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Activity of nanocarriers for delivery and controlled release containing phthalocyanine derivatives to treat central nervous system neoplasms associated with photodynamic therapy

Bárbara Gimenes de Castro[1,2†], Leonardo Barcelos de Paula[1], Antonio Claudio Tedesco[1*].

[1]*Departamento de Química, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto (FFCLRP) - University of São Paulo (USP)*
[2] Ciências Biomédicas, Ribeirão Preto Medical School (FMRP) - University of São Paulo (USP)

[†]barbara.gimenes.castro@usp.br / *atedesco@usp.br

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ABSTRACT

According to the National Cancer Institute (INCA) in 2018 in Brazil cancers of the Central Nervous System (CNS) represent 17.22% of cancer mortality and are the most frequent solid tumors in the pediatric population, 20% of childhood neoplasms. The conventional treatment is surgical resection of the tumor and then radiotherapy and/or chemotherapy. To reduce this side effects, Photodynamic Therapy (PDT) appears as an alternative and complementary treatment for cancer. In this work we evaluated the effect of PDT with phthalocyanine-chloro-aluminum nanoemulsion (NE/AlClPc) on glioblastoma (U87MG and T98G) and medulloblastoma (UW473) cell lines. In the 24, 48, 72 and 96h periods, the cells lines presented the following cell viability percentages after the 700mJ/cm² dose (Figura 1). The PDT seems to be efficient in reducing cell and proliferative viability of this cell lines, which is promising for the treatment of regression of CNS tumors.

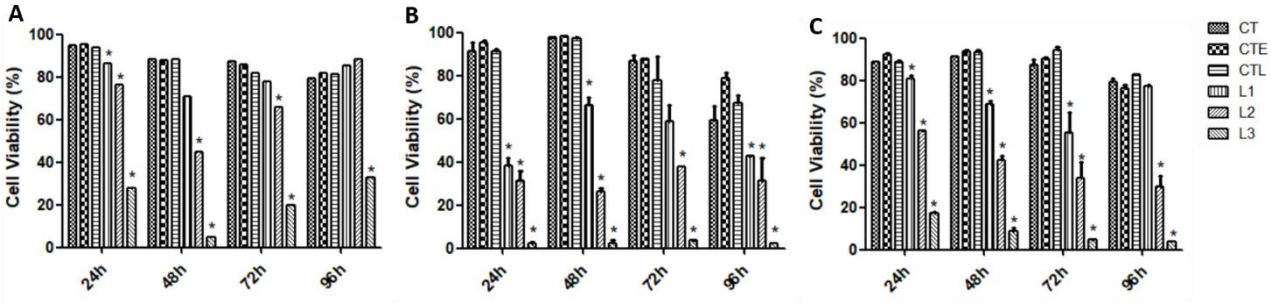

Figure 1: Effect of laser application on cell viability of glioblastoma strains: (A) U87MG, (B) T98G and medulloblastoma: (C) UW473 treated with NE/AlClPc at 0.5 µmol/L after 24, 48, 72 and 96 h. CT: control group (untreated cells); CTE: control group in the dark (cells treated with NE/ClAlP only); CTL: light control group (700 mJ/cm² laser-treated cells); L1: cells treated with NE/AlClPc + laser 100 mJ/cm²; L2: cells treated with NE/AlClPc + laser 200 mJ/cm²; L3: cells treated with NE/AlClPc + laser 700 mJ/cm².

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