

BIOLOGY

Radiation Harms Embryo

Irradiation of mice embryos during first 24 hours after conception produced high number of abnormal females. Very early development of mice embryos is much like that of humans.

WOMEN who might be pregnant should avoid any unnecessary exposure to radiation, especially during the first 24 hours after possible conception.

Present information indicates there is no lower limit to the amount of radiation beyond background level that could cause inherited damage.

Mice exposed to radiation die earlier and from different causes than those experiencing only the natural background radiation.

These three conclusions concerning the effects of radiation were among those drawn from studies reported to the National Academy of Sciences meeting in Washington, D.C., by scientists from the biology division of the Atomic Energy Commission's Oak Ridge National Laboratory in Tennessee.

Dr. Liane Brauch Russell, explaining results of studies of radiation on mice to a news conference, said if women who might become pregnant need X-ray or other radiation treatment, they should get the treatment during the very early part of the menstrual cycle, when conception is less likely to be in progress. During the 24 hours following conception, the fertilized

egg cell is particularly sensitive to changes resulting from many factors, and radiation is one of these factors, Dr. Russell's studies with Dr. Clyde L. Saylor have shown.

The amount of change caused by natural background radiation, including fallout, she said, would be much too low to cause the abnormalities in embryos they have observed when the mice were subjected within 24 hours after conception to 100 roentgens, which is a high radiation dose. Other factors could also affect the chromosomes within the first 24 hours, Dr. Russell reported.

The development of human embryos closely follows that of mice day by day for about the first week.

Drs. Russell and Saylor studied the occurrence of the so-called XO sex chromosome in mice. Normally, in mammals, the female possesses two X-chromosomes, and the male possesses one X and one Y chromosome. However, some mice possess only one X chromosome, without a partner, and they are females. These are called the XO constitution.

Human females lacking one sex chromosome, that is, with an XO constitution, are

badly stunted in their sexual development and may suffer from a number of other abnormalities. Drs. Russell and Saylor showed that irradiation during the first 24 hours after conception produced a very high proportion of XO females in mice. Within the 24-hour period between fertilization and the first cleavage division of the individual, the highest frequency of XO individuals occurred relatively early.

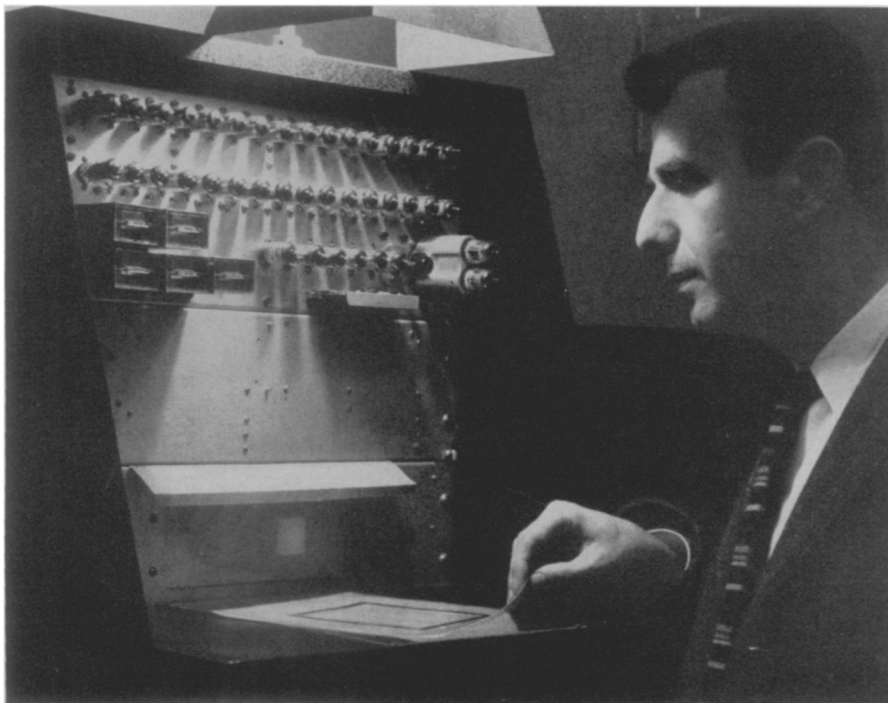
Dr. Russell also reported that the irradiation produced, for the first time, the loss of a maternal X-chromosome. All previous recorded cases have been for paternal sex chromosomes.

Her husband, Dr. W. L. Russell, reported that mice receiving a radiation dose as low as 10 roentgens per week still had higher mutation rates than controls receiving only background radiation. This is the lowest dose yet tried in experimental work on animals, Dr. Russell said. All other low dosage studies have been on the mature cells, but Dr. Russell and Dr. Elizabeth M. Kelly worked for the first time on early cell stages.

Their preliminary results of studies on some 40,000 mice indicate there is no so-called threshold dose of radiation below which no damage will be caused. The new information supports earlier findings that a given dose of chronic radiation is less genetically damaging than the same dose of radiation given at a much higher rate.

Drs. A. C. Upton and A. W. Kimball, also of Oak Ridge, have found that radiation doses given over a long period of time have much less effect in shortening the life span of mice than the same dose given at one time.

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SHAPE RECOGNIZER—Leon D. Harmon, scientist of Bell Telephone Laboratories, New York, demonstrates his invention for recognizing different shapes. The light above shines on the drawing of a square which is "recognized" by a scanner below the clear plastic table. The tiny lighted square in the back panel of the machine indicates that the shape has been identified as a square.

ANATOMY

Cockroaches Control Mating With Brains

COCKROACHES control their mating and reproduction cycles with their brains.

This "intellectuality" has been observed by Dr. Franz Engelmann, German anatomist now conducting research at Albert Einstein College of Medicine in the Bronx. Dr. Engelmann has studied the control of egg maturation in *Leucophaea maderae*, a cockroach of African origin now indigenous to many of New York's slum areas.

Two bodies called corpora allata behind the roach's brain serve to stimulate its sex glands just as the anterior part of the pituitary does for humans, he told the New York Academy of Sciences. As in humans, Dr. Engelmann said, a hormone does the job, but he does not yet know its nature.

If you deprive the female cockroach of food, he said, her brain sends a message to the corpora allata that makes them halt the maturation of eggs. With this damping down of the hormone production, the female also becomes less responsive to the male and mating.

Dr. Engelmann said his research on cockroach reproduction is part of a program at Einstein College of Medicine that is designed to compare the sexual-reproductive mechanisms of various insects, mammals and other animals.

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