

LACK OF BYSTANDER EFFECTS IN TWO MAMMALIAN CELL LINES AFTER EXPOSURE TO THE AUGER ELECTRON EMITTER I-123- AND I-125

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Introduction: Non-targeted effects caused by signalling of directly irradiated cells to neighboring non-irradiated cells, termed “bystander effect”, is still controversially discussed, especially in radiotherapy. Xue et al. (2002) demonstrated that the subcutaneous injection into nude mice of human adenocarcinoma LS174T cells lethally irradiated by Auger electrons from the decay of DNA-incorporated I-125 inhibits growth of co-injected LS174T cells (inhibitory bystander effect). Kishikawa et al. (2006) from the same group demonstrated in the same experimental set-up that I-123, an Auger electron emitter (AEE) whose emission spectrum is similar to that of I-125, stimulates the proliferation of neighboring unlabeled tumor cells (stimulatory bystander effect) and attributed the effect to soluble factors. To elucidate the nature of the opposed bystander effect for I-123 and I-125, we studied the cell culture medium-mediated bystander effect in respect to micronucleus formation and apoptosis in two mammalian cell lines.

Methods: Medium from AEE-treated human SCL-II and Kidney-T1 cells (I-123-UdR: 16, 48, 80 kBq/ml; I-125-UdR: 8, 24, 40 kBq/ml) was harvested and transferred to the respective non-irradiated bystander cell cultures. Micronucleus formation and apoptosis induction was assessed by fluorescence microscopy (Hoechst-33342 DNA staining) respectively flow cytometry (Annexin V/PI assay) for up to 48 h.

Results: No significant bystander effect in respect to micronucleus formation and apoptosis induction in neither cell-line was observed.

Conclusions: Neither I-123 nor I-125 have been found to induce cell culture medium-mediated bystander effects in the two investigated cell lines. However, in consideration of publications with contrary findings, the specific cell line respectively culture or experimental conditions may be of importance for inducing bystander effects. Other than stated the reported findings by Xue et al. (2002) and Kishikawa et al. (2006) might also be due to cell-cell contact mediated bystander effects.

Funded by Bundesamt für Strahlenschutz; Bundesministerium für Umwelt, Natur und Reaktorsicherheit (BMU); Project No.: 3608S03002

Referenzen:

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