

MT

stored in the punched paper tape for retrospective studies. The original image stored in the disc is then processed into an intelligent pattern for visual interpretation by means of smoothing and restoration, and displayed on CRT, line printer or curve plotter (Fig. 8). The above procedures are also programmed in an on-line mode so that all instructions are initiated at the keyboard of the input-output typewriter equipped in the scanning room. The viewer is allowed to choose any image processing technique employed in program and to repeat the display until he finds the best one to be photographed for diagnosis. These highspeed versatile functions offer the physicians many additional diagnostic information which cannot be obtained by the conventional methods. Details will be soon published.

Chromosome Abnormalities of Japanese Fishermen Exposed to Fallout Radiation in 1954

Toshiyuki Kumatori, Takaaki Ishihara, Sei-ichi Kohno and Machiko Inaba

Twentythree Japanese fishermen were exposed to fallout radiation in the Pacific Ocean on March 1, 1954. The fishermen were irradiated externally from the radioactive materials deposited on the boat, internally from those materials which entered various organs and by those that adhered to the body surface. Although the estimation of exposed dose was very difficult, the external gamma radiation dose of each person was inferred as 170-690 R for 14 days, nearly 60% of which was received on the first day. The external irradiation seems to have taken an important role in their radiation syndrome.

Follow-up studies on the fishermen have been performed on an annual basis by the authors. Number of persons examined in each year were 15-18, which corresponded to about 70-80% of exposed fishermen.

The cytogenetical studies have been continued since 1964. The chromosome analyses were done by the culture method of peripheral blood. At first we did 72 hrs. culture, but since the 1966 examinations, 2 days culture has been adopted. The results of chromosome analyses are summarized as follows; 1. The frequency of aneuploid cells was 2-3%, which was not so high compared with that of a

normal person.

2. The frequency of stable and unstable chromosome abnormalities was remarkable high. Compared with that of a normal person, the frequency of stable cells was 10-20 times higher, and fairly constant in each annual examination.

According to these results it was suggested that an intimate correlation might exist between chromosome aberration rate and the externally irradiated dose of each person. This correlation was examined on the findings of 1969 survey. The aberration rate used was that of the stable cells. 300 cells on an average were observed in each case for the calculation of the rate. As shown in Fig. 9 the close correlation between stable cells percentage and external doses were proved ($P < 0.01$). In addition a similar close relationship existed between these aberration rates and minimum values of neutrophils, which were observed at the critical stage (4-7 weeks after exposure) and almost corresponded to the severity of acute radiation syndrome of each fishermen. Fig. 10 shows this relationship ($P < 0.01$).

Although the significance of chromosome abnormalities should be elucidated by further follow-up studies, it is noted that the examination of chromosome abnormalities is valuable for the risk estimation of radiation exposed persons.

(Unpublished)

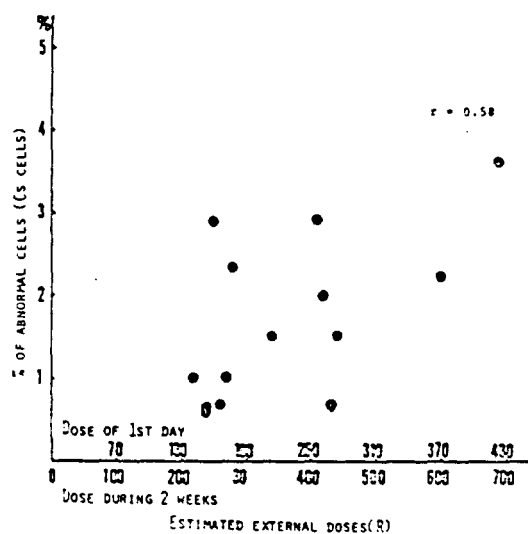


Fig. 9. Correlation between chromosome aberrations (Cs cells) and estimated external doses.