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A United States geneticist reported to an international audience today that results of his research with mice indicate that the risk of much of the genetic damage to man from small doses and low dose rates of X and gamma radiation may be considerably less than was estimated when radiation standards were set several years ago. The standards were set on the basis of results only at high dose rates and large doses.

Dr. William L. Russell, of Oak Ridge National Laboratory, stated that his work showing reduced mutation frequency with reduced radiation dose rate is strong evidence for the existence of a repair system which operates at low dose rates on mutational or pre-mutational damage, but which is saturated or damaged at high dose rates. He made his report to the Fourth United Nations International Conference on the Peaceful Uses of Atomic Energy at Geneva, Switzerland.

Dr. Russell, who has conducted his research with literally millions of mice during his 23 years as principal geneticist at Oak Ridge National Laboratory, measured radiation damage by the specific-locus method. Comparing the lower genetic damage per unit dose at low dose rates with that of high dose rates, he stated: "In the male, the reduction is to 30 percent. In the female, the risk is reduced to near zero."

Dr. Russell's report concentrated on one important aspect of the problem of estimating genetic hazards: radiation-induced

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mutation rates at specific gene loci in the mouse and the physical and biological factors that affect them. Findings which he enumerated as having a direct and important bearing on the estimation of genetic hazards are the effects of low dose rates and small doses, the effect of the interval between irradiation and fertilization and other effects such as sex and cell stage.

He reported that in the male mouse, progressive reduction in mutation frequency obtained by lowering the radiation dose rate works only down to a certain dose rate, and not beyond it. In the female mouse, however, mutation frequency continues to drop, and, at the lowest dose rate tested, it is not significantly above the control value.

For spermatogenesis in male mice, no effect of the interval between irradiation and fertilization has ever been observed. In the female reproductive cells, on the other hand, the interval between irradiation and conception has turned out to be one of the most dramatic factors affecting mutation rates, he stated. Conceptions occurring during the first seven weeks following irradiation produced a high frequency of mutations, but those after seven weeks produced a near zero frequency. This held true both for neutron and for X-irradiation.

Concerning age of mice at the time of irradiation, Dr. Russell explained that none of a variety of ages tested showed any marked increases in mutational hazard compared with that originally determined for young adult animals. However, some of the age groups, namely, newborns and certain fetal stages, exhibited significantly lower mutational response to radiation.