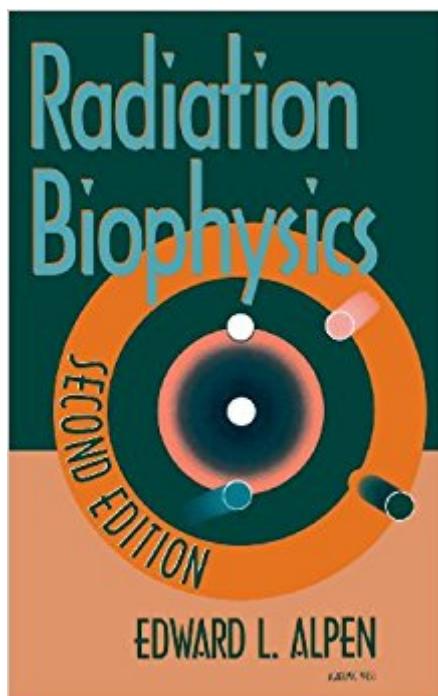


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# Radiation Biophysics, Second Edition



## Synopsis

This newly revised and updated edition of Radiation Biophysics provides an in-depth description of the physics and chemistry of radiation and its effects on biological systems. Coverage begins with fundamental concepts of the physics of radiation and radioactivity, then progresses through the chemistry and biology of the interaction of radiation with living systems. The Second Edition of this highly praised text includes major revisions which reflect the rapid advances in the field. New material covers recent developments in the fields of carcinogenesis, DNA repair, molecular genetics, and the molecular biology of oncogenes and tumor suppressor genes. The book also includes extensive discussion of the practical impact of radiation on everyday life. Covers the fundamentals of radiation physics in a manner that is understandable to students and professionals with a limited physics background. Includes problem sets and exercises to aid both teachers and students. Discusses radioactivity, internally deposited radionuclides, and dosimetry. Analyzes the risks for occupational and non-occupational workers exposed to radiation sources.

## Book Information

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## Customer Reviews

Praise for the Second Edition "...the book is well written. One of the attractive parts of the book is that as a single authored volume it is coherent from beginning to end... The book is highly recommended as a text in radiation biophysics and as a reference source for those who are working in closely related areas." --RADIATION RESEARCH Praise for the First Edition: "Radiation Biophysics is a comprehensive textbook that bridges the gap between radiation physics and

radiation biology by integrating these fields rather than focusing on one or the other... Radiation Biophysics brings together diverse subject matter in a cogent yet highly readable manner, reflecting the extensive experience of the author as a teacher of this material. The book should also, however, find utility beyond the classroom." --SCIENCE "I reviewed the first edition of the text for a journal in the discipline of radiation biophysics, and I have referred to the text many times over the past six years... The book is very nicely laid out. It is easy to read and contains extensive author and subject indexes. The illustrations, principally line drawings, are uniformly good... This second edition is improved over the first edition in both appearance and completeness." --William R. Hendee, PhD, Medical College of Wisconsin, for DOODY'S PUBLISHING REVIEWS

Awarded the Highest Rating by Doody's Publishing Reviewsâ "Five Stars!

The major book on radiation biology / radiation biophysics has been Hall's "Radiobiology for the Radiologist" now in it's 5th edition. It would be nice to have an alternative to this, particularly since that one is so weighted toward radiation oncology and radiology. Alpen's "Radiation Biophysics" (1998, 2nd ed.) tries to be a more general alternative, but it fails because of some glaring omissions and a level of biological sophistication that is at least 15-20 years out of date. Here are a few examples. - Although the revolutions in molecular biology and in signal transduction were late in penetrating the field of radiation biology, this kind of information has made its way into other texts but it is largely absent and mishandled in Alpen's book. While p53 is pitifully mentioned (an engineer or physicist is unlikely to understand Alpen's textual description, a diagram would have been more useful to cut through the jargon), absent are important regulators like ATM, Rb, and egr-1, and a mechanistic description of how all this fits in together. - Woefully brief and out of date is Alpen's discussion on biological modifiers of radiation sensitivity, e.g., the chemical WR2721 is described as having "limited value," citing studies from 1980, but this drug (also known as Amifostine) is in current clinical use today (2003) for radiation therapy of head & neck cancer and other tumors. In addition, missing is a decade of work on growth factors and cytokines that act as radiation protectors and radiation sensitzers. - While other books devote an entire chapter to the "oxygen effect," Alpen devotes only couple pages to this topic, failing to discuss how hypoxia (low dissolved oxygen concentration) in tissues makes them radioresistant. - While other books devote entire chapters to how the cell cycle influences radiation sensitivity, Alpen devotes only one and half paragraphs to this topic. - Discussion of the biological basis of "fractionation" is totally inadequate. This is where radiation exposure is broken up a little bit at a time, in relatively small doses spread

out over a longer period, rather than at a high dose all at once. The ultimate extension of this is something called "brachytherapy" which gives local, continuous low dosing by implanting "radioactive seeds" right into a tumor. Brachytherapy has emerged as a common treatment for prostate cancer, for example. Conceptually, brachytherapy ties in several aspects of radiation biophysics, including the use of radioactive isotopes, but it is nowhere to be found in this book. While Alpen does a reasonably good job at describing physical phenomena and at deriving equations, and the book is very well-written, the shallowness of biological information really hurts the overall effort. If one is interested in a book purely devoted to radiation physics, Khan's 1994 "The Physics of Radiation Physics" should be considered. However, anyone interested in books that REALLY cover the biological background in great detail should get Travis' 1989 "Primer of Medical Radiobiology" which is still in its 2nd edition but is nevertheless fine for it's strong, classic biomedical emphasis (the modern stuff will undoubtedly appear in the 3rd edition, which is still in the works), or again, go to Hall's very well-rounded classic.

This is an excellent book which everyone interested in radiation biophysics must have have read. The book has 16 chapters. In the first 6 the emphasis is on physics. In the following 10 chapters, the models for cell survival and the effect of radiation on tissue structures and organisms are discussed in great detail. A must for anyone interested in and trying to understand the "biological" background of radiation protection and radiotherapy.

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