

広島統計談話会
Hiroshima Statistics Study Group

第 318 回談話会を下記のように開催致しますので
御参集下さいませようご案内申し上げます。

You are cordially invited to the 318th meeting as scheduled below.

日 時 : 2019 年 10 月 4 日 (金) 15:00 –
Date : Oct 4, 2019 (Fri) 15:00 –

場 所 : 放射線影響研究所 講堂
Place : RERF Auditorium

演 者 : 大谷 敬子 博士 (広島大学平和センター客員研究員)
Speaker : Keiko Otani, Ph.D.
Affiliated Researcher
The Center for Peace, Hiroshima University

演 題 : 「コバルト 60 ガンマ線単一外照射によるラット運動量の経時的変化の統計解析 –
非線形混合モデルを用いて–」

Title : ”Statistical analysis of time-dependent effects due to a single point exposure of ⁶⁰Co
Gamma ray on locomotor activities in rats – Application of non-linear mixed effects
model –”

要 約 :

Summary:

The purpose of the present study is to examine in detail changes of locomotor activity in rats over time immediately after a single point of external irradiation with ⁶⁰Co gamma rays using statistical models. Specifically, we aimed to assess the time when reduction of locomotor activity began, the time when locomotor activity recovered to pre-irradiation level, the dose dependency of the degree of reduction in locomotor activity, and the dose dependency of the rate of recovery from the damage. There are individual differences in animal behavior that cannot be ignored, even if the animal type, gender, and weight are unified. In addition, when observed over a long period of time, it is expected that common changes in animal behavior will occur due to the indoor conditions such as temperature, humidity, and noise that may have daily change. Therefore, it is necessary to adjust these variations.

In the present study, effects of irradiation on behavior in rats were able to be investigated efficiently, despite a small number of animals with large individual differences, by applying a non-linear mixed model to repeated measurements.

As a result, it was demonstrated that a rapid reduction in locomotor activity occurred immediately after irradiation, with which the size of the decrease was dose dependent, and the reduced activity recovered gradually in a constant rate, with which the size of recovery rate was independent of dose.

The statistical framework of this study should be applicable to the analysis of many repeated measures data with a similar structure.