
MEDICAL

RADIATION

BIOLOGY

By

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PREFACE

In this volume I have attempted to present in textbook form observations on the effects of radiation as they pertain to man under conditions of health and disease. The book is based on my experiences gained in more than 25 years of work in experimental and clinical radiation biology as an investigator, lecturer and research administrator.

In planning the writing of a book as broad in scope as the present one, two avenues of approach are open; either to share the responsibility with a number of collaborators or to take on the responsibility alone. Each procedure subjects one to criticism by either producing a book which shows duplications and, possibly, opposing viewpoints on the same subject in its various parts, or by not covering the subject matter in all its ramifications with equal competence.

An academic teacher usually is expected to form an opinion on all facts and problems pertaining to his specialty and to present such to his students in a rounded-out picture. This situation seemed to me to justify the writing of the book as the sole author.

I have endeavored to present the entire subject of medical radiation biology under as uniform a concept as is possible, in the hope that this will facilitate penetration into this somewhat complex field of medical sciences.

In order to permit the reader to form his own views, an extensive bibliography comprising about five thousand references, essentially covering the literature up to 1955, has been incorporated in this volume. The number of publications is, however, so tremendous that even with double the number of references a certain selection would have to be made. This was done by quoting in the text, first of all, those to whom the credit goes for having made and published the first observations on any specific problem. In the writing of the text it has been my endeavor to stress the his-

torical sequence of events leading to our present state of knowledge, in order to demonstrate that also in this relatively new field of medicine we owe our present accomplishments to the labor of a long chain of scientific ancestors, a fact which too often is overlooked in present-day publications. It is for this reason that, in the quoted literature, a considerable number of references are mentioned dating back to the pioneer era of radiology some 30 to 50 years ago. These old references are sometimes difficult to find, and they might therefore, prove of value to those interested in the history of this recent branch of medical science.

In the detailed quotations of the later publications I have put emphasis on clinical observations, and with respect to general radiobiological studies referred the reader to the numerous excellent texts and monographs in this field which have covered the literature with great thoroughness. But also, in dealing with problems of clinical radiation biology, no completeness in quotation of the literature could possibly be achieved. I have therefore wherever possible included extensive reviews concerning either the earlier or the more recent literature, as the case may be, in order to offer the reference material as completely as possible within a limited space. My approach to the literature may have caused some unintentional omissions, for which I wish to apologize.

It has been my intention to indicate in this book the rationale on which the role of radiation as a health hazard and as a therapeutic agent is based. In order to do so, it has been necessary to indicate amounts of radiation required to produce effects of one or the other type in man. For this purpose I have quoted doses applied in medicine. In the selection of such clinical data I have emphasized the experiences of institutions in the U.S.A. but made an effort to include also experiences from other countries. In order to prevent any misunderstanding, I would like to stress the point that the radiation doses mentioned in the text are for general orientation only, in order to give the reader an idea of the orders of magnitude involved. It has not been my intention to provide a text on radiation therapy.

This manuscript has been concluded in the shadow of the first Atoms for Peace Conference. This event more clearly than any-

thing else has proven that the problems of the effects of radiant energy on man have grown from a problem of concern to the medical specialist, to a problem of concern to every physician. In recognizing the situation, I hope that the book may serve not only the specialist in radiology but all physicians. The text has therefore, been arranged in such a manner that the main points on each subject might easily be found. Extensive use of cross references has been made in the text for the same purpose.

If this book helps the present and the future physicians and also health officers to take a position in their daily work on the various problems caused by the many uses of radiant energy in our lives, and if it should also prove of value to research administrators in their efforts to channel the investigative endeavor into fields least covered and to problems still open and controversial, I feel richly rewarded.

If I may finally express a wish, it is that this book may help to achieve for medical radiation biology a proper place in the undergraduate and postgraduate teaching curricula in the medical schools of our universities. Medical radiation biology may justly be considered as the younger sister of pharmacology. If afforded a similar status within the institutions of medical education, this new discipline will be able to make great contributions to the preservation of health and the art of healing.

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