

ONCODEVELOPMENTAL MARKERS

Biologic, Diagnostic, and Monitoring Aspects

EDITED BY

William H. Fishman

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Preface

The recognition that in cancer one is dealing primarily with a change in gene expression rather than a substantial change in the gene per se is becoming widespread with the recent interest in cellular oncogenes. The latter, in our opinion, should now be referred to as "oncodevelopmental genes."

The field of oncodevelopmental genes was first defined in 1976 (*Oncodevelopmental Gene Expression*, W. H. Fishman and S. Sell, Academic Press, Inc.). That treatise dealt with areas of developmental biology, carcinogenesis, and the diagnostic implications of oncodevelopmental gene products.

The literature on tumor-associated markers is voluminous and confusing primarily because each marker is treated as a world unto itself without regard to its relationship to other tumor markers. Previous books have usually been compendiums of papers presented at meetings. Consequently, it was felt that there was a need for a treatise that would deal with the subject conceptually rather than empirically, a treatise that would illustrate for the reader examples of biologic, diagnostic, and monitoring aspects of oncodevelopmental markers, that would define clearly the limitations as well as the promise of such markers, and would be sufficiently provocative to be a springboard for meaningful inquiry.

In attempting to meet these needs, the editor has gathered together outstanding scientists who have written authoritative chapters in their fields. The first part of the book forms a conceptual exposition and examination of a number of theoretical and methodological approaches; through these the reader should achieve an understanding of the uses and limitations of various cell lines, xenotransplanted tumors, and polyclonal and monoclonal antibodies.

The volume begins with a conceptual treatment of "Oncodevelopmental Markers" (W. H. Fishman), an examination of "Cell-Matrix Interactions as Determinants of Differentiation and Tumor Invasion" (E. Ruoslahti), and an exploration of "Human Tumor Nucleolar Antigens" (H. Busch *et al.*).

The following three chapters deal with markers and cell model systems for their study. H. Bohn describes a "Systematic Identification of Specific Oncoplascental Proteins." R. W. Ruddon discusses "Marker Expression by Cultured Cancer Cells," and D. Raghavan covers "The Study of Oncodevelopmental Markers in Heterotransplanted Tumors."

The next three chapters are centered on the use of immunochemical and immunologic tools in the study of markers by recognized leaders in these areas. Thus, D. J. R. Laurence and A. M. Neville review "Specific Antibodies in Cytopathology and Immunohistology"; Z. Steplewski and H. Koprowski evaluate the "Use of Monoclonal Antibodies to Recognize Tumor Antigens"; R. H. J. Begent and K. D. Bagshawe update "Radioimmunolocalization of Cancer."

Finally, W. Blattner presents "Familial Cancer: An Opportunity to Study Mechanisms of Neoplastic Transformation."

In the second part of the book F. A. Dolbeare updates flow cytometry in the first chapter, and the next three chapters provide insights into the origin of cancer from ancestral migratory embryonic cells. Thus, R. F. Gagel's "Tumor Markers of Medullary Thyroid Carcinoma" illustrates the C-cells (calcitonin producing cells) as progenitors of C-cell hyperplasia and neoplasia. P. H. Lange develops a critical view of germ cell tumors of the testis. S. B. Baylin examines carefully the biochemical markers of small (Oat) cell lung carcinoma. M. Menon and W. J. Catalona evaluate "Tumor Markers in Prostatic Cancer."

Gastrointestinal cancer markers have held center stage among clinical oncologists and, in the opinion of some, CEA should be the standard against which to measure the performance of any other tumor marker. Hence, three chapters are devoted to gastrointestinal cancer markers. One by Y. S. Kim and L. J. McIntyre covers the general area, while P. Burtin and M. J. Escibano report on "The Carcinoembryonic Antigen and Its Cross-Reacting Antigens," and N. Zamcheck reviews the clinical value of CEA as a colorectal cancer marker.

Trophoblastic differentiation markers have aroused considerable interest. G. D. Braunstein deals specifically with "hCG Expression in Trophoblastic and Nontrophoblastic Tumors," and M. Seppälä covers "Oncodevelopmental Antigens in Gynecologic Cancer."

Kai-Li Xu discusses "Large-Scale AFP Screening for Hepatocellular Carcinoma in China," and R. B. Herberman writes of "Uses and Limitations of Tumor Markers." Xu's chapter is the first comprehensive review in English of the most extensive controlled evaluation of a tumor marker.

Oncologists, physicians, pathologists, and clinical chemists should find this treatise informative and interesting as a coherent account of biologic, diagnostic, and monitoring aspects of oncodevelopmental markers.

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Part I

BIOLOGIC ASPECTS

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I. INTRODUCTION

The field of oncodevelopmental biology and medicine promises to substitute gradually for the tumor marker empiricism of the past, a conceptual framework on which to build logical explorations of tumor markers into the future. Specifically, from an era that was populated entirely by tumor antigens of unknown molecules with unclear biological interest, one can now point to a number of characterized tumor proteins, the study of which is giving new insights into the nature of gene expression in cancer cells. More importantly the first oncodevelopmental proteins reported 20 years ago, such as α -fetoprotein, are not only the subjects of ever-increasing investigative interest, but also their utility in oncology as tumor markers is valuable and being defined with greater accuracy.

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