Book Reviews

Carl M. Mansfield (ed.) Therapeutic Radiology; 2nd ed.
Elsevier, Amsterdam 1988
XI+ 596 pp. US$ 85.-/DA. 215.-

The second edition of the well-known monograph edited by Carl M. Mansfield is a thorough review of therapeutic radiology. In the first 6 chapters, basic principles of radiobiology, radiologic investigations and radiation therapy treatment planning are entered upon: the merits of ultrasound, nuclear medicine and computed tomography are pointed out either in diagnosis and evaluation of primary tumor and spread of disease, or in planning radiation therapy by a better tumor localization and delineation of outer contours of the patient and tissue inhomogeneities. The central portion of the book is composed of 13 chapters devoted to the main tumor localizations. In each chapter the place of radiation therapy in the management of the disease is specified and Some special techniques are developed either for external irradiation or for interstitial therapy or brachytherapy. The book closes with chapters covering some modalities of treatment combining radiotherapy and drugs or hyperthermia with reference to basic and clinical research. Finally, this book provides a good introduction to radiation therapy replaced in the general approaches to treatment of cancer and points out the need of a close cooperation between all physicians: medical oncologists, radiologists, surgeons and other specialists, who have to take these patients in charge. Each chapter is completed by an important bibliography and the illustrations are of good quality. Although many of the techniques of irradiation developed refer to the British school, the diversity and quality of the contributors make this monograph useful in the library of every radiotherapy residency training program.

Claude Lagarde, Bordeaux
Man H. Shiu, Murray F. Brennan

Surgical Management of Soft Tissue Sarcoma
Lea & Febiger, Beckenham 1989 XII+ 297 pp.; E42.54 ISBN 0-8121-1152-4

The Memorial Sloan Kettering Cancer Center has had a longstanding interest in the treatment of soft tissue sarcomas. This is exemplified by the 19 chapters of text which encompass the management of soft tissue sarcomas in the most prevalent anatomic sites of origin of this tumor. The impressively large number of patients reported by the distinguished surgical oncologists allow for a rather reliable interpretation of their recommendations and results of treatment. The impressive cure rates of the past utilizing radical extirpative surgery have not only been improved by the new innovations in multimodality therapy, but have dramatically improved the cosmetic and functional results of therapy. This book very adequately documents this evolution of care offered the sarcoma patient. This multimodality approach emphasizes the necessity of encompassing the therapeutic disciplines of not only surgery but radiation and chemotherapy. It is made obvious that improved survival through what appears to be more conservative management depends to a great extent on not only the multidisciplinary treatment, but the multimodality
diagnostic workup and staging techniques necessary in the adequate understanding of these unusual tumors.

This 297 page hardback text has not only quality in informational substance, but also quality in its bibliographic documentation.

Alfred S. Ketcham, Miami, Fla.

Helmut Knolle

Cell Kinetic Modelling and the Chemotherapy of Cancer


This book provides an excellent introduction of practically oriented cell kinetic modelling and the methods suitable to determine the cell kinetic parameters. Considering the applications, the author selects models which can be represented by linear equations, i.e. when exponential tumor growth may be assumed. There is no emphasis on the stochastic aspect of model building. The statistical aspects of the experimental design and evaluation are not included.

In chapter I after introducing some basic concepts and notions about cell proliferation and cell cycle, several mathematical models built step by step from the simple to the complex one are presented. The mathematical models start with a simple model of tumor growth: defining the division factor $a$ and the proliferative fraction $PF(t)$, their relation and the behavior of $PF$ are discussed. In the extended model of tumor growth, $Q$ cells (resting and sterile cells) can transform $P$ cells (proliferative cells) again; the model, thus, considers the practical importance of ‘the recruitment of resting cells into the cell cycle’. Another extension of the simple model of cell growth is when the cell age distribution is built in the model with the assumption of uniform cell cycle time and phase durations. Using this model, formulas for different cell phase indices (the fraction of cells in a particular phase with respect to all cells) are derived. As a further generalization, the assumption of uniform cycle time is left out, and a more realistic model where cycle time is a random variable with arbitrary probability distribution is described. As a final step, the durations of cell phases are also random variables. This leads us to the Kendall-Takahasi model. In this model, as the author describes, the cell cycle is divided into $n$ stages, the passage from a stage to the next and the cell loss at any stage is a Poisson process, cells at stage $n$ divide and daughters pass to stage 1. Each cell behaves independently of every other with regard to passage time. These stages are aggregated into four groups according to the four cell phases. In the framework of the Kendall-Takahasi model, the previously derived results concerning cell phases are generalized.

In chapter II, the determinations of cell kinetic parameters without drug effects are covered. All the methods are applicable under the assumption of stable age distribution and exponential growth at the beginning of the experiment. The description of a method consists of three parts: the first describes how the experiment is carried out, the second refers to some previously established mathematical model for the interpretation of the experimental results, the third explains how to infer kinetic parameters based on the particular mathematical model from the experimental data. Methods covered in this chapter are pulse labelling, continuous labelling, double labelling, metaphase arrest, fraction of labelled mitosis and their combination. At the end
of this chapter, a good summary of cell kinetic parameters and experiments helps researchers to decide which experiment is to be chosen.

In chapter III, using the results of the previous two chapters the drug effects on cell kinetic parameters are analyzed, and further mathematical models for drug action are built. Drug effects such as phase-specific cell kill, blocking of cell cycle or retardation in different cell phases are discussed. The recruitment of resting cells, a phenomenon of clinical importance existing only in vivo, is also discussed. A computer program, CELLU, which is a realization of a complex mathematical model of a cell population and the effects of drugs is described. The use of the program for cell kinetic studies and simulation is illustrated by two examples. This chapter ends with some implications for drug testing and therapy.

Potential readers in the fields of experimental tumor models, tissue culturing, pharmacokinetics and clinical oncology would more benefit from the book if the computer programs were available.

S. Eckhardt, Budapest
Springer, Berlin 1988
VII + 202 pp.; 221 fig.; DM 150.
ISBN 3-540-17722-1

Using age-standardized cancer mortality rates at the province level, the authors present two sets of maps for each cancer site. The first set uses a relative scale (ranking), and the second an absolute scale to divide the rates across provinces into five categories. The first set of maps is color-coded, while the second is shaded in black and white. The color maps provide a visually striking display of the geographic variation of cancer in Poland, including clusters of high-risk and low-risk areas for several cancer sites. The maps and graphs for each cancer site are accompanied by a succinct and balanced etiologic commentary.

A number of intriguing geographic patterns can be found in the atlas. Several cancer sites show a longitudinal gradient with higher rates in western Poland and lower rates in the eastern part. This pattern, most evident for colon and rectal cancers, is correlated with the degree of urbanization. For certain other cancer sites (breast, prostate, testis), the high-risk areas are centered in Poznan and surrounding provinces in northwestern Poland. In addition, esophageal cancer tends to aggregate in the northeast (especially in males), stomach cancer in the southeast, gallbladder cancer in central areas, and cervix cancer in the western part of Poland. In the south is a cluster of high-risk provinces for thyroid cancer, corresponding to an area of endemic goiter in earlier years.

The geographic variations uncovered by this cancer atlas illustrate the value of developing national statistical resources as surveillance systems to generate and explore etiologic hypotheses. In Poland, as in several other countries, the mapping of cancer promises to be a useful strategy for providing leads to environmental risk factors, and eventually to measures aimed at preventing cancer.

The opinions expressed in this review are those of the author and do not necessarily reflect the views of the US Department of Health and Human Services, the Public Health Service or the National Institutes of Health.

J. Fraumeni, Bethesda, Md.
Cancer mortality atlases are now available for a number of European and Asian countries, and have become a popular and highly effective means of detecting geographic variation, including high-risk areas that deserve special attention by cancer investigators and health officials. This handsomely illustrated volume presents a series of maps depicting the geographic distribution of cancer mortality in Poland, using data from 49 voivodships (provinces) and 22 leading cancer sites. The project represents a successful collaboration between the Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology in Warszawa and the German Cancer Research Center in Heidelberg. The atlas includes helpful background information on the geographic and demographic characteristics of Poland and its provinces, including descriptive data on potential risk factors (e.g., environment, occupation, diet, tobacco, alcohol) that may influence the spatial and temporal patterns of cancer. Supplementary tables show the baseline 1975-79 data on which the maps are based. The volume also contains graphical presentations of time trends, age curves, and birth-cohort analyses using data for a 20-year period, 1963-82, thus providing a comprehensive survey of cancer statistics in Poland. Gregory Bock, Julie Whelan (eds.)

Metastasis
Ciba Foundation Symposium 141
John Wiley, Chichester 1988
IX+ 256 pp.; £30.50
ISBN 0-471-91513-0
In this publication papers presented at the Symposium on metastases held at the Ciba Foundation in London, 19-21 April 1989, are presented. For long decades, as soon as the patient developed metastases, he was beyond the possibility of treatment. However, in the last two decades in some tumor types, the combined treatment resulted in long remissions and even cures. As a consequence, much more profound understanding of the basic aspects of mechanisms of metastatic formation was needed. The present collection of papers could be considered as a manifestation of the efforts in the research of metastases as well as a cross-section of the present knowledge in this fast developing field of research. Additionally, many questions were posed indicating that some problems still remain to be solved. Although much knowledge has been accumulated in the past years, there is still a gap between the achievements of basic research and the clinical experience.
The majority of papers are related to the elucidation of the mechanism of dissemination on the cellular level, including the research on cell adhesion, the role of extracellular components such as fibronectin, and further, the role of growth factors, oncogenes, immune system and formation of metastatic phenotype. Unfortunately, out of twelve papers only one is dealing with the clinical aspects of metastatic dissemination. However, the positive sides of the present publication are: (1) the comparison of some characteristics of metastatic development with similar events in embryology; (2) the discussion of the role of different pharmacologically active substances in metastatic dissemination, and (3) the report on the discussion where many ideas, controversies and additional experimental data were pointed out.
The papers can be divided into two groups. The first comprises a series of papers dealing with metastatic properties of cells in their environment (study of characteristics of the metastatic phenotype or the relationship of cell-to-cell level, cell-to-stromal elements and cell-to-
extracellular molecules). In the second group, the present knowledge on molecular genetics, oncogenes and clonal changes connected with the appearance of metastases is collected. In particular, the importance of the fibronectin matrix for the organizational stability of normal tissue is stressed. However, in metastasis formation, apart from fibronectin many other molecules are involved, which could probably be identified by the use of monoclonals. The role of adhesion to fibronectin has been analyzed in metastatic tumor tissue. Also, the role of laminin has been investigated in the activation process of cancer cells. Further on, the adhesive properties of embryonic cells have been studied and the question posed if similar mechanisms are operative in cancer cell invasion as well. The role of oncogenes in the process of induction of metastases formation was also presented. There is a probability that the ras-oncogene augments the metastatic potential of cancer cells. In a further study it was shown that metastases could result from the abnormalities in gene regulation of cancer cells, but the resulting abnormal behavior of cancer cells could be influenced by host reactions. The expression of fms-related oncogene is probably connected with protein-kinase activity which represents the receptor for the local growth factor that controls the metastatic growth. Finally, the role of macrophages in controlling cancer disease was described. It was suggested that the residual disease could be treated and controlled by the use of lysosome-activated macrophages. The last paper presents a short review of all problems in clinical metastatic research and serves to bridge the existing gap in communication between the far advanced basic research and rather scarce and scattered data collected as clinical observations at patients’ beds. Those who wish or need an accurate knowledge in the process of metastatic formation will find reading the present publication richly rewarding.

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