,2] AND NUNO VALE [1,3]

[1]OncoPharma Research Group, Center for Health Technology and Services Research (CINTESIS), Rua Dr. Plácido da Costa, 4200-450 Porto, Portugal
[2]Faculty of Pharmacy of University of Porto, Rua Jorge Viterbo Ferreira, 228, 4050-313 Porto, Portugal
[3]Faculty of Medicine, University of Porto, Al. Prof. Hernâni Monteiro, 4200-319 Porto, Portugal

encontro CIÊNCIA '21

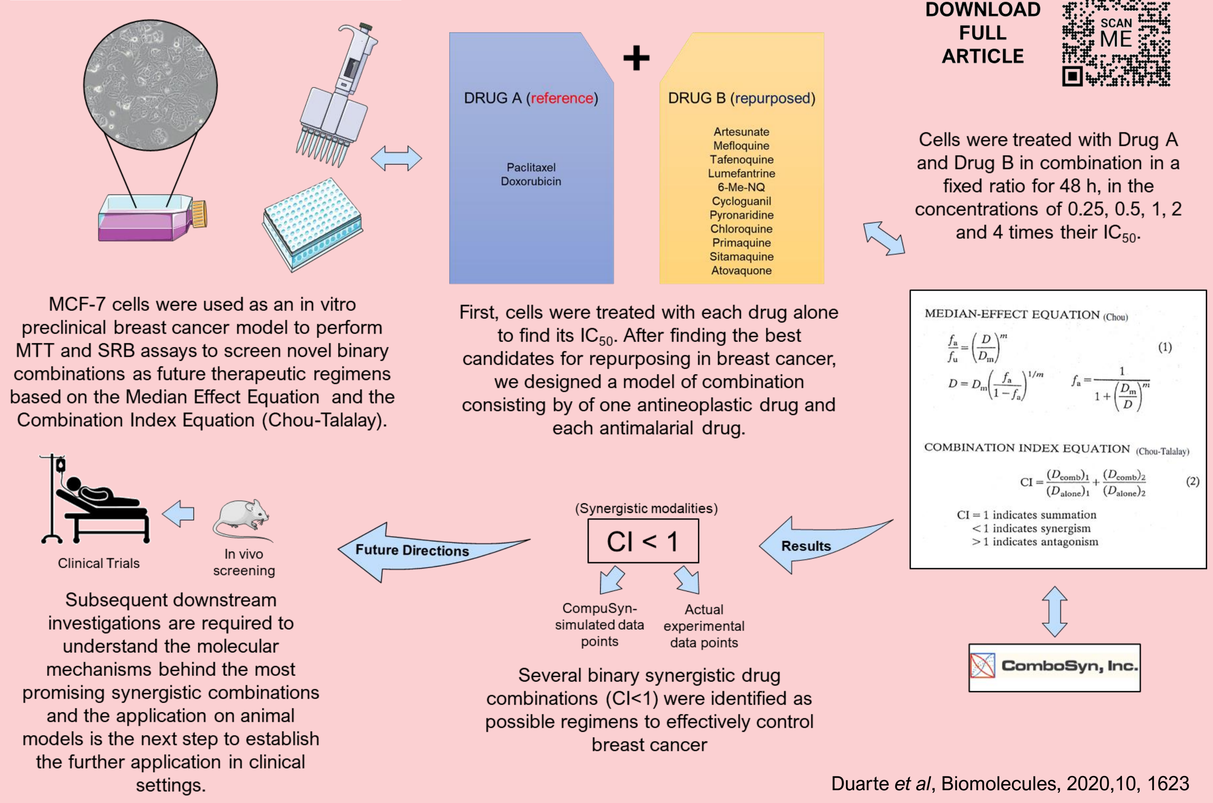
CINTESIS Health. Research.

INTRODUCTION

Chemotherapy plays a key role in breast cancer therapy, being responsible for the long-term survival of patients but has its effectiveness decreased due to the ability of tumor cells to offer intrinsic or acquired resistance to these therapeutic agents. It is, therefore, very important to develop new methodologies and protocols to ensure the long-term survival and good life quality of these patients by increasing the therapeutic efficacy of these treatments, while reducing the doses and toxicity.

In this work, we developed a new therapeutic strategy for breast cancer, based on the combination of several antimalarials and two antineoplastic drugs commonly used in breast cancer chemotherapy: DOX and PTX.

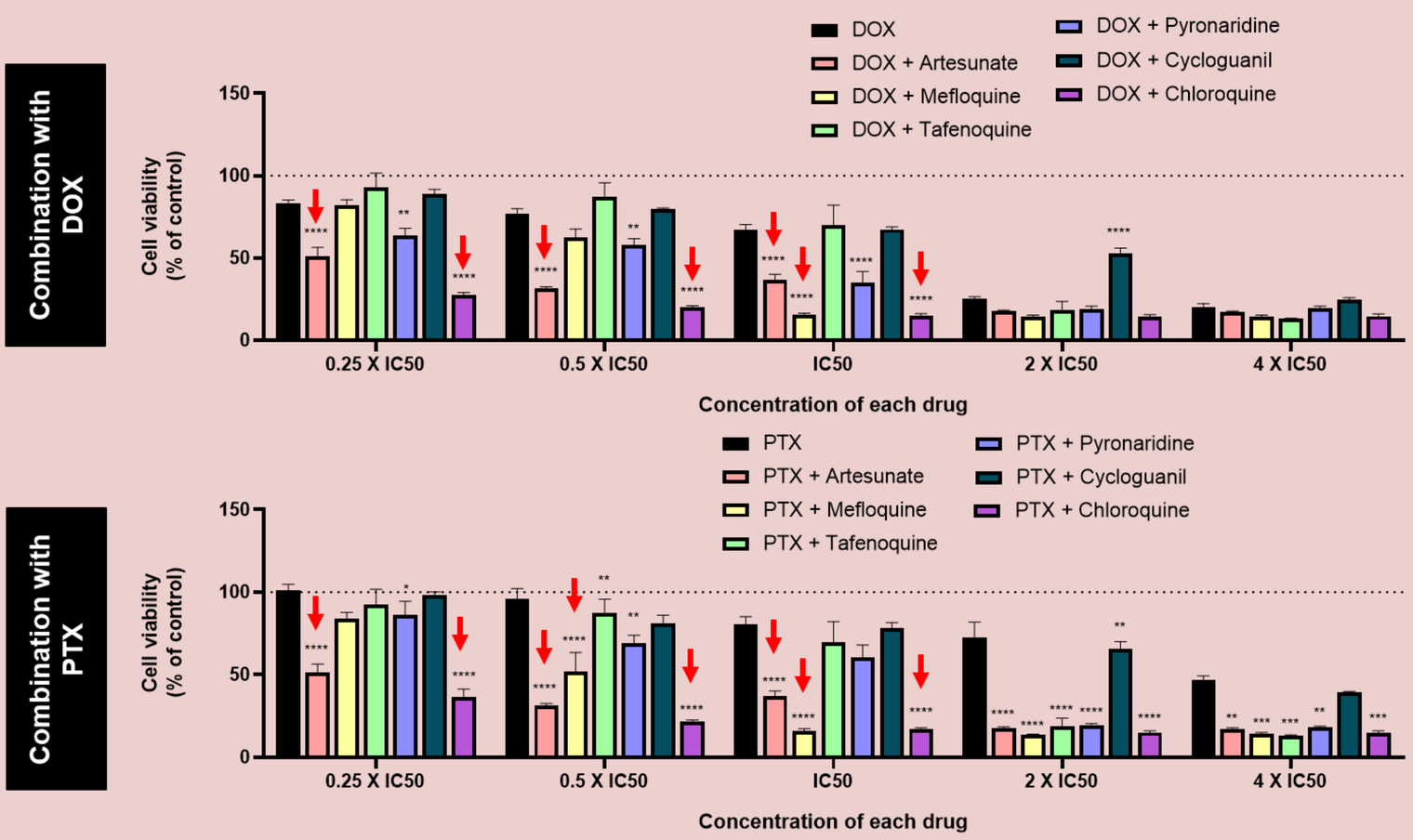
METHODS



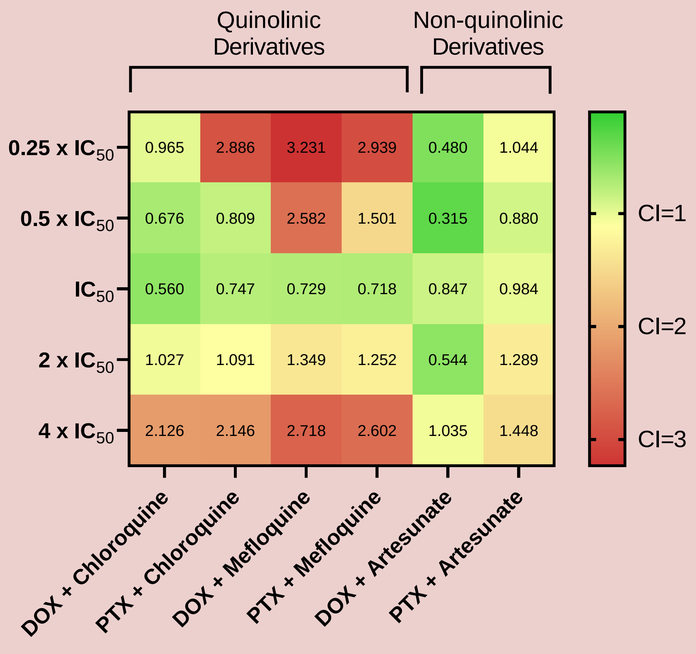
Duarte *et al*, Biomolecules, 2020,10, 1623

RESULTS

▶Combination of antineoplastic drugs with artesunate, mefloquine and chloroquine in concentrations of the IC_{50} of each drug resulted in significant decreases of cell viability compared to DOX and PTX alone.



▶Combination of DOX + chloroquine demonstrated more synergism than the combination with PTX. The combination of the IC_{50} of DOX/PTX + mefloquine resulted in a synergistic effect. Combination of artesunate with DOX resulted in more synergism than the combination of PTX, with CI<1 for almost all pair of concentrations.



Duarte *et al*, Biomolecules, 2020,10, 1623

CONCLUSION

▶Antimalarial drugs as single agents have the ability to decrease cell viability in a concentration-dependent manner and the combination can improve the anti-cancer activity of DOX and PTX in ER-positive breast cancer cells.

▶We demonstrated for the first time that the combination of artesunate, mefloquine and chloroquine can synergistically inhibit breast cancer proliferation in MCF-7 cells.

▶Further research should be made in other breast cancer cells, such as MDA-MB-231 and SUM159 cells (triple-negative) or other types of cancer, for a broader application. Also, deeper mechanistic studies are recommended for further evaluation of the anticancer mechanisms underlying these combinations. In vivo studies should be taken to explore further these effects and evaluate the safety and efficacy of the drug combinations studied in this model.

REPÚBLICA PORTUGUESA | CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR | FCT Fundação para a Ciência e a Tecnologia | NORTE2020 | CENTRO 2020 | ALENTEJO 2020 | POCH | PORTUGAL 2020 | UNIÃO EUROPEIA Fundo Social Europeu