National Cancer Institute

405122

(201)

SUMMARY OF PRELIMINARY CONFERENCES

Large Scale Research on Effects of Penetrating Ionizing Radiation Using Monkeys and Other Sub-human Primates

It has been proposed that the National Institutes of Health of the Public Health Service initiate an extramural research program on the effects of total and partial body irradiation using penetrating ionizing radiation on monkeys and other sub-human primates. In November, 1950, conferences were held between representatives of the National Institutes of Health and of the Division of Biology and Medicine of the Atomic Energy Commission.

After considerable discussion the following was agreed upon as representing the views of the majority of the conferees:

1. Much more information is needed on the biological and medical effects of penetrating ionizing radiation for military and civil defense purposes and for improvement of radiation therapy for cancer and other diseases. Ultimately this must be obtained for observation of humans who have been exposed to various types and amounts of radiation. Since the accumulation of this information from accidental or therapeutic human exposure is too slow for immediate needs and the feasibility of experimental exposure of humans is certainly open to question, it would be well to extend the studies of radiation effects to include sub-human primates among those species currently being investigated. Although they are probably not the animals of choice for all types of study they may well be for those in which their physiology more closely resembles that of man.

2. Preliminary review suggests that the problems for which sub-human primates might well be subjects of choice may be listed in the following order of importance and feasibility:

   a) Effects of radiation on gastro-intestinal physiology, with emphasis on nausea, vomiting, diarrhea, and in general on the motility of the tract.

   b) Effects of radiation on neurophysiological and psycho-physiological activity, including problems of fatigue, neuromuscular and psychomotor control, coordination and other related functions.

   c) Effects of radiation on other organs and organ systems (blood and blood-forming organs, eye endocrines, gonads, etc.) and determination of toxicity levels.

   d) Methods of prevention, relief, or modification of radiation effects, particularly with reference to a) and b).

e) Methods for detecting the degree of radiation sensitivity of individuals.

f) Biological additivity of radiations of differing specific ionization.

g) Physical fitness after exposure to radiation.

Practical and immediate information on radiation dosage factors and other mechanisms significant in the induction of radiation sickness may lead to better means of its prevention or relief in exposed persons, either well or sick. This information is needed to modify effects that may alter the capacity of an individual to function in military or civil defense responsibilities or in ordinary life.

3. Interpretation of experimental observations in monkeys and apes must be carefully controlled. It must be recognized that the data obtained may offer less basis for extrapolation to man than similar data obtained from other orders and classes of animals. Accidental and therapeutic exposure of man to irradiation has allowed the collection of fragmentary data, particulary regarding sensitivity to whole body radiation and hemopoietic changes. It would seem from these data that the human response is like that of the dog and guinea pig. Even though it may not be possible to extrapolate directly to man the information obtained from studies on monkeys and apes, it is believed that significant leads can be obtained that would not be secured from other usual laboratory animals.

4. Monkeys and apes are considered by some persons to be unsatisfactory animals for radiation studies because:

a) They are difficult to handle, house and nurse.

b) They are especially subject to tuberculosis and other intercurrent infections that may cause either loss of valuable experimental material at crucial times or an excessive cost for sufficient numbers to insure survival of statistically required numbers of animals.

c) Genetic and life span studies are not as feasible as for other animals for the above reason and because of the longer potential life span and maturation period in monkeys.

d) They are not genetically inbred to give a degree of biological uniformity and therefore require much larger numbers in experimental studies.

e) The cost of purchase and maintenance and the space requirements are so much greater than with other small animals, such as mice, rats, and guinea pigs that they should be used only for very special problems.

5. It was considered doubtful that it would be possible to muster personnel, facilities and animals sufficient to get the type of complete information desired without disrupting other important activities.

6. It was recommended that a planning committee of experts in fields related to the problem be appointed to advise on the desirability and practicability of initiating a program along the lines proposed, and to indicate the scope and scale of the study if it is determined that the project should be undertaken.

RGM/vbc
1/12/51