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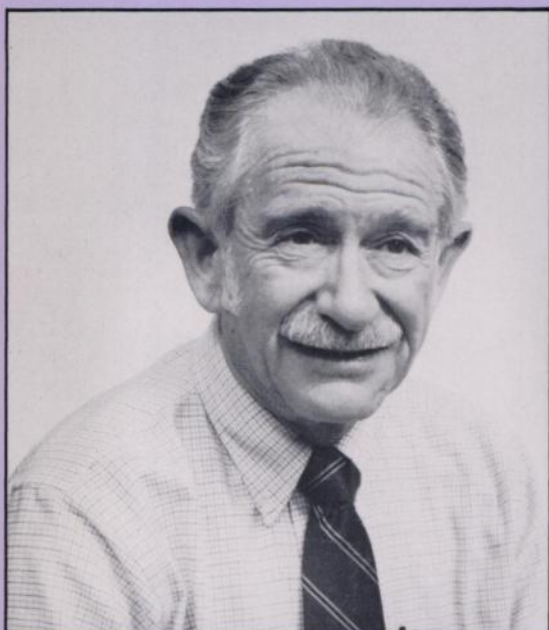
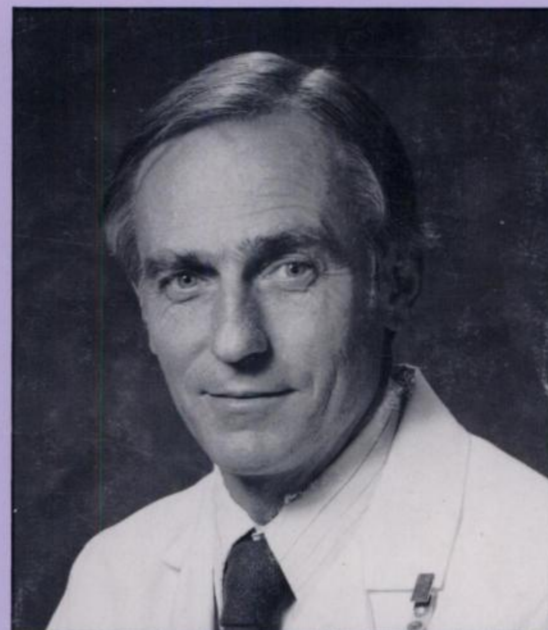
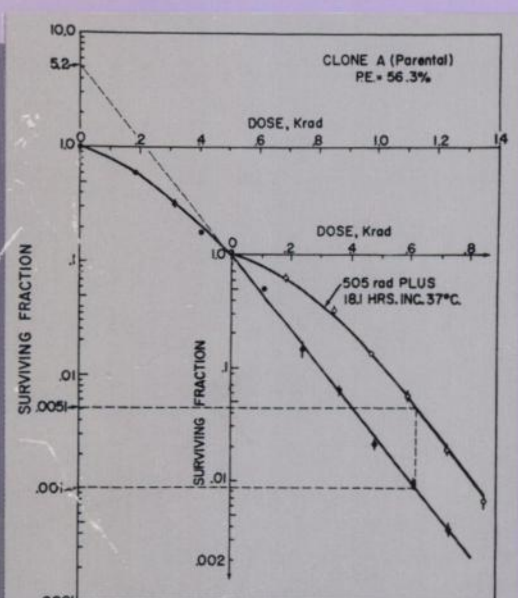
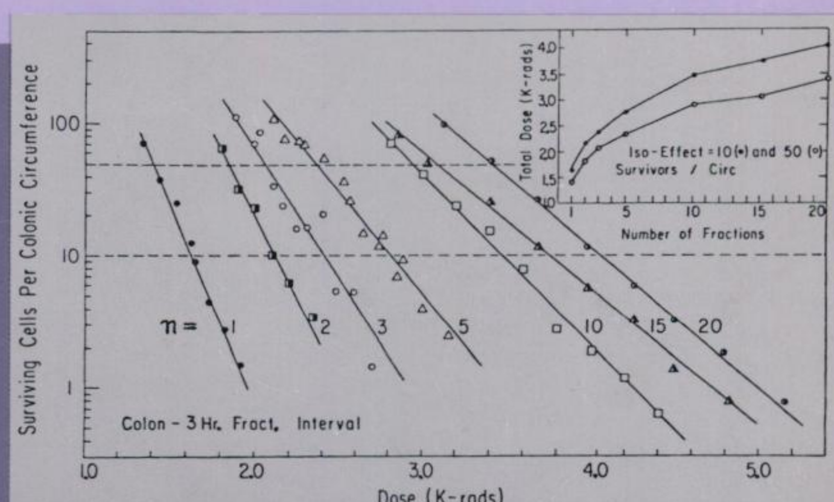








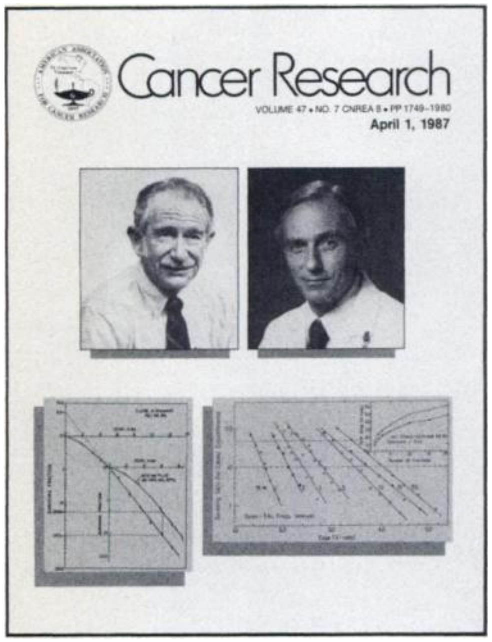
CONFERENCE ON PHOTOCARCINOGENESIS

The Special Center of Research on Genetic Toxicology and the Environmental Health Science Center of The Johns Hopkins University, School of Hygiene and Public Health, will sponsor a conference on Photocarcinogenesis which will be held at the Johns Hopkins Applied Physics Lab on June 17–19, 1987.

Topics include: human skin cancer, experimental photocarcinogenesis, nucleic acid and protein photochemistry, detection of DNA damage, mutagenesis and repair. **Speakers are:** Douglas Brash, Edward Emmett, David Elder, Bernard Erlanger, Evan Farmer, Barry Glickman, Joseph Gray, Philip Hanawalt, Curtis Harris, Kenneth Kraemer, Stephen Lesko, Jan van der Leun, Ronald Ley, Bob Midden, Meyrick Peak, Gwendolyn Sancar, Martin Shetlar, Paul Strickland, Betsy Sutherland, Paul Ts'o.

Poster presentations are invited. Registration fee of $200 includes attendance at all conference sessions, coffee breaks, two luncheons and evening banquet. For applications or more information contact Dr. Stephen Lesko, Program Coordinator at: Division of Biophysics, School of Hygiene and Public Health, 615 N. Wolfe St., Baltimore, MD 21205. Telephone: (301) 955-3170.

COVER LEGEND



By the late 1950s, it became possible to seek quantitative answers to specific questions in the radiobiology of mammalian cells. Among these was the important issue of whether such cells could repair sublethal damage after exposure to X-rays. The photoreactivation of bacteria exposed to ultraviolet light had been identified (A. Kelner, Proc. Natl. Acad. Sci. USA, *35:* 73–79, 1949), but repair processes in mammalian cells were unknown.

Single Chinese hamster cells exposed to X-rays have a threshold-type survival curve based on colony formation, indicating that the accumulation of sublethal damage leads to lethality. Mortimer M. Elkind and Harriet Sutton, then at the National Cancer Institute, asked whether such sublethal damage could be repaired. Working initially with Chinese hamster cells in culture and using a dose fractionation technique, they found that repair starts immediately after irradiation and is completed probably before the first division following exposure.

Although Elkind and others were quick to identify the implications of these findings for the radiotherapy of cancer, an appreciation in full measure of the discovery of Elkind and Sutton relative to tissue responses came from the extensive studies of Dr. H. Rodney Withers and his collaborators. Withers developed survival end points *in vivo* for stem cells of skin, gastrointestinal mucosa, and spermatogenic epithelia. Using these, he and his coworkers showed that repeated cycles of repair of sublethal injury contributed to the increased doses known to be necessary for a given tissue response when radiotherapy was given in increasing numbers of dose fractions.

Pictured are Elkind (*left*) and Withers (*right*). The figure on the left [M. M. Elkind and H. Sutton, Nature (Lond.), *184:* 1293, 1959] shows the single and fractionated response of clone A Chinese hamster cells. The shoulder of the single-dose survival curve indicates that damage is accumulated for killing, while the reappearance of the shoulder on the fractionated survival curve shows that those cells which survived the first dose fraction have repaired sublethal damage in the interfraction interval. The figure on the *right* [H. R. Withers and K. A. Mason, Cancer (Phila.), *34:* 896–903, 1974] shows dose survival curves for colonic mucosa stem cells of mice irradiated with single or multifractionated doses of γ-rays. The *inset* traces the increases in the total dose, for two different levels of effect, as a function of the number of fractions into which the total dose is divided.

Thus, for a given level of effect, fractionation requires an increasing total dose because of the successive repair of sublethal damage. Isoeffect curves of similar shape are also observed for tumor sterilization.

We are indebted to Dr. Elkind for the information and illustrations.

M. B. S.