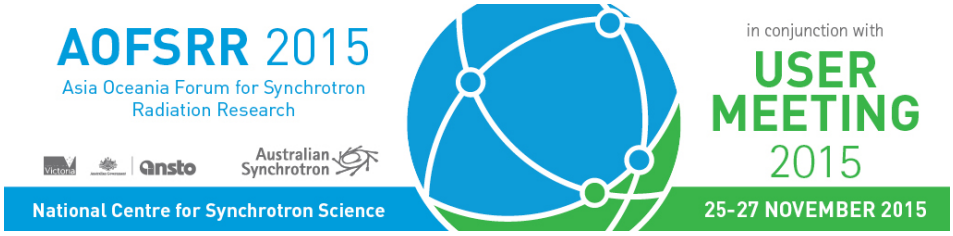

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Synchrotron FTIR microspectroscopy coupled with Principal Component Analysis shows evidence for the cellular bystander effect

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Synchrotron Radiation - Fourier Transform Infrared (SR-FTIR) microscopy coupled with multivariate data analysis was used to monitor the radiation induced cellular bystander effect. Living prostate cancer PC-3 cells were singly irradiated with various numbers of protons, ranging from 50-2000, with an energy of either 1 or 2 MeV using a proton microprobe. SR-FTIR spectra of cells, fixed after exposure to protons and non-irradiated neighboring cells (bystander cells) were recorded. Principal Component Analysis (PCA) was applied to analyse the data set. Spectral differences associated with changes in the nucleic acids and with changes in protein secondary structure were observed in both the directly targeted and the bystander cells. The percentage of affected bystander cells versus the applied number of protons at the two different energies was calculated. It was found that, of all the applied doses, 400 protons at 2 MeV was the most significant in causing macromolecular perturbation in PC-3 bystander cells.

Keywords

Synchrotron FTIR microspctroscopy Radiation induced cellular bystander effect

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