PÔSTER - RESUMO - MATERIAIS E BIOMATERIAIS

PHOTODYNAMIC EVALUATION OF METHYLENE VIOLET 3RAX: INSIGHTS INTO ITS INTERACTION WITH MELANOMA

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Although melanoma is the least common form of skin cancer, it remains the most aggressive and lethal subtype, posing major therapeutic challenges[1]. Photodynamic therapy (PDT) is an attractive alternative to conventional approaches because it is minimally invasive and can provide spatial and temporal selectivity[2]. Here, we investigated the phenazine-derived photosensitizer methylene violet 3RAX (MV) as a PDT agent against the melanoma cell lines A375 and SH-4, combining in vitro assays with Langmuir monolayer studies as membrane models. MV showed negligible dark cytotoxicity, whereas photoactivation elicited a clear dose-dependent reduction in cell viability. Flow cytometry indicated late apoptosis as the predominant cell-death pathway under irradiation. To extend these two-dimensional findings toward a more physiologically relevant context, we will evaluate MV-mediated

PDT in three-dimensional spheroids of both cell lines and compare responses between 2D and 3D systems. Langmuir isotherms revealed MV adsorption onto lipid monolayers and preferential interactions with anionic lipids. Moreover, irradiation promoted loss of monolayer material, consistent with lipid hydroperoxidation and subsequent chain cleavage, leading to membrane destabilization. Overall, these results support MV as a promising PDT photosensitizer, combining low dark toxicity with light-triggered cytotoxicity, apoptosis induction, and mechanistic evidence of membrane damage, warranting further validation in advanced biological models and informing its potential translation to therapeutic applications.

References

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Palavras-chave: photodynamic therapy; langmuir filme; melanoma; methylene violet 3rax.