Cancer Prevention

With 48 Figures and 27 Tables
Contents

Part I  Genetic Risk Profiles and Biomarkers in Cancer Prevention

1  A Favorable View: Progress in Cancer Prevention and Screening  ..........  3
   Peter Greenwald

2  Genetic Risk Profiles for Cancer Susceptibility and Therapy Response  ....  19
   Helmut Bartsch, Heike Dally, Odilia Popanda, Angela Risch, Peter Schmezer

3  Tumor Promotion as a Target of Cancer Prevention  .........................  37
   Friedrich Marks, Gerhard Fürstenberger, Karin Müller-Decker

4  Insulin-Like Growth Factor-Related Signaling and Cancer Development  49
   Michael Pollak

Part II  Inflammation, Infection, and Cancer Prevention

5  Cytokines Are a Therapeutic Target for the Prevention
   of Inflammation-Induced Cancers  ........................................  57
   Stefan Rose-John, Heidi Schooltink

6  Prevention of Hepatocellular Carcinoma in Chronic Viral
   Hepatitis Patients with Cirrhosis by Carotenoid Mixture  ..................  67
   Hoyoku Nishino

7  Cox-2 and Cancer Chemoprevention: Picking up the Pieces  .............  73
   Monica M. Bertagnolli
Part III  Prevention of Female and Male Genital Cancers

8  Human Papillomavirus Vaccine: A New Chance to Prevent Cervical Cancer .............................................................. 81
Bradley J. Monk, Ali Mahdavi

9  Prevention and Early Detection of Ovarian Cancer: Mission Impossible? 91
Robert C. Bast Jr., Molly Brewer, Changping Zou, Mary A. Hernandez, Mary Daley, Robert Ozols, Karen Lu, Zhen Lu, Donna Badgwell, Gordon B. Mills, Steven Skates, Zhen Zhang, Dan Chan, Anna Lokshin, Yinhua Yu

10  Prevention of Prostate Cancer: More Questions than Data .................. 101
Hans-Peter Schmid, Daniel S. Engeler, Karl Pummer, Bernd J. Schmitz-Dräger

Part IV  Prevention of Breast Cancer

11  Primary Prevention of Breast Cancer by Hormone-Induced Differentiation .............................................................. 111
Irma H. Russo, Jose Russo

12  The Genomic Signature of Breast Cancer Prevention .................... 131
Jose Russo, Gabriela Balogh, Daniel Mailo, Patricia A. Russo, Rebecca Heulings, Irma H. Russo

13  Estrogen Deprivation for Breast Cancer Prevention ...................... 151
Anthony Howell, Robert B. Clarke, Gareth Evans, Nigel Bundred, Jack Cuzick, Richard Santen, Craig Allred

Part V  Prevention of Colorectal Cancers

14  Primary Dietary Prevention: Is the Fiber Story Over? .................... 171
Cheryl L. Rock

15  Prevention and Early Detection of Colorectal Cancer – New Horizons ... 179
Gad Rennert
Part VI  Prevention of Skin and Brain Tumors

16  New Perspectives on Melanoma Pathogenesis and Chemoprevention  .................................................. 191
  Frank L. Meyskens, Jr., Patrick J. Farmer, Sun Yang, Hoda Anton-Culver

17  Vitamin D – An Emerging Issue in Skin Cancer Control. Implications for Public Health Practice Based on the Australian Experience  ........................................... 197
  Craig Sinclair

18  Are Gliomas Preventable? ................................................................. 205
  Victor A. Levin

Part VII  The Future of Cancer (Chemo)Prevention

19  Angiogenesis and Cancer Prevention: A Vision  ...................................... 219
  Douglas M. Noonan, Roberto Benelli, Adriana Albini

20  An Estimate of Cancer Mortality Rate Reductions in Europe and the US with 1,000 IU of Oral Vitamin D Per Day  ................................................................. 225
  William B. Grant, Cedric F. Garland, Edward D. Gorham

21  Uncovering Novel Targets for Cancer Chemoprevention  ........................................... 235
  Konstantin H. Dragnev, Qing Feng, Yan Ma, Sumit J. Shah,
  Candice Black, Vincent Memoli, William Nugent, James R. Rigas,
  Sutisak Kitareewan, Sarah Freemantle, Ethan Dmitrovsky

Part VIII  Conclusions and Summary

22  Conference Summary  ................................................................. 247
  Ursula Kapp, Hans-Jörg Senn
List of Contributors

Adriana Albini, Director
Responsabile Ricerca Oncologica
Polo Scientifico e Tecnologico,
IRCCS Multimedica
Viale Fantoli 16/15
20138 Milano
Italy

Craig Allred
Department of Pathology
Baylor School of Medicine
One Baylor Plaza
Houston, TX 77030
USA

Hoda Anton-Culver, PhD
Professor
Department of Epidemiology
Chao Family Comprehensive Cancer Center
University of California, Irvine
Irvine, CA 92601
USA

Donna Badgwell, PhD
Department of Experimental Therapeutics
University of Texas
M.D. Anderson Cancer Center
Houston, TX 77030
USA

Gabriela Balogh, PhD
Breast Cancer Research Laboratory
Fox Chase Cancer Center
333 Cottman Avenue
Philadelphia, PA 19111
USA

Helmuth Bartsch, Prof.
Deutsches Krebsforschungszentrum (DKFZ)
Toxicology and Cancer Risk Factors
Im Neuenheimer Feld 280
69120 Heidelberg
Germany

Robert C. Bast, Jr., MD
M.D. Anderson Cancer Center
Unit 355
1515 Holcombe Boulevard
Houston, TX 77030-4009
USA

Roberto Benelli
SC Oncologia Sperimentale A
Istituto Nazionale per la Ricerca sul Cancro
Largo Rosanna Benzi 10
16132 Genova
Italy

Monica Bertagnolli, MD
Brigham and Women's Hospital
Dana Farber Cancer Institute
c/o Daria Christiansen
Room CA 104
75 Francis Street
Boston, MA 02115
USA

Candice Black, DO
Department of Pathology
Dartmouth Medical School
Hanover, NH 03755
USA
Molly Brewer  
Division of Gynecologic Oncology  
University of Arizona  
Tucson, AZ 85724  
USA

Nigel Bundred  
University Department of Surgery  
University Hospital of South Manchester  
Whythenshaw Hospital  
Manchester M23 9LT  
UK

Dan Chan, PhD  
Johns Hopkins Medical Center  
Baltimore, MD 21205  
USA

Robert B. Clarke  
Cancer Research UK  
Department of Medical Oncology  
Christie Hospital  
University of Manchester  
Wilmslow Road  
Manchester M20 4BX  
UK

Jack Cuzick, Prof.  
Cancer Research UK  
Department of Epidemiology, Mathematics and Statistics  
Wolfson Institute of Preventive Medicine  
Charterhouse Square  
London EC1M 6BQ  
UK

Mary Daley, MD  
Fox Chase Cancer Center  
333 Cottman Avenue  
Philadelphia, PA 19111  
USA

Heike Dally  
Deutsches Krebsforschungszentrum (DKFZ)  
Toxicology and Cancer Risk Factors  
Im Neuenheimer Feld 280  
69120 Heidelberg  
Germany

Ethan Dmitrovsky, MD  
Department of Pharmacology and Toxicology  
Dartmouth Medical School  
7650 Remsen  
Hanover, NH 03755  
USA

Konstantin H. Dragnev, MD  
Department of Medicine  
Dartmouth Medical School  
Hanover, NH 03755  
USA

Daniel S. Engeler, Dr. med  
Department of Urology  
Kantonsspital  
9007 St. Gallen  
Switzerland

Gareth Evans  
Department of Medical Genetics  
St. Mary’s Hospital  
Hathersage Road  
Manchester M13 0JH  
UK

Patrick J. Farmer, PhD  
Department of Chemistry  
Chao Family Comprehensive Cancer Center  
University of California, Irvine  
Irvine, CA 92601  
USA

Qing Feng, PhD  
Department of Pharmacology and Toxicology  
Dartmouth Medical School  
Hanover, NH 03755  
USA

Sarah Freemantle, PhD  
Research Assistant Professor  
Department of Pharmacology and Toxicology  
Dartmouth Medical School  
Hanover, NH 03755  
USA

Gerhard Fürstenberger, PhD  
Deutsches Krebsforschungszentrum (DKFZ)  
Research Program Cell and Tumor Biology  
Im Neuenheimer Feld 280  
69120 Heidelberg  
Germany
Cedric F. Garland, PhD
Department of Family and Preventive Medicine
0631C
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92039-0631
USA

Edward D. Gorham, PhD
Department of Family and Preventive Medicine
0631C
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92039-0631
USA

William B. Grant, PhD
Sunlight, Nutrition and Health Research Center (SUNARC)
2115 Van Ness Avenue, MB 101
San Francisco, CA 94109-2510
USA

Peter Greenwald, MD, PhD
Division of Cancer Prevention
National Cancer Institute
National Institutes of Health
6130 Executive Boulevard
Suite 2040
Bethesda, MD 20892-7309
USA

Mary A. Hernandez, RN
Department of Experimental Therapeutics
University of Texas
M.D. Anderson Cancer Center
Houston, TX 77030
USA

Rebecca Heulings, BS
Breast Cancer Research Laboratory
Fox Chase Cancer Center
333 Cottman Avenue
Philadelphia, PA 19111
USA

Anthony Howell, Prof.
CRUK Department of Medical Oncology
Christie Hospital
University of Manchester
Wilmslow Road
Manchester M20 4BX
UK

Ursula Kapp, Prof. Dr. med
Tumor-Zentrum ZeTuP St. Gallen/Chur
Rorschacherstrasse 15
9006 St. Gallen
Switzerland

Sutisak Kitareewan, PhD
Instructor
Department of Pharmacology and Toxicology
Dartmouth Medical School
Hanover, NH 03755
USA

Victor A. Levin, MD
Neuro-Oncology Unit 431
University of Texas
M.D. Anderson Cancer Center
P.O. Box 301402
Houston, TX 77230-1402
USA

Anna Lokshin, PhD
University of Pittsburgh, Cancer Institute
Pittsburgh, PA 15232
USA

Karen Lu
Department of Gynecologic Oncology
University of Texas
M.D. Anderson Cancer Center
Houston, TX 77030
USA

Zhen Lu, MD
Department of Experimental Therapeutics
University of Texas
M.D. Anderson Cancer Center
Houston, TX 77030
USA
<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yan Ma, PhD</td>
<td>Department of Pharmacology and Toxicology</td>
</tr>
<tr>
<td></td>
<td>Dartmouth Medical School</td>
</tr>
<tr>
<td></td>
<td>Hanover, NH 03755</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Ali Mahdavi, MD</td>
<td>Division of Gynecologic Oncology</td>
</tr>
<tr>
<td></td>
<td>Chao Family Comprehensive Cancer Center</td>
</tr>
<tr>
<td></td>
<td>University of California, Irvine</td>
</tr>
<tr>
<td></td>
<td>101 The City Drive</td>
</tr>
<tr>
<td></td>
<td>Building 56, Room 262</td>
</tr>
<tr>
<td></td>
<td>Orange, CA 92868-3298</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Daniel Mailo, PhD</td>
<td>Breast Cancer Research Laboratory</td>
</tr>
<tr>
<td></td>
<td>Fox Chase Cancer Center</td>
</tr>
<tr>
<td></td>
<td>333 Cottman Avenue</td>
</tr>
<tr>
<td></td>
<td>Philadelphia, PA 19111</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Friedrich Marks, Prof., PhD</td>
<td>Deutsches Krebsforschungszentrum (DKFZ)</td>
</tr>
<tr>
<td></td>
<td>Research Program Cell and Tumor Biology</td>
</tr>
<tr>
<td></td>
<td>Im Neuenheimer Feld 280</td>
</tr>
<tr>
<td></td>
<td>69120 Heidelberg</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
</tr>
<tr>
<td>Vincent Memoli, MD</td>
<td>Department of Pathology</td>
</tr>
<tr>
<td></td>
<td>Dartmouth Medical School</td>
</tr>
<tr>
<td></td>
<td>Hanover, NH 03755</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Frank L. Meyskens, Prof.</td>
<td>University of California, Irvine</td>
</tr>
<tr>
<td></td>
<td>101 The City Drive South</td>
</tr>
<tr>
<td></td>
<td>Building 25, Suite 191, Route 81</td>
</tr>
<tr>
<td></td>
<td>Orange, CA 92868</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Gordon B. Mills, MD, PhD</td>
<td>Department of Molecular Therapeutics</td>
</tr>
<tr>
<td></td>
<td>University of Texas</td>
</tr>
<tr>
<td></td>
<td>M.D. Anderson Cancer Center</td>
</tr>
<tr>
<td></td>
<td>Houston, TX 77030</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Bradley J. Monk, MD</td>
<td>Division of Gynecologic Oncology</td>
</tr>
<tr>
<td></td>
<td>Chao Family Comprehensive Cancer Center</td>
</tr>
<tr>
<td></td>
<td>University of California, Irvine</td>
</tr>
<tr>
<td></td>
<td>101 The City Drive</td>
</tr>
<tr>
<td></td>
<td>Building 56, Room 262</td>
</tr>
<tr>
<td></td>
<td>Orange, CA 92868-3298</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Karin Müller-Decker, PhD</td>
<td>Deutsches Krebsforschungszentrum (DKFZ)</td>
</tr>
<tr>
<td></td>
<td>Research Program Cell and Tumor Biology</td>
</tr>
<tr>
<td></td>
<td>Im Neuenheimer Feld 280</td>
</tr>
<tr>
<td></td>
<td>69120 Heidelberg</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
</tr>
<tr>
<td>Hoyokhu Nishino, Prof.</td>
<td>Department of Biochemistry and Molecular Biology</td>
</tr>
<tr>
<td></td>
<td>Graduate School of Medical Science</td>
</tr>
<tr>
<td></td>
<td>Kyoto Prefectural University of Medicine</td>
</tr>
<tr>
<td></td>
<td>Kyoto 602-8566</td>
</tr>
<tr>
<td></td>
<td>Japan</td>
</tr>
<tr>
<td>Douglas M. Noonan</td>
<td>Dipartimento di Scienze Biologiche e Cliniche, Università dell’Insubria</td>
</tr>
<tr>
<td></td>
<td>Via Ravasi 2</td>
</tr>
<tr>
<td></td>
<td>21100 Varese</td>
</tr>
<tr>
<td></td>
<td>Italy</td>
</tr>
<tr>
<td>William Nugent, MD</td>
<td>Department of Surgery</td>
</tr>
<tr>
<td></td>
<td>Dartmouth Medical School</td>
</tr>
<tr>
<td></td>
<td>Hanover, NH 03755</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Robert Ozols, MD</td>
<td>Fox Chase Cancer Center</td>
</tr>
<tr>
<td></td>
<td>333 Cottman Avenue</td>
</tr>
<tr>
<td></td>
<td>Philadelphia, PA 19111</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Michael Pollak, Prof., MD</td>
<td>General Jewish Hospital</td>
</tr>
<tr>
<td></td>
<td>Medicine and Oncology</td>
</tr>
<tr>
<td></td>
<td>3755 Chemin de la Côte-Ste. Catherine</td>
</tr>
<tr>
<td></td>
<td>Montreal, Quebec H3T IE2</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
</tr>
</tbody>
</table>
Heidi Schooltink, Dr. rer. nat.
Biochemisches Institut
Christian-Albrechts-Universität zu Kiel
Olshausenstrasse 40
24098 Kiel
Germany

Hans-Jörg Senn, Prof. Dr. med.
Tumor-Zentrum ZeTuP St. Gallen/Chur
Rorschacherstrasse 15
9006 St. Gallen
Switzerland

Sumit J. Shah, PhD
Department of Pharmacology and Toxicology
Dartmouth Medical School
Hanover, NH 03755
USA

Craig Sinclair
The Cancer Council Victoria
1 Rathdowne Street
Carlton, Victoria 3053
Australia

Steven Skates, PhD
Massachusetts General Hospital
and Harvard Medical School
Boston, MA 02115
USA

Sun Yang, PhD, PharmD
Assistant Project Scientist
Department of Medicine, (Hematology/Oncology)
Chao Family Comprehensive Cancer Center
University of California, Irvine
Irvine, CA 92601
USA

Yinhua Yu, MD
Department of Experimental Therapeutics
University of Texas
M.D. Anderson Cancer Center
Houston, TX 77030
USA

Zhen Zhang, PhD
Johns Hopkins Medical Center
Baltimore, MD 21205
USA

Changping Zou, PhD
Division of Gynecologic Oncology
University of Arizona
Tucson, AZ 85724
USA