

CYTOGENETICS IN RADIATION PROTECTION - BENEFITS AND LIMITATIONS

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The purpose of this presentation is to examine the various applications of human chromosome analysis in radiation protection work. The objective is to determine which of these applications have been useful and which have been misleading. To make this assessment the radiation cytogenetic studies carried out in our clinical cytogenetics laboratory since 1960 have been reviewed. We have also reviewed the pertinent radiation cytogenetics literature. The most useful applications have been in the recognition and quantitation of individual overexposures as well as the ruling out of suspected but not actual overexposures. Problems have been noted relating to control exposure calibrations, and the interaction of extraneous agents. Another major application has been in the evaluation of populations receiving relatively low radiation exposures briefly, or intermittently over prolonged time periods. These have been productive on occasion but have also been misleading when limitations related to sample size considerations, selection of appropriate controls, and the lack of predictive power have not been recognized. In summary, cytogenetic studies have an important place in radiation protection but their limitations must be recognized adequately. Examples from our laboratory and the literature will be provided.