Abstract Submitted
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A mathematical model for the effects of radiation to the induced cancer in mice[1] TAKAHIRO WADA, Dept. Pure and Applied Physics, Kansai University, YUICHIRO MANABE, Graduate School of Engineering, Osaka University, MASAKO BANDO, RCNP, Osaka University — We have been studying biological effects of radiation in terms of mathematical models. There are two main objects that we need to study: mutation and cancer. We proposed the Whack-A-Mole (WAM) model which takes account of the repair effects to study radiation induced mutations. We applied it to the mutation of several species including Drosophila and mice, and succeeded to reproduce the dose and dose-rate dependence of the mutation rates. Here, as a next step, we study the effects of low dose-rate radiation to an induced cancer in mice. In the experiment, they divided their mice in four groups and kept them under constant gamma-ray radiations with different dose rate for each group since the birth. On the 35^{th} day, chemical carcinogen was given to each mouse and they observed the occurrence and the growth of cancer for one year. Our mathematical model consists of two stages. The first stage describes a multiple-step carcinogenesis and the second stage describes its growth. We assume that the carcinogenesis starts with the chemical carcinogen and that the rate of the following processes depends on the dose rate as it does in the WAM model. We found some irregularities in the data, however, the overall fit is satisfactory.

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