

Correlation between Hematopoietic Stem Cell Changes and Life Span

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Abstract

To clarify whether the decrease in the number of hematopoietic stem cells (HSCs) after continuous low dose-rate (LDR) radiation exposure is a direct effect on HSCs or an indirect effect through changes in the bone marrow microenvironment, we transplanted irradiated HSCs and investigated their self-renewal capacity, differentiation ability and possible effects on mouse life span.

To determine the effects of irradiated HSCs on the lifespan, HSCs from wild type (+/+) mice irradiated with gamma rays at a LDR (20 mGy/day; total dose: 8000 mGy) were transplanted to non-irradiated mast cell-deficient WBB6F1-*W/W^v* mice.

No significant differences in life spans were observed between males transplanted with non-irradiated HSCs and those transplanted with HSCs from mice exposed to LDR radiation. Although lifespans of females transplanted with HSCs from mice exposed to LDR radiation were shorter than those transplanted with non-irradiated HSCs, the difference was not significant.

These results do not seem to be in favor of the “direct effect on HSCs” of continuous LDR irradiation.

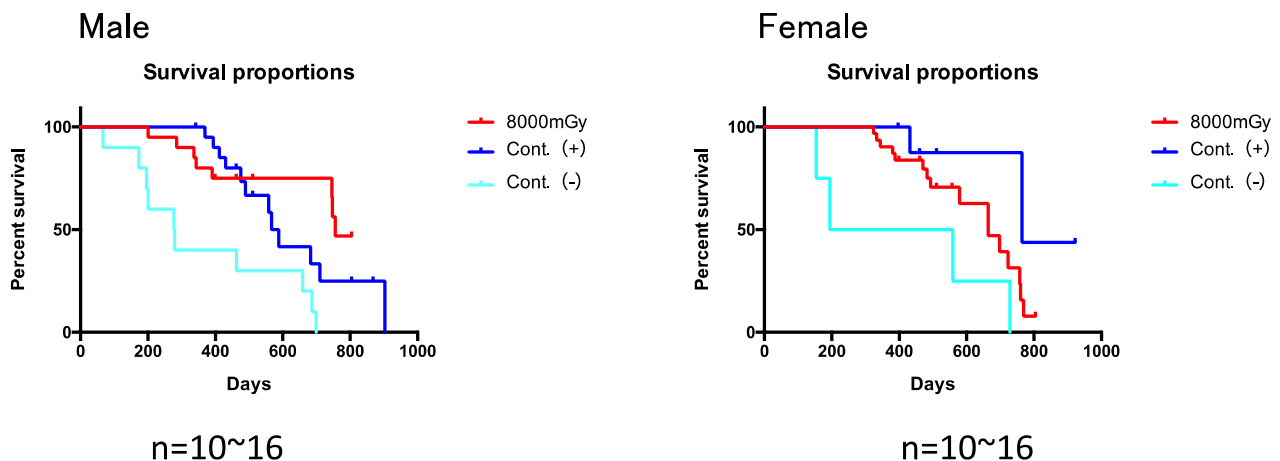


Fig. 1 Survival curves of mast cell-deficient WBB6F1-*W/W^v* mice.

Cont (-): non-transplanted

Cont (+): transplanted with HSCs from non-irradiated mice

8000 mGy: transplanted with HSCs from mice exposed to LDR gamma rays