Alpen, E.L.: **Radiation Biophysics. 2nd Ed.** - Academic Press, San Diego - London - Boston - New York - Sydney - Tokyo - Toronto 1998. ISBN 0-12-053085-6. 484 pp., USD 69.95.

Ionizing radiation (*e.g.*, UV and gamma radiation, electrons, neutrons, and other high energy particles) is used for medical diagnosis and treatment, for research, and in energy power stations but it also represents an hazard for living systems causing damage to molecules, organs, diseases (*e.g.*, cancer), or death (nuclear weapons). The interaction of this radiation with biological systems presents a typical research field of radiation biophysics. This book is a revised second edition of a textbook for advanced students of biophysics and medical physics at the University of California in Berkeley and San Francisco. The reader is expected to have a basic knowledge of mathematics and physics as well as of chemistry and cell and organ biology. However, all basic concepts of radiation biophysics are exactly defined and explained, most of equations are derived. Each chapter is written as a good particular pedagogical text containing introduction, references, and suggested additional reading. Problems are presented at the end of each chapter to be used for training of the topic. There are many figures and schemes illustrating the subject.

The book comprises 16 chapters. Definitions of physical and radiobiological quantities and units are given in chapter 1 (*e.g.*, exposure, dose, particle and energy fluence, kerma). The SI units are introduced and used throughout the book. Chapter 2 gives a basic information on the nature of electromagnetic radiation and atomic structure. The concept of radioactivity is explained in chapter 3 listing units, law of decay, and more complex decay processes. Chapter 4 describes the interaction of radiation with matter, attenuation coefficients, energy transfer, and absorption. Detailed mechanisms of energy transfer processes in water and tissue are explained in chapter 5. Interaction of charged and uncharged particles with the tissue are elucidated.

Chapter 6 is devoted to radiation chemistry. Mainly water radiolysis, radicals and their fate, and the role of scavengers are explained. Particular attention is paid to DNA as the target molecule of the radical reactions and biological action. Chapters 7 and 8 deal mostly with statistical theories and models for cell survival, survival curves, and relations between cell age and cell survival. Chapter 9 concentrates on modifications of the cell radiation response by some chemical substances or physical conditions (temperature, oxygen, thiols, *etc.*). The sensitizing effect of oxygen is of greatest importance.

Chapter 10 represents a comparison of the fast cell and organ radiation effects. Compared are the reactions of the normal tissues and tumors whereas chapter 11 concentrates on the late effects, induced pathology in different human organs. Chapter 12 is devoted to radiation carcinogenesis as a stochastic effect in experimental animals, cell transformation systems, and in human populations. Genetic effects of ionizing radiation leading to genetic or somatic mutations are shown in chapter 13. Chapter 14 describes the importance of the concept of linear energy transfer effects. In chapter 15 the effects of radionuclides deposited in the organism are presented. Radionuclides of biological importance are given and characterized. The last chapter deals with the effects of radiation from natural background and other sources, mainly from medical application. The book is supplemented with the Author and Subject Index and Appendix (physical constants).

This comprehensive book should be of interest for biophysicists, radiobiologists, physicians, and ecologists and to all who want to understand the effect of ionizing radiation on biological systems. Although the presented book concentrates on the cell or human tissue radiobiology, the information, concepts, and methods might also inspire researchers or students in genetics, plant stress biology, or phytopathology.

J. NAUŠ (*Olomouc*)