

GENETICS

Radiation and Genes

Females have been found less tough in tolerating a big, sudden dose of radiation while males are more sensitive to chronic radiation.

► FOR A BIG sudden dose of radiation the female is less tough than the male. For chronic irradiation, the male is more sensitive than the female.

For mice, and therefore presumably for men (and women), that is the way it is for the genetic effects of radiation, the causing of mutations, changes in the germ plasm that carries on life from generation to generation.

The difference in mutational response of male and female germ cells was reported to the American Philosophical Society annual meeting in Philadelphia by Dr. W. L. Russell of the Atomic Energy Commission's Oak Ridge National Laboratory, Tenn.

Of special interest currently because of the resumption of atomic bomb explosions, first by the Soviet and then by the United States, the AEC experimental work with mice by Dr. Russell radically alters the fundamental concepts used in the estimation of genetic hazards of radiation.

"Of first importance in the mouse experiments was the finding that, for the reproductive cell stages most involved in hazards, a given dose of radiation spread over hours, days or weeks produces fewer mutations than does the same dose delivered in a few minutes," Dr. Russell said. "This upset a long-held tenet of radiation genetics. It indicates that, at low radiation dose rates, some natural repair can take place, presumably

before the initial radiation damage in the cell is converted into a completed mutation.

"With some repair of this kind possible, it was reasonable to expect that the genetic effects of radiation might vary greatly, not only with dose rate, but with other conditions. Some recently explored conditions have, indeed, already exhibited marked effects on mutation rate, and the importance of still other factors is being uncovered in current experiments. Among these is the difference in mutational response of male and female germ cells.

"This is turning out to be far from a simple difference. With acute irradiation, female mice are more sensitive than males, but with chronic irradiation the results appear to be the other way around. The range over which a reduction in dose rate is effective in lowering mutation rate also seems to be different in the two sexes. Furthermore, the qualitative nature of the mutations induced in females differs from that in males," Dr. Russell said. "The newly discovered complexity of factors must be taken into account in estimating the genetic hazards of radiation."

Hope of protecting people against radiation or treating them after exposure seems less promising than in the past. Some experimental animals have responded to chemical substances or physical agents such as cold or lowered oxygen tension, but none as yet

have proved to be of practical value for man, Dr. Shields Warren of Harvard Medical School said. Modifications in the response of cancer to therapeutic radiation in man, however, can be brought about by cold or altered oxygen tension.

Dr. Howard J. Curtis of Brookhaven National Laboratory, Upton, N. Y., explained why therapy for overexposure to radiation has such poor prospects of success.

"Modern technology has created many different kinds of radiation having widely different physical properties," Dr. Curtis pointed out, adding that work with these radiations has tended to emphasize the similarities with respect to their biological effects rather than their differences.

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GENERAL SCIENCE

Nuclear Testing Called Politically Motivated

► NOBEL PRIZE WINNER in Chemistry, Dr. Linus C. Pauling, strongly criticized the President's decision to resume nuclear testing by stating that the tests are politically motivated and not due to military necessity.

"The decision to test has moved us away rather than toward the goal of disarmament," Dr. Pauling added. The California Institute of Technology scientist was in Washington for a White House dinner honoring all living Nobel Prize winners in the Western Hemisphere.

This view was shared by other Nobelists who came to the dinner but did not want to be quoted.

On a more positive note, Dr. Pauling praised the President for the "affair to honor man's scientific and intellectual achievements."

Dr. Pauling's unanimity with the President, however, did not go beyond evaluation of the dinner. Prior to the dinner, Dr. Pauling, together with Mrs. Pauling, had joined the picket lines of the Women's Strike for Peace and the American Friends Service Committee to march near the White House in protest against the resumption of United States atom tests in the atmosphere. It is the first time in history that a guest of honor at the White House picketed the Executive Mansion.

The dinner, believed to be the largest in White House history, marked the first time Nobelists have been so honored by an American President. In addition to the 49 Nobelists (45 of them scientists), it was attended by 124 other scientists, educators and literary figures, as well as the Vice President and Mrs. Lyndon B. Johnson, the Attorney General and Mrs. Robert Kennedy and Col. and Mrs. John H. Glenn Jr.

The Nobelists included such outstanding scientists as Dr. John F. Enders of Children's Hospital, Boston, Dr. Willard F. Libby, University of California chemist, Dr. Hermann J. Muller, Indiana University geneticist, and Dr. Glenn T. Seaborg, head of the Atomic Energy Commission.

President Kennedy noted that over 40% of the Nobel prizes in the last 30 years have gone to men and women in this Hemisphere.

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NOBELISTS VISIT PRESIDENT—The Chief Executive talks to the distinguished guests before dinner. Front row shows Dr. Georg von Bekesy, 1961 winner for medicine and physiology, Harvard University; Mrs. Richard J. Walsb (Pearl Buck), 1938 winner for literature, Perkasie, Pa.; Dr. Rudolf L. Mossbauer, 1961 winner for physics, California Institute of Technology; Mrs. Ernest Hemingway, widow of the 1954 winner in literature; The President; Mrs. George C. Marshall, widow of the 1953 winner for Peace; Dr. Melvin Calvin, 1961 winner for chemistry, University of California; Mrs. Kennedy, and Dr. Robert Hofstadter, 1961 winner for physics, Stanford University.