

Effect of X-Ray Single Whole-Head Irradiation on Glycolysis and Hormonal Function and Their Modifying Factor

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Single Linac X-ray irradiation of 1000, 3000 and 10000 R was applied to the whole head of the rat (Donryu, averaging 200 g in weight), to study the effect on glycolysis, taking the cumulative curve of expiratory $^{14}\text{CO}_2$ gas as an index (reported in 53 by S. Suzuki.)

Also histological and blood biochemical studies were made and reported at the 15th Meeting of Japanese Radiation Research, 1972.

Two modifying factors applied were: inhalation of 95% O_2 + 5% CO_2 gas mixture at 1 atm and hypothermia (Chlorpromazine 6.7 mg/Kg, 20°C).

The following results were obtained.

1. Glycolysis was depressed dose-dependently, mainly in anerobic phase (macroautoradiographic finding in mouse). Biochemical studies are in progress to confirm these findings.

2. High O_2 -inhalation increased the radiation effect remarkably, but hypothermia exert minimum modifying effect.

3. Macroautoradiographical, blood biochemical and histological findings supported the above findings, which was generally considered as stress reaction after Selye and combined brain damage.

Analysis of the Sector Pattern Depending on Expiratory $^{14}\text{CO}_2$ Produced in Mouse Organs

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In previous papers, a counting system was reported for continuous counting and recording of the radioactive flow stream^{1), 2)}. A mouse was injected with ^{14}C -glucose.

^{14}C -radioactivity in the fluid could increase as the time elapsed. When the radioactive increase in the fluid was recorded, the pattern must be a cumulative curve. The curve was differentiated for observing variations of the expiratory $^{14}\text{CO}_2$ after the injection and $^{14}\text{CO}_2$ yield in a few organs mainly contributing to the respiration of the whole body. The differential sector pattern

consists of a peak and two shoulders, one located at the left side of the peak and the other at the right side.

In order to elucidate a correlation of the sector pattern and $^{14}\text{CO}_2$ yield in the main organs as the time elapsed, 3 experiments were performed.

Macroautoradiographs were made from freeze, dried whole body sections prepared from mice 30, 45, 60 and 160 minutes after the injection of 4 μCi of ^{14}C -glucose, because the left shoulder of the expiratory $^{14}\text{CO}_2$ sector pattern was