



## **Development and evaluation of a nanofiber membrane *in vitro* as a therapeutic alternative for the post treatment in cancer breast cell in a murine model**

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Worldwide female breast cancer is the most commonly diagnosed cancer, with an estimated 2.3 million new cases in 2020, reason for the need of targeted therapies that can maximize treatment success and minimize toxicity. Nanoparticles of gold (AuNps) exhibit cytotoxic properties against certain types of cancer cell lines. Nanofibers have been use in the drug delivery systems due to its degradability and high surface area. We proposed a membrane with nanometric fibers using polivinilic alcohol (PVA) and chitosan (Qts) loaded with AuNps and Doxorubicin (Doxo) with the purpose of diminish tumor regression.

PVA-Qts membrane was develop with electrospinning, the injection, voltage, distance and relative humidity parameters were standardized and it were characterized by Microscopic Atomic Force. The cytotoxicity with a median lethal dose (DL50) in two cell lines, breast adenocarcinoma murine (4T1) and murine fibroblast (NiH3T3) as a healthy control were evaluated.

AuNps had a size of 3 nanometers (nm) with a Z potential of 13.2 mVolts and a DL50 of 75  $\mu$ M in the cell line 4T1. Doxo was decrease in 95% with a final concentration of 0.03 mg/cm<sup>2</sup>. Both doses were loaded in the PVA-Qts solution.

PVA-Qts-Doxo and PVA-Qts-AuNps-Doxo decrease the viability in 4T1 in 24 hours with a 15%, 72 hours with a 28%, the first with 60% and the latter with 82%. PVA-Qts-Doxo and PVA-Qts-AuNps-Doxo in NiH3T3 diminish incrementing with the time reaching a 40% in 120 hours.

Finally, The viability for 4T1 cultured on PVA-Qts-Doxo was minor than in NiH3T3. The amount of Doxo in the membrane synthetized was 95% less than the employ doses, demonstrating that the fiber improves the delivery of the chemotherapeutic in a palatine time.