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# The Influence of X-ray Radiation on DNA and Platinated DNA Complexes in the Presence of Porphyrin

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This study examines the effects of X-ray radiation on DNA and platinated DNA complexes in the presence of AgTOEPyP4 porphyrin. We investigated varying relative concentrations of porphyrin-DNA complexes (r = 0.01, 0.02, 0.04, where r = Cporf/CDNA) and conducted a comparative analysis with platinated DNA complexes (r = 0.025, where r = cis-Pt/CDNA) at a radiation dose of 2 Gy. This approach builds on our previous resulsts for studying DNA-radiation and DNA/porphyrins complexes radiation interactions and extends the methodological framework outlined in the FLAP Collaboration. Melting curves of DNA and cisplatin-DNA complexes at different relative concentrations of AgTOEPyP4 porphyrin were obtained using an Agilent Cary 3500 Multizone UV-Vis spectrophotometer at a heating rate of 1℃/min. The melting temperature (Tm) and melting interval (ΔT) served as indicators of double-helix stability and the occurrence of strand breaks in DNA molecules following radiation exposure.

Our findings demonstrate that the presence of porphyrin stabilizes DNA molecules, resulting in higher melting temperatures with increasing porphyrin concentration. For DNA/cisplatin complexes, the melting temperature decreases with higher relative concentrations of cisplatin. Upon X-ray irradiation with a 2 Gy dose, however, the DNA/ cis-Pt complex exhibited stabilization, probably connecting with presence of cis-Pt molecule. The presence of porphyrins molecules we obtained a different picture of the changes in melting temperature depending on the concentration of porphyrin.

These results contribute to our understanding of porphyrin-DNA interactions and their response to radiation. The observed effects between AgTOEPyP4, DNA, and cisplatin have potential implications for radiation biology and applications in cancer treatment research. Further investigation of these molecular interactions may provide valuable insights into the mechanisms of radiation effects on DNA-drug complexes and inform the development of novel approaches for cancer therapy.

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