

# Analysis of the Effects of Low Dose-rate Radiation-induced Polyamine Fluctuation on the Circadian Rhythm

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## Abstract

It has been reported that spermidine, a polyamine compound, controls the biological circadian clock and that reduced levels of spermidine prolong the circadian period. In our previous study, we found that low dose-rate (LDR) irradiation of mice decreases the spermidine levels in the liver. Based on these pieces of information, we have started experiments to examine the effects of LDR radiation on the circadian period. For 50 days, both LDR-irradiated mice and non-irradiated mice were kept under a 12 h light/12 h dark cycle. They showed the accurate 24 h circadian period. Thereafter, the mice were kept in constant darkness. The LDR-irradiated mice showed a shorter circadian period of 23.75h in comparison with 23.83h in the non-irradiated mice in constant darkness. In addition, we noticed a somewhat longer period of activity per day in the irradiated mice. These results suggest a possibility that LDR radiation may affect the circadian rhythm.

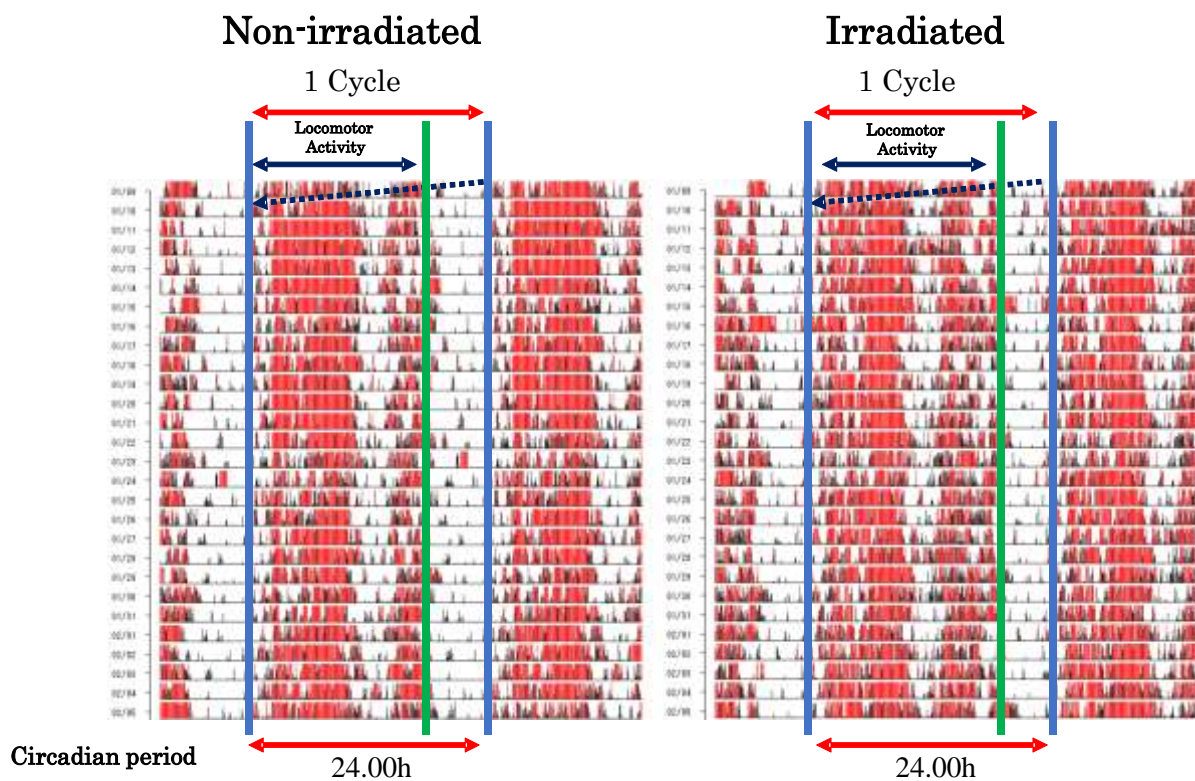


Fig.1. The constant circadian period in LDR-irradiated mice and non-irradiated mice under a 12 h light/12 h dark cycle

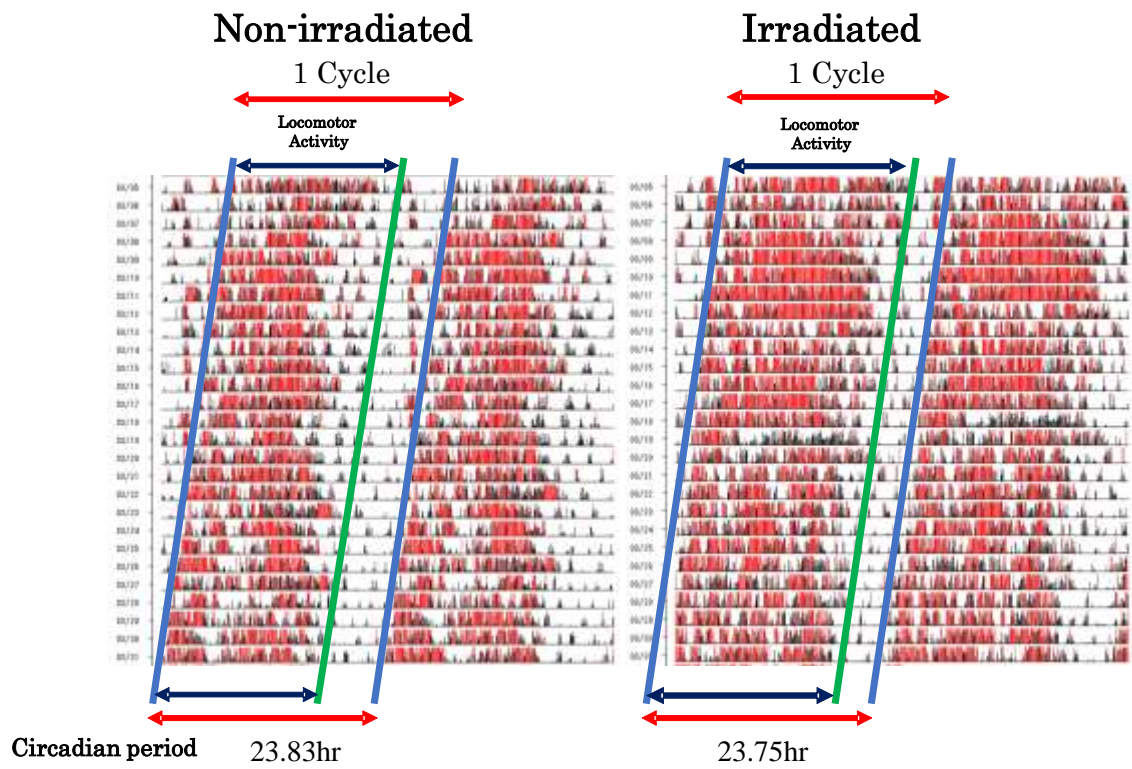


Fig.2. Modulation of the circadian period in LDR-irradiated mice and in non-irradiated mice in constant darkness