

Title	Emergency preparedness exercise for biological dosimetry - BIOPEX (2008)
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Abstract	<p>As a continuation to the NKS-funded BIODOS project, the BIOPEX project has aimed at testing and validation of the newly established dose calibration curve for PCC rings, a specific chromosome aberration for use in biodosimetry in large casualty emergency preparedness. The testing of the PCC ring technique was performed by direct comparison to the conventional dicentric assay, both conducted with a triage approach that gives a crude dose estimate through analysis of a relatively small number of cells. Altogether 62 blood samples were analysed, each irradiated with an individual dose using <math>\gamma</math>-rays, and representing casualties in a simulated radiation accident resulting in a broad spectrum of whole body and partial body doses, ranging from zero dose up to a lethal whole body dose of 13 Gy. The results indicated that both triage assays were capable of discerning non-exposed cases and that in the uniform irradiations, the dose estimates based on data from both assays were fairly consistent with the given dose. However, differences were observed depending on the dose level. At doses about 5 Gy and below, dicentric scoring resulted in more accurate whole-body dose estimates than PCC rings. At very high doses, PCC rings appeared to give more accurate dose estimates than dicentrics. The discrepancies are mainly caused by shortcomings in the respective dose calibration curves. In non-uniform irradiations, the PCC ring assay was slightly better in the approximation of the partial body dose than dicentrics, but neither assay enabled accurate estimation of either dose or fraction of cells irradiated. The irradiated fraction of cells for the casualties in this scenario was apparently too small (10-40%) to be distinguished with the triage approach applied in the current study. With respect to the technical aspects, scoring of the PCC rings is easier and therefore somewhat faster but may be more sensitive to quality aspects. In conclusion, the study demonstrated that the PCC ring assay is suitable for use as a biodosimeter, especially for estimation of very high doses.</p>
Key words	Biological dosimetry, PCC assay, dicentrics, triage, mass casualty radiological accident