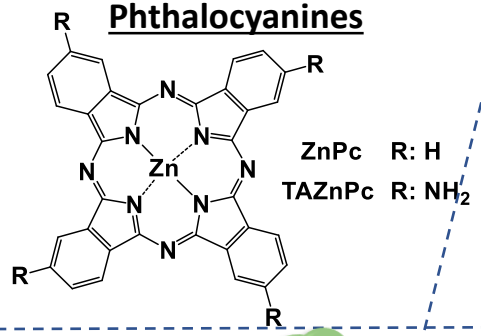
Comparison of photophysical properties of two zinc (II) phthalocyanines in dimethylformamide or into liposomes. Photodynamic activity in glioblastoma cells.

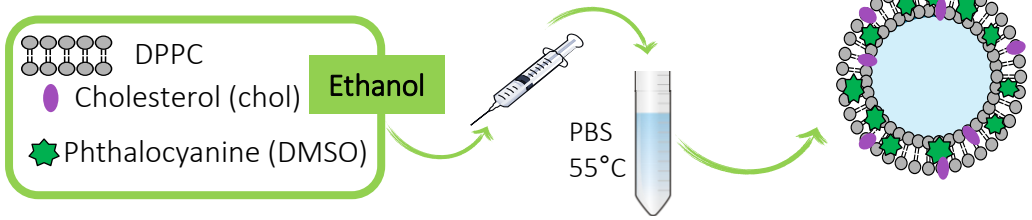
Mariana Miretti[1], Tomas C. Tempesti[1], Cesar G. Prucca[2], M. Teresa Baumgartner[1] *e*-mail (Presenting Author): mmiretti@fcq.unc.edu.ar
[1]INFIQC (UNC-CONICET) Universidad Nacional de Córdoba, Córdoba, Argentina. [2]CIQUIBIC (UNC-CONICET) Universidad Nacional de Córdoba, Córdoba, Argentina.

Introduction. Photodynamic therapy (PDT) utilizes light in combination with a photosensitizer (PS). Both components are innocuous if they act separately but in combination, are able to induce injury and cellular death. When a PS absorb light, the PS is excited. This excited state undergoes intersystem crossing to the long-lived triplet state, which can react with molecular oxygen inducing reactive species, which can injury the surrounding bioorganic molecules leading to cell death. Phthalocyanines (Pcs), second-generation PSs, are characterized with far-red wavelength absorption (>670 nm), long triplet lifetime (~1 ms), and high quantum yields of singlet oxygen generation (>0.2). Pcs have been used as a treatment for a variety of cancers. Due to the hydrophobic character of Pcs, intravenous treatment is greatly hampered. Liposomal preparations are currently used as an effective delivery system in experimental studies and clinical trials. In this work the photophysical properties of two Pcs (ZnPc and TAZnPc) in DMF (dimethylformamide) solution or carried into DipalmitoylPhosphatidylCholine (DPPC)-cholesterol liposomes in PBS (Phosphate Buffer Saline) and their effectiveness on glioblastoma cells were evaluated.

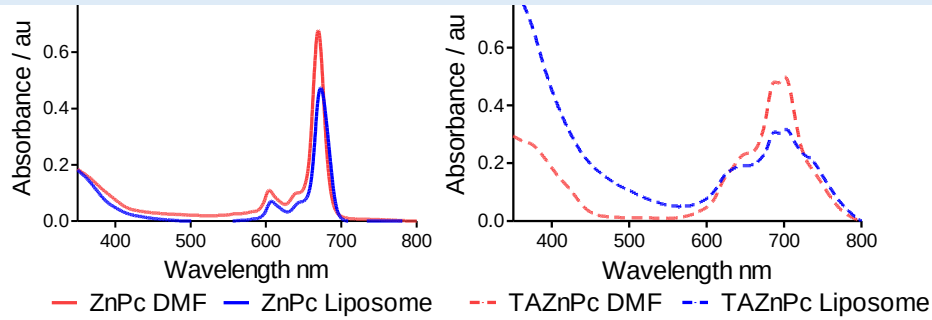
Phthalocyanines



Liposome synthesis by injection method

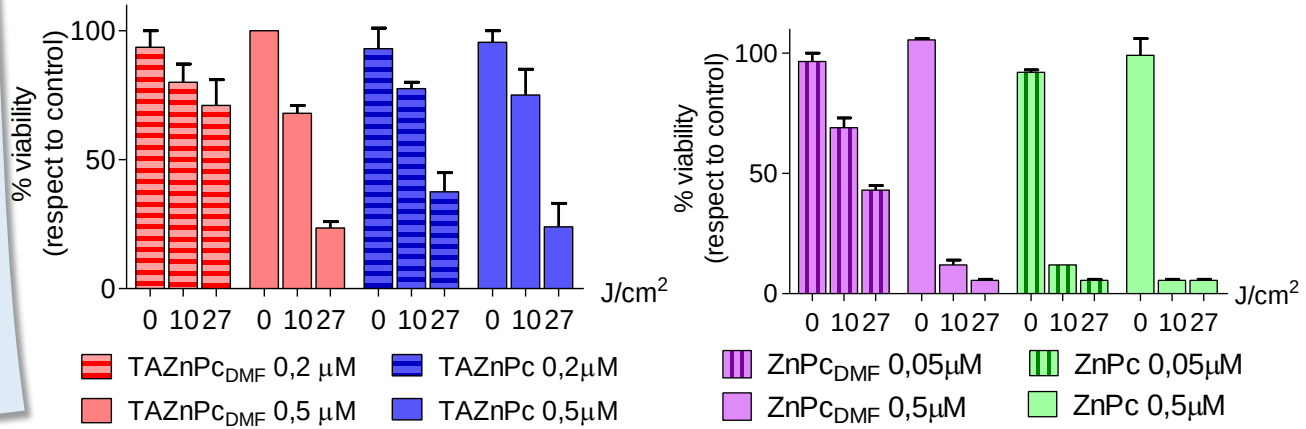


Uv-vis



- Glioblastoma cells: T98G
- Irradiation dose (white light): 10 y 27 J/cm²
- Uptake: 18 h
- Dark toxicity at concentration ≥ 0,5µM

Photocitotoxicity on glioblastoma cells



Conclusions. It is highlighted the characterization and the enhancement in photocytotoxicity of TAZnPc and ZnPc delivered using a liposomal formulation of DPPC and chol compared with DMF solutions on glioblastoma cells.Liposomes formulation allows diminishing the concentration of Pcs to be used in PDT. These results suggest that ZnPcs delivered into liposomes could be applied as an adjuvant in the treatment of glioblastoma.