

Analysis of Persistence of Radiation-induced Chromosomal Aberrations

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Abstract

Among various chromosomal aberrations, translocations are considered to persist over time and through multiple cell divisions. However, the results of our previous study, in which we compared the frequencies of translocations in the splenocytes of the mice irradiated with gamma-rays at various dose-rates, suggest that translocations are not necessarily stable over time and that a substantial fraction of them might be lost during the long time of low dose-rate irradiation. In the present study, we therefore investigate the persistence (or possible non-persistence) of translocations after irradiation with gamma-rays (accumulated dose: 0.5 or 1 Gy) at a low (20 mGy/day), high (726 mGy/min), or intermediate (1.5 mGy/min) dose-rate. This year, we prepared the metaphase chromosome spreads of the splenocytes from the mice at 0, 7, 28, 56, 112, 224 days after completion of irradiation and scored the frequencies of translocations (and also dicentrics) at day 0.

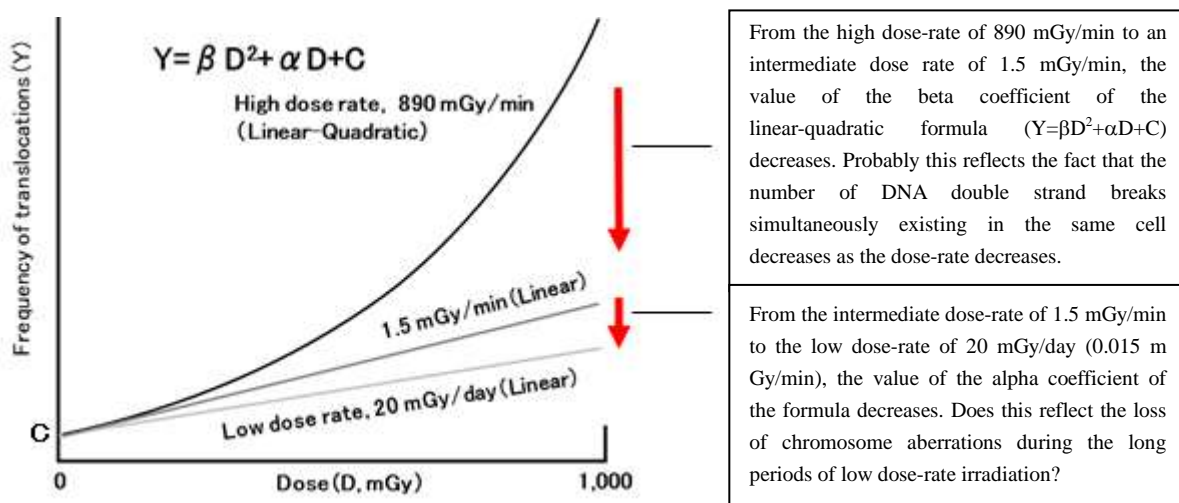


Fig. 1. Transition of the shape of the dose response relationship from “linear-quadratic” to “linear” with the decrease of the dose-rate observed in our previous study

Table 1. Frequency of translocations and dicentrics (per 100 cells) at day 0 after completion of irradiation

Dose rate	500 mGy			1,000 mGy		
	726 mGy/min	1.5 mGy/min	20 mGy/day	726 mGy/min	1.5 mGy/min	20 mGy/day
Frequencies of translocations	4.2	2.2	1.3	11.9	3.9	1.9
Frequencies of Dicentrics	1.9	1.7	0.9	5.3	1.5	0.7