

Poster Session

Atomic bomb effects**1 Indirect effects in radiation cataractogenesis**

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Purpose: We analyzed intermediate risk factors in ophthalmologic study of A-bomb survivor. Subjects: The AHS participants who were age 13 or less at the time of the bombs and those who had the previous ophthalmologic examination during 1978–1980. Methods: Slit lamp examination, digital photograph, and classification by the Lens Opacity Classification System. We selected items statistically significant both with radiation dose and cataract from ophthalmologic findings, 23 cataract related questionnaires and 15 clinical laboratory tests. Results: During the period, 873 persons underwent the ophthalmologic examination. Statistical significance in dose response was observed in cortical and posterior subcapsular opacities, but not in nuclear color and nuclear opacity. Inflammation and calcium were found to be significant as intermediate risk factors. Conclusion: Thus, presence of intermediate risk factors in A-bomb survivors strongly suggests a presence of indirect effects in radiation cataractogenesis.

2 Correlation between lifestyle and mortality in Atomic Bomb Survivors

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We examined the correlation between lifestyle and mortality on the basis of health survey interview which 3831 Nagasaki A-bomb survivors underwent in 1997. Items asked at interview were: activities of daily living (ADL), living with family, recollection of atomic bombing, worry about health, relatives' death, visit by friends, socializing with neighbor, club member and mental health. Mental health conditions were assessed by 30-item version of General Health Questionnaire. Among 3700 who completely responded, 408 died from 1 August 1997 to 31 January 2003. It was observed that mortality was significantly correlated with ADL, socializing with neighbor, club member and mental health after adjustment for sex and age, and that mortality in those with poor ADL was 1.94-fold higher than those with better ADL.

3 Geographic Effects on Cancer Mortality in Nagasaki A-Bomb Survivors

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We compared cancer mortality between two groups of Nagasaki A-bomb survivors; one group was bombed in area shielded by Mt. Kompira(366 meter-high) and Mt. Gosha(285 meter-high) located east and east-south at about 2.5 km from the hypocenter, respectively, while the other was bombed in unshielded area in the south at a similar distance from the hypocenter. Cancer mortality during 1970–2001 in 2345 survivors bombed in the unshielded area was 1.51-fold (95%CI: 1.20–1.89) higher than that in 2340 bombed in the shielded area after adjustment for sex, age, distance and shielding. The results suggest that the survivors bombed in the shielded area were less irradiated than those bombed in the unshielded area.

4 Fetal Mice are Resistant to Radiation-Induced Translocations

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We have recently found that A-bomb survivors exposed in utero recorded practically no chromosome damage induced by radiation exposure. To investigate the mechanisms, we irradiated pregnant mice (B6C3F1) at day 15.5 pc with 2 Gy of X rays, and translocation frequencies were examined at 18–21 weeks after birth using FISH painting of chromosomes 1 (yellow) and 3 (red). We scored 800 metaphase cells in each tissue from each animal; T lymphocytes from peripheral blood (PB) and spleen (SP), and bone marrow cells (BM). We found that genomic translocation frequencies in the mothers were about 25% (PB), 20% (SP), and 10% (BM). In contrast, about half of the offspring showed no translocations, and the remaining animals had the frequency of only about 5%, in which several clonal translocations were detected. The results confirmed our previous observations in A-bomb survivors exposed in utero, and we propose that fetal lymphoid precursor cells undergo elimination when damaged by irradiation, probably through apoptosis. We expect that future studies using genetically manipulated mice will clarify the mechanisms.