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Investigating the cell death mechanisms in primary prostate cancer cells using low-temperature plasma treatment[1] DEBORAH O'CONNELL, A M HIRST, York Plasma Institute, University of York, J R PACKER, Cancer Research Unit, University of York, M S SIMMS, V M MANN, Dep. of Urology, Castle Hill Hospital & Hull York Medical School, University of Hull, F M FRAME, N J MAITLAND, Cancer Research Unit, University of York
— Atmospheric pressure plasmas have shown considerable promise as a potential cancer therapy. An atmospheric pressure plasma driven with kHz kV excitation, operated with helium and oxygen admixtures is used to investigate the interaction with prostate cancer cells. The cytopathic effect was verified first in two commonly used prostate cancer cell lines (BPH-1 and PC-3 cells) and further extended to examine the effects in paired normal and tumour prostate epithelial cells cultured directly from patient tissues. Through the formation of reactive species in cell culture media, and potentially other plasma components, we observed high levels of DNA damage, together with reduced cell viability and colony-forming ability. We observed differences in response between the prostate cell lines and primary cells, particularly in terms of the mechanism of cell death. The primary cells ultimately undergo necrotic cell death in both the normal and tumour samples, in the complete absence of apoptosis. In addition, we provide the first evidence of an autophagic response in primary cells. This work highlights the importance of studying primary cultures in order to gain a more realistic insight into patient efficacy.

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