Comments on and Summary of Panel on Assessment of *in Vitro* and *in Vivo* Mutagenicity Data With Regard to Safety Evaluation

by S. Abramamson*

It seems obvious that the 45 years of experience in assessing the genetic hazards from ionizing radiation can serve as a model approach for assessing the vast world of environmental mutagens. I am extremely impressed with the three-tier approach suggested by Bridges and also strongly feel that it would be most useful to establish a roentgen equivalent mutagen dose estimate as described by both Crow and Bridges. This at least will permit assessing the mutagen in terms of genetic risk to man. I should like to point out the fact that in the past year both the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the Biological Effects of Ionizing Radiation (BEIR) committee of the National Academy of Sciences have completed in depth and up-dated reports on genetic risk estimates for man.

The problems and difficulties associated with extrapolating the experimental data to man and the necessary caveats involved in so doing are documented in reports in the preparation of which Drs. Crow, Wolff, and E. B. Lewis have participated. I believe that we would all agree that for all the uncertainties, these estimates do provide us with the most reasonable evaluations of hazard that can be made from existing data.

Dr. Freese discussed the need for the utilization of the concept of linearity in assessing mutagenicity data; Dr. Nicols discussed chromosome aberrations in man, Dr. Lewis treated methods for assessing somatic hazards, and Dr. Ramel touched on the need for adequate training of qualified personnel in carrying out mutagen testing and the problems associated in this area.

We opened up the discussion to all the participants after each speaker had completed his presentation to permit considerable exchange of views.

This was a truly stimulating discussion. Many different viewpoints were expressed, and I believe everyone had an opportunity to make his views known.

Finally I should like to quote from the genetics section of the BEIR committee report on recommendations for estimating genetic risks, which I think are particularly relevant based on the present discussions:

1. "Use relevant data from all sources, but emphasize human data when feasible. In general, when data of comparable accuracy exist, place greater emphasis on organisms closest to man."

2. "Use data from the lowest doses and dose rates for which reliable data exist, as being more relevant to the usual conditions of human exposure."

3. "Use simple linear extrapolation between the lowest reliable dose data and the spontaneous or zero dose rate. In order to get any kind of precision from experiments of manageable size, it is necessary to use dosages much higher than are expected for the human population. Some mathematical assumption is necessary and the linear model, if not always correct, is likely to err on the safe side."

4. "If cell stages differ in sensitivity, weight the data in accordance with the duration of the stage."

5. "If the sexes differ in sensitivity, use the unweighted average of data for the two sexes."

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