

*Molecular Radiobiology*

Edited by N. B. Strazhevskaya; translated from Russian by A. Mercado, translation edited by P. Harry  
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This book was first published in Moscow in 1972 and the English translation appeared in 1975. It is an instructive and thought-provoking account of the achievements to date of molecular radiobiology, with suggestions as to how future research in this subject should develop.

The Introduction points out that although molecular radiobiology has already contributed greatly to molecular biology as a whole its ultimate objective must be to reveal the molecular basis of radiation-induced damage to higher organisms, with the aim of enabling control of this process. This must involve progression from research on the effects of radiation on isolated systems to work on animal and plant cells with a view to the ultimate understanding of the molecular basis of the regulatory mechanisms involved in the realisation of information in cells possessing a chromosomal apparatus.

Accordingly, the book commences with an account of the principles underlying the effects of radiation on aqueous solutions of biological materials and discusses the indirect effects following on the migration of the excitation energy along the hydration sheaths of the functional groups of biopolymers and the breakdown of the water molecules in these sheaths to form radicals which can affect the substrates.

It continues with fairly detailed accounts of the chemical changes produced in monosaccharides and glycosides by radiation, and the chemi-luminescence method of investigating radiation-induced transformations in proteins. In this connection the great disparity

between the radiation sensitivity of the enzyme patterns in cells and the insensitivity of isolated enzymes is attributed to the effects of radiation in producing small conformational changes with wide-reaching effects on the biological properties of the protein. In particular, allosteric enzymes are shown to be very radiation sensitive.

Turning to DNA replication and transcription, a review is given of the frequently contradictory findings on the changes in DNA and RNA activity of cells caused by radiation, and various possible explanations are discussed for the radio-sensitive and radio-insensitive stages, including the production of radiotoxins and direct action of radiation on the thymine residues of DNA.

In the final two chapters an excellent account is given of the molecular aspects of radiation damage, repair and protection, to chromosomes in the living cells, and damage to cellular and intracellular membranes and associated biochemical processes.

Each chapter ends with a useful summary and bibliography drawn from both Eastern European and Western sources.

It is unfortunate that the views expressed on controversial issues cannot be attributed to particular sources, since only the editor's name is given, but overall the book gives a good account of the present position and current trends in research in molecular radiobiology.

G. E. Francis