Textbook of Pulmonary Vascular Disease
Editors

Textbook of Pulmonary Vascular Disease
The major function of the lungs is gas exchange and it does this using a low resistance circulation. The pulmonary circulation (or the pulmonary vasculature) is a unique system that differs dramatically from the systemic circulatory system (e.g., coronary, cerebral, renal arteries) in structure, function, and regulation. A typical example of functional differences between the pulmonary and systemic vasculature is that hypoxia causes pulmonary vasoconstriction but systemic vasodilation. Furthermore, in patients with systemic arterial hypertension (e.g., essential hypertension), pulmonary arterial pressure is normal, while in patients with idiopathic pulmonary arterial hypertension (previously referred to as primary pulmonary hypertension), systemic arterial pressure is usually within the normal range. The divergent vascular responses to hypoxia and the alternative existence of systemic or pulmonary arterial hypertension in patients indicate that the pulmonary vasculature or the pulmonary circulation is unique in terms of its anatomic and histological structure, physiological and pharmacological properties, genetic and epigenetic development as well as cellular and molecular determinants for vasoconstriction, vascular-wall remodeling, and embolus formation. Therefore, the pathogenic mechanisms of pulmonary vascular diseases are rather different from those of systemic circulatory disorders. Development of therapeutic approaches and improvement of clinical management for patients with pulmonary vascular diseases should be directed by understanding the unique physiological and pathological features of the pulmonary vasculature at organ, tissue, cell, and molecular levels.

Although many books have addressed clinical aspects of cardiovascular diseases, systemic arterial hypertension and basic science progress about structural and functional studies on systemic arteries (e.g., coronary, cerebral, and other peripheral arteries and microcirculation), very few books have focused on the pulmonary circulation and pulmonary vascular disease. Given the significant differences between the pulmonary and systemic vasculature and between systemic and pulmonary vascular diseases, it is urgent to have a comprehensive reference book specifically designated to describe a) basic structure and function of the pulmonary vasculature or the pulmonary circulation, b) pathophysiology of the pulmonary circulatory system, and c) clinical aspects (diagnosis, treatment, and prevention) of pulmonary vascular diseases.

_Textbook of Pulmonary Vascular Disease_ is therefore designed for and is of special interest to a) clinicians (pulmonologists, cardiologists, intensive care physicians, cardiothoracic and vascular surgeons, and emergency physicians), b) physician-scientists and basic-science researchers in the fields of cardiopulmonary and critical care medicine, vascular physiology and pathophysiology, translational medical research, and bioengineering, c) healthcare workers in cardiopulmonary and critical care medicine, and d) clinical and research fellows as well as residents, medical and graduate students. _Textbook of Pulmonary Vascular Disease_ combines basic scientific concepts and knowledge on the pulmonary circulation with clinical diagnosis and treatment on pulmonary vascular diseases. _Textbook of Pulmonary Vascular Disease_ is unique in that no book currently available i) focuses on elucidating the cellular and molecular regulation of normal pulmonary vasculature and the pathogenic mechanisms of pulmonary vascular diseases, ii) includes advanced techniques and technology for basic and clinical research, and iii) includes conventional and molecular approaches currently available for
Textbook of Pulmonary Vascular Disease is divided into five parts. Part 1 (Structure, Function and Regulation), consisting of nine sections and twenty-nine chapters, is designated for basic knowledge and recent findings related to pulmonary vascular structure, function, and regulation at levels of molecule, cell, tissue, organ and system. Part 2 (Methodological Approaches for Research) is composed of six sections and sixteen chapters that are designed to provide a basic knowledge and spectrum on the techniques and technology that are commonly used to study genetic, molecular, cellular, systemic and pathophysiological aspects of the pulmonary vasculature. Part 3 (Pathology and Pathobiology) includes four sections and nineteen chapters that discuss the potential mechanisms or sequence of events involved in the initiation and progression of abnormalities in the pulmonary vasculature in patients with pulmonary vascular disease. Part 4 (Pulmonary Vascular Diseases) consists of nine sections and thirty-two chapters devoted to describe pathogenesis, epidemiology and pathophysiology of almost all of the pulmonary vascular diseases identified so far by the World Health Organization (WHO). One of the sections is specifically designated to describe pulmonary vascular disease in pediatric patients. Part 5 (Diagnosis and Treatment) includes three sections and twenty chapters designed to illustrate, in details, the diagnostic and therapeutic procedures currently used for patients with pulmonary vascular disease.

Textbook of Pulmonary Vascular Disease is written by more than 220 experts in the field including physicians, surgeons, epidemiologists, bioinformaticians, nurses, physician scientists and investigators. All of the contributors are actively involved in clinical, physiological, and pathophysiological studies on the pulmonary circulation and pulmonary vascular diseases. The vast majority of authors are recognized experts in the research area of the topic on which the chapter is based with many contributors also Fellows of the Pulmonary Vascular Research Institute, a not-for-profit, international scientific association focused on the pulmonary circulation and pulmonary vascular disease. Founded in 2007, the Pulmonary Vascular Research Institute (PVRI) has assembled clinical, epidemiological, translational and basic scientists from around the world to perform research and advance education regarding pulmonary vascular disease and right heart failure. There is a focus on performing research in and providing education and treatment to underserved populations of the world. The unique strength of the PVRI is that it brings together a multidisciplinary faculty from around the world within a single focused institute. PVRI members have the expertise to conduct basic, translational, and clinical research at a level that no single academic institution can offer. The publication of an authoritative textbook on pulmonary vascular disease was an initial goal of the Institute.

Textbook of Pulmonary Vascular Disease will not only serve as a reference book for physicians, surgeons, private practitioners, translational medical researchers, clinical and research fellows, and medical and graduate students, but also can be used as a guidance manual for technical and marketing personnel in pharmaceutical and biotechnological companies, that are interested in clinical and basic science research in cardiopulmonary diseases, pulmonary vascular diseases, vascular biology, and lung/heart transplantation.

We hope that this book will also allow readers to foster new concepts and new collaboration and cooperation among clinicians, physician scientists and investigators so as to further understand the pathogenic mechanisms of pulmonary vascular disease and develop novel therapeutic approaches for the disease.

La Jolla, California
May 9, 2010

Jason X.-J. Yuan, MD, PhD
Joe G.N. (Skip) Garcia, MD
Charles A. Hales, MD
Stuart Rich, MD
Stephen L. Archer, MD
John B. West, MD, PhD, DSc
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Lucien Abenhaim, MD, PhD (Ch: 73)
Professor, London School of Hygiene and Tropical Medicine, London, UK

Steven H. Abman, MD (Ch: 9, 76)
Professor, Department of Pediatrics, University of Colorado,
The Children’s Hospital, Denver CO, USA

Serge Adnot, MD, PhD (Ch: 108)
Professor, Department of Physiology, Henri Mondor Hospital, Creteil, France

Mansoor Ahmad, MD, PhD (Ch: 18)
Research Associate, Department of Physiology, New York Medical College,
Valhalla, NY, USA

Sara K. Alford, MS (Ch: 35)
Predoctoral Research Fellow, Department of Radiology, University of Iowa,
Iowa City, IA, USA

Stephen L. Archer, MD (Ch: 19, 97)
Harold Hines Jr. Professor and Chief of Cardiology, Department of Medicine,
University of Chicago, Chicago, IL, USA

Christine Archer-Chicko, MSN, CRNP-BC (Ch: 111)
Program Coordinator, Pulmonary Vascular Disease Program,
Penn Presbyterian Medical Center,
Philadelphia, PA, USA

Judy L. Aschner, MD (Ch: 75, 76, 107)
Department of Pediatrics, The Monroe Carell Jr. Children’s Hospital,
Vanderbilt University School of Medicine, Nashville, TN, USA

William R. Auger, MD (Ch: 87, 113)
Division of Pulmonary Critical Care Medicine, University of California,
San Diego, CA, USA

Eric D. Austin, MD (Ch: 69, 75)
Assistant Professor, Department of Pediatrics, The Monroe Carell Jr. Children’s Hospital,
Vanderbilt University, Nashville, TN, USA

David B. Badesch, MD (Ch: 65)
Professor, Department of Medicine, University of Colorado, Denver, Aurora, CO, USA
Contributors

Angela P. Bandiera, MD, PhD (Ch: 91)
Consultant Cardiologist, Department of Cardiology,
Health Sciences Centre, PROCAPE – University of Pernambuco and Memorials
S. Jose Hospital, Recife, Brazil

Christopher Barnett, MD, MPH (Ch: 99)
Assistant Professor, Department of Cardiology, University of California,
San Francisco, CA, USA

Frederick E. Barr, MD (Ch: 75, 107)
Professor and Division Chief, Department of Pediatrics, The Monroe Carell Jr. Children’s
Hospital, Vanderbilt University, Nashville, USA

Christina J. Barry, BS (Ch: 15)
Graduate Student, Center for Lung Biology, University of South Alabama, Mobil, AL, USA

Robyn J. Barst, MD (Ch: 105)
Professor, Columbia University College of Physicians and Surgeons,
New York, NY, USA

Rebecca Bascom, MD, MPH (Ch: 67)
Professor, Department of Pulmonary Allergy and Critical Care Medicine,
Milton S. Hershey Medical Center, Hershey, PA, USA

Melissa L. Bates, PhD (Ch: 67)
Postdoctoral Fellow, Department of Pediatrics, University of Wisconsin, Madison, WI, USA

Ori Ben-Yehuda, MD, FACC (Ch: 99)
Professor, Department of Medicine, University of California, San Diego,
San Diego, CA, USA

Lamiae Bensouda-Grimaldi, PharmD (Ch: 73)
Doctor, Department Paris Santé Cochin, Inserm/La-ser, Paris, France

Michael A. Bettmann, MD (Ch: 100)
Professor and Vice Chair for Interventional Services, Department of Radiology,
Wake Forest School of Medicine, Winston-Salem, NC, USA

Konstantin G. Birukov, MD, PhD (Ch: 64)
Assistant Professor, Department of Medicine, University of Chicago, Chicago, IL, USA

Kenneth D. Bloch, MD (Ch: 48)
William Thomas Green Morton Professor, Departments of Anesthesia and Medicine,
Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Herman J. Bogaard, MD, PhD (Ch: 82)
Assistant Professor, Department of Internal Medicine, Virginia Commonwealth University,
Richmond, VA, USA

Diana Bonderman, MD (Ch: 88)
Assistant Professor, Department of Cardiology, Medical University of Vienna,
Vienna, Austria

Kim Bouillon, MD, MPH (Ch: 73)
Doctor, Paris Santé Cochin, La-ser, Paris, France

Ellen C. Breen, PhD (Ch: 37)
Associate Research Scientist, Department of Medicine, University of California,
San Diego, La Jolla, CA, USA
Todd M. Bull, MD (Ch: 40)
Associate Professor, Department of Medicine, University of Colorado, Denver,
Aurora, CO, USA

Kelly S. Burrowes, PhD (Ch: 6)
Postdoctoral Research Fellow, Oxford University, Oxford, UK

Ghazwan Butrous, MB, ChB, PhD (Ch: 91)
Professor, Division of Cardiopulmonary Sciences, University of Kent, Canterbury, UK

Jesús A. Cabrera, MD, PhD (Ch: 46)
Assistant Professor, Department of Medicine, University of Minnesota, Minneapolis, MN, USA

Diane E. Capen, BA (Ch: 3, 51)
Department of Anesthesia, Critical Care and Pain Management, Massachusetts General Hospital,
Harvard Medical School, Boston, MA, USA

D. Jeannean Carver, MD (Ch: 17)
Associate Professor, Department of Pediatrics, University of Virginia, Charlottesville, VA, USA

Stephen Y. Chan, MD, PhD (Ch: 11)
Instructor, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA

Richard N. Channick, MD (Ch: 68)
Associate Professor and Director, Pulmonary Hypertension Program, Department of Pulmonary
and Critical Care Medicine, Massachusetts General Hospital, Harvard Medical School,
Boston, MA, USA

Shampa Chatterjee, PhD (Ch: 54)
Research Assistant Professor, Institute for Environmental Medicine, University of Pennsylvania, Philadelphia, PA, USA

Naomi C. Chesler, PhD (Ch: 5)
Associate Professor, Department of Biomedical Engineering, University of Wisconsin,
Madison, WI, USA

Eddie T. Chiang, MA (Ch: 12)
Senior Research Technician, Department of Medicine, University of Illinois at Chicago, Chicago, IL, USA

Nicole Cipriani, MD (Ch: 97)
Fellow, Department of Pathology, University of Chicago, Chicago IL, USA

Peter F. Clardy, MD (Ch: 80)
Clinical Instructor, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Barbara A. Cockrill, MD (Ch: 98)
Clinical Director, Pulmonary Vascular Disease Center, Brigham and Women's Hospital,
Harvard Medical School, Boston, MA, USA

Donna L. Cioffi, PhD (Ch: 15)
Assistant Professor, Center for Lung Biology, University of South Alabama,
Mobile, AL, USA

John V. Conte, Jr. MD (Ch: 116)
Professor and Director, Heart Transplantation and Mechanical Circulatory Support,
Johns Hopkins University School of Medicine, Baltimore, MD, USA

David N. Cornfield, MD (Ch: 50)
Department of Pediatrics – Pulmonary Medicine, Lucile Salter Packard Children’s Hospital at Stanford,
Stanford, CA, USA

James T. B. Crawley, PhD (Ch: 23)
Department of Haematology, Imperial College London, Hammersmith Hospital, London, UK
Contributors

Paul F. Currier, MD, MPH (Ch: 86, 110)
Associate Program Director, Department of Medicine, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Riku Das, PhD (Ch: 27)
Postdoctoral Fellow, Department of Molecular Cardiology, Lerner Research Institute, Cleveland Clinic, Cleveland, OH, USA

Hiroshi Date, MD (Ch: 117)
Professor, Department of Thoracic Surgery, Kyoto University, Kyoto, Japan

Yvonne Dempsie, PhD (Ch: 8)
Faculty of Biomedical and Life Sciences, University of Glasgow, Glasgow, UK

Michael C. Donohue, PhD (Ch: 45)
Assistant Project Scientist, Division of Biostatistics and Bioinformatics, University of California, San Diego, La Jolla, CA, USA

Dayue Darrel Duan, MD, PhD (Ch: 41)
Professor, Department of Pharmacology, University of Nevada School of Medicine, Reno, NV, USA

Jocelyn Dupuis, MD, PhD (Ch: 30)
Associate Professor, Department of Medicine, Montreal Heart Institute, Montreal, Quebec, Canada

Oliver Eickelberg, MD (Ch: 22)
Professor, Institute of Lung Biology and Disease, Comprehensive Pneumology Center, Neuherberg/Munich, Bavaria, Germany

Harrison W. Farber, MD (Ch: 72)
Professor, Pulmonary Center, Boston University, Boston, MA, USA

Savitri E. Fedson, MD (Ch: 97)
Assistant Professor and Medical Director of Cardiac Care Unit, University of Chicago, Chicago, IL, USA

Peter F. Fedullo, MD (Ch: 80, 87, 113)
Division of Pulmonary Critical Care Medicine, University of California, San Diego, CA, USA

Thomas Fellner, PhD (Ch: 42)
Assistant Director, Human Embryonic Stem Cell Core Facility, University of California, San Diego, La Jolla, CA, USA

Candice D. Fike, MD (Ch: 75, 107)
Professor, Department of Pediatrics, The Monroe Carell Jr. Children’s Hospital, Vanderbilt University, Nashville, TN, USA

Amy L. Firth, PhD (Ch: 13, 43)
Postdoctoral Fellow, Laboratory of Genetics, The Salk Institute for Biological Studies, La Jolla, CA, USA

Aron B. Fisher, MD (Ch: 54)
Professor and Director, Institute for Environmental Medicine, University of Pennsylvania, Philadelphia, PA, USA

Hans G. Folkesson, PhD (Ch: 60)
Department of Physiology and Pharmacology, Northeastern Ohio Universities College of Medicine, Rootstown, OH, USA
Paul R. Forfia, MD (Ch: 102)
Professor and Director, Institute for Environmental Medicine,
Department of Medicine/Cardiology, University of Pennsylvania, Philadelphia, PA, USA

Franz-Peter Freudenthal Tichauer, MD (Ch: 85)
Department of Interventional Cardiology, Kardiozentrum Medical Specialty Center,
La Paz, Bolivia

Maria G. Frid, PhD (Ch: 52, 56)
Instructor, Department of Pediatric Critical Care, University of Colorado, Denver,
Aurora, CO, USA

Anthony C. Gamst, PhD (Ch: 45)
Associate Professor, Division of Biostatistics and Bioinformatics, University of California,
San Diego, La Jolla, CA, USA

Joe G. N. Garcia, MD (Ch: 63, 12)
University of Illinois at Chicago,
Chicago, IL, USA

Jorge Gaspar, MD (Ch: 112)
Chief, Interventional Cardiology Department, Ignacio Chávez National Institute of
Cardiology, Mexico City, Mexico

Max Gassmann, DVM (Ch: 49)
Professor, Vetsuisse Faculty, Institute of Veterinary Physiology and Zurich Center for
Integrative Human Physiology, University of Zurich, Zurich, Switzerland

Mark W. Geraci, MD (Ch: 40)
Professor and Division Head, Department of Medicine, University of Colorado,
Denver, Aurora, CO, USA

Adel Giaid, MD, PhD (Ch: 58)
Department of Cardiology, McGill University Health Centre, Montreal, Quebec, Canada

Joan Gil, MD (Ch: 2)
Professor, Department of Pathology, Mount Sinai School of Medicine,
New York, NY, USA

Mark T. Gladwin, MD (Ch: 90)
Professor and Chief, Division of Pulmonary, Allergy, and Critical Care Medicine,
University of Pittsburgh, Pittsburgh, PA, USA

Ankush Goel, MD (Ch: 97)
Fellow, Department of Medicine, University of Chicago, Chicago, IL, USA

Mardi Gomberg-Maitland, MD, MSc (Ch: 97, 103, 81)
Associate Professor and Director of Pulmonary Hypertension,
Department of Medicine/Cardiology, University of Chicago, Chicago, IL, USA

Jose R. Gonzalez-Porras (Ch: 23)
Department of Haematology, Imperial College London, Hammersmith Hospital,
London, UK

Brian B. Graham, MD (Ch: 101)
Fellow, Department of Medicine, University of Colorado Hospital, Denver, CO, USA

Catherine Grossman, MD (Ch: 82)
Assistant Professor, Department of Internal Medicine, Virginia Commonwealth University,
Richmond, VA, USA
Contributors

Sachin A. Gupte, MD, PhD (Ch: 18)
Assistant Professor, Department of Biochemistry and Molecular Biology,
University of South Alabama, Mobile, AL, USA

François Haddad, MD (Ch: 94)
Attending Cardiologist, Department of Medicine, Stanford University, Palo Alto,
CA, USA

Charles A. Hales, MD (Ch: 86, 98, 110)
Professor, Pulmonary and Critical Care Unit, Massachusetts General Hospital,
Harvard Medical School, Boston, MA, USA

Sara Hanif Mirza, MD (Ch: 32)
Internal Medicine Resident, Department of Medicine, University of Illinois at Chicago,
Chicago, IL, USA

Paul M. Hassoun, MD (Ch: 70)
Professor and Director of Pulmonary Hypertension Program, Department of Medicine,
Johns Hopkins University, Baltimore, MD, USA

Alexandra Heath de Freudenthal, MD (Ch: 85)
Head of Pediatric Cardiology, Kardiozentrum Medical Specialty Center, La Paz, Bolivia

Nicholas S. Hill, MD (Ch: 109)
Professor and Chief of Pulmonary, Division of Pulmonary,
Critical Care and Sleep Medicine, Tufts Medical Center, Boston, MA, USA

Eric A. Hoffman, PhD (Ch: 35)
Professor, Department of Radiology, University of Iowa, Iowa City, IA, USA

Zhigang Hong, MD, PhD (Ch: 46)
Assistant Professor, Department of Medicine, University of Minnesota,
VA Medical Center, Minneapolis, MN, USA

Gabor Horvath, MD, PhD (Ch: 29)
Associate Professor, Department of Pulmonology, Semmelweis University,
Budapest, Hungary

Aliya N. Husain, MD (Ch: 97)
Professor, Department of Pathology, University of Chicago, Chicago, IL, USA

Michael H. Ieong, MD (Ch: 72)
Department of Allergy, Pulmonary, and Critical Care Medicine, Boston University
Medical Center, Boston, MA, USA

Paul A. Insel, MD (Ch: 14, 36)
Professor and Vice Chair, Departments of Pharmacology and Medicine,
University of California, San Diego, La Jolla, CA, USA

Jeffrey R. Jacobson, MD (Ch: 62)
Assistant Professor, University of Illinois at Chicago,
Illinois, Chicago

Stuart W. Jamieson, MD (Ch: 114)
Distinguished Professor and Director of Cardiothoracic Surgery Division,
Department of Surgery, University of California, San Diego, San Diego, CA, USA

Rosemary C. Jones, PhD (Ch: 3, 51)
Department of Anesthesia, Critical Care and Pain Management, Massachusetts General
Hospital, Harvard Medical School, Boston, MA, USA
S. Ananth Karumanchi, MD (Ch: 92)
Associate Professor, Department of Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Kim M. Kerr, MD (Ch: 87, 95, 113)
Associate Professor, Department of Medicine, University of California, San Diego, La Jolla, CA, USA

Nick H. Kim, MD (Ch: 89)
Division of Pulmonary and Critical Care Medicine, University of California, San Diego, La Jolla, CA, USA

Andrew A. Klein, MBBS (Ch: 79)
Consultant Anaesthetist, Transplant Unit, Papworth Hospital NHS Trust, Cambridge, UK

Elizabeth S. Klings, MD (Ch: 90)
Pulmonary Center, Boston University, Boston, MA, USA

Greg A. Knock, PhD (Ch: 10)
Division of Asthma, Allergy and Lung Biology, King’s College London, London, UK

Stella Kourembanas, MD (Ch: 53)
Clement A. Smith Professor and Chief, Harvard Division of Newborn Medicine, Children’s Hospital, Harvard Medical School, Boston, MA, USA

Fotini M. Kouri, PhD (Ch: 22)
Department of Neurology, Northwestern University, Chicago, IL, USA

Michael H. Kroll, MD (Ch: 24)
Professor and Chief, Department of Benign Hematology, University of Texas, MD Anderson Cancer Center, Houston, TX, USA

Michael J. Krowka, MD (Ch: 71)
Professor and Vice-Chair, Division of Pulmonary and Critical Care Medicine, Mayo Clinic, Rochester, MN, USA

Thomas J. Kulik, MD (Ch: 77)
Senior Associate in Cardiology, Department of Cardiology, Children’s Hospital Boston, Boston, MA, USA

Manoj M. Lalu, MD, PhD (Ch: 28)
Resident Physician, Department of Anesthesiology, Ottawa Hospital, Ottawa, ON, Canada

Judd W. Landsberg, MD (Ch: 74)
Assistant Professor and Medical Director of Intensive Care Unit, VA San Diego Healthcare System, University of California, San Diego, La Jolla, CA, USA

David A. Lane, PhD (Ch: 23)
Professor, Department of Haematology, Imperial College London, Hammersmith Hospital, London, UK

Irene M. Lang, MD (Ch: 59, 88)
Professor, Department of Cardiology, Medical University of Vienna, Vienna, Austria

David Langleben, MD (Ch: 7)
Professor and Director, Center for Pulmonary Vascular Disease, Department of Cardiology, Jewish General Hospital, McGill University, Montreal, Quebec, Canada

Robin N. Leathers, BS (Ch: 57)
Staff Research Associate, Division of Cardiothoracic Surgery, University of California, San Diego, San Diego, CA, USA
Fabiola León-Velarde, DSc (Ch: 84)
Professor, Department of Clinical Biology and Physiology, Universidad Peruana Cayetano Heredia, Lima, Peru

Clive J. Lewis, MB, BChir, PhD (Ch: 79)
Consultant Cardiologist, Transplant Unit, Papworth Hospital NHS Trust, Cambridge, UK

Jane E. Lewis, MD (Ch: 68)
Postdoctoral Fellow, Department of Medicine, University of California, San Diego, La Jolla, CA, USA

Xioadong Li, MD, PhD (Ch: 57)
Project Scientist, Division of Cardiothoracic Surgery, University of California, San Diego, San Diego, CA, USA

Antonio A. Lopes, MD (Ch: 78)
Professor, Department of Pediatric Cardiology and Adult Congenital Heart Disease, Heart Institute, University of São Paulo School of Medicine, São Paulo, Brazil

Joseph Loscalzo, MD, PhD (Ch: 11)
Bersey Professor and Chairman, Department of Medicine, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, USA

Karen M. Lounsbury, PhD (Ch: 21)
Associate Professor, Department of Pharmacology, University of Vermont, Burlington, VT, USA

James E. Loyd, MD (Ch: 69)
Rudy W. Jacobson Professor, Department of Medicine, Vanderbilt University, Nashville, TN, USA

Roberto F. Machado, MD (Ch: 63)
Assistant Professor, Department of Medicine, University of Illinois at Chicago, Chicago, IL, USA

Margaret R. MacLean, PhD (Ch: 8)
Mandy MacLean College of Medical, Veterinary and Life Sciences, University of Glasgow, UK

Michael M. Madani, MD (Ch: 114)
Associate Professor, Department of Surgery, University of California, San Diego, San Diego, CA, USA

Amit K. Mahajan, MD (Ch: 62)
Fellow, Department of Medicine, University of Chicago, Chicago, IL, USA

Saswati Mahapatra, MS (Ch: 46)
Assistant Scientist, Department of Medicine, University of Minnesota, Minneapolis, MN, USA

Susan M. Majka, PhD (Ch: 56)
Assistant Professor, Department of Cardiovascular Pulmonary Research, University of Colorado, Denver, Aurora, CO, USA

Ayako Makino, PhD (Ch: 33)
Assistant Professor, Department of Medicine, University of Illinois at Chicago, Chicago IL, USA

Rajeev Malhotra, MD (Ch: 48)
Fellow, Massachusetts General Hospital, Harvard Medical School, Division of Cardiology, Boston, MA, USA
Asrar B. Malik, PhD (Ch: 16, 32)
Distinguished Professor and Head, Department of Pharmacology and Center for Lung and Vascular Biology, University of Illinois, Chicago, IL, USA

Jess Mandel, MD (Ch: 66, 74, 80)
Associate Professor, Division of Pulmonary and Critical Care Medicine, University of California, San Diego, La Jolla, CA, USA

Andriana Margariti, PhD (Ch: 44)
Cardiovascular Division, King’s College London, Coldharbour Lane, London, UK

Janet R. Maurer, MD, MBA, MBC (Ch: 118)
Vice President, Medical Director, Department of Provider Services and Coaching Effectiveness, Health Dialog Service Corporation, Desert Hills, AZ, USA

Janne C. Lopes Mendes (Ch: 85)
Master of Public Health/Epidemiology, General Medicine, Kardiozentrum Medical Specialty Center, La Paz, Bolivia

Evangelos Michelakis, MD (Ch: 94)
Professor, Division of Cardiovascular Medicine, University of Alberta, Edmonton, Canada

Richard D. Minshall, PhD (Ch: 16)
Associate Professor, Departments of Pharmacology and Anesthesiology and Center for Lung and Vascular Biology, University of Illinois at Chicago, Chicago, IL, USA

M. Kamran Mirza, MD, PhD (Ch: 32)
Postdoctoral Research Associate, Department of Pharmacology, University of Illinois at Chicago, Chicago, IL, USA

J. Donald Moore, MD (Ch: 75, 107)
Assistant Professor, Division of Cardiology, Vanderbilt Children’s Hospital, Nashville, TN, USA

Yola Moride, PhD (Ch: 73)
Associate Professor, Faculty of Pharmacy, University of Montreal, Montreal, Quebec, Canada

Nicholas W. Morrell, MD (Ch: 20)
Professor, Department of Medicine, University of Cambridge, Cambridge, UK

Timothy A. Morris, MD (Ch: 25)
Professor, Department of Medicine, University of California, San Diego, San Diego, CA, USA

Rohit Moudgil, MD, PhD (Ch: 28)
Postdoctoral Fellow, Department of Medicine, Ottawa General Hospital, Ottawa, Ontario, Canada

Mary P. Mullen, MD, PhD (Ch: 77)
Associate in Cardiology, Department of Cardiology, Children’s Hospital Boston, Harvard Medical School, Boston, MA, USA

Fiona Murray, PhD (Ch: 14, 36)
Postdoctoral Fellow, Departments of Medicine and Pharmacology, University of California, San Diego, La Jolla, CA, USA

Robert Naeije, MD, PhD (Ch: 4)
Professor, Laboratory of Physiology, Erasme Hospital, Brussels, Belgium
Debby Ngo, MD (Ch: 25)
Postdoctoral Fellow, Department of Medicine, University of California, San Diego, La Jolla, CA, USA

Geerten P. van Nieuw Amerongen, PhD (Ch: 16)
Assistant Professor, VU University Medical Center, Institute for Cardiovascular Research, Department of Physiology, Amsterdam, The Netherlands

Takashi Ohtsuka, MD (Ch: 26)
Research Fellow, Department of Internal Medicine, University of Michigan, Ann Arbor, MI, USA

Horst Olschewski, MD, PhD (Ch: 104)
Professor, Department of Internal Medicine, University Hospital, Giessen, Germany

Stylianos E. Orfanos, MD, PhD (Ch: 7)
Associate Professor, 2nd Department of Critical Care, University of Athens Medical School and Pulmonary Hypertension Clinic, Attikon Hospital, Haidari Athens, Greece

Louise Östergaard, PhD (Ch: 49)
Zurich Center for Integrative Human Physiology, Vetsuisse Faculty, Institute of Veterinary Physiology, University of Zurich, Zurich, Switzerland

Takahiro Oto, MD, PhD (Ch: 117)
Senior Assistant Professor and Head of Lung Transplant Program, Department of Cancer and Thoracic Surgery, Okayama University, Okayama, Japan

Lisa A. Palmer, PhD (Ch: 17)
Associate Professor, Departments of Pediatrics and Anesthesiology, University of Virginia, Charlottesville, VA, USA

Amit Patel, MD (Ch: 97)
Assistant Professor and Director of Cardiac Magnetic Resonance, Department of Medicine, University of Chicago, Chicago, IL, USA

Héctor Peña, MD (Ch: 112)
Staff, Cardiopulmonary Department, Ignacio Chávez National Institute of Cardiology, Mexico City, Mexico

Douglas A. Peterson, MD, PhD (Ch: 46)
Assistant Professor, Department of Medicine, VA Medical Center, University of Minnesota, Minneapolis, MN, USA

John A. Phillips III, MD (Ch: 69)
Professor and David T. Karzon Chair; Director, Division of Medical Genetics, Vanderbilt University, Nashville, TN, USA

David J. Pinksy, MD (Ch: 26)
J. Griswold Ruth, MD & Margery Hopkins Ruth Professor; Chief, Division of Cardiovascular Medicine; Director, Cardiovascular Center, Department of Internal Medicine, Cleveland Clinic, Cleveland, OH, USA

Edward F. Plow, PhD (Ch: 27)
Professor and Chairman, Department of Molecular Cardiology, Lerner Research Institute, Cleveland Clinic, Cleveland, OH, USA

Ioana R. Preston, MD (Ch: 109)
Assistant Professor and Co-Director, Division of Pulmonary, Critical Care and Sleep Medicine, Pulmonary Hypertension Center, Tufts Medical Center, Boston, MA, USA
Marlene Rabinovitch, MD (Ch: 55)
Dwight and Vera Dunlevie Professor, Department of Pediatrics; Research Director, Vera Moulton Wall Center for Pulmonary Vascular Disease, Stanford University, Stanford, CA, USA

Carmelle V. Remillard, PhD (Ch: 33, 34, 47)
Assistant Project Scientist, Department of Medicine, University of California, San Diego, La Jolla, CA, USA

Stuart Rich, MD (Ch: 81, 103)
Section of Cardiology, University of Chicago Medical Center, Chicago, IL, USA

David H. Roberts, MD (Ch: 92)
Clinical Director, Division of Pulmonary, Critical Care and Sleep Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Megan Robinson, BS (Ch: 42)
Staff Research Associate, Human Embryonic Stem Cell Core Facility, University of California, San Diego, La Jolla, CA, USA

Alejandro Roldán-Alzate, PhD (Ch: 5)
Research Associate, Department of Biomedical Engineering, University of Wisconsin, Madison, WI, USA

Patricia C. Rose, PhD (Ch: 21)
Postdoctoral Fellow, Department of Pharmacology, University of Vermont, Burlington, VT, USA

Bryan Ross, BScH (Ch: 58)
Department of Cardiology, McGill University Health Centre, Montreal QC, Canada

John J. Ryan, MD (Ch: 19, 97)
Cardiology Fellow, Department of Medicine, University of Chicago, Chicago, IL, USA

Julio Sandoval, MD (Ch: 112)
Professor and Chief, Cardiopulmonary Division, Ignacio Chávez National Institute of Cardiology, Mexico City, Mexico

Vinzenz H. Schmid, PhD (Ch: 49)
Zurich Center for Integrative Human Physiology, Vetsuisse Faculty, Institute of Veterinary Physiology, University of Zurich, Zurich, Switzerland

Nicholas J. Schork, PhD (Ch: 39)
Professor and Director of Research, Scripps Genomic Medicine; Director of Biostatistics and Bioinformatics, Scripps Translational Science Institute; Department of Molecular and Experimental Medicine, Scripps Research Institute, La Jolla, CA, USA

Ashish S. Shah, MD (Ch: 116)
Assistant Professor and Director of Lung Transplantation, Department of Surgery, Johns Hopkins University, Baltimore, MD, USA

Mehdi Skhiri, MD (Ch: 94)
Fellow Heart Transplant and Heart Failure, Department of Medicine, Stanford University, Palo Alto, CA, USA

Julian Solway, MD (Ch: 83)
Walter L. Palmer Distinguished Service Professor and Associate Dean for Translation Medicine; Vice Chair for Research, Department of Medicine, University of Chicago, Chicago, IL, USA