Contribution ID: **67** Type: **Poster Presentation**

In Vitro antiproliferative effects of berberine in phthalocyanine-mediated photodynamic therapy on MCF-7 Breast Cancer Cells with Overexpressed P-Glycoprotein

Abstract: Multidrug-resistance (MDR) is one of the common challenges seen in cancer therapy. This phenomenon has led to the development of novel therapeutic strategies in which chemotherapeutic drugs are administered in combination with photodynamic therapy (PDT). PDT is a two-staged treatment that employs the administration of a photosensitizing agent which is followed by low laser irradiation. In the presence of molecular oxygen, the irradiated photosensitizer (PS) induces the generation of cytotoxic reactive oxygen species that are aimed at destroying precancerous and cancerous cells. This study aimed to assess tumor cell proliferation rates and evaluate the cell death mechanism 24 h post-treatment with the combination of berberine and zinc phthalocyanine tetrasulfonic acid (ZnPcS4) in MDR MCF-7 breast cancer cells with overexpressed P-glycoprotein (P-gp). MDR MCF-7 breast cancer cells will be treated with optimized concentrations of BBR and ZnPcS 4 and later irradiated by using a 680 nm diode laser at a fluency of 10 J/cm 2 . Morphological changes and adenosine triphosphate proliferation will be performed to determine the cytotoxic effect 24 h post treatment. The determined 50 % inhibitory concentration (IC 50) will be used to evaluate cell death mechanisms induced by individual therapies as well as in combination therapy. All experiments will be run 4 times (n=4), and the raw data will be analyzed by using SPSS statistical software version 27 at a 0.95 confidence interval. This study will provide an insight of the therapeutic benefits of combining chemo-toxic and phototoxic drugs in MDR cancer.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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Session Classification: Poster Session

Track Classification: Track C - Photonics