Progress in
Experimental Tumor Research

Edited by


Vol. 9

Contributors:

Nobuhisa Baba, Columbus, O.
Fritz Bischoff, Santa Barbara, Cal.
Herman T. Blumenthal, St.Louis, Mo.
George Bryson, Santa Barbara, Cal.
Emmerich von

, Columbus, O.
I. Hellström, Seattle, Wash.
K. E. Hellström, Seattle, Wash.
L. W. Law, Bethesda, Md.
James B. Rogers, Louisville, Ky.
Chester M. Southam, New York, N.Y.
R. C. Ting, Bethesda, Md.
Henry N. Wood, New York, N.Y.

With 85 figures and 25 tables

BASEL (Switzerland) S.KARGER NEW YORK

S. Karger AG, Arnold-Böcklin-Strasse 25, 4000 Basel 11 (Switzerland)

All rights, including that of translation into foreign languages, reserved.
Photomechanic reproduction (photocopy, microcopy) of this book or part of it without special
permission of the publishers is prohibited.

©

Copyright 1967 by S. Karger AG, Basel
Printed in Switzerland by Buchdruckerei Stäfa AG, Stäfa ZH
Clichés: Aboregg-Steiner & Cie. AG, Bern
Evidence for Cancer-specific Antigens in Man
Chester M. Southam

I. Introduction 2

II. Clinical Observations Suggesting Host Defense Against Cancer 2

III. Transplantation and Vaccination Studies with Human Cancer 3
A. Syngeneic (autologous) 3
   1. Problems peculiar to clinical cancer research 3
   2. Autovaccination 4
   3. Cancer autotransplants 5
   4. Autotransplants of cancer plus leukocytes 5
B. Allogeneic (homologous) 5
   1. Fundamental inadequacy of research on homologous cancer 5
   2. Problems peculiar to man 6
   3. Antigenic analysis by use of second set homografts 6
   4. Homotransplants with admixed leukocytes 6
   5. Homologous cancer vaccines as experimental therapy 7
C. Xenogeneic (heterologous) 7
   1. Immunologic tolerance as a possible approach 7

IV. Tissue-culture Methods 8
A. Potential advantages 8
B. Studies of cell-associated immune mechanisms of animals 8

V. Serologic Methods: General Considerations 9
A. Advantages and limitations 9
B. Terminology of antibodies and of transplants 9
C. Serologic approaches to the problem of cancer-specific antigens 10

VI. Search for Cancer-specific Antibodies in Patients’ Sera 11
A. Autoantibodies 11
B. Isoantibodies 15
C. Heteroantibodies 18

VII. Search for Cancer-specific Antigens in Human Tumors 18
A. By use of isoantibodies 19
B. By use of heteroantibodies 20
   1. Attempts to produce more specific antisera 22
   2. Attempts to obtain more specific antigens 24
   3. By use of more discriminating serologic techniques 27

Index
Allogeneic Inhibition of Transplanted Tumor Cells

K. E. Hellström and I. Hellström

Introduction 41
Demonstration of Allogeneic Inhibition with Various Tumor Lines 41
Homozygous lymphomas 41
Isoantigenic variant lines selected from an F1 hybrid lymphoma 42
Carcinomas and sarcomas 45
Conclusions 45
Approaches to the Mechanisms of Allogeneic Inhibition 46
Attempts to abrogate allogeneic inhibition by X-irradiation of tumor recipients 47
Attempts to induce immunity or tolerance to allogeneic inhibition 47
Neutralization experiments 48
Demonstration of allogeneic inhibition in tissue culture 54
Abrogation of allogeneic inhibition by cortisone 60
Conclusions 61
Selection of Cells with Decreased Sensitivity to Allogeneic Inhibition 62
Can Allogeneic Inhibition be Demonstrated with Normal Cells ? 64
The Use of H-2 Antigens as Positive Selective Markers on Basis of Allogeneic Inhibition 66
General Considerations 68
Allogeneic inhibition as an exception to transplantation laws 68
Allogeneic inhibition as a possible surveillance mechanism 68
Cellular mechanisms of allogeneic inhibition...................................... 71
Possible role of allogeneic inhibition in the homograft reaction 72
References 73

Silicate-Induced Neoplasms

George Bryson and Fritz Bischoff

Introduction 78
Silicate structural chemistry 79
Silica 81
Silica solubility 82
Silicosis solubility theories 85
I. Introduction 165
II. The Role of the Thymus in Immunological Competence 166
A. Effect of thymectomy on development of lymphoid tissues 166
B. Thymectomy and the ‘wasting’ syndrome 167
C. Effect of thymectomy on humoral antibody response 169
D. Effect of thymectomy on delayed hypersensitivity and homograft rejection 171
E. Restoration and humoral factors of the thymus 173

III. The Role of the Thymus in Carcinogenesis 174
A. Tumor-specific antigens 174
B. Oncogenesis in thymectomized animals 175
1. Leukemia 175
2. Polyoma 176
3. Other tumor viruses 182
4. Chemical carcinogens 182

IV. Effect of Thymectomy on Transplantation Resistance 182
A. Transplantation resistance induced by polyoma virus 182
B. Transplantation resistance induced by polyoma tumor homografts 183

V. Discussion 185
References 187

VI Index

Experimental Carcinoma of the Endometrium

Adenocarcinoma in Rabbits and Squamous Cell Carcinoma in Rats and Mice

Nobuhisa Baba and Emmerich von Haam

Normal Endometrium of the Rabbit, Rat, and Mouse 192
Spontaneous Tumors of the Endometrium in the Rabbit, Rat, and Mouse 201
Pathogenesis 208
Carcinogenic effect of estrogens 208
Effect of chemical carcinogens 211
Pathologic Anatomy 225
Cytomorphology 232
Discussion 248
Summary and Conclusions 253
Spontaneous and Induced Tumors in the Guinea Pig, with Special Reference to the Factor of Age

Herman T. Blumenthal and James B. Rogers

Introduction 261
Spontaneous Tumors in Guinea Pigs 262
Induced Tumors in Guinea Pigs 268
The Age Factor in Neoplastic Disease 272
Summary 280
References 280

Plant Carcinogenesis

Henry N. Wood

Introduction 286
The Crown-Gall Disease 287
Nutritional Studies 288
Membranes as Regulators of Biosynthetic Metabolism 292
Regulation of Cell Division in Normal and Plant Tumor Cells 305
Nature of the Heritable Cellular Change in Crown Gall 307
Summary 309
References 310

Subject-Index 1-9 312
Index Vols. 1-9 339

This volume is dedicated to

SHIELDS WARREN, M.D., D.Sc., LL.D,

who has contributed immeasurably to the art and science of pathology as teacher, investigator and author, and who continues his contributions through his services and counsel to many organizations in his community, his country, and the world.
Editor's Foreword

As long as the questions concerning the cause, prevention, and cure of cancer remain unresolved, it is impossible to evaluate the true significance of recent developments in experimental tumor research. However, aside from their possible pertinence to cancer management, some fascinating phases of recent experimental tumor research are already opening new vistas. This is true of much current work on the thymus and its role in immunology, including antibodies against tumors (Ting and Law). Southam's chapter relates progress in immunology to problems in human cancer.

Studies on allogeneic inhibition of transplanted tumor cells (Hellsström and Hellström) exemplify a type of experimental search for an understanding of fundamental phenomena of tumor-host relations. Silicate-induced neoplasms, as studied by Bryson and Bischoff, require crossing interdisciplinary boundaries of physics, chemistry and biology in an attempt to understand one of the most puzzling aspects of cancer: solid state surface carcinogenesis. Blumtenthal and Rogers' studies in guinea pigs illustrate the significance of aging in relation to cancer formation, and Wood's chapter on plant carcinogenesis describes a subject neglected by most cancer researchers.

Thus, the editor has tried to fulfill the original purpose of this series by presenting up-to-date research developments and by covering the most acute and/or the most neglected fields of interest. It is his sincere hope that this volume will materially assist the vast army of investigators engaged in the multifaceted attack on a common enemy cancer. He again gratefully acknowledges the cooperation of the authors, the thoughtfulness and competence of the publisher, and the faithful devotion to duty of his editorial assistant, Mrs. Mary Miller.

F. Homburger, M.D.
Editor.
Bio-Research Institute, Inc.
Cambridge, Mass. (USA)