

- 150 Radiological Investigation in the ground zero of the 1st surface nuclear explosion of USSR
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- The nuclear explosion inside the city by the terrorist became underlying threatening in the 21th century since September 11th, 2001. Under the circumstances, we investigated the former USSR's first nuclear explosion site on September 25th, 2001. It was the plutonium nuclear bomb of 22 kilotons which was exploded in August, 1949 on the steel tower of the height 38 m. Dose rate was measured in the ground zero and 20 km zone in the downwind side at the explosion time. It was equal to or more than 10 μ Sv/h within 80 m. The maximum was about 30 μ Sv/h in the 65 m from the epicenter. The radiation was decreased at sites more than 90 m. Incidentally, soil sampling was prohibited in the 1 km zone. We estimated dose rate after the explosion under the approximation in which it was proportional to the residual radioactivity semi theoretically. It is 2800 mSv/h at D+1 and 2 mSv/h at Y +1 in the ground zero. In conclusion, the ground nuclear explosion that bolide covers the surface of the earth, is the worst situation from the points of view for circumference resident's being exposed to radiation and residual radioactivity.
- 151 Long-term Memory and Neuropathological Effects of Prenatal X-irradiation in the Rat
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- Cerebral dysfunction is one of the major concerns associated with prenatal irradiation. However, little is known about the neurochemical basis of brain dysfunction induced by prenatal irradiation. We examined learning and memory tasks in rats which had been subjected to 1.5 Gy X-ray exposure when they were embryonic day 15 (E15). The memory tasks was started on the 7 week-old. Compared with the control group, the X-ray exposure group showed significant learning impairments in the water maze task which examined long-term reference memory. Furthermore, histological examinations with HE indicated the obvious change in the structures of the hippocampus and cortex. These results revealed that prenatal exposure to ionizing radiation may induce brain dysfunction, and indicated a possible correlation between behavior impairment and histological changes in the hippocampus.
- 152 Prenatal X-irradiation-induced alterations in the cerebellar cortex in the rat
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- Development of the cerebellar cortex in the rat prenatal exposed to X-irradiation was examined. Females of Wistar rats were exposed to X-ray at a single dose of 2.0 Gy on embryonic day 21. Cerebellar samples from pups were obtained at different postnatal days. Sections from the samples were serially cut off in a sagittal plane at 8 micron, and then incubated with anti-inositol 1, 4, 5-triphosphate receptor antibody, followed by the visualization by the avidin-biotin complex method. The settled Purkinje cells were lined up in the monolayer and their dendritic plexus was always oriented perpendicular to the long axis of the lobule in the control rat. However, such Purkinje cells in the posterior lobes of the irradiated rat formed multi-layers, and orientation of their dendritic plexus was disordered. X-irradiation at the end of pregnancy might prevent mainly the generation of the Purkinje cell that played important roles for neuronal pathways.
- 153 Analysis of Radiation-induced Mutations in Mice Organogenesis
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- We analyzed mutations induced by gamma-rays in major organogenesis using New HITEC mice, which have rpsL gene as a reporter for mutation detection. The pregnant mice were exposed to 2 Gy of gamma-rays on day 9.5 of gestation. On day 18.5 of gestation, fetuses were removed by cesarean operation, and forelimb, hindlimb and the tail were extracted and the mutation frequencies were analyzed. The mutation frequencies in forelimb and hindlimb of the irradiated group increased about 2 times compared with the control group, while those in tail did not change significantly in both group. A major mutation was one or two base deletion in the control group. After irradiation, the mutation in forelimb showed increase of larger deletion, but in hindlimb there was no difference of the spectrum of mutation between irradiated and control group. These results may be related with the event that development of the hindlimb lagged behind that of the forelimb.