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Abstract 2958: Evaluating the therapeutic effects of methylene blue against prostate cancer FREE

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Abstract

Prostate cancer (PCa) is the second most commonly occurring cancer among men and the fourth most commonly occurring cancer overall. According to American Cancer Society, in the year 2018, it was estimated that there will be 164,690 new cases and 29,430 deaths from PCa. The treatment options currently available for PCa are found to be ineffective with varied side effects and complications associated with the development of resistance among patients. Therefore, there is an unmet need to find a safe and potent agent to treat PCa. In our study, we focused on studying the anticancer potential of Methylene Blue (MB) which belongs to the class of phenothiazinium salt. MB has been widely used to treat the condition of methemoglobinemia, emerging studies have shown that it has been effectively used as a photosensitizer in the treatment of cancer by means of photodynamic therapy (PDT). Our initial analysis showed that MB effectively reduced the viability of androgen-dependent (LNCaP) and androgen-independent (PC3 and DU145) PCa cells. Further experimental evaluations showed that MB inhibited the colony forming ability of PCa cells *in-vitro* suggesting its tumor suppressive potential. In addition, our studies showed that MB treatment disrupted the migration potential of PCa cells in a wound healing assay indicating the anti-metastatic function of MB. Moreover, confocal and FACS analysis using Annexin V FITC and propidium iodide staining revealed that MB effectively targeted the PCa cell lines by inducing apoptotic cell death. To delineate the underlying anticancer mechanism of MB, apoptosis protein array was performed employing LNCaP cells, and the results of which showed that key apoptotic molecules such as Bax, TRAIL

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R2/D5, and phospho p53 (Serine 15, Serine 46, Serine 392) were robustly upregulated in LNCaP cells following MB treatment. In conclusion, our findings suggest that MB induces apoptosis in PCa

cells and thus could serve as a potential anticancer agent for treating both hormone-dependent and -independent PCa.

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