



SKIN CANCER (OTHER THAN MELANOMA)

ZNPC-LOADED CHITOSAN/MPEG-PLA NANOPARTICLE ENHANCED THE EFFECTIVENESS OF PHOTODYNAMIC THERAPY IN THE TREATMENT OF CUTANEOUS SQUAMOUS CELL CARCINOMA

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Background: Zinc Pthalocyanine (ZnPc) is a second- generation photosensitizer with sufficient photodynamic activity for squamous cell carcinoma (SCC). ZnPc is hydrophobic and insoluble in water, which creates hurdles in systemic administration and hence restricts its use in clinic.

Objectives: To load ZnPc on chitosan / methoxy polyethylene glycol - polylactic acid (CPP) nanoparticles to form Z-CPP to enhance the efficacy of photodynamic therapy (PDT).

Materials and methods: In vitro and in vivo studies were performed to see dark toxicity of the compounds ZnPc, CPP, and Z-CPP. Then PDT was done and its growth inhibitory effect on SCC cells was evaluated. In addition, reactive oxygen species (ROS) formation and apoptosis of cancer cells following PDT were studied.

Results: The results showed that the tested compounds exhibit no dark toxicity and the effect of PDT was significantly better with Z-CPP when compared to free ZnPc ($P < 0.05$). Photoactivation of Z-CPP led to a dose dependent growth inhibition of cancer cells of >50% at 1 μM to >80% at 10 μM concentration. Also Z-CPP treated cells had highest number of apoptotic cells and produced more ROS compared to free ZnPc treated cells ($P < 0.05$).

Conclusion: This study suggests that Z-CPP is a suitable pharmaceutical compound to increase PDT efficacy.

