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Titelseiten

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Somatic Effects of low-intensity Radiation at different Levels of biological Organization

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Summary

In any study of the effects of low-intensity radiation, one is handicapped by the difficulty of designing quantitative methods of analysis and by a frequent inability to recognize one damaged cell in the presence of many undamaged individual cells. For this reason, a number of specific studies will be mentioned in which it was possible to follow the individual cell, or the offspring of individual cells, after exposure to low-level radiation.

The first problem to be discussed will be the effect of radiation on the rate of mitosis in the grasshopper neuroblast; an effect of as little as 1 r can be recognized. The rate of mitosis, i.e., the speed with which chromosomes move, is a well-defined, basic function that responds to very-low-level radiation and that can be observed under properly controlled conditions. It has now been found *(M. E. Gaulden)* that the effect can be reduced by specific treatment immediately after exposure.

The second problem to be discussed is the effect of radiation on the sperm of the mouse. The early B stage is extremely sensitive to radiation; doses of 20 r or less produce recognizable effects. It is the damage to these cells that is responsible for the temporary sterility of males after irradiation. The A stage is extremely resistant; males irradiated in this stage with slightly more than 1000 r to the gonads suffer no *permanent* sterility *(E. F. Oakberg)*. This is in contrast to the egg, certain stages of which are extremely sensitive to radiation. Again, a dose as low as 25 r can produce recognizable damage; the quantitative results show a linear relation with increasing energy *(L. W. Russell)*.

Response to radiation is distinctly different in the sperm and the egg. The sperm apparently does not readily recover from the radiation