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INDUCTION OF IMMUNOGENIC CELL DEATH IN TUMOUR CELLS SENSITIZED BY CURCUMIN AND TREATED WITH PHOTODYNAMIC THERAPY MEDIATED BY ALUMINIUM-PHTHALOCYANINE CHLORIDE NANOEMULSION

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Cancer chemotherapy remains a challenge due to the mechanisms of resistance of tumour cells and the toxicity of anticancer drugs. Processes associated with immunogenic cell death may result in the emission of damage-associated molecular patterns (DAMPs), some are exposed on the plasma membrane, such as heat shock proteins and calreticulin. The curcumin executes mechanisms that can generate immunogenic cell death in cancer cells, because it can generate an increase of intracellular calcium that generates a stress in the endoplasmatic reticulum and possibly in the exposition of calreticulin in the plasma membrane. The photodynamic therapy leads to the generation of reactive oxygen species and thus leading to immunogenic cell death. In this context, the justification for this work is that combined anticancer therapy using curcumin and aluminium-phthalocyanine chloride nanoemulsion mediated by transcription factor decoy (TFD) can cause intense stress on cancer cells by promoting immunogenic cell death. The results presented in this study showed that: treatments containing curcumin and phthalocyanine nanoemulsion were the more toxic to CT26.WT cells after TFD than free curcumin; in 24 hours the lipid nanoparticles containing curcumin caused greater increase of granularity in CT26.WT cells; in 3 hours free curcumin produces greater accumulation of intracellular calcium than curcumin associated with lipid nanoparticles; in 3 and 24 hours free curcumin is more internalized than curcumin associated with lipid nanoparticles. Future studies to investigate the generation other DAMPs (calreticulin, HMGB1, ATP, HSP70 and 90) to prove that curcumin and phthalocyanine are capable of generating an immune response and are effective against tumours.

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