W-I-3 Feasibility of genetic studies in F1 of atomic-bomb survivors

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We use dose response data of mouse spermatogonia. B-cell lines derived from 1,000 families (children and both parents) will be examined by a two-dimensional DNA gel electrophoresis technique, which surveys nearly 2,000 DNA fragments as spots on autoradiograms. The technique mainly detects deletion mutations by image analysis of spot intensities. Under these conditions, 27 recessive mutations in the control group (664 children) and 55 in the exposed (735 children) will be present among the total fragments of DNA tested. If we assume that deletion mutations comprise 20% of the spontaneous mutations and 50% of the radiation-induced ones, the method will detect 5 deletion mutations in the control group and 19 (6 of which are spontaneous) in the exposed. Since cytogenetic data suggest that human spermatogonial cells are not less sensitive than mouse cells for the induction of translocations, these numbers may be minimum estimates.

A FISH technique with 24 different colors to stain each chromosome became available and the feasibility of a new cytogenetic study plan will be presented. The collection of blood samples from high-dose-exposed parents and children continues even when both parents are not available.

W-I-4 Molecular Pathology of Radiation-Induced Thyroid Cancer

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The thyroid gland is one of the most radiosensitive organs, and a clear excess of thyroid cancer occured after the A-bomb exposure and the Chernobyl Nuclear Power Plant Reactor accident. The incidence of thyroid cancer in children around Chernobyl was still high in 1996. In the last several years many reports about molecular analysis of thyroid cancer around Chernobyl have been published. Using the molecular biological studies, new types of ret/PTC gene rearrangement have been found and might be involved in an etiology of post-Chernobyl thyroid cancer. However, other gene abnormalities are not directly involved so far and the difference of molecular basis of thyroid carcinogenesis between pediatric and adult cases has not been clarified. In contrast to Chernobyl cases, molecular analysis among A-bomb survivors has not been progressed on account of long time-preserved materials.

Now it is necessary to cooperate internationally for prevention from scattering valuable biological materials and for avoiding overlapped studies on them. Observer variation of histological diagnosis still exists among pathologists although WHO classification was introduced. To disolve these problems, the international Tissue Bank project takes concrete shape and a standerlized protocol for pathological diagnosis and tissue sampling is being prepared. Here we will give the view on molecular thyroid pathology for the 21th cetury.

W-I-5 Establishment of Telemedicine System for International Hibakushas' Medical Care

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Atomic Bomb Disease Institute, Nagasaki University School of Medicine has established the database of Hibakusha in Nagasaki, and applied it to the health care and epidemiological study for Hibakusha. For the 21st century, we are now making an effort to establish an international information center to apply our accumulated knowledge and techniques of Hibakushas' Medical Care to the world.

Twelve years have been past since the accident of Chernobyl Nuclear Power Plant, but it is still necessary to cooperate for improvement of the medical system of the former USSR and especially of medical diagnosis and treatment, besides the continuation of the support for Hibakushas'medical care. As a model case, we plan to introduce a new medical system into Gomel region, Belarus where is the most radiocontaminated area around Chernobyl. Establishment of Telemedicine system is at first one of the essential factors for this project. We have already started to set up the transfer system of thyroid ultrasonographic images, using the satellite communication between Nagasaki University School of Medicine and Gomel Specialized Medical Dispensary. Furthermore, we are planning to apply this system to standardize Telepathology, how to transport microscopic images under the common international diagnostic criteria. Here we will give the overviews on our future direction of the International Hibakushas' Medical Care for the 21st century.