141 X-ray-induced delayed damage in normal human embryo cells

Genetic instability is characterized by the loss of genetic integrity in the genome and may play an important role in carcinogenesis. However, the mechanism of induced genetic instability is not yet clear. There is an accumulated evidence that several delayed damage such as reproductive cell death, giant cell formation, chromosomal aberrations and gene mutation is associated with radiation induced genetic instability. Most of the experiments examining genetic instability have been used with rodent cells or human tumor cells and that often induce genetic instability spontaneously. We studied the delayed effects of X-irradiation in normal human embryo cells to elucidate the mechanism of radiation induced genetic instability. We demonstrate that delayed lethality, giant cell formation and chromosomal aberrations are induced by X-irradiation in normal human embryo cells. The delayed plating for 24 hr after X-irradiation remarkably increased surviving fractions in the assay for not only acute damage, but also delayed damage, indicating that potentially lethal damage is involved in induction of delayed lethal damage. This also indicates that amount of initial damage is crucial for induction of delayed lethal damage. Therefore, it is likely that the repair process plays a crucial role in the induction of genetic instability by X-irradiation.