

M-FISH Analysis of Chromosome Aberrations in Human Fibroblast Cells after *in vitro* Exposure to Low- and High-LET Radiation

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The recently commercialized multiplex fluorescence *in situ* hybridization (m-FISH) technique, which allows human chromosomes to be painted in 24 different colors, was used to analyze chromosome aberrations in diploid human fibroblast cells after *in vitro* radiation exposure. Confluent flasks of a normal primary fibroblast cell line (AG1522) were irradiated at high dose rates with either γ rays or 200 MeV/nucleon Fe ions (LET = 440 keV/ μ m), incubated at 37 °C for 24 hours after exposure, and subsequently subcultured. A chemically induced premature chromosome condensation technique was used to collect chromosome samples 32 hours after subculture. Results showed that the fraction of exchanges which were identified as complex, i.e. involving misrejoining of three or more DSB, were higher in the Fe-irradiated samples compared with the γ -irradiated samples, as has been shown previously using FISH with one or two painted chromosomes. The ratios of complex/simple type exchanges were similar for samples irradiated with 0.7 Gy and 3 Gy of Fe ions, although exchanges involving five or more breaks were found only in 3 Gy irradiated samples. The fraction of incomplete exchanges was also higher in Fe- than γ -irradiated samples. Data on the distribution of individual chromosome involvement in interchromosomal exchanges will be presented.