

Cancer Diagnostics

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Current and Future Trends

Edited by

Robert M. Nakamura, MD

Scripps Clinic, La Jolla, CA

Wayne W. Grody, MD, PhD

UCLA School of Medicine, Los Angeles, CA

James T. Wu, PhD

ARUP Labs, Salt Lake City, UT

Raymond B. Nagle, MD, PhD

Arizona Cancer Center, Tucson, AZ



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Preface

In the past, many tumor marker laboratory tests have not been sensitive enough for the very early detection of cancer. However, many of them have nonetheless proved useful in monitoring therapy, following the course of the tumor, and predicting prognosis. Today, cancer may be viewed as a genetic disease with various specific chromosomal and nucleotide aberrations, such as mutations, deletions, gene amplification, gene rearrangements, and translocations occurring during the transformation of a normal cell into a malignant cell.

The considerable advances in technology during the past several years have greatly enhanced our ability to detect human cancers in the very early stages of tumor formation. These technologies include: (1) nucleotide molecular assays (genomics); (2) proteomics (multiplex protein measurements); (3) DNA microarrays; and (4) bioinformatics. Many of these technologies are already helping in the integration and use of multiple biomarkers for tumors. Although the individual biomarkers may reveal only limited information, the use of multiple biomarkers can help markedly elevate the diagnostic capabilities for early detection of tumors.

Nucleic acid molecular tests are unusual in that the tests do not measure any physiological state and can be performed on fresh, frozen, or archival biological tissue specimens. Many of the molecular tests may be specific to one disease. The modern approach to the diagnosis and understanding of cancer has been characterized by the use of molecular and protein profiling. With the help of bioinformatics, artificial intelligence, and neural networks, even more accurate and sensitive diagnostic tests for cancer will surely be developed.

Cancer Diagnostics: Current and Future Trends is concerned primarily with those clinical laboratory tests that may already, or in the near future, help in the early detection, evaluation, and prediction of human tumors for specific therapeutic decisions. It should be of high interest and value to physicians who diagnose and treat cancer patients, and to clinical laboratory scientists and pathologists who are interested in diagnostic clinical laboratory tests for cancer and their future evaluation.

Robert M. Nakamura, MD

Wayne W. Grody, MD, PhD

James T. Wu, PhD

Raymond B. Nagle, MD, PhD

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Contributors

- DANIEL A. ARBER, MD • *Department of Pathology, Stanford University Medical Center, Stanford, CA*
- KENNETH J. BLOOM, MD • *Senior Medical Director, US Labs, Irvine, CA*
- JENNIE C. C. CHANG, PhD • *Beckman Coulter Inc., San Diego, CA*
- HELEN H. CHUN, PhD • *Division of Molecular Pathology, Department of Pathology and Laboratory Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- ALISTAIR J. COCHRAN, MD, FRCP • *Departments of Pathology and Laboratory Medicine and Surgery, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- JUDITH A. FINLAY, PhD • *Hybritech Inc., A Subsidiary of Beckman Coulter Inc. San Diego, CA*
- PATRICIA A. GANZ, MD • *Department of Hematology and Oncology and School of Public Health, Department of Health Services and Medicine and The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- RICHARD A. GATTI, MD • *Division of Molecular Pathology, Department of Pathology and Laboratory Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- ARMAND B. GLASSMAN, MD • *Department of Pathology and Laboratory Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX*
- KAREN GRAY, PhD • *Millennium Pharmaceuticals Inc., Cambridge, MA*
- WAYNE W. GRODY, MD, PhD • *Divisions of Medical Genetics and Molecular Pathology, Departments of Pathology and Laboratory Medicine, Pediatrics, and Human Genetics, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- DAVE S. B. HOON, PhD • *Department of Molecular Oncology, John Wayne Cancer Institute, Santa Monica, CA*
- VICKI L. HOPWOOD, MS • *Cytogenetic Technology Program, MD Anderson Cancer Center, The University of Texas, Houston, TX*
- PETER C. HU, MS • *Cytogenetic and Medical Technology Programs, MD Anderson Cancer Center, The University of Texas, Houston, TX*
- YASUSHI KASAHARA, PhD, DMSc • *Department of Clinical Pathology, School of Medicine, Showa University, Tokyo, Japan*
- FERDYNAND KOS, PhD • *Beckman Coulter Inc., San Diego, CA*
- KRISTINE KUUS-REICHEL, PhD • *Beckman Coulter Inc., San Diego, CA*
- FRANK J. LIU, MD • *F. J. Medical Consultation Services, Sugar Land, TX*
- KEVIN S. LIU, MD • *Department of Family Medicine, Scott & White Clinics (Waco Clinic), Texas A&M University College of Medicine, Waco, TX*
- ALFREDO MARTÍNEZ, PhD • *Cell and Cancer Biology Branch, National Cancer Institute, Bethesda, MD*
- STEPHEN D. MIKOLAJCZYK, MS • *Hybritech Inc., A Subsidiary of Beckman Coulter Inc. San Diego, CA*
- MIDORI MITSUI, PhD • *Division of Molecular Pathology, Department of Pathology and Laboratory Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA*

- REBECCA MOSHER, MD • *Millennium Pharmaceuticals Inc., Cambridge, MA*
- JAMES L. MULSHINE, MD • *Cell and Cancer Biology Branch, National Cancer Institute, Bethesda, MD*
- FARAMARZ NAEIM, MD • *Department of Pathology and Laboratory Medicine, UCLA Medical Center, Los Angeles, CA*
- RAYMOND B. NAGLE, MD, PhD • *Department of Pathology, Arizona Cancer Center, Tucson, AZ*
- SHAREEF A. NAHAS, MS • *Division of Molecular Pathology, Department of Pathology and Laboratory Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- ROBERT M. NAKAMURA, MD • *Department of Pathology, Scripps Clinic, La Jolla, CA*
- CHARLES T. NUGENT, PhD • *Beckman Coulter Inc., San Diego, CA*
- THOMAS M. PRIBYL, PhD • *Hybritech Inc., A Subsidiary of Beckman Coulter, Inc., San Diego, CA*
- ASIF RASHID, MD, PhD • *Department of Pathology, The University of Texas MD Anderson Cancer Center, Houston, TX*
- RAMUNE RELIENE, PhD • *Department of Pathology and Laboratory Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- HARRY G. RITTENHOUSE, PhD • *Hybritech Inc., A Subsidiary of Beckman Coulter, Inc., San Diego, CA*
- ALICE A. ROBERTS, MD, PhD • *Department of Pathology and Laboratory Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- JEFFREY S. ROSS, MD • *Department of Pathology and Laboratory Medicine, Albany Medical College, Albany, NY and Millennium Pharmaceuticals Inc., Cambridge, MA*
- ROBERT H. SCHIESTL, PhD • *Departments of Pathology, Environmental Health, and Radiation Oncology, UCLA Schools of Medicine and Public Health, Los Angeles, CA*
- JOYCE L. SELDON, MS CGC • *Jonsson Comprehensive Cancer Center, University of California, Los Angeles, CA*
- SOPHIE SONG, MD, PhD • *Department of Pathology and Laboratory Medicine, The David Geffen School of Medicine at UCLA, Los Angeles, CA*
- JAMES STEC • *Millennium Pharmaceuticals Inc., Cambridge, MA*
- BRET TABACK, MD • *Department of Molecular Oncology, John Wayne Cancer Institute, Santa Monica, CA*
- ENG M. TAN, MD • *W. M. Keck Autoimmune Disease Center, Department of Molecular and Experimental Medicine, The Scripps Research Institute, La Jolla, CA*
- JORDI TAULER, PhD • *Cell and Cancer Biology Branch, National Cancer Institute, Bethesda, MD*
- C. HOWARD TSENG, MD, PhD • *College of Medicine, Chung Shan Medical University, Taichung, Taiwan*
- YUTAKA TSUKADA, MD, PhD • *Hachioji Main Labs, SRL Inc., Tokyo, Japan*
- R. BRUCE WALLACE, PhD • *Hybritech Inc., A Subsidiary of Beckman Coulter, Inc., San Diego, CA*
- JAMES T. WU, MD • *ARUP Labs, University of Utah, Salt Lake City, UT*
- TSUNG-TEH WU, MD, PhD • *Department of Pathology, The University of Texas MD Anderson Cancer Center, Houston, TX*