

SYNTHESIS, PHYSICOCHEMICAL PROPERTIES AND LIPOSOMAL FORMULATIONS OF NOVEL BODIPY DERIVATIVES AS EFFECTIVE ANTIBACTERIAL AND ANTICANCER AGENTS

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Boron dipyrromethene derivatives (BODIPY) constitute a new class of photosensitizers with interesting optical properties, including strong fluorescence. The optical properties make derivatives of BODIPY also promising candidates for practical applications, especially in the photodynamic therapy (PDT) of cancers and non-cancer lesions, as well as bacterial infections [1,2].

Photodynamic therapy (PDT) is a promising treatment successfully applied for localized cancers and other premalignant or non-malignant dermal lesions, and a perspective modality to treat microbial infections (photodynamic antimicrobial chemotherapy, PACT). PDT involves the use of a photosensitizer (PSs) and light of appropriate wavelength to induce oxidative stress leading to the eradication of targeted cells. PACT is a very promising therapeutic option to treat antibiotic-resistant microbes, but currently no photosensitizers are approved for antimicrobial photodynamic treatment. For that reason, the development of novel compounds for PACT represents an urgent need for research [3].

Novel BODIPY derivatives and its brominated and iodinated derivatives were synthesized and characterized using MS, UV-Vis spectrophotometry, and various NMR techniques including 2D methods. Photochemical studies allowed to evaluate absorption and emission

properties as well as singlet oxygen generation ability of obtained compounds. Liposomal formulations were obtained by thin-film lipid hydration method. *In vitro* photodynamic activity studies were performed two bacterial strains gram-positive *Staphylococcus aureus* and gram-negative *Escherichia coli*, and two cell lines, ovarian cancer cell line (A2780) and triple-negative breast cancer (MDA-MB-231). It was found that the brominated and iodinated derivatives possess high singlet oxygen generation yields, which is considered a crucial cytotoxic agent in PDT. Liposomal formulations of BODIPY derivatives possessing bromine and iodine atoms revealed high activity towards both bacterial and cancer cells.

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References

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Figures

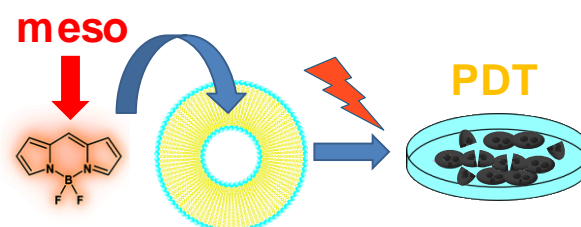


Figure 1. Schematic illustration of the procedures during studies.

