Manfred Schwab *Editor* 

# Encyclopedia of Cancer

Fourth Edition



### **Encyclopedia of Cancer**

## Manfred Schwab Editor

## **Encyclopedia of Cancer**

Fourth Edition

With 1230 Figures and 260 Tables



Editor
Manfred Schwab
German Cancer Research Center (DKFZ)
Tumorgenetik, Heidelberg, Germany

ISBN 978-3-662-46874-6 ISBN 978-3-662-46875-3 (eBook) ISBN 978-3-662-47424-2 (print and electronic bundle) DOI 10.1007/978-3-662-46875-3

Library of Congress Control Number: 2017933328

#### © Springer-Verlag Berlin Heidelberg 2001, 2008, 2011, 2017

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature The registered company is Springer-Verlag GmbH Germany The registered company address is: Heidelberger Platz 3, 14197 Berlin, Germany

#### **Preface to the Fourth Edition**

Welcome to the fourth edition of the *Encyclopedia of Cancer*. The third edition had appeared in 2011, and the tremendous response by the scientific community has encouraged us to prepare a subsequent edition that is now available. The past 5 years have seen an enormous progress in cancer research, with particular emphasis on the bench-to-bed paradigm and the application of personalized cancer medicine.

For this new edition, the multidisciplinary approach bridging basic science and clinical application was further developed. Numerous new entries by authorities from the international scientific community were added to meet the substantial progress in molecular cancer etiology, diagnostics, and therapy. Entries from the third edition were updated, and new entries were added addressing central areas of basic and clinical cancer research, such as personalized cancer medicine, immunotherapy, pediatric and adult oncology, and epigenetics.

The *Encyclopedia of Cancer*, fourth edition, will be available both in print and online version. The online version is designed as an interactive and dynamic database where authors at any time will be able to modify and update presentations in order to keep the content up to date. Additionally, new entries can be entered at any time, and contributors are encouraged to suggest new topics that they feel are insufficiently covered.

The technical preparation of the *Encyclopedia of Cancer* would not have been possible without the competent and dedicated input by Daniela Graf and Melanie Thanner. Their excellent and pleasant cooperation is highly appreciated. Thanks also to the publisher who has taken every effort to develop this prestigious *Encyclopedia of Cancer* into a useful instrument from which both basic scientists and clinicians may benefit.

Heidelberg, March 1, 2016 Manfred Schwab

#### **Preface to the Third Edition**

Recent developments in the rapidly developing field of cancer research are seeing a dynamic progress in basic and clinical cancer science, with translational research increasingly becoming a new paradigm. In particular, the identification of a large number of prognostic and predictive clinically validated biomarkers now allows exciting and promising new approaches in both personalized cancer medicine and targeted therapies to be pursued.

The third edition of the *Encyclopedia of Cancer* is now available 10 years after the first edition had come out in 2001. Numerous new entries addressing topics of basic cancer research have been added. As a major new feature, upto-date and authoritative essays present a comprehensive picture of topics ranging from pathology, to clinical oncology and targeted therapies for personalized cancer medicine for major cancers types, such as breast cancer, colorectal cancer, prostate cancer, ovarian cancer, renal cancer, lung cancer, and hematological malignancies, leukemias, and lymphomas. This information source should be of great value to both the clinical and basic science community.

The *Encyclopedia of Cancer*, Third Edition, is available both in print and online versions. Contributors to the *Encyclopedia of Cancer* are encouraged to keep their presentations up-to-date by online editing. Clinical and basic scientists are encouraged to suggest new essays to the editor-in-chief.

The technical preparation of the *Encyclopedia of Cancer* would not have been possible without the competent input of Jutta Jaeger-Hamers, Melanie Thanner, and Saskia Ellis; their excellent and pleasant cooperation is highly appreciated.

Heidelberg, Germany Manfred Schwab

#### **Preface to the Second Edition**

Given the overwhelming success of the first edition of the Cancer Encyclopedia, which appeared in 2001, and the amazing development in the different fields of cancer research, it has been decided to publish a second fully revised and expanded edition, following the principal concept of the first edition that has proven so successful.

Recent developments are seeing a dynamic merging of basic and clinical science, with translational research increasingly becoming a new paradigm in cancer research. The merging of different basic and clinical science disciplines toward the common goal of fighting against cancer has long ago called for the establishment of a comprehensive reference source both as a tool to close the language gap between clinical and basic science investigators and as a platform of information for advanced students and informed laymen alike. It is intended to be a resource for all interested in information beyond their own specific expertise.

While the first edition had featured contributions from approximately 300 scientists/clinicians in one volume, the second edition includes more than 1,000 contributors in four volumes with an A–Z format of more than 7,000 entries. It provides definitions of common acronyms and short definitions of both related terms and processes in the form of keyword entries. A major information source are detailed essays that provide comprehensive information on syndromes, genes and molecules, and processes and methods. Each essay is well structured, with extensive cross-referencing between entries. Essays represent original contributions by the corresponding authors, all distinguished scientists in their own field, editorial input has been carefully restricted to formal aspects.

A panel of field editors, each an eminent international expert for the corresponding field, has served to ensure the presentation of timely and authoritative Encyclopedia entries. These new traits are likely to meet the expectance that a wide community has toward a cancer reference work.

An important element in the preparation of the Encyclopedia has been the competent support by the Springer crew, Dr. Michaela Bilic, Saskia Ellis, and lately, Jana Simniok. I am extremely grateful for their excellent and pleasant cooperation.

The Cancer Encyclopedia, Second Edition, will be available both in print and online versions. Clinicians, research scientists, and advanced students will find this an amazing resource and a highly informative reference for cancer.

Heidelberg, Germany Manfred Schwab

#### **Preface to the First Edition**

Cancer, although a dreadful disease, is at the same time a fascinating biological phenotype. Around 1980, cancer was first attributed to malfunctioning genes and, subsequently, cancer research has become a major area of scientific research supporting the foundations of modern biology to a great extent. To unravel the human genome sequence was one of those extraordinary tasks, which has largely been fueled by cancer research, and many of the fascinating insights into the genetic circuits that regulate developmental processes have also emerged from research on cancer.

Diverse biological disciplines such as cytogenetics, virology, cell biology, classical and molecular genetics, epidemiology, biochemistry, together with the clinical sciences, have closed ranks in their search of how cancer develops and to find remedies to stop the abnormal growth that is characteristic of cancerous cells. In the attempt to establish how, why, and when cancer occurs, a plethora of genetic pathways and regulatory circuits have been discovered that are necessary to maintain general cellular functions such as proliferation, differentiation, and migration. Alterations of this fine-tuned network of cascades and interactions, due to endogenous failure or to exogenous challenges by environmental factors, may disable any member of such regulatory pathways. This could, for example, induce the death of the affected cell, may mark it for cancerous development or may immediately provide it with a growth advantage within a particular tissue.

Recent developments have seen the merger of basic and clinical science. Of the former, particularly genetics has provided instrumental and analytical tools with which to assess the role of environmental factors in cancer, to refine and enable diagnosis prior to the development of symptoms, and to evaluate the prognosis of patients. Hopefully, even better strategies for causal therapy will become available in the future. Merging the basic and clinical science disciplines toward the common goal of fighting cancer calls for a comprehensive reference source to serve both as a tool to close the language gap between clinical and basic science investigators and as an information platform for the student and the informed layperson alike. Obviously this was an extremely ambitious goal, and the immense progress in the field cannot always be portrayed in line with the latest developments. The aim of the Encyclopedia is to provide the reader with an entrance point to a particular topic. It should be of value to both basic and clinical scientists working in the field of cancer research. Additionally, both students and lecturers in the life sciences should

xii Preface to the First Edition

benefit highly from this database. I therefore hope that this Encyclopedia will become an essential complement to existing science resources.

The attempts to identify the mechanisms underlying cancer development and progression have produced a wealth of facts, and no single individual is capable of addressing the immense breadth of the field with undisputed authority. Hence, the "Encyclopedic Reference of Cancer" is the work of many authors, all of whom are experts in their fields and reputable members of the international scientific community. Each author contributed a large number of keyword definitions and in-depth essays and in so doing it was possible to cover the broad field of cancer-related topics within a single publication. Obviously this approach entails a form of presentation, in which the author has the freedom to set priorities and to promote an individual point of view. This is most obvious when it comes to nomenclature, particularly that of genes and proteins. Although the editorial intention was to apply the nomenclature of the Human Genome Organisation (HUGO), the more vigorous execution of this attempt has been left to future endeavors.

In the early phase of planning the Encyclopedia, exploratory contacts to potential authors produced an overwhelmingly positive response. The subsequent contact with almost 300 contributory authors was a marvelous experience, and I am extremely grateful for their excellent and constructive cooperation. An important element in the preparation of the Encyclopedia has been the competent secretarial assistance of Hiltrud Wilbertz of the Springer-Verlag and of Ingrid Cederlund and Cornelia Kirchner of the DKFZ. With great attention to detail they helped to keep track of the technical aspects in the preparation of the manuscript. It was a pleasure to work with the Springer crew, including Dr. Rolf Lange as the Editorial Director (Medicine) and Dr. Thomas Mager, Senior Editor for Encyclopedias and Dictionaries. In particular I wish to thank Dr. Walter Reuss, who untiringly has mastered all aspects and problems associated with the management of the numerous manuscripts that were received from authors of the international scientific community. It has been satisfying and at times comforting to see how he made illustration files come alive. Thanks also to Dr. Claudia Lange who, being herself a knowledgeable cell biologist, has worked as the scientific editor. Her commitment and interest have substantially improved this Encyclopedia. As a final word, I would like to stress that although substantial efforts have been made to compose factually correct and well-understandable presentations, there may be places where a definition is incomplete or a phrase in an essay is flawed. All contributors to this Encyclopedia will be extremely happy to receive possible corrections, or revisions, in order for them to be included in any future editions of the "Encyclopedic Reference of Cancer."

Heidelberg, Germany Manfred Schwab

#### **Editor-in-Chief**

#### Manfred Schwab, Dr. rer. nat.

University-Professor of Genetics Neuroblastoma Genomics B087 German Cancer Research Center (DKFZ)

#### **Contributors**

Apart from few editorial input, the respective authors are responsible for the content of their own texts.

Vesa Aaltonen Department of Ophthalmology, University of Turku, Turku, Finland

**Trond Aasen** Department of Pathology, Vall d'Hebron University Hospital, Barcelona, Spain

**Cory Abate-Shen** Herbert Irving Comprehensive Cancer Center, Columbia University Medical Center, New York, NY, USA

**Phillip H. Abbosh** Department of Pathology and Laboratory Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

**Kotb Abdelmohsen** RNA Regulation Section, National Institute on Aging, National Institutes of Health, Biomedical Research Center, Baltimore, MD, USA

**Fritz Aberger** Department of Molecular Biology, University of Salzburg, Salzburg, Austria

**Hinrich Abken** Tumor Genetics, Clinic I Internal Medicine, University Hospital Cologne, and Center for Molecular Medicine Cologne, University of Cologne, Cologne, Germany

**Amal M. Abu-Ghosh** Department of Oncology and Pediatrics, Lombardi Comprehensive Cancer Center, Georgetown University, Washington, DC, USA

**Rosita Accardi** Infections and Cancer Biology Group, International Agency for Research on Cancer, Lyon, France

**Filippo Acconcia** Molecular and Cellular Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Christina L. Addison** Cancer Therapeutics Program, Ottawa Hospital Research Institute, Ottawa, ON, Canada

Vaqar M. Adhami School of Medicine and Public Health, University of Wisconsin, Madison, WI, USA

**Farrukh Afaq** Department of Dermatology, University of Alabama at Birmingham, Birmingham, AL, USA

**Chapla Agarwal** SOP-Administration, University of Colorado Denver – Anschutz Medical Campus, Aurora, CO, USA

xvi Contributors

**Garima Agarwal** College of Pharmacy, The Ohio State University, Columbus, OH, USA

**Rajesh Agarwal** Department of Pharmaceutical Sciences, Skaggs School of Pharmacy and Pharmaceutical Sciences, University of Colorado, Aurora, CO, USA

**Patrizia Agostinis** Department of Cellular and Molecular Medicine, Cell Death Research and Therapy Lab, KU Leuven Campus Gasthuisberg, Leuven, Belgium

Terje C. Ahlquist Roche Norway, Oslo, Norway

**Kazi Mokim Ahmed** Department of Radiation Oncology, Houston Methodist Research Institute, Houston, TX, USA

**Khalil Ahmed** Minneapolis VA Health Care System and University of Minnesota, Minneapolis, MN, USA

**Shahid Ahmed** Department of Oncology, University of Saskatchewan, Saskatoon, SK, Canada

Joohong Ahnn Department of Life Science, Hanyang University, Seoul, South Korea

Cem Akin University of Michigan, Ann Arbor, MI, USA

**Gada Al-Ani** Department of Cancer Biology, University of Kansas Cancer Center, The University of Kansas Medical Center, Kansas City, KS, USA

**Ami Albihn** Department of Microbiology, Tumor and Cell Biology (MTC), Karolinska Institutet, Stockholm, Sweden

Adriana Albini IRCCS Multimedica, Milano, Italy

**Jérôme Alexandre** Faculté de Médecine Paris – Descartes, UPRES 18-33, Groupe Hospitalier Cochin – Saint Vincent de Paul, Paris, France

**Amal Yahya Alhefdhi** Department of Surgery – MBC 40, King Faisal Specialist Hospital and Research Center, Riyadh, Kingdom of Saudi Arabia

**Shadan Ali** Karmanos Cancer Institute, Wayne State University, Detroit, MI, USA

**Malcolm R. Alison** Centre for Diabetes and Metabolic Medicine, Queen Barts and the London School of Medicine and Dentistry, Institute of Cell and Molecular Science, London, UK

**Catherine Alix-Panabieres** University Medical Center, Lapeyronie Hospital, Montpellier, France

**Alison L. Allan** Cancer Research Laboratories, London Regional Cancer Program and Departments of Oncology and Anatomy and Cell Biology, Schulich School of Medicine and Dentistry, University of Western Ontario, London, ON, Canada

Contributors xvii

**Paola Allavena** Department of Immunology, Fondazione Humanitas per la Ricerca, Rozzano, Milan, Italy

**Damian A. Almiron** Departments of Pediatrics and of Genetics, Norris Cotton Cancer Center, Geisel School of Medicine at Dartmouth, Hanover, NH, USA

Angel Alonso Deutsches Krebsforschungszentrum, Heidelberg, Germany

**Gianfranco Alpini** Departments of Medicine and Medical Physiology, Texas A&M Health Science Center, College of Medicine, Central Texas Veterans Health Care System, Baylor Scott & White Health, Temple, TX, USA

**Marie-Clotilde Alves-Guerra** Molecular and Cellular Oncogenesis Program, The Wistar Institute, Philadelphia, PA, USA

**Pierre Åman** LLCR, Department of Pathology, Institute of Biomedicine, Sahlgrenska Academy, Goteborg University, Gothenburg, Sweden

**Kurosh Ameri** Department of Medicine, Division of Cardiology, Translational Cardiac Stem Cell Program, Eli and Edythe Broad Center of Regeneration Medicine and Stem Cell Research, Cardiovascular Research Institute, University of California San Francisco (UCSF), San Francisco, CA, USA

Mounira Amor-Guéret Institut Curie – UMR 3348 CNRS, Orsay Cedex, France

**Grace Amponsah** Department of Pathology, Comprehensive Cancer Centre, The Ohio State Medical Centre, Columbus, OH, USA

John W. Anderson Dream Master Laboratory, Chandler, AZ, USA

**Kenneth C. Anderson** Department of Medical Oncology, Jerome Lipper Multiple Myeloma Center, Dana-Farber Cancer Institute, Boston, MA, USA

**Nicolas André** Centre for Research in Oncobiology and Oncopharmacology, INSERM U911, Marseille, France

Metronomics Global Health Initiative, Marseille, France

Department of Pediatric Hematology and Oncology, La Timone Children's Hospital, Marseille, France

**Peter Angel** Division of Signal Transduction and Growth Control, Deutsches Krebsforschungszentrum, Heidelberg, Germany

**Andrea Anichini** Department of Experimental Oncology, Fondazione IRCCS Istituto Nazionale per lo Studio e la Cura dei Tumori, Milan, Italy

**Talha Anwar** Medical Scientist Training Program and Department of Pathology, University of Michigan Medical School, Ann Arbor, MI, USA

**Peter D. Aplan** Genetics Branch, Center for Cancer Research, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

xviii Contributors

**Natalia Aptsiauri** UGC Laboratorio Clínico Hospital Universitario Virgen de las Nieves Facultad de Medicina, Universidad de Granada, Granada, Spain

Rami I. Aqeilan He Lautenberg Center for General and Tumor Immunology, Department of Immunology and Cancer Research-Institute for Medical Research Israel-Canada, Hebrew University-Hadassah Medical School, Jerusalem, Israel

**Tsutomu Araki** Departments of Obstetrics and Gynecology, Nippon Medical School, Kawasaki and Tokyo, Japan

**Sanchia Aranda** School of Nursing, The University of Melbourne, Carlton, VIC, Australia

**Diego Arango** CIBBIM - Nanomedicina Oncologia Molecular, Vall d'Hebron Hospital Research Institute, Barcelona, Spain

**David J. Araten** NYU School of Medicine, Laura and Isaac Perlmutter Cancer Center and the New York VA Medical Center, New York, NY, USA

**Laura Arbona** Department of Biology, University of the Balearic Islands, Palma de Mallorca, Spain

**Valentina Arcangeli** Department of Oncology, Instituto Scientifico Romagnolo per lo s, Infermi Hospital, Rimini, Italy

**Gemma Armengol** Faculty Biosciences, U. Biological Anthropology, Universitat Autonoma de Barcelona, Barcelona, Spain

**Elias S. J. Arnér** Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Stockholm, Sweden

**Marie Arsenian-Henriksson** Department of Microbiology, Tumor and Cell Biology (MTC), Karolinska Institutet, Stockholm, Sweden

**Stefano Aterini** Department of Experimental Pathology and Oncology, University of Firenze, Florence, Italy

**Scott Auerbach** Biomolecular Screening, National Toxicology Program, National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, NC, USA

**Katarzyna Augoff** Department of Gastrointestinal and General Surgery, Wroclaw Medical University, Wroclaw, Poland

Marc Aumercier CNRS, INRA, UMR 8576-UGSF-Unité de Glycobiologie Structurale et Fonctionnelle, Université de Lille, Villeneuve d'Ascq, France

**Riccardo Autorino** Clinica Urologica, Seconda Università degli Studi, Naples, Italy

**Matias A. Avila** Division of Hepatology, CIMA, University of Navarra, Pamplona, Spain

**Hava Karsenty Avraham** Division of Experimental Medicine, Beth Israel Deaconess Medical Center, Harvard Institutes of Medicine, Boston, MA, USA

Contributors

**Shalom Avraham** Division of Experimental Medicine, Beth Israel Deaconess Medical Center, Harvard Institutes of Medicine, Boston, MA, USA

Sanjay Awasthi United States Longview Cancer Center, Longview, TX, USA

Yogesh C. Awasthi City of Hope, Duarte, CA, USA

**Debasis Bagchi** Department of Pharmacy Sciences, Creighton University Medical Center, Omaha, NE, USA

**Xue-Tao Bai** State Key Laboratory of Medical Genomics, Shanghai Institute of Hematology, Rui-Jin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, People's Republic of China

**Michael J. Baine** Department of Radiation Oncology, Fred and Pamela Buffett Cancer Center, University of Nebraska Medical Center, Omaha, NE, USA

**Jürgen Bajorath** Department of Life Science Informatics, B-IT, University of Bonn, Bonn, Germany

**Stuart G. Baker** Biometry Research Group, National Cancer Institute, Bethesda, MD, USA

**Elizabeth K. Balcer-Kubiczek** Department of Radiation Oncology, Marlene and Stewart Greenebaum Cancer Center, University of Maryland School of Medicine, Baltimore, MD, USA

**Enke Baldini** Department of Experimental Medicine, University of Rome "Sapienza", Rome, Italy

**Graham S. Baldwin** Department of Surgery, Austin Health, The University of Melbourne, Heidelberg, VIC, Australia

Sherri Bale GeneDx, Rockville, MD, USA

Laurent Balenci INSERM Unité Mixte 873, Grenoble, France

**Sushanta K. Banerjee** Cancer Research Unit, Research Division, VA Medical Center, Kansas City, MO, USA

**Michal Baniyash** The Lautenberg Center for Immunology and Cancer Research, Israel-Canada Medical, Research Institute Faculty of Medicine, The Hebrew University, Jerusalem, Israel

**Shyam S. Bansal** Division of Cardiovascular Disease, University of Alabama at Birmingham, Birmingham, AL, USA

**Nektarios Barabutis** Frank Reidy Research Center for Bioelectrics, Old Dominion University, Norfolk, VA, USA

**Aditya Bardia** Massachusetts General Hospital Cancer Center and Harvard Medical School, Boston, MA, USA

**Rafijul Bari** Departments of Medicine and Molecular Sciences, Vascular Biology Center, Cancer Institute, University of Tennessee Health Science Center, Memphis, TN, USA

xx Contributors

**Nicola L. P. Barnes** Department of Academic Surgery, South Manchester University Hospital, Manchester, UK

Robert Barouki Inserm UMR-S 1124, Université Paris Descartes, Paris, France

**Juan Miguel Barros-Dios** Department of Preventive Medicine and Public Health, School of Medicine, University of Santiago de Compostela, Santiago de Compostela, Spain

**Harry Bartelink** Department of Radiotherapy, The Netherlands Cancer Institute–Antoni van Leeuwenhoek Hospital, Amsterdam, The Netherlands

**Stefan Barth** Institute of Infectious Disease and Molecular Medicine and Department of Integrative Biomedical Sciences, University of Cape Town, Cape Town, South Africa

**Helmut Bartsch** Division of Toxicology and Cancer Risk Factors, German Cancer Research Center (DKFZ), Heidelberg, Germany

Thomas Barz Max-Panck-Institut für Psychiatrie, Munich, Germany

**Holger Bastians** Abt. Molekulare Onkologie, Universitätsmedizin Göttingen, Göttingen, Germany

Anna Batistatou Ioannina University Medical School, Ioannina, Greece

**Surinder K. Batra** Eppley Institute for Research in Cancer and Allied Diseases and Department of Biochemistry and Molecular Biology, University of Nebraska Medical Center, Omaha, NE, USA

**Frederic Batteux** Faculté de Médecine Paris – Descartes, UPRES 18-33, Groupe Hospitalier Cochin – Saint Vincent de Paul, Paris, France

Jacques Baudier INSERM Unité Mixte 873, Grenoble, France

Paul Bauer Pfizer Research Technology Center, Cambridge, MA, USA

**Tobias Bäuerle** Institute of Radiology, University Medical Center Erlangen, Erlangen, Germany

**Asne R. Bauskin** Department of Medicine, Centre for Immunology, St. Vincent's Hospital, University of New South Wales, Sydney, NSW, Australia

**Boon-Huat Bay** Department of Anatomy, National University of Singapore, Singapore, Singapore

**Jean-Claude Béani** Clinique Universitaire de Dermato-Vénéréologie, Photobiologie et Allergologie, Pôle Pluridisciplinaire de Médecine, CHU de Grenoble, Grenoble, France

**Nicole Beauchemin** Goodman Cancer Research Centre, McGill University, Montreal, QC, Canada

**John F. Bechberger** Department of Cellular and Physiological Sciences, The University of British Columbia, Vancouver, BC, Canada

Contributors xxi

**Gerhild Becker** Department of Palliative Care, University Hospital Freiburg, Freiburg, Germany

**Katrin Anne Becker** Department of Molecular Biology, University of Duisburg-Essen, Essen, Germany

Marie E. Beckner Department of Pathology, University of Pittsburgh School of Medicine, Pittsburgh, PA, USA

**Roberto Bei** Department of Clinical Sciences and Translational Medicine, Faculty of Medicine, University of Rome "Tor Vergata", Rome, Italy

**Claus Belka** Department of Radiation Oncology, University of Tübingen, Tübingen, Germany

**Anita C. Bellail** Department of Pathology and Laboratory Medicine, Henry Ford Health System, Detroit, MI, USA

**Larissa Belov** School of Molecular and Microbial Biosciences, University of Sydney, Sydney, NSW, Australia

**P. Annécie Benatrehina** College of Pharmacy, The Ohio State University, Columbus, OH, USA

**Maurizio Bendandi** Department of Clinical Medicine, School of Medicine, Ross University, Roseau, Commonwealth of Dominica

**Yaacov Ben-David** Division of Molecular and Cellular Biology, Sunnybrook Health Sciences Centre, Toronto, ON, Canada

**Martin Benesch** Division of Pediatric Hematology and Oncology, Department of Pediatrics and Adolescence Medicine, Medical University of Graz, Graz, Austria

**Suzanne M. Benjes** Cancer Genetics Research, University of Otago, Christchurch, New Zealand

**Carmen Berasain** Division of Hepatology, CIMA, University of Navarra, Pamplona, Spain

**Alan Berezov** Department of Pathology, Laboratory Medicine and Abramson Cancer Center, University of Pennsylvania, Philadelphia, PA, USA

**Rob J. W. Berg** University Medical Center Utrecht, Utrecht, The Netherlands

**Corinna Bergelt** Institute of Medical Psychology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Rene Bernards The Netherlands Cancer Institute, Amsterdam, The Netherlands

**Zwi Berneman** Vaccine and Infections Disease Institute (VAXINFECTIO) Laboratory of Experimental Hematology, Faculty of Medicine and Health Sciences, University of Antwerp, Edegem, Belgium

xxii Contributors

**Jérôme Bertherat** Endocrinology, Metabolism and Cancer Department, INSERM U567, Institut Cochin, Paris, France

**Saverio Bettuzzi** Department of Biomedicine, Biotechnology and Translational Research, University of Parma, Parma, Italy

**Arun Bhardwaj** Department of Oncologic Sciences, Mitchell Cancer Institute, University of South Alabama, Mobile, AL, USA

**Kumar M. R. Bhat** Department of Anatomy, Kasturba Medical College, Manipal University, Manipal, Karnataka, India

Malaya Bhattacharya-Chatterjee University of Cincinnati and The Barrett Cancer Center, Cincinnati, OH, USA

**Caterina Bianco** Division of Extramural Activities, National Institutes of Health, Rockville, MD, USA

**Tina Bianco-Miotto** Robinson Research Institute and School of Agriculture, Food and Wine, The University of Adelaide, Adelaide, SA, Australia

**Jean-Michel Bidart** Department of Clinical Biology, Institut Gustave-Roussy, Villejuif, France

**Jaclyn A. Biegel** Department of Pathology and Laboratory Medicine, Children's Hospital of Los Angeles, Los Angeles, CA, USA

Margherita Bignami Istituto Superiore di Sanita', Rome, Italy

**Irene V. Bijnsdorp** Department of Medical Oncology, VU University Medical Center, Amsterdam, The Netherlands

**Chen Bing** Institute of Ageing and Chronic Disease, University of Liverpool, Liverpool, UK

**Angelique Blanckenberg** Department of Chemistry and Polymer Science, Stellenbosch University, Matieland, South Africa

**Giovanni Blandino** Translational Oncogenomic Laboratory, Regina Elena Cancer Institute, Rome, Italy

**David E. Blask** Laboratory of Chrono-Neuroendocrine Oncology, Department of Structural and Cellular Biology, Tulane University School of Medicine, New Orleans, LA, USA

**Jonathan Blay** Department of Pharmacology, Dalhousie University, Halifax, NS, Canada

Peter Blume-Jensen Xtuit Pharmaceuticals, Boston, MA, USA

**Sarah Bocchini** Department of Experimental Medicine, University of Rome "Sapienza", Rome, Italy

**Ann M. Bode** The Hormel Institute, University of Minnesota, Austin, MN, USA

Paolo Boffetta Icahn School of Medicine at Mount Sinai, New York, NY, USA

Contributors xxiii

**Stefan K. Bohlander** Faculty of Medical and Health Sciences, The University of Auckland, Auckland, New Zealand

**Valentina Bollati** EPIGET - Epidemiology, Epigenetics and Toxicology Lab - Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy

**Subbarao Bondada** Department of Microbiology, Immunology and Molecular Genetics, University of Kentucky, Lexington, KY, USA

Maria Grazia Borrello Department of Experimental Oncology and Molecular Medicine, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

**Giuseppe Borzacchiello** Department of Veterinary Medicine and Animal Productions, University of Naples "Federico II", Naples, Italy

**Valerie Bosch** Forschungsschwerpunkt Infektion und Krebs, F020, German Cancer Research Center (DKFZ), Heidelberg, Germany

**Chris Boshoff** Cancer Research Campaign Viral Oncology Group, Wolfson Institute for Biomedical Research, University College London, London, UK

Irina Bosman Institute of Pharmacy, University of Bonn, Bonn, Germany

**Galina I. Botchkina** Department of Pathology, Stony Brook University, Stony Brook, NY, USA

Institute of Chemical Biology and Drug Discovery, Stony Brook University, Stony Brook, NY, USA

**Franck Bourdeaut** Département de pédiatrie, INSERM 830, Biologie et génétique des tumeurs, Institut Curie, Paris, France

**Jean-Pierre Bourquin** Pediatric Oncology, University Children's Hospital Zurich, Zurich, Switzerland

**Hassan Bousbaa** Instituto Investigação Formação Avançada Ciências Tecnologias Saúde, CESPU – Cooperativa de Ensino Superior Politecnico e Universitario, Gandra PRD, Portugal

**Norman Boyd** Campbell Family Institute for Breast Cancer Research, Ontario Cancer Institute, Toronto, ON, Canada

**Sven Brandau** Department of Otorhinolaryngology, University Duisburg-Essen, Essen, Germany

**Burkhard H. Brandt** Institute of Clinical Chemistry, University Medical Centre Schleswig-Holstein, Kiel, Germany

**Hiltrud Brauch** Breast Cancer Susceptibility and Pharmacogenomics, Dr. Margarete Fischer-Bosch-Institute of Clinical Pharmacology, University of Tübingen, Stuttgart, Germany

**Massimo Breccia** Department of Cellular Biotechnologies and Hematology, Sapienza University, Rome, Italy

xxiv Contributors

**Samuel N. Breit** Cytokine Biology and Inflammation Research Program, St Vincent's Centre for Applied Medical Research (AMR), St Vincent's Hospital, Sydney, NSW, Australia

**Edwin Bremer** Department of Pathology and Laboratory Medicine, Section Medical Biology, Laboratory for Tumor Immunology, University Medical Center Groningen, Groningen, The Netherlands

**Catherine Brenner** INSERM UMR-S 769, Labex LERMIT, Châtenay-Malabry, University of Paris Sud, Paris, France

**David J. Brenner** Department of Radiation Oncology, Columbia University, New York, NY, USA

**Amanda E. Brinker** Department of Cancer Biology, University of Kansas Cancer Center, The University of Kansas Medical Center, Kansas City, KS, USA

**Nikko Brix** Clinic for Radiotherapy and Radiation Oncology, LMU Munich, Munich, Germany

**Katja Brocke-Heidrich** Praxis für Naturheilkunde und ganzheitliche Therapie, Leipzig, Germany

**Angela Brodie** University of Maryland School of Medicine, Baltimore, MD, USA

**Jonathan Brody** Department of Surgery, Thomas Jefferson University, Philadelphia, PA, USA

**Christopher L. Brooks** Institute for Cancer Genetics, and Department of Pathology, College of Physicians and Surgeons, Columbia University, New York, NY, USA

**Mai N. Brooks** Surgical Oncology, School of Medicine, University of California, Los Angeles, CA, USA

**David A. Brown** St. Vincent's Centre for Applied Medical Research, St Vincent's Hospital, University of New South Wales, Sydney, NSW, Australia

**Karen Brown** Department of Cancer Studies, University of Leicester, Leicester, UK

**Kevin Brown** University of Florida, College of Medicine, Gainesville, FL, USA

**Tilman Brummer** Institut für Molekulare Medizin und Zellforschung, Zentrum für Biochemie und Molekulare Zellforschung (ZBMZ), Albert-Ludwigs-Universität Freiburg, Freiburg, Germany

**Antonio Brunetti** Department of Health Sciences, University of Catanzaro "Magna Græcia", Catanzaro, Italy

**Andreas K. Buck** Department of Nuclear Medicine, University of Würzburg, Würzburg, Germany

Contributors xxv

**Laszlo Buday** Department of Medical Chemistry, Semmelweis University Medical School, Budapest, Hungary

Marie Annick Buendia Hopital Paul Brousse, Inserm U785, Centre Hépatobiliaire, Villejuif, France

**Ralf Buettner** City of Hope National Medical Center and Beckman Research Institute, Duarte, CA, USA

**Nigel J. Bundred** Department of Academic Surgery, South Manchester University Hospital, Manchester, UK

**Alexander Bürkle** Department of Biology, University of Konstanz, Konstanz, Germany

**Barbara Burwinkel** Division Molecular Biology of Breast Cancer, University of Heidelberg, Department of Gynecology and Obstetrics, Heidelberg, Germany

**Xavier Busquets** Department of Biology, University of the Balearic Islands, Palma de Mallorca, Spain

**Jagdish Butany** Laboratory Medicine and Pathobiology, University Health Network/Toronto, Toronto, ON, Canada

**Neville J. Butcher** School of Biomedical Sciences, University of Queensland, St Lucia, QLD, Australia

**Timon P. H. Buys** Department of Cancer Genetics and Developmental Biology, British Columbia Cancer Research Centre, Vancouver, BC, Canada

**Miguel A. Cabrita** Cancer Therapeutics Program, Ottawa Hospital Research Institute, Ottawa, ON, Canada

Jean Cadet Département de Médecine Nucléaire et Radiobiologie, Faculté de Médecine et des Sciences de la Santé, Université de Sherbrooke, Sherbrooke, QC, Canada

Yi Cai Department of Pathology, Baylor College of Medicine, Houston, TX, USA

**Yiqiang Cai** Section of Nephrology, Yale University School of Medicine, New Haven, CT, USA

**Bruno Calabretta** Kimmel Cancer Institute, Thomas Jefferson University, Philadelphia, PA, USA

**Daniele Calistri** Molecular Laboratory, Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (I.R.S.T.), Meldola, Italy

**Javier Camacho** Department of Pharmacology, Centro de Investigación y de Estudios Avanzados del I.P.N., Mexico City, D.F., Mexico

**William G. Cance** Departments of Surgical Oncology, Roswell Park Cancer Institute, Buffalo, NY, USA

xxvi Contributors

**Amparo Cano** Departamento de Bioquímica, Facultad de Medicina, UAM, Instituto de Investigaciones Biomédicas "Alberto Sols" CSIC-UAM IdiPAZ, Madrid, Spain

**Anthony J. Capobianco** Molecular and Cellular Oncogenesis Program, The Wistar Institute, Philadelphia, PA, USA

Emilia Caputo Institute of Genetics and Biophysics – ABT, Napoli, Italy

**Salvatore J. Caradonna** Department of Molecular Biology, Rowan University School of Osteopathic Medicine, Stratford, NJ, USA

Michele Carbone University of Hawaii Cancer Center, Honolulu, HI, USA

Vinicio Carloni University of Florence, Florence, Italy

**Neil O. Carragher** Drug Discovery Group, Edinburgh Cancer Research Centre, University of Edinburgh, Edinburgh, UK

Michela Casanova Pediatric Oncology Unit, Fondazione IRCCS Istituto Nazionale Tumori, Milano, Italy

**Wolfgang H. Caselmann** Medizinische Klinik und Poliklinik I, Rheinische Friedrich-Wilhelms-Universität, Bonn, Germany

**Giuliana Cassinelli** Molecular Pharmacology Unit, Department of Experimental Oncology and Molecular Medicine, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

**Webster K. Cavenee** Ludwig Institute for Cancer Research, UCSD, La Jolla, CA, USA

Esteban Celis Georgia Cancer Center, Augusta University, Augusta, GA, USA

**Chiswili Chabu** Howard Hughes Medical Institute, Yale University School of Medicine, New Haven, CT, USA

**Wook-Jin Chae** Department of Immunobiology, Yale University School of Medicine, New Haven, CT, USA

**Ho Man Chan** Division of Biochemistry and Molecular Biology, Davidson Building, University of Glasgow, Glasgow, UK

**Shing Leng Chan** Cancer Science Institute of Singapore, National University of Singapore, Singapore, Singapore

**Dawn S. Chandler** Department of Pediatrics, Columbus Children's Research Institute, Center for Childhood Cancer, The Ohio State University School of Medicine, Columbus, OH, USA

**Guru Chandramouly** Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

**Mau-Sun Chang** Institute of Biochemical Sciences, National Taiwan University, Taipei, Taiwan

Contributors xxvii

**Mei-Chi Chang** Biomedical Science Team, Chang Gung Institute of Technology, Taoyuan, Taiwan

**Lung-Ji Chang** Department of Molecular Genetics and Microbiology, College of Medicine, University of Florida, Gainesville, FL, USA

**Jane C. J. Chao** School of Nutrition and Health Sciences, Taipei Medical University, Taipei, Taiwan

**Christine Chaponnier** Department of Pathology and Immunology, University of Geneva, Geneva, Switzerland

**Konstantinos Charalabopoulos** Ioannina University Medical School, Ioannina, Greece

**Malay Chatterjee** Department of Pharmaceutical Technology, Jadavpur University, Calcutta, West Bengal, India

**Sunil K. Chatterjee** University of Cincinnati and The Barrett Cancer Center, Cincinnati, OH, USA

**Gautam Chaudhuri** Department of Molecular and Medical Pharmacology and Department of Obstetrics and Gynecology, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA

**M. Asif Chaudry** University Department of Surgery, Royal Free and University College London Medical School, London, UK

**Dharminder Chauhan** Department of Medical Oncology, The Jerome Lipper Multiple Myeloma Center, Dana Farber Cancer Institute, Harvard Medical School, Boston, MA, USA

**Jeremy P. Cheadle** Institute of Medical Genetics, Cardiff University, Heath Park, Cardiff, UK

**Ai-Ping Chen** Department of Gynecology, Affiliated Hospital of Qingdao University, Qingdao, China

**Chienling Chen** Department of Molecular Genetics and Microbiology, College of Medicine, University of Florida, Gainesville, FL, USA

**Herbert Chen** Department of Surgery, University of Alabama - Birmingham (UAB) School of Medicine, UAB Hospital and Health System, University of Alabama Comprehensive Cancer Center, Birmingham, AL, UK

**Jie Chen** Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong, China

**Sai-Juan Chen** State Key Laboratory of Medical Genomics, Shanghai Institute of Hematology, Rui-Jin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, People's Republic of China

**Taosheng Chen** Chemical Biology and Therapeutics, St. Jude Children's Research Hospital, Memphis, TN, USA

xxviii Contributors

**Wenxing Chen** Department of Clinical Pharmacy, College of Pharmacy, Nanjing University of Chinese Medicine, Nanjing, China

**Yingchi Chen** Department of Molecular Genetics and Microbiology, College of Medicine, University of Florida, Gainesville, FL, USA

**Zhu Chen** State Key Laboratory of Medical Genomics, Shanghai Institute of Hematology, Rui-Jin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, People's Republic of China

George Z. Cheng Harvard Medical School, Boston, MA, USA

**Jin Q. Cheng** Molecular Oncology Program and Research Institute, H. Lee Moffitt Cancer Center, University of South Florida College of Medicine, Tampa, FL, USA

**Liang Cheng** Department of Pathology and Laboratory Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

**Chun Hei Antonio Cheung** Department of Pharmacology and Institute of Basic Medical Sciences, College of Medicine, National Cheng Kung University, Tainan, Taiwan, Republic of China

**Ya-Hui Chi** Institute of Biotechnology and Pharmaceutical Research, National Health Research Institutes, Zhunan, Taiwan

**Martyn A. Chidgey** School of Cancer Sciences, University of Birmingham, Birmingham, UK

**Sudhakar Chintharlapalli** Department of Veterinary Physiology and Pharmacology, Texas A&M University, College Station, TX, USA

**Alexandre Chlenski** Department of Pediatrics, Section of Hematology/ Oncology, University of Chicago, Chicago, IL, USA

Daniel C. Cho Beth Israel Deaconess Medical Center, Boston, MA, USA

**William Chi-Shing Cho** Department of Clinical Oncology, Queen Elizabeth Hospital, Kowloon, Hong Kong

**Michael Chopp** Neurology Research, Henry Ford Health System, Detroit, MI, USA

**Pei-Lun Chou** Division of Allergy-Immunology-Rheumatology, Department of Internal Medicine, Lin Shin Hospital, Taichung, Taiwan

**Claus Christensen** Department of Cancer Genetics, Danish Cancer Society, Copenhagen, Denmark

Rikke Christensen Clinical Genetics, Aarhus University Hospital, Aarhus, Denmark

**Gerhard Christofori** Department of Biomedicine, University of Basel, Basel, Switzerland

**Richard I. Christopherson** School of Life and Environmental Sciences, University of Sydney, Sydney, NSW, Australia

Contributors xxix

**Fong-Fong Chu** Department of Cancer Biology, Beckman Research Institute of City of Hope, Duarte, CA, USA

**Wen-Ming Chu** Cancer Biology Program, University of Hawaii Cancer Center, Honolulu, HI, USA

**Bong-Hyun Chung** BioNanotechnology Research Center, Korea Research Institute of Bioscience and Biotechnology, Yuseong, Daejeon, Republic of Korea

**Fung-Lung Chung** Department of Oncology, Lombardi Comprehensive Cancer Center, Georgetown University Medical Center, Washington, DC, USA

**Jacky K. H. Chung** Department of Medical Genetics and Microbiology, University of Toronto, Toronto, ON, Canada

Sue Clark Imperial College London, London, UK

**Pier Paolo Claudio** The University of Mississippi, Medical Center Cancer Institute, Jackson, MS, USA

**Elizabeth B. Claus** Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, CT, USA

**Pascal Clayette** SPI-BIO, Service de Neurovirologie, CEA, CRSSA, EPHE, Fontenay aux Roses Cedex, France

**Dahn L. Clemens** Research Service, Veterans Administration Medical Center, Omaha, NE, USA

**Steven C. Clifford** Northern Institute for Cancer Research, Newcastle University, Newcastle upon Tyne, UK

**Kevin A. Cockell** Nutrition Research Division, Health Canada, Ottawa, ON, Canada

**Susan L. Cohn** Department of Pediatrics, Section of Hematology/Oncology, University of Chicago, Chicago, IL, USA

Graham A. Colditz Washington University in St. Louis, St. Louis, MO, USA

**Paola Collini** Anatomic Pathology Department, Fondazione IRCCS Istituto Nazionale Tumori, Milano, Italy

**Andrew R. Collins** Department of Nutrition, University of Oslo, Oslo, Norway

Nicoletta Colombo Istituto Europeo di Oncologia, Milan, Italy

Joan W. Conaway Stowers Institute for Medical Research, Kansas, MO, USA

Ronald C. Conaway Stowers Institute for Medical Research, Kansas, MO, USA

Bong-Hyun Chung: deceased.

xxx Contributors

**Lellys Mariella Contreras** Department of Cancer Biology, University of Kansas Cancer Center, The University of Kansas Medical Center, Kansas City, KS, USA

**Amanda E. Conway** Molecular Cancer Biology, Duke University Medical Center, Durham, NC, USA

**Nathalie Cools** Vaccine and Infections Disease Institute (VAXINFECTIO) Laboratory of Experimental Hematology, Faculty of Medicine and Health Sciences, University of Antwerp, Edegem, Belgium

**Helen C. Cooney** UCD School of Biomolecular and Biomedical Science, UCD Conway Institute, University College Dublin, Dublin, Ireland

**Scott Coonrod** Baker Institute for Animal Health, Department of Biomedical Sciences, School of Veterinary Medicine, Cornell University, Ithaca, NY, USA

**Kumarasen Cooper** Pathology and Laboratory Medicine, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, USA

**Laurence J. N. Cooper** Division of Pediatrics, Department of Immunology, MD Anderson Cancer Center, Houston, TX, USA

**Michael K. Cooper** Department of Neurology, Vanderbilt Medical Center, Nashville, TN, USA

**Peter J. Coopman** IRCM, INSERM U1194, Montpellier Cancer Research Institute, Montpellier, France

**Lanfranco Corazzi** Department of Experimental Medicine, University of Perugia, Perugia, Italy

Maria Paola Costi Department of Pharmaceutical Sciences, University of Modena and Reggio Emilia, Modena, Italy

**Richard J. Cote** Department of Pathology, Miller School of Medicine, University of Miami, Miami, FL, USA

**Massimo Cristofanilli** Division of Hematology and Oncology, Robert H Lurie Comprehensive Cancer Center, Chicago, IL, USA

**Marcus V. Cronauer** Department of Urology, University Hospital Schleswig-Holstein – Campus Lübeck, Lübeck, Germany

**Sidney Croul** Department of Pathology, UHN, University of Toronto, Toronto, ON, Canada

**Ronald G. Crystal** Division of Pulmonary and Critical Care Medicine, Weill Cornell Medical College, New York, NY, USA

**Bruce D. Cuevas** Department of Molecular Pharmacology and Therapeutics, Stritch School of Medicine, Loyola University Chicago, Maywood, IL, USA

Jiuwei Cui Jilin University, Changchun, Jilin, China

**Edna Cukierman** Basic Science/Tumor Cell Biology, Fox Chase Cancer Center, Philadelphia, PA, USA

Contributors xxxi

**Zoran Culig** Department of Urology, Innsbruck Medical University, Innsbruck, Austria

**David Cunningham** Department of Medicine, The Royal Marsden NHS Foundation Trust, London, UK

**David T. Curiel** Division of Cancer Biology, Washington University, St. Louis, MO, USA

**Franck Cuttitta** NCI Angiogenesis Core Facility, National Cancer Institute, National Institutes of Health, Advanced Technology Center, Gaithersburg, MD, USA

**Andrea Cziffer-Paul** Department of Pathology, The Mount Sinai School of Medicine, New York, NY, USA

**Massimino D'Armiento** Department of Experimental Medicine, University of Rome "Sapienza", Rome, Italy

**Yun Dai** Department of Gastroenterology, Peking University First Hospital, Beijing, China

**Yataro Daigo** Institute of Medical Science, The University of Tokyo, Tokyo, Japan

**Lokesh Dalasanur Nagaprashantha** City of Hope National Medical Center, Duarte, CA, USA

**Ashraf Dallol** Centre of Innovation in Personalised Medicine, King Abdulaziz University, Jeddah, Kingdom of Saudi Arabia

**Tamas Dalmay** School of Biological Sciences, University of East Anglia, Norwich, UK

**Ivan Damjanov** Department of Pathology, University of Kansas School of Medicine, Kansas City, KS, USA

Vincent Dammai Dammai-Morgan Scientific Consultants LLC, Mount Pleasant, SC, USA

**Chendil Damodaran** University of Louisville, Louisville, KY, USA

**Janet E. Dancey** Canadian Cancer Trials Group, Queen's University, Kingston, ON, Canada

**Nadia Dandachi** Department of Internal Medicine, Division of Oncology, Medical University Graz, Graz, Austria

**Chi V. Dang** Division of Hematology, Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD, USA

**Alla Danilkovitch-Miagkova** National Cancer Institute-FCRDC, Frederick, MD, USA

**Kakoli Das** Cancer and Stem Cell Biology Program, Duke-NUS Graduate Medical School, Singapore, Singapore

xxxii Contributors

**Kaustubh Datta** Department of Urology Research, Department of Biochemistry and Molecular Biology, Mayo Clinic College of Medicine, Rochester, MN, USA

**Pran K. Datta** Departments of Surgery and Cancer Biology, Vanderbilt-Ingram Cancer Center, Vanderbilt University School of Medicine, Nashville, TN, USA

Department of Medicine, University of Alabama at Birmingham, Birmingham, AL, USA

**Leonor David** IPATIMUP (Institute of Molecular Pathology and Immunology of the University of Porto) and Medical Faculty of the University of Porto, Porto, Portugal

**David Mark Davies** Department of Oncology, South West Wales Cancer Centre, Swansea, UK

Juhayna Kassem Davis Carolinas HealthCare System, Charlotte, NC, USA

Alexey Davydov Fox Chase Cancer Center, Philadelphia, PA, USA

**Shaheenah Dawood** Department of Medical Oncology, Dubai Hospital, Dubai, United Arab Emirates

**Robert Day** Department of Surgery/Division of Urology, Institut de Pharmacologie, Faculté de Médecine et des sciences de la santé, Université de Sherbrooke, Sherbrooke, QC, Canada

**Terry Day** Head and Neck Tumor Program, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC, USA

**Suzane Ramos da Silva** Department of Molecular Microbiology and Immunology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

**Enrique de Alava** Institute of Biomedicine of Sevilla (IBiS), Virgen del Rocio University Hospital /CSIC/University de Sevilla, Seville, Spain

**Diederik de Bruijn** Department of Human Genetics, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Floris Aart de Jong Amgen BV, Breda, The Netherlands

Vincenzo de Laurenzi Department of Experimental Medicine and Biochemical Sciences, University of Tor Vergata, Rome, Italy

**Ben O. de Lumen** Department of Nutritional Sciences and Toxicology, University of California at Berkeley, Berkeley, CA, USA

**Elvira de Mejia** Department of Food Science and Human Nutrition, University of Illinois, Urbana-Champaign, IL, USA

**Ana Ramirez de Molina** Nutritional Genomics and Cancer Unit, IMDEA Food Institute, Madrid, Spain

Contributors xxxiii

**Christiane de Wolf-Peeters** Department of Pathology, University Hospitals of K.U. Leuven, Leuven, Belgium

**Jochen Decker** Hematology Oncology Medical School Clinic III, University of Mainz, Mainz, Germany

**P. Markus Deckert** Zentrum für Innere Medizin II – Abteilung für Onkologie und Palliativmedizin, Klinikum Brandenburg, Brandenburg an der Havel, Germany

**Francesca Degrassi** Institute of Molecular Biology and Pathology IBMN c/o "Sapienza" University, Italian National Research Council CNR, Rome, Italy

**Amir R. Dehdashti** Division of Neurosurgery, University of Toronto, Toronto, ON, Canada

**Maryse Delehedde** R&D Lunginnov, Campus de l'Institut Pasteur de Lille, Lille, France

**Olivier Dellis** Signalisation Calcique et Interactions Cellulaires dans le Foie, INSERM UMR-S 1174, Université Paris-Sud 11, Orsay, France

**Renée M. Demarest** Molecular and Cellular Oncogenesis Program, The Wistar Institute, Philadelphia, PA, USA

**Berna Demircan** University of Florida, College of Medicine, Gainesville, FL, USA

**Miriam Deniz** Department of Obstetrics and Gynaecology, University of Ulm, Ulm, Germany

**Samuel Denmeade** The Sidney Kimmel Comprehensive Cancer Center, Johns Hopkins, Baltimore, MD, USA

**David A. Denning** Department of Surgery, Marshall University, Huntington, WV, USA

**Sylviane Dennler** Department of Molecular Cell Biology, Leiden University Medical Center, Leiden, The Netherlands

**Channing J. Der** University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

**Barbara Deschler** Comprehensive Cancer Center Mainfranken, Clinical Trials Office, University of Würzburg, Würzburg, Germany

**Chantal Desdouets** Institut Cochin, Université Paris Descartes, CNRS, Paris, France

**Peter Devilee** Human Genetics, Leiden University Medical Center, Leiden, The Netherlands

**Mark W. Dewhirst** Department of Radiation Oncology, Duke University, Durham, NC, USA

**Girish Dhall** Division of Hematology-Oncology, Department of Pediatrics, Children's Hospital Los Angeles and the Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

xxxiv Contributors

**Danny N. Dhanasekaran** Stephenson Cancer Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA

**Pier Paolo Di Fiore** IFOM, the FIRC Institute of Molecular Oncology, Milan, Italy

**Giuseppe Di Lorenzo** Cattedra di Oncologia Medica, Dipartimento di Endocrinologia e Oncologia molecolare e clinica, Università degli Studi "Federico II", Naples, Italy

**Dario Di Luca** Department of Medical Sciences, University of Ferrara, Ferrara, Italy

Marc Diederich College of Pharmacy, Seoul National University, Seoul, South Korea

**Joseph DiFranza** Department of Family Medicine and Community Health, University of Massachusetts Medical Center, Worcester, MA, USA

**Martin Digweed** Institute of Medical and Human Genetics, Charité – Universitätsmedizin Berlin, Berlin, Germany

**Peter ten Dijke** Department of Molecular Cell Biology, Leiden University Medical Center, Leiden, The Netherlands

**Gerard Dijkstra** University Medical Center Groningen, University of Groningen, Groningen, The Netherlands

**Nathalie Dijsselbloem** Lab of Eukaryotic Gene Expression, LEGEST-University Gent, Ghent, Belgium

**Helen Dimaras** The Hospital for Sick Children, Department of Ophthalmology and Vision Science, The University of Toronto, Toronto, ON, Canada

**Jian Ding** State Key Laboratory of Drug Research, Shanghai Institute of Materia Medica, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai, People's Republic of China

**Zhaoxia Ding** Department of Gynecology, Affiliated Hospital of Qingdao University, Qingdao, China

**Jürgen Dittmer** Klinik für Gynäkologie, Universität Halle-Wittenberg, Halle (Saale), Germany

**Henrik J. Ditzel** Department of Cancer and Inflammation Reserch, Institute fo Molecular Medicine, University of Southern Denmark, Odense C, Denmark

**Dan Dixon** Cancer Biology, University of Kansas Medical Center, Kansas City, KS, USA

**Cholpon S. Djuzenova** Klinik für Strahlentherapie der Universität Würzburg, Würzburg, Germany

Christian Doehn Urologikum Lübeck, Lübeck, Germany

Contributors xxxv

Yasufumi Doi Department of Medicine and Clinical Science, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan

**Milos Dokmanovic** Division of Monoclonal Antibodies, Office of Biotechnology Products, Office of Pharmaceutical Science, Center for Drug Evaluation and Research, U.S. Food and Drug Administration, Bethesda, MD, USA

**Qihan Dong** The University of Western Sydney, Sydney, NSW, Australia Department of Endocrinology, Central Clinical School, Royal Prince Alfred Hospital, The University of Sydney, Sydney, NSW, Australia

**Zigang Dong** The Hormel Institute, University of Minnesota, Austin, MN, USA

**Ben Doron** Oregon Health and Science University, Portland, OR, USA

**Qing Ping Dou** The Prevention Program, Barbara Ann Karmanos Cancer Institute and Department of Pathology, School of Medicine, Wayne State University, Detroit, MI, USA

**Thierry Douki** Laboratoire "Lésions des Acides Nucléiques", Institute Nanosciences et Cryogénie, Grenoble, France

**Harry A. Drabkin** Division of Hematology-Oncology, Medical University of South Carolina and the Hollings Cancer Center, Charleston, SC, USA

**Tommaso A. Dragani** Fondazione IRCCS Istituto Nazionale Tumori, Milan, Italy

**Kenneth Drake** Department of Chemistry and Biochemistry, University of Texas at Arlington, Arlington, TX, USA

**Martin Dreyling** Department of Internal Medicine III, University of Munich, Großhadern, Munich, Germany

Nathalie Druesne-Pecollo UMR U1153 INSERM, U1125 INRA, CNAM, Université Paris 13, Centre de Recherche Epidémiologie et Statistique Sorbonne Paris Cité, Bobigny, France

**Brian J. Druker** Oregon Health and Science University Cancer Institute, Portland, OR, USA

**Denis Drygin** Pimera, Inc., San Diego, CA, USA

Raymond N. DuBois ASU Biodesign Institute, Tempe, AZ, USA

**Dan G. Duda** Steele Laboratories for Tumor Biology, Department of Radiation Oncology, Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA

**Jaquelin P. Dudley** Department of Molecular Biosciences and Institute for Cellular and Molecular Biology, The University of Texas at Austin, Austin, TX, USA

**Roy J. Duhé** Department of Pharmacology and Toxicology, University of Mississippi Medical Center, Jackson, MS, USA

xxxvi Contributors

Department of Radiation Oncology, University of Mississippi Medical Center, Jackson, MS, USA

**Ignacio Duran** Department of Medical Oncology and Hematology, Robert and Maggie Bras and Family New Drug Development Program, Princess Margaret Hospital, Toronto, ON, Canada

**Stephen T. Durant** R&D, Oncology, Innovative Medicines, AstraZeneca, Little Chesterford, UK

Meenakshi Dwivedi Department of Life Science, Hanyang University, Seoul, South Korea

**Madalene A. Earp** Department of Health Sciences Research, Mayo Clinic College of Medicine, Rochester, MN, USA

**Behfar Ehdaie** Department of Surgery, Urology Service, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

Justis P. Ehlers Cole Eye Institute, Cleveland Clinic, Cleveland, OH, USA

**Gerhard Eisenbrand** Department of Chemistry, Division of Food Chemistry and Toxicology, University of Kaiserslautern, Kaiserslautern, Germany

**Mohamad Elbaz** Department of Pathology, Comprehensive Cancer Centre, The Ohio State Medical Centre, Columbus, OH, USA

**Patricia V. Elizalde** Laboratory of Molecular Mechanisms of Carcinogenesis, Institute of Biology and Experimental Medicine (IBYME), CONICET, Buenos Aires, Argentina

**Bassel El-Rayes** Department of Hematology and Medical Oncology, Emory University School of Medicine, Atlanta, GA, USA

Winship Cancer Institute of Emory University, Atlanta, GA, USA

**Mitsuru Emi** Departments of Obstetrics and Gynecology, Nippon Medical School, Kawasaki and Tokyo, Japan

**Steffen Emmert** Clinic for Dermatology and Venereology, University Medical Center Rostock, Rostock, Germany

**Caroline End** Division of Molecular Genome Analysis, DKFZ, Heidelberg, Germany

**Daniela Endt** Department of Human Genetics, Biozentrum University of Würzburg, Würzburg, Germany

**Rainer Engers** Institute of Pathology, University Hospital Düsseldorf, Düsseldorf, Germany

**Marica Eoli** Unit of Clinical Neuro-Oncology, Istituto Neurologico Besta, Milan, Italy

**Anat Erdreich-Epstein** Division of Hematology-Oncology, Department of Pediatrics, Children's Hospital Los Angeles and the Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

Contributors xxxvii

**Süleyman Ergün** Institut für Anatomie und Zellbiologie, Julius-Maximilians-Universität Würzburg, Würzburg, Germany

**Pablo V. Escribá** Department of Biology, University of the Balearic Islands, Palma de Mallorca, Spain

**Nuria Están-Capell** Service of Clinical Analysis, Dr. Peset University Hospital, Valencia, Spain

**Konstantinos Evangelou** Molecular Carcinogenesis Group, Laboratory of Histology-Embryology, Medical School, National and Kapodistrian University of Athens, Athens, Greece

**Mark F. Evans** Department of Pathology and Laboratory Medicine, University of Vermont, Burlington, VT, USA

**B. Mark Evers** Department of Surgery, The University of Texas Medical Branch, Galveston, TX, USA

Vera Evtimov Monash University, Melbourne, VIC, Australia

**Jörg Fahrer** Department of Toxicology, University Medical Center Mainz, Mainz, Germany

**Cristina Maria Failla** Experimental Immunology Laboratory, IDI-IRCCS, Rome, Italy

**Marco Falasca** Faculty of Health Sciences, School of Biomedical Sciences, Curtin University, Perth, WA, Australia

Fang Fan Department of Pathology, University of Kansas School of Medicine, Kansas City, KS, USA

**Saijun Fan** Long Island Jewish Medical Center, Albert Einstein College of Medicine, Bronx, NY, USA

**Bingliang Fang** Department of Thoracic and Cardiovascular Surgery, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Jinxu Fang** Department of Chemical Engineering and Materials Science, Viterbi School of Engineering, University of Southern California, Los Angeles, CA, USA

**Lei Fang** Dermatology Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

Valeria R. Fantin Merck Research Laboratories, Boston, MA, USA

Z. Shadi Farhangrazi Biotrends International, Denver, CO, USA

**Omid C. Farokhzad** Laboratory of Nanomedicine and Biomaterials, Department of Anesthesiology, Brigham and Women's Hospital, Boston, MA, USA

William L. Farrar National Cancer Institute – Frederick, Frederick, MD, USA

xxxviii Contributors

**Alessandro Fatatis** Department of Pharmacology and Physiology, Drexel University College of Medicine, Philadelphia, PA, USA

**Andrew P. Feinberg** Department of Medicine and Center for Epigenetics, Institute for Basic Biomedical Sciences, Johns Hopkins University School of Medicine, Baltimore, MD, USA

Mark A. Feitelson Department of Biology, Temple University, Philadelphia, PA, USA

**Francesco Feo** Department of Biomedical Sciences, Division of Experimental Pathology and Oncology, University of Sassari, Sassari, Italy

**Félix Fernández Madrid** Department of Internal Medicine, Division of Rheumatology, Wayne State University, Detroit, MI, USA

**Paula Fernández-García** Department of Biology, University of the Balearic Islands, Palma de Mallorca, Spain

Marie Fernet INSERM U612, Institut Curie-Recherche, Orsay, France

**Audrey Ferrand** INSERM U.858, Institut de Médecine Moléculaire de Rangueil, IFR150, Université Paul Sabatier, Toulouse, France

**Andrea Ferrari** Pediatric Oncology Unit, Fondazione IRCCS Istituto Nazionale Tumori, Milano, Italy

**Stefania Ferrari** Department of Pharmaceutical Sciences, University of Modena and Reggio Emilia, Modena, Italy

**Robert A. Figlin** Division of Hematology Oncology, Samuel Oschin Comprehensive Cancer Institute, Cedars-Sinai Medical Center, Los Angeles, CA, USA

**Lorena L. Figueiredo-Pontes** Medical School of Ribeirão Preto, University of São Paulo, Ribeirão Preto, Brazil

**Cristina Fillat** Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS) and Centro de Investigación Biomédica en Red de Enfermedades Raras (CIBERER), Barcelona, Spain

**Daniel Finley** Department of Cell Biology, Harvard Medical School, Boston, MA, USA

**Gaetano Finocchiaro** Unit of Experimental Neuro-Oncology, Istituto Nazionale Neurologico Besta, Milan, Italy

**Paul B. Fisher** Departments of Urology, Pathology and Neurosurgery, Columbia University Medical Center, College of Physicians and Surgeons, New York, NY, USA

**James Flanagan** Institute of Reproductive and Developmental Biology, Imperial College London, London, UK

**Michael Fleischhacker** Universitätsklinikum Halle (Saale), Klinik für Innere Medizin I, Schwerpunkt Pneumologie, Halle (Saale), Germany

Contributors xxxix

**Eliezer Flescher** Department of Human Microbiology, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

Jonathan A. Fletcher Albany Medical College, Albany, NY, USA

**Barbara D. Florentine** Department of Pathology, Henry Mayo Newhall Memorial Hospital, Valencia, CA, USA

CA and Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

**Tamara Floyd** Cancer Vaccine Section, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

**Riccardo Fodde** Department of Pathology, Josephine Nefkens Institute, Erasmus MC, Rotterdam, The Netherlands

**Judah Folkman** Children's Hospital and Harvard Medical School, Boston, MA, USA

**Hamidreza Fonouni** Department of General, Visceral and Transplantation Surgery, University of Heidelberg, Heidelberg, Germany

Kenneth A. Foon The Pittsburgh Cancer Institute, Pittsburgh, PA, USA

**Alessandra Forni** Department of Occupational and Environmental Health "Clinica del Lavoro L. Devoto", University of Milan, Milan, Italy

**David A. Foster** Department of Biological Sciences, Hunter College of the City University of New York, New York, NY, USA

**Paul Foster** Department of Endocrinology and Metabolic Medicine, Imperial College Faculty of Medicine, St. Mary's Hospital, London, UK

Paul Fréneaux Département de Pathologie, Institut Curie, Paris, France

**Rodrigo Franco** Redox Biology Center, School of Veterinary Medicine and Biomedical Sciences, University of Nebraska-Lincoln, Lincoln, NE, USA

**David A. Frank** Dana-Farber Cancer Institute and Harvard Medical School, Boston, MA, USA

**Stuart J. Frank** Division of Endocrinology, Diabetes, and Metabolism, Department of Medicine, UAB, Endocrinology Section, Birmingham VAMC Medical Service, Birmingham VA Medical Center, University of Alabama, Birmingham, AL, USA

Stanley R. Frankel Merck Research Laboratories, Boston, MA, USA

**Michael J. Franklin** Division of Hematology, Oncology and Transplantation, University of Minnesota, Minneapolis, MN, USA

**Aleksandra Franovic** Department of Cellular and Molecular Medicine, Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada

Ralph S. Freedman UT MD Anderson Cancer Center, Houston, TX, USA

xl Contributors

**Michael R. Freeman** Urological Diseases Research Center, Children's Hospital Boston, Harvard Medical School, Boston, MA, USA

Emil Frei Dana-Farber Cancer Institute, Boston, MA, USA

**Jean-Noël Freund** INSERM U1113 and Fédération de Médecine Translationnelle de Strasbourg (FMTS), Université de Strasbourg, Faculté de Médecine, Strasbourg, France

**Errol C. Friedberg** University of Texas Southwestern Medical Center, Dallas, TX, USA

**Steven M. Frisch** Mary Babb Randolph Cancer Center and Department of Biochemistry, West Virginia University, Morgantown, WV, USA

Andrew M. Fry University of Leicester, Leicester, UK

**Mark Frydenberg** Department of Surgery, Monash University, Melbourne, VIC, Australia

**Hendrik Fuchs** Institute for Laboratory Medicine, Clinical Chemistry and Pathobiochemistry, Charité – Universitätsmedizin Berlin, Berlin, Germany

**Atsuko Fujihara** Department of Urology, Kyoto Prefectural University of Medicine, Kyoto, Japan

**Hirota Fujiki** Department of Clinical Laboratory Medicine, Faculty of Medicine, Saga University, Saga, Japan

**Jiro Fujimoto** Department of Obstetrics and Gynecology, Gifu University School of Medicine, Gifu City, Japan

**Jun Fujita** Department of Clinical Molecular Biology, Graduate School of Medicine, Kyoto University, Kyoto, Japan

**Hiroshi Fukamachi** Department of Molecular Oncology, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University (TMDU), Tokyo, Japan

**Kenji Fukasawa** Molecular Oncology Program, H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL, USA

**Tomoya Fukui** Department of Respiratory Medicine, Kitasato University School of Medicine, Sagamihara, Kanagawa, Japan

**Simone Fulda** Institute for Experimental Cancer Research in Pediatrics, Goethe-University Frankfurt, Frankfurt, Germany

**Claudia Fumarola** Department of Experimental Medicine, Unit of Experimental Oncology, University of Parma, Parma, Italy

**Kyle Furge** Van Andel Research Institute, Grand Rapids, MI, USA

**Mutsuo Furihata** Department of Pathology, Kochi Medical School, Kochi, Japan

**Rhoikos Furtwängler** Universitätsklinikum des Saarlandes, Klinik für Pädiatrische Onkologie und Hämatologie, Homburg/Saar, Germany

**Bernard W. Futscher** Department of Pharmacology and Toxicology, Arizona Cancer Center and College of Pharmacy, University of Arizona, Tucson, AZ, USA

**Ulrich Göbel** Clinic of Pediatric Oncology, Hematology and Immunology, Heinrich-Heine-University Düsseldorf, Düsseldorf, Germany

**Tobias Görge** Department of Dermatology, University of Münster, Münster, Germany

**Ursula Günthert** Institute of Pathology, University Hospital, Basel, Switzerland

**Shirish Gadgeel** Karmanos Cancer Institute, Wayne State University, Detroit, MI, USA

**Jochen Gaedche** Department of General, Visceral and Pediatric Surgery, University Medical Center, Göttingen, Germany

**Federico Gago** Departamento de Ciencias Biomédicas, Facultad de Medicina, Universidad de Alcalá, Alcalá de Henares, Madrid, Spain

**William M. Gallagher** UCD School of Biomolecular and Biomedical Science, UCD Conway Institute, University College Dublin, Dublin, Ireland

**Bernard Gallez** Biomedical Magnetic Resonance, Université Catholique de Louvain, Brussels, Belgium

**Brenda L. Gallie** The Hospital for Sick Children, Department of Ophthalmology and Vision Science, The University of Toronto, Toronto, ON, Canada

**Antoine Galmiche** EA4666, Université de Picardie Jules Verne (UPJV), Amiens, France

Service de Biochimie, Centre de Biologie Humaine (CBH), University Hospital of Amiens (CHU Sud), Amiens, France

Ramesh K. Ganju Department of Pathology, Comprehensive Cancer Centre, The Ohio State Medical Centre, Columbus, OH, USA

**Ping Gao** Division of Hematology, Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD, USA

**Dolores C. García-Olmo** Unidad de Investigación, Complejo Hospitalario Universitario de Albacete, Albacete, Spain

**Roy Garcia** City of Hope National Medical Center and Beckman Research Institute, Duarte, CA, USA

xlii Contributors

**Robert A. Gardiner** School of Medicine, University of Queensland, Brisbane, QLD, Australia

Centre for Clinical Research, University of Queensland, Herston, QLD, Australia

Royal Brisbane and Women's Hospital, Brisbane, QLD, Australia

Edith Cowan University Western Australia, Joondalup, WA, Australia

**Lawrence B. Gardner** The NYU Cancer Institute, New York University School of Medicine, New York, NY, USA

**Patricio Gariglio** Genetic and Molecular Biology, CINVESTAV-IPN, Mexico City, México

Cathie Garnis MIT Center for Cancer Research, Cambridge, MA, USA

**Andrei L. Gartel** Department of Medicine, University of Illinois at Chicago, Chicago, IL, USA

**Ronald B. Gartenhaus** The University of Maryland Marlene and Stewart Greenebaum Cancer Center, Baltimore, MD, USA

**Thomas A. Gasiewicz** University of Rochester Medical Center, Rocheser, NY, USA

**Patrizia Gasparini** Tumor Genomic Unit, Department of Experimental Oncology, Istituto Nazionale Tumori, Milan, Italy

**Zoran Gatalica** Department of Pathology, Creighton University School of Medicine, Omaha, NE, USA

**Grégory Gatouillat** Laboratory of Biochemistry, IFR53, Faculty of Pharmacy, Reims, France

**Adi F. Gazdar** Hamon Center for Therapeutic Oncology Research and Departments of Pathology, Internal Medicine and Pharmacology, University of Texas Southwestern Medical Center, Dallas, TX, USA

**Christian Geisler** Department of Hematology, The Finsen Centre, Rigshospitalet, Copenhagen, Denmark

**Klaramari Gellci** Department of Biomedical Engineering, Wayne State University, Detroit, MI, USA

**Eleni A. Georgakopoulou** Department of Histology and Embryology, Faculty of Medicine, National and Kapodistrian University of Athens, Athens, Greece

**Spyros D. Georgatos** Department of Basic Sciences, The University of Crete, School of Medicine, Heraklion, Crete, Greece

Julia M. George Queen Mary University of London, London, UK

**Kimberly S. George Parsons** Department of Chemistry, Marietta College, Marietta, OH, USA

**Armin Gerger** Department of Internal Medicine, Division of Oncology, Medical University Graz, Graz, Austria

**Ulrich Germing** Klinik für Hämatologie, Onkologie und Klinische Immunologie, Heinrich-Heine-Universität, Düsseldorf, Germany

**Jeffrey E. Gershenwald** Department of Surgical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Andreas J. Gescher** Department of Cancer Studies, Cancer Biomarkers and Prevention Group, University of Leicester, Leicester, Leicester, UK

**Christian Gespach** Laboratory of Molecular and Clinical Oncology of Solid tumors, Faculté de Médecine, Université Pierre et Marie Curie-Paris 6, Paris, France

INSERM U. 673, Paris, France

**B. Michael Ghadimi** Department of General, Visceral and Pediatric Surgery, University Medical Center, Göttingen, Germany

**Michelle Ghert** Department of Surgery, Hamilton Health Sciences, Juravinski Cancer Centre, McMaster University, Hamilton, ON, Canada

**Riccardo Ghidoni** Laboratory of Biochemistry and Molecular Biology, San Paolo Medical School, University of Milan, Milan, Italy

**Saurabh Ghosh Roy** Department of Cell and Developmental Biology, University of California, Irvine, Irvine, CA, USA

**Ronald A. Ghossein** Department of Pathology, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

**Lorenzo Gianni** Department of Oncology, Instituto Scientifico Romagnolo per lo s, Infermi Hospital, Rimini, Italy

Michael K. Gibson Case Western Reserve University, Cleveland, OH, USA

**Michael Z. Gilcrease** Department of Pathology, Breast Section, MD Anderson Cancer Center, Houston, TX, USA

**M. Boyd Gillespie** Head and Neck Tumor Program, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC, USA

**François Noël Gilly** Department of Digestive Oncologic Surgery, Hospices Civils de Lyon–Université Lyon 1, Lyon, France

**Thomas Gilmore** Biology Department, Boston University, Boston, MA, USA

**Oliver Gimm** Department of Surgery, University Hospital, Linköping, Sweden

**Alessio Giubellino** Laboratory of Pathology, Center for Cancer Research, National Cancer Institute, Bethesda, MD, USA

**Morten F. Gjerstorff** Department of Oncology, Odense University Hospital, Odense C, Denmark

xliv Contributors

**Shannon S. Glaser** Department of Internal Medicine, Texas A&M Health Science Center, Central Texas Veterans Health Care System, Temple, TX, USA

Hansruedi Glatt Federal Institute for Risk Assessment (BfR), Berlin, Germany

**Olivier Glehen** Department of Digestive Oncologic Surgery, Hospices Civils de Lyon–Université Lyon 1, Lyon, France

**Aleksandra Glogowska** Department of Human Anatomy and Cell Science, College of Medicine, Faculty of Health Sciences, University of Manitoba, Winnipeg, MB, Canada

**Thomas W. Glover** Department of Human Genetics, University of Michigan, Ann Arbor, MI, USA

**John C. Goddard** Jacksonville Hearing and Balance Institute, Jacksonville, FL, USA

**Andrew K. Godwin** The University of Kansas Medical Center, Kansas City, KS, USA

**Elspeth Gold** Department of Anatomy, Otago School of Medical Sciences, Dunedin, New Zealand

**Gary S. Goldberg** Molecular Biology, University of Medicine and Dentistry of New Jersey, Stratford, NJ, USA

**Itzhak D. Goldberg** Long Island Jewish Medical Center, Albert Einstein College of Medicine, Bronx, NY, USA

**Susanne M. Gollin** Department of Human Genetics, University of Pittsburgh Graduate School of Public Health and the University of Pittsburgh Cancer Institute, Pittsburgh, PA, USA

**Roy M. Golsteyn** Department of Biological Sciences, University of Lethbridge, Lethbridge, AB, Canada

**Rohini Gomathinayagam** Stephenson Cancer Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA

**Ellen L. Goode** Department of Health Sciences Research, Mayo Clinic College of Medicine, Rochester, MN, USA

**Gregory J. Gores** Miles and Shirley Fiterman Center for Digestive Diseases, Division of Gastroenterology and Hepatology, Mayo Clinic College of Medicine, Rochester, MN, USA

Vassilis Gorgoulis Department of Histology and Embryology, Faculty of Medicine, National and Kapodistrian University of Athens, Athens, Greece

**Noriko Gotoh** Division of Cancer Cell Biology, Cancer Research Institute, Kanazawa University, Kanazawa city, Ishikawa, Japan

Lynn F. Gottfried LeClairRyan, Rochester, NY, USA

**Stéphanie Gout** Le Centre de recherche du CHU de Québec-Université Laval: axe Oncologie, Le Centre de recherche sur le cancer de l'Université Laval, Québec, QC, Canada

**Ammi Grahn** Department of Clinical Chemistry and Transfusion Medicin, Institute of Biomedicine, Sahlgrenska Academy at Göteborg University, Göteborg, Sweden

**Galit Granot** Felsenstein Medical Research Center, Beilinson Hospital, Sackler School of Medicine, Tel Aviv University, Petah Tikva, Israel

**Denis M. Grant** Department of Pharmacology and Toxicology, Faculty of Medicine, University of Toronto, Toronto, ON, Canada

**Heidi J. Gray** Gynecologic Oncology, University of Washington, Seattle, WA, USA

**Peter Greaves** Department of Cancer Studies, University of Leicester, Leicester, UK

**John A. Green** Department of Cancer Medicine, University of Liverpool, Liverpool, UK

Mark I. Greene Department of Pathology, Laboratory Medicine and Abramson Cancer Center, University of Pennsylvania, Philadelphia, PA, USA

Michael Greene Auburn University, Auburn, AL, USA

**Arjan W. Griffioen** Angiogenesis Laboratory, Department of Pathology, Maastricht University, Maastricht, The Netherlands

**Dirk Grimm** BIOQUANT, Cluster of Excellence Cell Networks, University of Heidelberg, Heidelberg, Germany

**Matthew J. Grimshaw** Breast Cancer Biology Group, King's College London School of Medicine, Guy's Hospital, London, UK

**Stephen R. Grobmyer** Department of Surgery, Division of Surgical Oncology, University of Florida, Gainesville, FL, USA

**Bernd Grosche** Department of Radiation Protection and Health, Bundesamt für Strahlenschutz (Federal Office for Radiation Protection), Oberschleissheim, Germany

Isabelle Gross INSERM U1113, Université de Strasbourg, Strasbourg, France

**Michael Grusch** Institute of Cancer Research, Department of Medicine I, Medical University of Vienna, Vienna, Austria

**Wei Gu** Institute for Cancer Genetics, and Department of Pathology, College of Physicians and Surgeons, Columbia University, New York, NY, USA

**Francisca Guardiola-Serrano** University of the Balearic Islands, Palma de Mallorca, Spain

xlvi Contributors

**Juliana Guarize** Department of Thoracic Surgery, European Institute of Oncology, Milan, Italy

**Valentina Guarneri** Istituto Oncologico Veneto IRCCS, Division of Medical Oncology 2, Department of Surgery, Oncology and Gastroenterology, University of Padova, Padova, Italy

**Tiziana Guarnieri** Department of Biology, Geology and Environmental Sciences, Alma Mater Studiorum University of Bologna, Bologna, Italy

**Liliana Guedez** Immunopathology Section, National Eye Institute, Bethesda, MD, USA

**Frederick Peter Guengerich** Department of Biochemistry and Center in Molecular Toxicology, Biochemistry and Center in Molecular Toxicology, Vanderbilt University School of Medicine, Nashville, TN, USA

**Abhijit Guha** Division of Neurosurgery, University of Toronto, Toronto, ON, Canada

**Katherine A. Guindon** Department of Pharmacology and Toxicology, Queen's University, Kingston, ON, Canada

**Erich Gulbins** Department of Molecular Biology, University of Duisburg-Essen, Essen, Germany

**Charles A. Gullo** Microbiology NUS (Research), Duke/NUS GMS, Singapore, Singapore

**Aparna Gupta** Life Science Research Associate, Department of Gastroenterology and Hepatology, Stanford University School of Medicine, Stanford, CA, USA

**Sonal Gupta** Department of Pathology, The Sol Goldman Pancreatic Cancer Research Center, Johns Hopkins University School of Medicine, Baltimore, MD, USA

**Murali Gururajan** Department of Hematology and Oncology, Cedars-Sinai Medical Center, Los Angeles, CA, USA

Bristol-Myers Squibb & Co, Princeton, NJ, USA

**James F. Gusella** Center for Human Genetic Research, Massachusetts General Hospital, Boston, MA, USA

**Graeme R. Guy** Signal Transduction Laboratory, Institute of Molecular and Cell Biology, Singapore, Singapore

**Manuel Guzmán** Department of Biochemistry and Molecular Biology I, School of Biology, Complutense University, Madrid, Spain

**Geum-Youn Gwak** Department of Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Gangnam-gu, Seoul, South Korea

Contributors xlvii

**Guy Haegeman** Lab of Eukaryotic Gene Expression, LEGEST-University Gent, Ghent, Belgium

Stephan A. Hahn University of Bochum, Bochum, Germany

**Jörg Haier** Comprehensive Cancer Center Münster, University Hospital Münster, Münster, Germany

**Numsen Hail** Department of Pharmaceutical Sciences, The University of Colorado at Denver and Health Sciences Center, Denver, CO, USA

Pierre Hainaut International Prevention Research Institute, Lyon, France

**Brett M. Hall** Department of Pediatrics, Columbus Children's Research Institute, The Ohio State University, Columbus, OH, USA

**Janet Hall** Centre de Recherche en Cancérologie de Lyon (CRCL), UMR Inserm 1052 - CNRS 5286, Lyon, France

**Joyce L. Hamlin** Department of Biochemistry and Molecular Genetics, University of Virginia School of Medicine, Charlottesville, VA, USA

Rasha S. Hamouda GeneDx, Rockville, MD, USA

**Kelsey R. Hampton** Department of Cancer Biology, Kansas University Cancer Center, Kansas City, KS, USA

The University of Kansas Medical Center, Kansas City, KS, USA

**Lina Han** Department of Leukemia, Section of Molecular Hematology and Therapy, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Ross Hannan** Department of Cancer Biology and Therapeutics, John Curtin School of Medical Research, ANU College of Medicine, Biology and the Environment, Canberra, ACT, Australia

**Chunhai Hao** Department of Pathology and Laboratory Medicine, Henry Ford Health System, Detroit, MI, USA

**J. William Harbour** Bascom Palmer Eye Institute, University of Miami, Miami, FL, USA

**Mark Harland** Section of Epidemiology and Biostatistics, Cancer Research UK Clinical Centre, Leeds Institute of Molecular Medicine, St. James's University Hospital, Leeds, UK

**Adrian L. Harris** Weatherall Institute of Molecular Medicine, John Radcliffe Hospital, University of Oxford, Cancer Research UK, Headington, Oxford, UK

**Randall E. Harris** Director Center of Molecular Epidemiology, The Ohio State University, Columbus, OH, USA

**Marion Hartley** Ruesch Center for the Cure of Gastrointestinal Cancers, Lombardi Comprehensive Cancer Center, Georgetown University, Washington, DC, USA xlviii Contributors

**Uzma Hasan** CIRI, Oncoviruses and Innate Immunity, INSERM U1111, Ecole Normale Supérieure, Université de Lyon, CNRS-UMR5308, Hospices Civils de Lyon, Lyon, France

Mia Hashibe University of Utah, Salt Lake City, UT, USA

**Masaharu Hata** Division of Radiation Oncology, Department of Oncology, Yokohama City University Graduate School of Medicine, Yokohama, Kanagawa, Japan

**Yosef S. Haviv** Division of Nephrology, Hadassah-Hebrew University Medical Center, Department of Medicine, Jerusalem, Israel

**John D. Hayes** Medical Research Institute, Jacqui Wood Cancer Centre, University of Dundee, Dundee, UK

**Nicole M. Haynes** Cancer Therapeutics Program, Trescowthick Laboratories, Peter MacCallum Cancer Centre, East Melbourne, VIC, Australia

Hong He Department of Surgery, Austin Health, The University of Melbourne, Heidelberg, VIC, Australia

**Lili He** Molecular Oncology Program and Research Institute, H. Lee Moffitt Cancer Center, University of South Florida College of Medicine, Tampa, FL, USA

**Li-Zhen He** Memorial Sloan-Kettering Cancer Center, Weill Cornell Graduate School of Medical Sciences, New York, NY, USA

**Ruth He** Lombardi Comprehensive Cancer Center, Georgetown University, Washington, DC, USA

Yu-Ying He Medicine/Dermatology, University of Chicago, Chicago, IL, USA

**Stephen S. Hecht** The Cancer Center, University of Minnesota, Minneapolis, MN, USA

**Ingrid A. Hedenfalk** Department of Oncology, Clinical Sciences, Lund University, Lund, Sweden

**Petra Heffeter** Department of Medicine I, Institute of Cancer Research, Medical University of Vienna, Vienna, Austria

**Ahmed E. Hegab** Department of Geriatric and Respiratory Medicine, Tohoku University Hospital, Sendai, Japan

**Axel Heidenreich** Division of Oncological Urology, Department of Urology, University of Köln, Köln, Germany

**Olaf Heidenreich** Northern Institute for Cancer Research, Newcastle University, Newcastle upon Tyne, UK

**Werner Held** Ludwig Center for Cancer Research, Department of Oncology, University of Lausanne, Epalinges, Switzerland

**Carl-Henrik Heldin** Ludwig Institute for Cancer Research, Uppsala University, Uppsala, Sweden

**Wijnand Helfrich** Groningen University Institute for Drug Exploration (GUIDE), University Medical Center Groningen, Department of Pathology and Laboratory Medicine, Section Medical Biology, Laboratory for Tumor Immunology, University Medical Center Groningen, Groningen, The Netherlands

**Debby Hellebrekers** Department of Pathology, GROW-School for Oncology and Developmental Biology, Maastricht University Hospital, Maastricht, The Netherlands

**Ingegerd Hellstrom** Department of Pathology, University of Washington, Seattle, WA, USA

**Karl Erik Hellstrom** Department of Pathology, University of Washington, Seattle, WA, USA

**Paul W. S. Heng** Department of Pharmacy, National University of Singapore, Singapore, Singapore

**Kai-Oliver Henrich** DKFZ, German Cancer Research Center, Heidelberg, Germany

**Rui Henrique** Department of Pathology, Portuguese Oncology Institute-Porto, Porto, Portugal

Ellen C. Henry University of Rochester Medical Center, Rocheser, NY, USA

**Elizabeth P. Henske** Center for LAM Research and Clinical Care, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA

**Donald E. Henson** Uniformed Services University of the Health Sciences, Bethesda, MD, USA

**Serge Hercherg** UMR U1153 INSERM, U1125 INRA, CNAM, Université Paris 13, Centre de Recherche Epidémiologie et Statistique Sorbonne Paris Cité, Bobigny, France

Meenhard Herlyn The Wistar Institute, Philadelphia, PA, USA

**Heike M. Hermanns** Med. Klinik II, Hepatologie, Universitätsklinikum Würzburg, Würzburg, Germany

**Blanca Hernandez-Ledesma** Instituto de Investigación en Ciencias de la Alimentación (CIAL, CSIC-UAM, CEI UAM+CSIC), Madrid, Spain

Wolfgang Herr Universitätsklinikum Regensburg, Regensburg, Germany

**Erika Herrero Garcia** Department of Pharmacology, University of Illinois College of Medicine, Chicago, IL, USA

**Helen E. Heslop** Center for Cell and Gene Therapy, Baylor College of Medicine, Texas Children's Hospital, and The Methodist Hospital, Houston, TX, USA

**Jochen Hess** Division of Signal Transduction and Growth Control, Deutsches Krebsforschungszentrum, Heidelberg, Germany

**Dominique Heymann** Physiopathologie de la Résorption Osseuse et Thérapie des Tumeurs Osseuses Primitives, University of Nantes, Nantes, France

**Martha Hickey** Obstetrics and Gynaecology, The University of Melbourne, Parkville, VIC, Australia

**James Hicks** Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, USA

**Kevin O. Hicks** Auckland Cancer Society Research Centre, The University of Auckland, Auckland, New Zealand

**Colin K. Hill** Department of Radiation Oncology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

**Shawn Hingtgen** Division of Molecular Pharmaceutics, UNC Eshelman School of Pharmacy, Biomedical Research Imaging Center, University of North Carolina, Chapel Hill, NC, USA

**Isabelle Hinkel** INSERM U1113, Université de Strasbourg, Strasbourg, France

**Boaz Hirshberg** Cardiovascular and Metabolic Diseases, Pfizer Inc, Groton, CT, USA

Ari Hirvonen Finnish Institute of Occupational Health, Helsinki, Finland

Ricardo Hitt Hospital Universitario Severo Ochoa, Madrid, Spain

**Eiso Hiyama** Natural Science Center for Basic Research and Development, Department of Pediatric Surgery, Hiroshima University Hospital, Hiroshima University, Hiroshima, Japan

**Falk Hlubek** Department of Pathology, Ludwig-Maximilians-University of Munich, Munich, Germany

**Steven N. Hochwald** Departments of Surgical Oncology, Roswell Park Cancer Institute, Buffalo, NY, USA

**Mir Alireza Hoda** Division of Thoracic Surgery, Medical University of Vienna, Vienna, Austria

**Michael Hodsdon** Department of Laboratory Medicine, Yale University School of Medicine, New Haven, CT, USA

**Kasper Hoebe** Division of Immunobiology, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

**Markus Hoffmann** Hals-, Nasen- und Ohrenheilkunde, Kopf- und Halschirurgie, Universitätsklinikum Schleswig-Holstein, Campus Kiel, Kiel, Germany

**Michèle J. Hoffmann** Department of Urology, Heinrich Heine University, Düsseldorf, Germany

**Lorne J. Hofseth** Department of Pharmaceutical and Biomedical Sciences, South Carolina College of Pharmacy, University of South Carolina, Columbia, SC, USA

**Susanne Holck** Department of Pathology, Copenhagen University Hospital, Hvidovre, Denmark

**Stefan Holdenrieder** Institute of Clinical Chemistry and Clinical Pharmacology, Universitatsklinikum Bonn, Bonn, Germany

**James F. Holland** Tisch Cancer Institute, Icahn School of Medicine at Mount Sinai, New York, NY, USA

**Petra Den Hollander** Department of Translational Molecular Pathology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

Caroline L. Holloway BC Cancer Agency, Vancouver Island Centre, Victoria, BC, Canada

**Arne Holmgren** Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Stockholm, Sweden

**Astrid Holzinger** Tumor Genetics, Clinic I Internal Medicine, University Hospital Cologne, and Center for Molecular Medicine Cologne, University of Cologne, Cologne, Germany

**Jun Hyuk Hong** Division of Urologic Oncology, The Cancer Institute of NJ, Robert Wood Johnson Medical School, New Brunswick, NJ, USA

**Adília Hormigo** Department of Neurology, Medicine (Division Hematology Oncology) and Neurosurgery, Icahn School of Medicine at Mount Sinai and The Tisch Cancer Institute, New York, NY, USA

**Joshua Hornig** Head and Neck Tumor Program, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC, USA

**Michael R. Horsman** Department of Experimental Clinical Oncology, Aarhus University Hospital, Aarhus, Denmark

**Andrea Kristina Horst** Inst. Experimental Immunology and Hepatology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

**David W. Hoskin** Departments of Pathology, and Microbiology and Immunology, Dalhousie University, Halifax, NS, Canada

**Andreas F. Hottinger** Departments of Clinical Neuroscience and Oncology, CHUV, Lausanne University Hospital, Lausanne, VD, Switzerland

**Peter J. Houghton** Greehey Children's Cancer Research Institute, UT Health Science Center, San Antonio, TX, USA

**Anthony Howell** CRUK Department of Medical Oncology, University of Manchester, Christie Hospital NHS Trust, Manchester, UK

lii Contributors

**Lynne M. Howells** Department of Cancer Studies, University of Leicester, Leicester, UK

**Chia-Chien Hsieh** Department of Human Development and Family Studies (Nutritional Science and Education), National Taiwan Normal University, Taipei, Taiwan

**Shie-Liang Hsieh** Department of Microbiology and Immunology, National Yang-Ming University, Immunology Research Center, Taipei Veterans General Hospital; Genomics Research Center, Academia Sinica, Taipei, Taiwan

**Wei Hu** Departments of Gynecologic Oncology and Reproductive Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Cheng-Long Huang** Department of Second Surgery, Kagawa University, Kagawa, Japan

**Gonghua Huang** Department of Immunology, St. Jude Children's Research Hospital, Memphis, TN, USA

**Shile Huang** Department of Biochemistry and Molecular Biology and Feist-Weiller Cancer Center, Louisiana State University Health Sciences Center, Shreveport, LA, USA

**Kay Huebner** Department of Molecular Virology, Immunology and Medical Genetics, Ohio State University Comprehensive Cancer Center, Columbus, OH, USA

**Pere Huguet** Department of Pathology, Vall d'Hebron University Hospital, Barcelona, Spain

**Maureen B. Huhmann** Department of Nutrition Sciences, School of Health Related Professions, Rutgers The State University, Newark, NJ, USA

**Wen-Chun Hung** National Institute of Cancer Research, National Health Research Institutes, Tainan Taiwan, Republic of China

**Tony Hunter** Salk Institute, Molecular and Cell Biology Laboratory, La Jolla, CA, USA

**Teh-Ia Huo** Institute of Pharmacology, School of Medicine, National Yang-Ming University, Taipei, Taiwan

**Jacques Huot** Le Centre de recherche du CHU de Québec-Université Laval: axe Oncologie, Le Centre de recherche sur le cancer de l'Université Laval, Québec, QC, Canada

**Karen L. Huyck** Department of Pathology, Brigham and Women's Hospital, Boston, MA, USA

**Sam T. Hwang** Dermatology Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

**Brandy D. Hyndman** Department of Pathology and Molecular Medicine, Queen's University Cancer Research Institute, Queen's University, Kingston, ON, Canada

**Maitane Ibarguren** Department of Biology, University of the Balearic Islands, Palma de Mallorca, Spain

**Takafumi Ichida** Department of Hepatology and Gastroenterology, Juntendo University School of Medicine, Shizuoka Hospital, Shizuoka, Japan

**Yoshito Ihara** Department of Biochemistry, School of Medicine, Wakayama Medical University, Wakayama, Japan

**Hitoshi Ikeda** Department of Pediatric Surgery, Dokkyo Medical University Koshigaya Hospital, Koshigaya, Saitama, Japan

**Landon Inge** Norton Thoracic Institute, St. Joseph's Hospital and Medical Center, Phoenix, AZ, USA

**Kazuhiko Ino** Department of Obstetrics and Gynecology, Nagoya University Graduate School of Medicine, Nagoya, Japan

**Juan Iovanna** INSERM, Stress Cellulaire, Parc Scientifique et Technologique de Luminy, Marseille Cedex, France

**Irmgard Irminger-Finger** Molecular Gynecology and Obstetrics Laboratory, Department of Gynecology and Obstetrics, Geneva University Hospitals, Geneva, Switzerland

**Meredith S. Irwin** Cell Biology Program and Division of Hematology-Oncology Hospital for Sick Children, University of Toronto, Toronto, ON, Canada

**Toshihisa Ishikawa** Biochemistry, Molecular Biology, and Pharmacogenomics, NGO Personalized Medicine and Healthcare, Yokohama, Japan

**Toshiyuki Ishiwata** Department of Integrated Diagnostic Pathology, Graduate School of Medicine, Nippon Medical School, Tokyo, Japan

Mark A. Israel Departments of Pediatrics and of Genetics, Norris Cotton Cancer Center, Geisel School of Medicine at Dartmouth, Hanover, NH, USA

**Antoine Italiano** Early Phase Trials and Sarcoma Units, Institut Bergonie, Bordeaux, France

**Norimasa Ito** Departments of Surgery and Bioengineering, University of Pittsburgh, Pittsburgh, PA, USA

**Michael Ittmann** Department of Pathology, Baylor College of Medicine, Houston, TX, USA

**Richard Ivell** School of Biosciences and School of Veterinary Medicine and Science, University of Nottingham, Nottingham, UK

**Antoni Ivorra** Department of Information and Communication Technologies, Universitat Pompeu Fabra (UPF), Barcelona, Spain

**Nobutaka Iwakuma** Department of Surgery, Division of Surgical Oncology, University of Florida, Gainesville, FL, USA

liv Contributors

**Shai Izraeli** Pediatric Hemato-Oncology, Sheba Medical Center and Tel Aviv University, Ramat Gan, Israel

**Paola Izzo** Department of Molecular Medicine and Medical Biotechnology, School of Medicine and Surgery, University of Naples Federico II, Naples, Italy

Mark Jackman Wellcome/CRC Institute, Cambridge, UK

**Alan Jackson** Centre for Imaging Sciences, University of Manchester, Manchester, UK

**Deborah Jackson-Bernitsas** Department of Systems Biology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Stephan C. Jahn** Department of Pharmacology and Therapeutics and the UF and Shands Cancer Center, University of Florida, Gainesville, FL, USA

**David Jamieson** School of Clinical and Laboratory Sciences, Newcastle University, Newcastle upon Tyne, UK

**Siegfried Janz** Department of Pathology, Carver College of Medicine, University of Iowa, Iowa City, IA, USA

Daniel G. Jay Tufts University School of Medicine, Boston, MA, USA

**Gordon C. Jayson** Cancer Research UK Department of Medical Oncology, Christie Hospital, Manchester, UK

**Kuan-Teh Jeang** National Institute of Allergy and Infectious Disease, NIH, Bethesda, MD, USA

**Diane F. Jelinek** Department of Immunology, Mayo Clinic, College of Medicine, Rochester, MN, USA

**Jiiang-Huei Jeng** Laboratory of Pharmacology and Toxicology, School of Dentistry, National Taiwan University Hospital and National Taiwan University Medical College, Taipei, Taiwan

Elwood V. Jensen National Institute of Health, Bethesda, MD, USA

**Erika Jensen-Jarolim** Institute of Pathophysiology and Allergy Research, Center of Pathophysiology, Infectiology and Immunology, Medical University Vienna, Vienna, Austria

The Interuniversity Messerli Research Institute, University of Veterinary Medicine Vienna, Medical University Vienna and University Vienna, Vienna, Austria

**Carmen Jeronimo** Research Center, Portuguese Oncology Institute-Porto, Porto, Portugal

**Lin Ji** Department of Thoracic and Cardiovascular Surgery, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Shuai Jiang** Department of Biology and Biological Engineering, California Institute of Technology, Pasadena, CA, USA

Contributors Iv

**Yufei Jiang** Cancer Vaccine Section, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

**Charlotte Jin** Departments of Clinical Genetics, University Hospital, Lund, Sweden

**Chengcheng Jin** The David H. Koch Institute of Integrative Cancer Research, Massachusetts Institute of Technology, Cambridge, MA, USA

**Andrew K. Joe** Department of Medicine, Herbert Irving Comprehensive Cancer Center, New York, NY, USA

**Manfred Johannsen** Facharztpraxis Urologie Johannsen and Laux, Berlin, Germany

Kaarthik John Division of Microbiology, Tulane University, Covington, LA, USA

Alan L. Johnson Pennsylvania State University, State College, PA, USA

**Sara M. Johnson** Department of Surgery, The University of Texas Medical Branch, Galveston, TX, USA

**Won-A Joo** The Wistar Institute, Philadelphia, PA, USA

**V. Craig Jordan** Breast Medical Oncology, MD Anderson Cancer Center, Houston, TX, USA

Serene Josiah Cambridge, MA, USA

**Richard Jove** Vaccine and Gene Therapy Institute of Florida, Port Saint Lucie, FL, USA

**Jaroslaw Jozwiak** Department of Histology and Embryology, Medical University of Warsaw, Warsaw, Poland

**Jesper Jurlander** Department of Hematology, Rigshospitalet, Copenhagen, Denmark

**Donat Kögel** Experimental Neurosurgery, Center for Neurology and Neurosurgery, Goethe-University Hospital, Frankfurt am Main, Germany

**Ralf Küppers** Institute of Cell Biology (Cancer Research), University of Duisburg-Essen, Medical School, Essen, Germany

**Chaim Kahana** Department of Molecular Genetics, Weizmann Institute of Science, Rehovot, Israel

**Bernd Kaina** Department of Toxicology, University Medical Center Mainz, Mainz, Germany

**Kiran Kakarala** Departments of Otolaryngology-Head and Neck Surgery, University of Kansas Medical Center, Kansas City, KS, USA

Tadao Kakizoe National Cancer Center, Tokyo, Japan

Ganna V. Kalayda Institute of Pharmacy, University of Bonn, Bonn, Germany

lvi Contributors

**Tuula Kallunki** Unit of Cell Death and Metabolism, Danish Cancer Society Research Center, Copenhagen, Denmark

**Takehiko Kamijo** Research Institute for Clinical Oncology, Saitama Cancer Center, Ina, Saitama, Japan

**Yasufumi Kaneda** Department of Gene Therapy Science, Graduate School of Medicine, Osaka University, Suita, Osaka, Japan

**Kazuhiro Kaneko** Department of Gastroenterology, Endoscopy Division, National Cancer Center Hospital East, Chiba, Japan

**Inkyung Kang** Department of Surgery, University of California, San Francisco, San Francisco, CA, USA

**Jayakanth Kankanala** Center for Drug Design, Academic Health Center, University of Minnesota, Minneapolis, MN, USA

**Yung-Hsi Kao** Department of Life Sciences, College of Science, National Central University, Jhongli City, Taiwan

**David E. Kaplan** Division of Gastroenterology, University of Pennsylvania, Philadelphia, PA, USA

**Niki Karachaliou** Instituto Oncológico Dr. Rosell, Quiron-Dexeus University Hospital, Barcelona, Spain

**Sophia N. Karagiannis** St. John's Institute of Dermatology, Division of Genetics and Molecular Medicine, Faculty of Life Sciences and Medicine, King's College London, London, UK

NIHR Biomedical Research Centre at Guy's and St. Thomas' Hospitals, Guy's Hospital, King's College London, London, UK

**Michalis V. Karamouzis** Department of Biological Chemistry, Medical School, University of Athens, Goudi, Athens, Greece

**Adam R. Karpf** Department of Pharmacology and Therapeutics, Roswell Park Cancer Institute, Buffalo, NY, USA

**Nilesh D. Kashikar** Departments of Surgery and Cancer Biology, Vanderbilt-Ingram Cancer Center, Vanderbilt University School of Medicine, Nashville, TN, USA

**Matilda Katan** CRC Centre for Cell and Molecular Biology, Institute of Cancer Research, London, UK

**William K. Kaufmann** Department of Pathology and Laboratory Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

**Manjinder Kaur** Department of Pharmaceutical Sciences, School of Pharmacy, University of Colorado Health Sciences Center, Denver, CO, USA

**Sukhwinder Kaur** Department of Biochemistry and Molecular Biology, University of Nebraska Medical Center, Omaha, NE, USA

**Ingo Kausch** Department of Urology, Ammerlandklinik Westerstede, Westerstede, Germany

**Koji Kawakami** Department of Pharmacoepidemiology, Graduate School of Medicine and Public Health, Kyoto University, Kyoto, Japan

**Frederic J. Kaye** National Cancer Institute, NIH and National Naval Medical Center, Bethesda, MD, USA

**Stanley B. Kaye** Drug Development Unit, Institute of Cancer Research, The Royal Marsden Hospital, Sutton, UK

**Evan T. Keller** Departments of Urology and Pathology, University of Michigan, Ann Arbor, MI, USA

**Daniel Keppler** Department of Biological Science, College of Pharmacy, Touro University-CA, Vallyo, CA, USA

**Santhosh Kesari** Department of Translational Neuro-Oncology and Neurotherapeutics, John Wayne Cancer Institute, Providence St. John's Health Center, Santa Monica, CA, USA

**Jorma Keski-Oja** Departments of Pathology and of Virology, Haartman Institute, University of Helsinki, Helsinki, Finland

**Khandan Keyomarsi** Department of Experimental Radiation Oncology, Unit 1052, University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Abdul Arif Khan** Department of Pharmaceutics, College of Pharmacy, King Saud University, Riyadh, Saudi Arabia

**Shahanavaj Khan** Department of Pharmaceutics, College of Pharmacy, King Saud University, Riyadh, Saudi Arabia

**Chand Khanna** Comparative Oncology Program, Center for Cancer Research, National Cancer Institute, Bethesda, MD, USA

Samir N. Khleif GRU Cancer Center, Augusta, GA, USA

**Roya Khosravi-Far** Department of Pathology, Harvard Medical School, Beth Israel Deaconess Medical Center, Boston, MA, USA

**Tobias Kiesslich** Department of Internal Medicine I, Paracelsus Medical University, Institute of Physiology and Pathophysiology, Paracelsus Medical University, Salzburg, Austria

**Fumitaka Kikkawa** Department of Obstetrics and Gynecology, Nagoya University Graduate School of Medicine, Nagoya, Japan

Nerbil Kilic Kantonspital St. Gallen, St. Gallen, Switzerland

**Isaac Yi Kim** Division of Urologic Oncology, The Cancer Institute of NJ, Robert Wood Johnson Medical School, New Brunswick, NJ, USA

**Jung-whan Kim** Department of Biological Sciences, The University of Texas at Dallas, Richardson, TX, USA

lviii Contributors

**Miran Kim** Division of Gastroenterology, Liver Research Center, Rhode Island Hospital and Warren Alpert Medical School of Brown University, Providence, RI, USA

**Moonil Kim** BioNanotechnology Research Center, Korea Research Institute of Bioscience and Biotechnology, Yuseong, Daejeon, Republic of Korea

**Seong Jin Kim** Laboratory of Cell Regulation and Carcinogenesis, National Cancer Institute, Bethesda, MD, USA

**Su Young Kim** Pediatric Oncology Branch, Center for Cancer Research, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

Adi Kimchi Department of Molecular Genetics, Weizmann Institute of Science, Rehovot, Israel

**A. Douglas Kinghorn** College of Pharmacy, The Ohio State University, Columbus, OH, USA

David Kirn Jennerex Biotherapeutics Inc., San Francisco, CA, USA

Youlia M. Kirova Department of Radiation Oncology, Institut Curie, Paris, France

Shinichi Kitada Burnham Institute for Medical Research, La Jolla, CA, USA

**Karel Kithier** Department of Pathology, Wayne State University School of Medicine, Detroit, MI, USA

**Chikako Kiyohara** Department of Preventive Medicine, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan

**Celina G. Kleer** Department of Pathology and Comprehensive Cancer Center, University of Michigan Medical School, Ann Arbor, MI, USA

**George Klein** Microbiology, Tumor and Cell Biology, Karolinska Institute, Stockholm, Sweden

Michael J. Klein Department of Pathology and Laboratory Medicine, Hospital for Special Surgery, New York, NY, USA

**Elena Klenova** Department of Biological Sciences, University of Essex, Colchester, Essex, UK

**Thomas Klonisch** Department of Human Anatomy and Cell Science, College of Medicine, Faculty of Health Sciences, University of Manitoba, Winnipeg, MB, Canada

**Elizabeth Knobler** Department of Dermatology, Columbia College of Physicians and Surgeons, New York, NY, USA

**Robert Knobler** Department of Dermatology, Medical University of Vienna, Vienna, Austria

Beatrice Knudsen Cedars-Sinai, Los Angeles, CA, USA

Contributors lix

**Stefan Kochanek** Division of Gene Therapy, University of Ulm, Ulm, Germany

Manish Kohli Medical Oncology, Mayo Clinic, Rochester, MN, USA

Katri Koli Translational Cancer Biology Program, University of Helsinki, Helsinki, Finland

**Christian Kollmannsberger** Division of Medical Oncology, British Columbia Cancer Agency, Vancouver Cancer Centre, University of British Columbia, Vancouver, BC, Canada

**Yutaka Kondo** Department of Epigenomics, Nagoya City University Graduate School of Medical Sciences, Nagoya, Japan

**Lin Kong** Department of Radiation Oncology, Fudan University Shanghai Cancer Center, Shanghai, China

**Marina Konopleva** Department of Leukemia and Department of Stem Cell Transplantation and Cellular Therapy, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Roland E. Kontermann** Institute of Cell Biology and Immunology, University of Stuttgart, Stuttgart, Germany

Janko Kos Faculty to Pharmacy, University of Ljubljana, Ljubljana, Slovenia

**Marta Kostrouchova** Institute of Cellular Biology and Pathology, 1st Faculty of Medicine, Charles University, Prague, Czech Republic

**Athanassios Kotsinas** Molecular Carcinogenesis Group, Laboratory of Histology-Embryology, Medical School, National and Kapodistrian University of Athens, Greece

**Evangelia A. Koutsogiannouli** Department of Urology, Heinrich Heine University, Düsseldorf, Germany

Heinrich Kovar Children's Cancer Research Institute, Vienna, Austria

**Craig Kovitz** Department of Medical Oncology, University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Christian Kowol** Institute of Inorganic Chemistry, University of Vienna, Vienna, Austria

**Barnett S. Kramer** Office of Disease Prevention, National Institutes of Health, Bethesda, MD, USA

**Oliver H. Krämer** Department of Toxicology, University Medical Center Mainz, Mainz, Germany

**Barbara Krammer** Department of Molecular Biology, University of Salzburg, Salzburg, Austria

**Henk J. van Kranen** National Institute of Public Health and Environment, Bilthoven, The Netherlands

lx Contributors

**Robert Kratzke** Division of Hematology, Oncology and Transplantation, University of Minnesota, Minneapolis, MN, USA

**Thomas Krausz** Department of Pathology, University of Chicago, Chicago, IL, USA

**Jürgen Krauter** Medizinische Klinik III – Hämatologie und Onkologie, Klinikum Braunschweig, Braunschweig, Germany

**Bernhard Kremens** Department of Pediatric Hematology, Oncology and Respiratory Medicine, University Hospitals of Essen, Essen, Germany

**Betsy T. Kren** Minneapolis VA Health Care System and University of Minnesota, Minneapolis, MN, USA

**Yasusei Kudo** Department of Oral Molecular Pathology, Institute of Biomedical Sciences, Tokushima University Graduate School, Tokushima, Japan

**Deepak Kumar** Department of Biological and Environmental Sciences, University of the District of Columbia, Washington, DC, USA

**Parvesh Kumar** Department of Radiation Oncology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

**Rakesh Kumar** Department of Biochemistry and Molecular Medicine, George Washington University, Washington, DC, USA

**Hiroki Kuniyasu** Department of Molecular Pathology, Nara Medical University School of Medicine, Kashihara, Nara, Japan

**Siavash K. Kurdistani** Department of Biological Chemistry, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA

**Elena Kurenova** Departments of Surgical Oncology, Roswell Park Cancer Institute, Buffalo, NY, USA

**Keisuke Kurose** Departments of Obstetrics and Gynecology, Nippon Medical School, Kawasaki and Tokyo, Japan

**Peter Kurre** Department of Pediatrics, Oregon Health and Science University, Portland, OR, USA

**Robert M. Kypta** Cell Biology and Stem Cells Unit, CIC bioGUNE, Derio, Spain

Imperial College London, London, UK

**Juan Carlos Lacal** Instituto de Investigaciones Biomedicas, CSIC, Madrid, Spain

James C. Lacefield Departments of Electrical and Computer Engineering and Medical Biophysics, University of Western Ontario, London, ON, Canada

**Stephan Ladisch** Center for Cancer and Immunology Research, Children's Research Institute, Children's National Medical Center and The George Washington University School of Medicine, Washington, DC, USA

**Hermann Lage** Institute of Pathology, Charité Campus Mitte, Berlin, Germany

**Charles P. K. Lai** Department of Cellular and Physiological Sciences, The University of British Columbia, Vancouver, BC, Canada

**Henry Lai** Departments of Bioengineering, University of Washington, Seattle, WA, USA

**Dale W. Laird** Department of Anatomy and Cell Biology, University of Western Ontario, London, ON, Canada

**Hilaire C. Lam** Center for LAM Research and Clinical Care, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA

**Janice B. B. Lam** Department of Pharmacology and Pharmacy, The University of Hong Kong, Hong Kong, China

**Wan L. Lam** Department of Cancer Genetics and Developmental Biology, British Columbia Cancer Research Centre, Vancouver, BC, Canada

Hui Y. Lan The Chinese University of Hong Kong, Hong Kong, China

Joseph R. Landolph, Jr. Department of Molecular Microbiology and Immunology, and Department of Pathology; Laboratory of Chemical Carcinogenesis and Molecular Oncology, USC/Norris Comprehensive Cancer Center, Keck School of Medicine; Department of Molecular Pharmacology and Pharmaceutical Sciences, School of Pharmacy, Health Sciences Campus, University of Southern California, Los Angeles, CA, USA

**Ari L. Landon** The University of Maryland Marlene and Stewart Greenebaum Cancer Center, Baltimore, MD, USA

**Robert Langer** Department of Chemical Engineering and Center for Cancer Research, Massachusetts Institute of Technology, Cambridge, MA, USA

**Sigrid A. Langhans** Nemours Center for Childhood Cancer Research, Alfred I duPont Hospital for Children, Wilmington, DE, USA

**Cinzia Lanzi** Molecular Pharmacology Unit, Department of Experimental Oncology and Molecular Medicine, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

**Rosamaria Lappano** Department of Pharmacy and Health and Nutritional Sciences, University of Calabria, Rende, Italy

**Paola Larghi** Department of Immunology, Fondazione Humanitas per la Ricerca, Rozzano, Milan, Italy

**James M. Larner** Department of Therapeutic Radiology and Oncology, University of Virginia School of Medicine, Charlottesville, VA, USA

**Göran Larson** Department of Clinical Chemistry and Transfusion Medicin, Institute of Biomedicine, Sahlgrenska Academy at Göteborg University, Göteborg, Sweden lxii Contributors

**Lars-Inge Larsson** Department of Pathology, Copenhagen University Hospital, Hvidovre, Denmark

**Susanna C. Larsson** Division of Nutritional Epidemiology, Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden

Philippe Lassalle INSERM U774, Institut Pasteur de Lille, Lille, France

**Antony M. Latham** Endothelial Cell Biology Unit, Leeds Institute of Genetics Health and Therapeutics (LIGHT), University of Leeds, Leeds, UK

**Farida Latif** Institute of Cancer and Genomic Sciences, University of Birmingham, Edgbaston, Birmingham, UK

Paule Latino-Martel UMR U1153 INSERM, U1125 INRA, CNAM, Université Paris 13, Centre de Recherche Epidémiologie et Statistique Sorbonne Paris Cité, Bobigny, France

**Kirsten Lauber** Clinic for Radiotherapy and Radiation Oncology, LMU Munich, Munich, Germany

**Béatrice Lauby-Secretan** Section of the IARC Monographs, IARC/WHO, Lyon, France

**Virpi Launonen** Department of Medical Genetics, Biomedicum Helsinki, University of Helsinki, Helsinki, Finland

**Martin F. Lavin** University of Queensland Centre for Clinical Research at Royal Brisbane and Women's Hospital, The University of Queensland, Brisbane, OLD, Australia

**Brian Law** Department of Pharmacology and Therapeutics and the UF and Shands Cancer Center, University of Florida, Gainesville, FL, USA

Gwendal Lazennec INSERM, Montpellier, France

**Pedro A. Lazo** CSIC-Universidad de Salamanca, Instituto de Biología Molecular y Celular del Cáncer, Salamanca, Spain

**Gail S. Lebovic** Director of Women's Services, The Cooper Clinic, Dallas, TX, USA

**David P. LeBrun** Department of Pathology and Molecular Medicine, Queen's University Cancer Research Institute, Queen's University, Kingston, ON, Canada

Protein Function Discovery Group, Queen's University, Kingston, ON, Canada

Division of Cancer Biology and Genetics, Cancer Research Institute, Queen's University, Kingston, ON, USA

**Sean Bong Lee** Department of Pathology and Laboratory Medicine, Tulane University School of Medicine, New Orleans, LA, USA

**Seong-Ho Lee** Department of Nutrition and Food Science, University of Maryland, College Park, MD, USA

**Stephen Lee** Department of Cellular and Molecular Medicine, Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada

**William P. J. Leenders** Department of Pathology, Radboud University Medical Center Nijmegen, Nijmegen, The Netherlands

**Andreas Leibbrandt** Institute of Molecular Biotechnology of the Austrian Academy of Sciences, Vienna, Austria

Manuel C. Lemos CICS-UBI, Health Sciences Research Centre, University of Beira Interior, Covilhã, Portugal

**Eric Lentsch** Head and Neck Tumor Program, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC, USA

**Derek LeRoith** Division of Endocrinology, Diabetes and Bone Diseases, Mount Sinai School of Medicine, New York, NY, USA

**Yun-Chung Leung** Lo Ka Chung Centre for Natural Anti-cancer Drug Development and Department of Applied Biology and Chemical Technology, The Hong Kong Polytechnic University, Hong Kong, China

Francis Lévi Warwick Medical School, University of Warwick, Coventry, UK

**Jay A. Levy** University of California, School of Medicine, San Francisco, CA, USA

**Benyi Li** Department of Urology, The University of Kansas Medical Center, Kansas City, KS, USA

**Guideng Li** Institute for Immunology, School of Medicine, University of California, Irvine, CA, USA

Kaiyi Li Department of Surgery, Baylor College of Medicine, Houston, TX, USA

Yan Li Department of Immunology, Cleveland Clinic, Cleveland, OH, USA

**Daiqing Liao** Department of Anatomy and Cell Biology, UF Health Cancer Center, University of Florida College of Medicine, Gainesville, FL, USA

**Yung-Feng Liao** Institute of Cellular and Organismic Biology, Academia Sinica, Taipei, Taiwan

**Emmanuelle Liaudet-Coopman** IRCM, INSERM, UMI, CRLC Val d'Aurelle, Montpellier, France

**Rossella Libè** Endocrinology, Metabolism and Cancer Department, INSERM U567, Institut Cochin, Paris, France

**Danielle Liddle** Gray Institute for Radiation Oncology and Biology, Department of Oncology, University of Oxford, Oxford, UK

**Jane Liesveld** James P. Wilmot Cancer Center, University of Rochester, Rochester, NY, USA

lxiv Contributors

**Stephanie Lim** Medical Oncology, Ingham Research Institute, Liverpool, NSW, Australia

**Ke Lin** Department of Haematology, Royal Liverpool University Hospital, Liverpool, UK

**Sheng-Cai Lin** Department of Biomedical Sciences, School of Life Sciences, Xiamen University, Xiamen, Fujian, China

**Shiaw-Yih Lin** Department of Systems Biology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Wan-Wan Lin** Department of Pharmacology, College of Medicine, National Taiwan University, Taipei, Taiwan

**Yong Lin** Molecular Biology and Lung Cancer Program, Lovelace Respiratory Research Institute, Albuquerque, NM, USA

**Janet C. Lindsey** Northern Institute for Cancer Research, Newcastle University, Newcastle upon Tyne, UK

Christopher A. Lipinski Melior Discovery, Waterford, CT, USA

Joseph Lipsick Stanford University, Stanford, CA, USA

**Fei-Fei Liu** Princess Margaret Cancer Centre, University Health Network, Toronto, ON, Canada

Department of Radiation Oncology, Princess Margaret Hospital, Toronto, ON, Canada

Department of Radiation Oncology, University of Toronto, Toronto, ON, Canada

Department of Medical Biophysics, University of Toronto, Toronto, ON, Canada

**Tao Liu** Department of Medicine, Harvard Medical School, Brigham and Women's Hospital, Boston, MA, USA

**Wen Liu** Division of Life Science, Hong Kong University of Science and Technology, Kowloon, Hong Kong

**Xiangguo Liu** School of Life Science, Shandong University, Jinan, Shandong, China

**Yiyan Liu** Department of Radiology, New Jersey Medical School, Rutgers University, New Brunswick, NJ, USA

**Hui-Wen Lo** Department of Cancer Biology, Wake Forest University School of Medicine, Winston-Salem, NC, USA

**Ting Ling Lo** Signal Transduction Laboratory, Institute of Molecular and Cell Biology, Singapore, Singapore

**Victor Lobanenkov** Section of Molecular Pathology, Laboratory of Immunopathology, NIAID, National Institutes of Health, Bethesda, MD, USA

Contributors Ixv

**Holger N. Lode** Klinik und Poliklinik für Kinder und Jugendmedizin, Universitätsmedizin Greifswald, Greifswald, Germany

Lawrence A. Loeb University of Washington, Seattle, WA, USA

**Robert Loewe** Department of Dermatology, Division of General Dermatology, Medical University of Vienna, Vienna, Austria

**Steffen Loft** Department of Environmental Health, University of Copenhagen, Copenhagen, Denmark

**Dietmar Lohmann** Institut für Humangenetik, Universitätsklinikum Essen, Essen, Germany

**Matthias Löhr** Department of Clinical Science, Intervention and Technology (CLINTEC), Karolinska Institutet, Stockholm, Sweden

**Vinata B. Lokeshwar** Department of Biochemistry and Molecular Biology, Medical College of Georgia; Augusta University, Augusta, GA, USA

**Alexandre Loktionov** DiagNodus Ltd, Babraham Research Campus, Cambridge, UK

**Elias Lolis** Department of Laboratory Medicine, Yale University School of Medicine, New Haven, CT, USA

**Pier-Luigi Lollini** Laboratory of Immunology and Biology of Metastasis, Department of Experimental, Diagnostic and Specialty Medicine, University of Bologna, Bologna, Italy

**Weiwen Long** Department of Biochemistry and Molecular Biology, Wright State University, Dayton, OH, USA

**David J. López** University of the Balearic Islands, Palma de Mallorca, Spain

**Miguel Lopez-Lazaro** Department of Pharmacology, Faculty of Pharmacy, University of Seville, Seville, Spain

Ana Lopez-Martin Hospital Universitario Severo Ochoa, Madrid, Spain

**Charles L. Loprinzi** Department of Oncology, Mayo Clinic, Rochester, MN, USA

Jochen Lorch Dana Farlur Cancer Institute, Boston, MA, USA

**Edith M. Lord** Department of Microbiology and Immunology, University of Rochester School of Medicine and Dentistry, Rochester, NY, USA

**Reuben Lotan** Department of Thoracic Head and Neck Medical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Ragnhild A. Lothe** Department of Cancer Prevention, Rikshospitalet-Radiumhospitalet Medical Centre, Oslo, Norway

**Michael T. Lotze** Department of Surgery and Department of Immunology, University of Pittsburgh, Pittsburgh, PA, USA

lxvi Contributors

**Christophe Louandre** EA4666, Université de Picardie Jules Verne (UPJV), Amiens, France

Service de Biochimie, Centre de Biologie Humaine (CBH), University Hospital of Amiens (CHU Sud), Amiens, France

**Chrystal U. Louis** Center for Cell and Gene Therapy, Baylor College of Medicine, Texas Children's Hospital, and The Methodist Hospital, Houston, TX, USA

**Dmitri Loukinov** Section of Molecular Pathology, Laboratory of Immunopathology, NIAID, National Institutes of Health, Bethesda, MD, USA

**David B. Lovejoy** Department of Pathology, University of Sydney, Sydney, NSW, Australia

**José Lozano** Department of Molecular Biology and Biochemistry, University of Málaga, Málaga, Spain

**Guanning N. Lu** Departments of Otolaryngology-Head and Neck Surgery, University of Kansas Medical Center, Kansas City, KS, USA

**Jiade J. Lu** Department of Radiation Oncology, Fudan University Shanghai Cancer Center, Shanghai, China

**Jing Lu** Departments of Molecular and Cellular Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Tzong-Shi Lu** Division of Experimental Medicine, Beth Israel Deaconess Medical Center, Harvard Institutes of Medicine, Boston, MA, USA

Yuanan Lu Department of Public Health Science, University of Hawaii, Honolulu, HI, USA

**Irina A. Lubensky** National Cancer Institute, Division of Cancer Treatment and Diagnosis, National Institutes of Health, Rockville, MD, USA

**Jared M. Lucas** Divisions of Human Biology, Fred Hutchinson Cancer Research Center, Seattle, WA, USA

**Andreas Luch** German Federal Institute for Risk Assessment (BfR), Berlin, Germany

**Maria Li Lung** Department of Clinical Oncology, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong, China

**Jian-Hua Luo** Department of Pathology, University of Pittsburgh, Pittsburgh, PA, USA

**Gary H. Lyman** Public Health Sciences and Clinical Research Divisions, Hutchinson Institute for Cancer Outcomes Research, Fred Hutchinson Cancer Research Center, Seattle, WA, USA

**Henry Lynch** Department of Preventive Medicine and Public Health, Creighton University, Omaha, NE, USA

Contributors lxvii

**Elsebeth Lynge** Institute of Public Health, University of Copenhagen, Copenhagen, Denmark

**Scott K. Lyons** Molecular Imaging Group, CRUK Cambridge Research Institute, Li Ka Shing Centre, Cambridge, UK

**Wenjian Ma** National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, NC, USA

**Michael MacManus** Department of Radiation Oncology, Peter MacCallum Cancer Centre, East Melbourne, VIC, Australia

Britta Mädge DKFZ, Heidelberg, Germany

**Claudie Madoulet** Laboratory of Biochemistry, IFR53, Faculty of Pharmacy, Reims, France

Rolando F. Del Maestro Montreal, QC, Canada

**Marcello Maggiolini** Department of Pharmacy and Health and Nutritional Sciences, University of Calabria, Rende, Italy

**Brinda Mahadevan** Abbott Nutrition, Regulatory Affairs, Abbott Laboratories, Columbus, OH, USA

**Joseph F. Maher** Cancer Institute, University of Mississippi Medical Center, Jackson, MS, USA

**Csaba Mahotka** Institute of Pathology, Heinrich Heine Universität, Düsseldorf, Germany

**Sourindra N. Maiti** Division of Pediatrics, Department of Immunology, MD Anderson Cancer Center, Houston, TX, USA

**Isabella W. Y. Mak** Department of Surgery, Hamilton Health Sciences, Juravinski Cancer Centre, McMaster University, Hamilton, ON, Canada

**N. K. Mak** Department of Biology, Hong Kong Baptist University, Kowloon Tong, Hong Kong, China

**Jennifer Makalowski** Tumor Genetics, Clinic I Internal Medicine, University Hospital Cologne, and Center for Molecular Medicine Cologne, University of Cologne, Cologne, Germany

**Cédric Malicet** INSERM, Stress Cellulaire, Parc Scientifique et Technologique de Luminy, Marseille Cedex, France

**Alessandra Mancino** Department of Immunology, Fondazione Humanitas per la Ricerca, Rozzano, Milan, Italy

**Evelyne Manet** CIRI-International Center for Infectiology Research, INSERM U1111, Université Lyon 1, ENS de Lyon, Lyon, France

**Sridhar Mani** Department of Medicine, Oncology and Molecular Genetics, Albert Einstein College of Medicine, New York, NY, USA

lxviii Contributors

**Marcel Mannens** Academic Medical Centre, University of Amsterdam, Amsterdam, The Netherlands

**Alberto Mantovani** Department of Immunology, Fondazione Humanitas per la Ricerca, Rozzano, Milan, Italy

**Ashley A. Manzoor** Department of Radiation Oncology, Duke University, Durham, NC, USA

**Selwyn Mapolie** Department of Chemistry and Polymer Science, Stellenbosch University, Matieland, South Africa

**Lucia Marcocci** Department of Biochemical Sciences "A. Rossi Fanelli", Sapienza University of Rome, Rome, Italy

**Maurie Markman** Department of Medical Oncology, Eastern Regional Medical Center, Philadelphia, PA, USA

**Dieter Marmé** Tumor Biology Center, Institute of Molecular Oncology, Freiburg, Germany

**Marie-Claire Maroun** Department of Internal Medicine, Division of Rheumatology, Wayne State University, Detroit, MI, USA

**Deborah J. Marsh** Kolling Institute of Medical Research and Royal North Shore Hospital, University of Sydney, Sydney, NSW, Australia

**John L. Marshall** Lombardi Comprehensive Cancer Center, Georgetown University, Washington, DC, USA

**Angela Märten** National Centre for Tumour Diseases; Department of Surgery, University Hospital Heidelberg, Heidelberg, Germany

**Francis L. Martin** Centre for Biophotonics, Lancaster University, Lancaster, Lancashire, UK

**Olga A. Martin** Division of Radiation Oncology and Cancer Imaging, Molecular Radiation Biology Laboratory, Peter MacCallum Cancer Centre, Melbourne, VIC, Australia

The Sir Peter MacCallum Department of Oncology, The University of Melbourne, Melbourne, VIC, Australia

Victor D. Martinez British Columbia Cancer Research Centre, Vancouver, BC, Canada

**Gaetano Marverti** Department of Biomedical Sciences, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, Italy

**Edmund Maser** Institute of Toxicology and Pharmacology for Natural Scientists, University Medical School, Kiel, Germany

**Thomas E. Massey** Department of Biomedical and Molecular Sciences, Queen's University, Kingston, ON, Canada

**Noriyuki Masuda** Department of Respiratory Medicine, Kitasato University School of Medicine, Sagamihara, Kanagawa, Japan

**Atsuko Masumi** Department of Safety Research on Blood and Biological Products, National Institute of Infectious Diseases, Tokyo, Japan

**Yasunobu Matsuda** Department of Medical Technology, Niigata University Graduate of Health Sciences, Niigata, Japan

**Sachiko Matsuhashi** Department of Internal Medicine, Saga Medical School, Saga University, Saga, Japan

**Takaya Matsuzuka** Department of Anatomy and Physiology, Kansas State University, Manhattan, KS, USA

**Malgorzata Matusiewicz** Department of Medical Biochemistry, Wroclaw Medical University, Wroclaw, Poland

**Warren L. May** Department of Health Administration, School of Health Related Professions, University of Mississippi Medical Center, Jackson, MS, USA

**Arnulf Mayer** Department of Radiooncology and Radiotherapy, University Medical Center Mainz, Mainz, Germany

**Matthew A. McBrian** Department of Biological Chemistry, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA

Joseph H. McCarty MD Anderson Cancer Center, Houston, TX, USA

**Molliane Mcgahren-Murray** Department of Systems Biology, Unit 1058, University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Katherine A. McGlynn** Division of Cancer Epidemiology and Genetics, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

W. Glenn McGregor University of Louisville, Louisville, KY, USA

**Iain H. McKillop** Department of General Surgery, Carolinas Medical Center, Charlotte, NC, USA

Margaret McLaughlin-Drubin Brigham and Women's Hospital, Boston, MA, USA

**Roger E. McLendon** Department of Pathology, Duke University Medical Center, Durham, NC, USA

**Donald C. McMillan** University Department of Surgery, Royal Infirmary, Glasgow, UK

**David W. Meek** Division of Cancer Research, Jacqui Wood Cancer Centre/CRC, University of Dundee, Dundee, UK

**Annette Meeson** Institute of Genetic Medicine and North East Stem Cell Institute, Newcastle University, International Centre for Life, Newcastle upon Tyne, UK

**Kamiya Mehla** The Eppley Institute for Research in Cancer and Allied Diseases, University of Nebraska Medical Center, Omaha, NE, USA

lxx Contributors

**Arianeb Mehrabi** Department of General, Visceral and Transplantation Surgery, University of Heidelberg, Heidelberg, Germany

**Mohammad Mehrmohammadi** Department of Biomedical Engineering, Wayne State University, Detroit, MI, USA

**Anil Mehta** Division of Cardiovascular Medicine, University of Dundee, Dundee, UK

**Kapil Mehta** The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Rekha Mehta** Regulatory Toxicology Research Division, Bureau of Chemical Safety, Food Directorate, HPFB, Health Canada, Ottawa, ON, Canada

**Yaron Meirow** The Lautenberg Center for Immunology and Cancer Research, Israel-Canada Medical, Research Institute Faculty of Medicine, The Hebrew University, Jerusalem, Israel

**Bar-Eli Menashe** Department of Cancer Biology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

**Wenbo Meng** Special Minimally Invasive Surgery, Hepatopancreatobiliary Surgery Institute of Gansu Province, Clinical Medical College Cancer Center, First Hospital of Lanzhou University, Lanzhou University, Lanzhou, Gansu, China

**Deepak Menon** Department of Biological Sciences, Hunter College of the City University of New York, New York, NY, USA

Heather Mernitz Alverno College, Milwaukee, WI, USA

**Karl-Heinz Merz** Department of Chemistry, Division of Food Chemistry and Toxicology, University of Kaiserslautern, Kaiserslautern, Germany

**Enrique Mesri** Viral Oncology Program, Sylvester Comprehensive Cancer Center and Development Center for AIDS Research, Department of Microbiology and Immunology, University of Miami Miller School of Medicine, Miami, FL, USA

**Roman Mezencev** Georgia Institute of Technology, School of Biology, Atlanta, GA, USA

**Jun Mi** Department of Therapeutic Radiology and Oncology, University of Virginia School of Medicine, Charlottesville, VA, USA

**Dennis F. Michiel** Biopharmaceutical Development Program, Leidos Biomedical Research, Inc., Frederick National Laboratory for Cancer Research, Frederick, MD, USA

**Josef Michl** Departments of Pathology, Molecular and Cell Biology, State University of New York, Downstate Medical Center, New York, NY, USA

**Stephan Mielke** Abteilung Hämatologie und Onkologie, Medizinische Klinik und Poliklinik II, Zentrum Innere Medizin (ZIM), Universitätsklinikum Würzburg, Würzburg, Germany

**Oleg Militsakh** Head and Neck Surgery, Nebraska Medical Center, Nebraska Methodist Hospital, Omaha, NE, USA

**Mark Steven Miller** Department of Cancer Biology, Comprehensive Cancer Center, Wake Forest School of Medicine, Winston-Salem, NC, USA

**Takeo Minaguchi** Department of Obstetrics and Gynecology, University of Tsukuba, Tokyo, Japan

**Nagahiro Minato** Department of Immunology and Cell Biology, Graduate School of Medicine, Kyoto University, Kyoto, Japan

**Rodney F. Minchin** School of Biomedical Sciences, University of Queensland, St Lucia, QLD, Australia

**Lucas Minig** Gynecologic Department, Valencian Institute of Oncology (IVO), Valencia, Spain

**John D. Minna** Hamon Center for Therapeutic Oncology Research and Departments of Pathology, Internal Medicine and Pharmacology, University of Texas Southwestern Medical Center, Dallas, TX, USA

Claudia Mitchell Institut Cochin, Université Paris Descartes, CNRS, Paris, France

**Kazuo Miyashita** Faculty of Fisheries Sciences, Department of Bioresources Chemistry, Hokkaido University, Hakodate, Hokkaido, Japan

**Eiji Miyoshi** Department of Molecular Biochemistry and Clinical Investigation, Osaka University Graduate School of Medicine, Suita, Japan

**Jun Miyoshi** Department of Molecular Biology, Osaka Medical Center for Cancer and Cardiovascular Diseases, Osaka, Japan

**Toshihiko Mizuta** Department of Internal Medicine, Imari Arita Kyoritsu Hospital, Saga, Japan

**Omeed Moaven** Department of Surgery, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

**K. Thomas Moesta** Klinik für Chirurgie und Chirurgische Onkologie, Charité Universitätsmedizin Berlin, Berlin, Germany

**Seyed Moein Moghimi** Nanomedicine Research Group, Centre for Pharmaceutical Nanotechnology and Nanotoxicology, Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark

**Sunish Mohanan** Baker Institute for Animal Health, Department of Biomedical Sciences, School of Veterinary Medicine, Cornell University, Ithaca, NY, USA

**Sonia Mohinta** Department of Medical Microbiology, Immunology and Cell Biology, Southern Illinois University, School of Medicine, Springfield, IL, USA

lxxii Contributors

**Jan Mollenhauer** Molecular Oncology Group, University of Southern Denmark, Odense, Denmark

**Michael B. Møller** Department of Pathology, Odense University Hospital, Odense, Denmark

**Bruno Mondovì** Department of Biochemical Sciences "A. Rossi Fanelli", Sapienza University of Rome, Rome, Italy

Alessandra Montecucco Istituto di Genetica Molecolare CNR, Pavia, Italy

Ruggero Montesano International Agency for Research on Cancer, Lyon, France

Wolter J. Mooi Department of Pathology, VU Medical Center, Amsterdam, The Netherlands

Amy C. Moore Georgia Cancer Coalition, Atlanta, GA, USA

**Malcolm A. S. Moore** Department of Cell Biology, Memorial-SloanKettering Cancer Center, New York, NY, USA

**Cesar A. Moran** Department of Pathology, MD Anderson Cancer Center, Houston, TX, USA

**Jan S. Moreb** Department of Medicine, Division of Hematology/Oncology, College of Medicine, University of Florida, Gainesville, USA

**Sergio Moreno** Instituto de Biología Molecular y Celular del Cáncer, CSIC/ Universidad de Salamanca, Salamanca, Spain

**Fabiola Moretti** Institute of Cell Biology and Neurobiology, National Council Research of Italy, Rome, Italy

**Eiichiro Mori** Department of Radiation Oncology, School of Medicine, Nara Medical University, Kashihara, Nara, Japan

**Akira Morimoto** Department of Pediatrics, Kyoto Prefectural University of Medicine, Kyoto, Japan

**Pat J. Morin** Laboratory of Molecular Biology and Immunology, National Institute on Aging, Baltimore, MD, USA

Department of Pathology, Oncology and Gynecology and Obstetrics, Johns Hopkins Medical Institutions, Baltimore, MD, USA

American Association for Cancer Research, Philadelphia, PA, USA

**Christine M. Morris** Cancer Genetics Research, University of Otago, Christchurch, New Zealand

**Cynthia C. Morton** Department of Pathology, Brigham and Women's Hospital, Boston, MA, USA

**Gabriela Möslein** Helios Klinik, Allgemein- und Viszeralchirurgie, Bochum, Germany

**Justin L. Mott** Department of Biochemistry and Molecular Biology, University of Nebraska Medical Center, Omaha, NE, USA

**Spyro Mousses** Cancer Genetics Branch, National Human Genome Research Institute, NIH, Bethesda, MD, USA

**Pavlos Msaouel** Jacobi Medical Center, Albert Einstein College of Medicine, Bronx, NY, USA

**Sebastian Mueller** Centre of Alcohol Research (CAR), University of Heidelberg, Heidelberg, Germany

**Susette C. Mueller** Lombardi Comprehensive Cancer Center, Georgetown University Medical Center, Washington, DC, USA

**Subhajit Mukherjee** Albert Einstein College of Medicine, New York, NY, USA

**Hans K. Müller-Hermelink** Institute of Pathology, University of Würzburg, Würzburg, Germany

**Gabriele Multhoff** Klinikum rechts der Isar, Department Radiation Oncology, TU München and CCG – "Innate Immunity in Tumor Biology", Helmholtz Zentrum München, Munich, Germany

**Julia Münzker** Division of Endocrinology and Diabetology, Department of Internal Medicine, Medical University of Graz, Graz, Austria

**Ramachandran Murali** Department of Biomedical Sciences, Cedars-Sinai Medical Center, Los Angeles, CA, USA

**Kenji Muro** Department of Neurological Surgery, Robert H. Lurie Comprehensive Cancer Center, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

**Mandi Murph** Department of Pharmaceutical and Biomedical Sciences, Georgia Cancer Coalition Distinguished Cancer Scholar, University of Georgia and College of Pharmacy, Athens, GA, USA

**Edward L. Murphy** University of California, School of Medicine, San Francisco, CA, USA

**Paul G. Murray** CRUK Institute for Cancer Studies, Molecular Pharmacology, Medical School, University of Birmingham, Birmingham, UK

**Ruth J. Muschel** Radiation Oncology and Biology, University of Oxford, Oxford, UK

**Markus Müschen** Leukemia and Lymphoma Program, Norris Comprehensive Cancer Center, University of Southern California, Los Angeles, CA, USA

**Antonio Musio** Institute for Genetic and Biomedical Research, National Research Council, Pisa, Italy

Istituto Toscano Tumori, Firenze, Italy

lxxiv Contributors

**Akira Naganuma** Laboratory of Molecular and Biochemical Toxicology, Graduate School of Pharmaceutical Sciences, Tohoku University, Sendai, Japan

Shigekazu Nagata Osaka University Medical School, Osaka, Japan

**Christina M. Nagle** Cancer and Population Studies, Queensland Institute of Medical Research, Royal Brisbane Hospital, Brisbane, QLD, Australia

Rita Nahta Department of Pharmacology, Emory University, Atlanta, GA, USA

Akira Nakagawara Saga Medical Center KOSEIKAN, Tosu, Japan

**Tetsuya Nakatsura** Division of Cancer Immunotherapy, Explonatory Oncology Research and Clinical Trial Center, National Cancer Center, Kashiwa City, Chiba Prefecture, Japan

**Hariktishna Nakshatri** IU Simon Cancer Center, Indiana University School of Medicine, Indianapolis, IN, USA

**Patrizia Nanni** Laboratory of Immunology and Biology of Metastasis, Department of Experimental, Diagnostic and Specialty Medicine, University of Bologna, Bologna, Italy

**Zvi Naor** Department of Biochemistry and Molecular Biology, The George S. Wise Faculty of Life Sciences, Tel Aviv University, Tel Aviv, Israel

**Mohd W. Nasser** Department of Pathology, Comprehensive Cancer Centre, The Ohio State Medical Centre, Columbus, OH, USA

**Christian C. Naus** Department of Cellular and Physiological Sciences, The University of British Columbia, Vancouver, BC, Canada

**Tim S. Nawrot** Division of Lung Toxicology, Department of Occupational and Environmental Medicine (T.S.N.) and the Studies Coordinating Centre (J.A.S.), Division of Hypertension and Cardiovascular Rehabilitation, Department of Cardiovascular Diseases, University of Leuven, Leuven, Belgium

**David F. Nellis** Biopharmaceutical Development Program, SAIC-Frederick, Inc., National Cancer Institute-Frederick, Frederick, MD, USA

**Kenneth P. Nephew** School of Medicine, Indiana University, Bloomington, IN, USA

**David M. Neskey** Department of Otolaryngology and Head and Neck Surgery, Medical University of South Carolina, Charleston, SC, USA

**Klaus W. Neuhaus** School of Dental Medicine, Department of Preventive, Restorative and Pediatric Dentistry, University of Bern, Bern, Switzerland

**Kornelia Neveling** Department of Human Genetics, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

**Brad Neville** Head and Neck Tumor Program, Hollings Cancer Center, Medical University of South Carolina, Charleston, SC, USA

Contributors lxxv

**Calvin S. H. Ng** Division of Cardiothoracic Surgery, Chinese University of Hong Kong, Hong Kong, China

**Irene O. L. Ng** Department of Pathology, The University of Hong Kong, Hong Kong, China

**Duc Nguyen** Howard Hughes Medical Institute, Yale University School of Medicine, New Haven, CT, USA

**Carole Nicco** Faculté de Médecine Paris – Descartes, UPRES 18-33, Groupe Hospitalier Cochin – Saint Vincent de Paul, Paris, France

Santo V. Nicosia H. Lee Moffitt Cancer Center, Tampa, FL, USA

**Anne T. Nies** Dr. Margarete Fischer-Bosch-Institut für Klinische Pharmakologie, Stuttgart, Germany

**M.** Angela Nieto Instituto de Neurociencias de Alicante CSIC-UMH, Sant Joan d'Alacant, Spain

Omgo E. Nieweg Melanoma Institute Australia, North Sydney, NSW, Australia

**Jonas Nilsson** Department of Clinical Chemistry and Transfusion Medicin, Institute of Biomedicine, Sahlgrenska Academy at Göteborg University, Göteborg, Sweden

**Ewa Ninio** INSERM UMRS, Université Pierre et Marie Curie-Paris, Paris, France

Douglas Noonan University of Insubria, Varese, Italy

**Larry Norton** Breast Cancer Medicine Service, Department of Medicine, Memorial Sloan-Kettering Cancer Center, New York, NY, USA

**Francisco J. Novo** Department of Biochemistry and Genetics, University of Navarra, Pamplona, Spain

Ruslan Novosiadly Department of Cancer Immunobiology, Eli Lilly and Company, New York, NY, USA

**Noa Noy** Department of Cellular and Molecular Medicine, Lerner Research Institute, Cleveland Clinic and Case Western Reserve University, Cleveland, OH, USA

**Hala H. Nsouli** Department of Epidemiology and Biostatistics, The George Washington University School of Public Health and Health Services, Washington, DC, USA

**Lauren M. Nunez** Department of Biological Science, College of Pharmacy, Touro University-CA, Vallyo, CA, USA

**John P. O'Bryan** Department of Pharmacology, University of Illinois College of Medicine, Chicago, IL, USA

Jesse Brown VA Medical Center, Chicago, IL, USA

lxxvi Contributors

**James P. B. O'Connor** Institute of Cancer Sciences, University of Manchester, Manchester, UK

**Sarah T. O'Dwyer** Colorectal and Peritoneal Oncology Centre, The Christie NHS Foundation Trust, University of Manchester, Manchester, UK

**John O'Leary** Departments of Obstetrics and Gynaecology/Histopathology, Trinity College Dublin, Trinity Centre for Health Sciences, Dublin, Ireland

Ruth M. O'Rega Winship Cancer Institute, Emory University, Atlanta, GA, USA

**Sharon O'Toole** Departments of Obstetrics and Gynaecology/Histopathology, Trinity College Dublin, Trinity Centre for Health Sciences, Dublin, Ireland

**André Oberthür** Department of Pediatric Oncology and Hematology, Children's Hospital, University of Cologne, Cologne, Germany

**Takahiro Ochiya** Division of Molecular and Cellular Medicine, National Cancer Center Research Institute, Tokyo, Japan

**Stefan Offermanns** Department of Pharmacology, Max-Planck-Institute for Heart and Lung Research, Bad Nauheim, Germany

**Anat Ohali** Cancer Vaccine Section, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

**Takeo Ohnishi** Department of Radiation Oncology, School of Medicine, Nara Medical University, Kashihara, Nara, Japan

**Hitoshi Ohno** Department of Internal Medicine, Faculty of Medicine, Kyoto University, Kyoto, Japan

Kevin R. Oldenburg MatriCal, Inc., Spokane, WA, USA

**Magali Olivier** Group of Molecular Mechanisms and Biomarkers, International Agency for Research on Cancer, World Health Organization, Lyon, France

**Egbert Oosterwijk** Laboratory of Experimental Urology, University Medical Centre Nijmegen, Nijmegen, The Netherlands

**Gertraud Orend** Department of Clinical and Biological Sciences, Institute of Biochemistry and Genetics, Center for Biomedicine, DKBW, University of Basel, Basel, Switzerland

**Makoto Osanai** Department of Pathology, Kochi University School of Medicine, Kochi, Japan

**Eduardo Osinaga** Departamento de Inmunobiología, Facultad de Medicina, Universidad de la República, Montevideo, Uruguay

**German Ott** Department of Clinical Pathology, Robert-Bosch-Krankenhaus, Stuttgart, Germany

**Christian Ottensmeier** CRC Wessex Oncology Unit, Southampton General Hospital and Tenovous Laboratory, Southampton University Hospital Trust, Southampton, UK

**Sai-Hong Ignatius Ou** Chao Family Comprehensive Cancer Center, University of California, Irvine, CA, USA

Iwata Ozaki Health Administration Center, Saga Medical School, Saga University, Saga, Japan

**Shuji Ozaki** Department of Hematology, Tokushima Prefectural Central Hospital, Tokushima, Japan

**Mónica Pérez-Ríos** Department of Preventive Medicine and Public Health, School of Medicine, University of Santiago de Compostela, Santiago de Compostela, Spain

**Helen Pace** Department of Molecular Virology, Immunology and Medical Genetics, Ohio State University Comprehensive Cancer Center, Columbus, OH, USA

**Simon Pacey** Cancer Research UK Center for Cancer Therapeutics, The Institute of Cancer Research, Sutton, Surrey, UK

**Mabel Padilla** Molecular Biology and Lung Cancer Program, Lovelace Respiratory Research Institute, Albuquerque, NM, USA

**Sumanta Kumar Pal** Department of Medical Oncology and Experimental Therapeutics, City of Hope Comprehensive Cancer Center, Duarte, CA, USA

**Viswanathan Palanisamy** Department of Oral Health Sciences, Medical University of South Carolina, Charleston, SC, USA

**Pier Paolo Pandolfi** Division of Genetics, Beth Israel Deaconess Medical Center, Boston, MA, USA

Klaus Pantel Universitäts-Krankenhaus Eppendorf, Hamburg, Germany

**Melissa C. Paoloni** National Cancer Institute, Center for Cancer Research, Comparative Oncology Program, Bethesda, MD, USA

**Evangelia Papadimitriou** Laboratory of Molecular Pharmacology, Department of Pharmacy, School of Health Sciences, University of Patras, Patras, Greece

**Philippe Paparel** Department of Urology, Lyon Sud University Hospital, Pierre Benite, France

**Athanasios G. Papavassiliou** Department of Biological Chemistry, Medical School, University of Athens, Goudi, Athens, Greece

**Sabitha Papineni** Department of Veterinary Physiology and Pharmacology, Texas A&M University, College Station, TX, USA

lxxviii Contributors

**Benoit Paquette** Department of Nuclear Medicine and Radiobiology, Faculty of Medicine and Health Sciences, Université de Sherbrooke, Sherbrooke, QC, Canada

**Ben Ho Park** The Sidney Kimmel Comprehensive Cancer Center, Johns Hopkins University, Baltimore, MD, USA

**Geoff J. M. Parker** Centre for Imaging Sciences, University of Manchester, Manchester, UK

Sarah J. Parsons University of Virginia, Charlotteville, VA, USA

**Eddy Pasquier** Centre for Research in Oncobiology and Oncopharmacology, INSERM U911, Marseille, France

Metronomics Global Health Initiative, Marseille, France

Children's Cancer Institute, Randwick, NSW, Australia

**Oneel Patel** Department of Surgery, Austin Health, The University of Melbourne, Heidelberg, VIC, Australia

**Rusha Patel** Otolaryngology, Medical University of South Carolina, Charleston, SC, USA

Shyam Patel Standford University, Palo Alto, CA, USA

**Patrizia Paterlini-Bréchot** Faculté de Médecine Necker Enfants Malades, INSERM Unit 1151, Team 13, Paris, France

**Yvonne Paterson** Department of Microbiology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA

**Konan Peck** Institute of Biomedical Sciences, Academia Sinica Taipei, Taiwan, Republic of China

**Florence Pedeutour** Laboratory of Solid Tumors Genetics, Faculty of Medicine, Nice University Hospital, Nice, France

**Dan Peer** Laboratory of Precision NanoMedicine, Department of Cell Research and Immunology, George S. Wise Faculty of Life Sciences, Tel Aviv University, Tel Aviv, Israel

Department of Materials Science and Engineering, The Iby and Aladar Fleischman Faculty of Engineering, Tel Aviv University, Tel Aviv, Israel

Center for Nanoscience and Nanotechnology, Tel Aviv University, Tel Aviv, Israel

**Tobias Peikert** Division of Pulmonary and Critical Care Medicine, Department of Internal Medicine, Mayo Clinic College of Medicine, Rochester, MN, USA

**Miguel A. Peinado** Institute of Predictive and Personalized Medicine of Cancer (IMPPC), Badalona, Barcelona, Spain

**Angel Pellicer** Department of Pathology, New York University School of Medicine, New York, NY, USA