MBAND ANALYSIS OF LATE CHROMOSOME ABERRATIONS IN HUMAN LYMPHOCYTES INDUCED BY LOW- AND HIGH-LET RADIATION

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Chromosomal translocations and inversions are considered stable, and cells containing these types of aberrations can survive multiple cell divisions. An efficient method to detect inversions is multi-color banding fluorescent *in situ* hybridization (mBAND) which allows identification of both inter- and intrachromosome aberrations simultaneously. Post irradiation, chromosome aberrations may also arise after multiple cell divisions as a result of genomic instability. To investigate the stable or late-arising chromosome aberrations induced after radiation exposure, we exposed human lymphocytes to gamma rays, C and Fe ions *ex vivo*, and cultured the cells for multiple generations. Chromosome aberrations were analyzed in cells collected at first mitosis and at several time intervals during the culture period post irradiation. With gamma irradiation, about half of the damages observed at first mitosis remained after 7 day- and 14 day- culture, suggesting transmissibility of damages to the surviving progeny. In contrast, at the doses that produced similar frequencies of gamma-induced chromosome aberrations as observed at first mitosis, a significantly lower yield of aberrations remained at the same population doublings after high-LET radiation exposures. At the equitoxic doses, more complex type aberrations were observed for high-LET ions, indicating that high-LET radiation-induced initial chromosome damages are more severe and may lead to cell death.