

**Assessment of the radiosensitivity of rectal adenocarcinoma cells using the alkaline comet assay**

X Watson<sup>1</sup>, J Broderick<sup>1</sup>, D Burke<sup>2</sup>, M Routledge<sup>1</sup>

<sup>1</sup>Molecular Epidemiology Unit, University of Leeds, Leeds, United Kingdom; <sup>2</sup>Academic Unit of Surgery, Leeds General Infirmary, Leeds, United Kingdom

Therapy for rectal cancer includes radiation treatment, for which patient response varies. The intrinsic radiosensitivity of tumour cells may be a significant factor in predicting patient response. The alkaline comet assay has been used to study the radiosensitivity of a number of cell lines and tumour cells with a view to using this assay as a predictor of tumour sensitivity to radiotherapy. The assay measures DNA damage as single strand breaks, reported here as the percent DNA in the comet tail.

We irradiated HT29 cells and CaCo2 cells in suspension with 0-10 Gy, using a gamma irradiation source and showed that there was a dose response for DNA damage measured with the alkaline comet assay and that increasing DNA damage correlated with decreasing cell survival, measured using the clonogenic assay. We then irradiated cells from nine human rectal adenocarcinoma samples with 0 Gy, 2 Gy and 5 Gy. The mean percent tail DNA for all nine samples was 3.6 % (+/- 0.6 %, 1 SEM) at 0 Gy, 23.2 % (+/- 1.8 %) at 2 Gy and 47.3 % (+/- 2.2 %) at 5 Gy. The induced DNA damage in the nine samples ranged from 14 to 30 % tail DNA at 2 Gy and from 35 to 58 % tail DNA at 5 Gy.

Our results show that the comet assay is suitable for assessing radiation induced damage in cells from rectal tumours, and that there is variation in response of tumour cells to clinically relevant doses of radiation.