Encyclopedia of Medical Immunology
Introduction

The concept of an encyclopedia derives from the Greek words for gathering together or “encircling” knowledge and learning. Indeed, Diderot and the French encyclopedists of the mid 18th century aimed to bring together all of the world’s knowledge in one giant publication. Our ambitions today are more modest but “encapsulating” existing knowledge of a defined topic is still a reasonable basis for decision making in the present and planning for the future. The Encyclopedia of Medical Immunology follows in the encyclopedist tradition. At the present time, however, progress is proceeding at such a rapid pace that a static volume, no matter how extensive, could never do justice to this dynamic subject. Thus our present encyclopedia is based on the concept that articles will be linked to current research and updated on a regular basis. The reader needs to gain an understanding of medical immunology not only at the date of publication, but on a continuing basis.

The immune system, as a vital component of normal physiology, participates in establishing and maintaining the well-being of the host. Its core responsibility is to prevent or control infection and malignancy. Immune functions can be divided into constitutive and adaptive. Inherited innate immunity takes its origins from most primitive cellular functions of recognition and nutrition. In animals, it evolved through invertebrates as a group of formed barriers and a system of cells and cell products for promptly dealing with harmful invaders or preventing clonal amplification of malignant cells. In vertebrates, in addition to innate immunity, an adaptive immune system provides a more focused and potent response, but one that requires more time to mobilize. It utilizes a novel system of hypermutation and recombination to provide a sufficiently broad repertory of receptors to recognize and eliminate, in principle, any potential microbial invader. In establishing and maintaining such a wide repertory of recognition structures, the adaptive immune system inevitably recognizes many epitopes on molecules within the body of the host. Thus, the same protective effector mechanisms of the healthy immune system, if out of control, can produce harm in the form of the immune mediated disorders described in these Volumes.

The most frequent disorders of the immune system are deficiencies. If the immune system fails to perform its core function of protection, infectious or malignant disease can follow. Most of these immune failures result from germ line inheritance of mutations in genes regulating the innate or adaptive
immune systems. The most frequent sign of an immune deficiency disease is infection due to one or more of the myriad microorganisms that inhabit the human environment.

A second group of immune-related illnesses results from loss of normal immunologic homeostasis. The regulatory devices that normally limit immune responses are inadequate. The failure may result from deficiencies, either inherited or acquired, of the overall regulatory machinery. Rather than a decrease in homeostatic regulation, immune disease can result from augmented immune responses. Powerful adjuvants, providing the non-antigen-specific signals, may overcome even normally functioning immune regulation.

Both types of immune-mediated disease are considered in our encapsulated knowledge. Allergies result from exposures to foreign substances that are harmless in the majority of individuals. As a group, allergic diseases affect at least 10% of the population and appear to be increasing over time in many populations. In contrast to an exaggerated response to foreign antigens, autoimmunity is the consequence of the “forbidden” recognition of some antigens in the host’s body. Like allergic disease, autoimmune disease represents an uncontrolled immune response. Because allergic and autoimmune diseases can occur in different organ systems in the body, they can differ greatly in their clinical presentation, even though they share many genetic and regulatory features.

The goal in all medical immunology is to alleviate or prevent illness. If a disease is related to an inadequate immune response or to an overwhelming challenge, an intervention in the form of vaccination is a historically proven approach. Preventive vaccinations may be the most successful public health measure of the 20th century. New vaccines directed to oncoming newly emerging infectants or subtypes remains a major goal of current immunologic research. Potential adverse effects of vaccines also require constant attention. These days vaccines are being tested as a way of limiting or reducing malignant tumors.

Immunotherapy is a more modern success story as biological agents such as monoclonal antibodies and receptor-blocking ligands are increasingly available for control of diseases due to immunological derangement.

The need for an Encyclopedia of Medical immunology is compelling. Our encyclopedia is divided for convenience into the four subject areas discussed above: Immune deficiency diseases, allergic diseases, autoimmune diseases and vaccines. Each of these areas has significant and immediate relevance to medical practice and public health. Each is a growing area of research.

By bringing together these different areas in one comprehensive publication, the encyclopedia illustrates and emphasizes the fundamentals of the immune response. For immunity to play its part in good health, it must maintain homeostasis within itself and with all other physiologic systems. The challenges to maintaining immunologic good health are both internal and external. In the face of changes in the environment, including climate, infectious agents and industrial exposures, human survival places a need for constant recalibration of the immune system. Internally, the effects of aging,
hormonal changes, the microbiome and life cycle events (eg. puberty, pregnancy) also require readjustment of immunologic homeostasis. Interventions are designed to restore immunologic balance, to repair innate or induced deficiencies and to strengthen immune responses.

As Editors-in-Chief, we trust that the users will find this “encirclement” of a body of knowledge will prove helpful for decision making in promoting immunologic health and reducing immunologic disorders.

June 2014

Ian R. Mackay
Clayton, Victoria, Australia

Noel R. Rose
Baltimore, MD, USA

Editors-in-Chief
Preface

The immune system is the sensory organ that perceives and responds to dangerous alterations in tissue. The major alerts to the immune system are pathogen-associated molecular patterns (PAMPs) expressed by microbes and damage-associated molecular patterns (DAMPs) expressed by stressed or injured tissue. These triggers bind to membranes and cytosolic pattern recognition receptors (PRPs) and galvanize the immune system into action. An immune response begins with activation of an innate immune response and progresses to an adaptive immune response, which is the locus of immune memory. Interestingly, the response may also be communicated to the brain, which can contribute to the regulation of peripheral inflammation and immune responses.

During lymphocyte ontogeny and in the course of any immune response, there is a risk of the generation and/or activation of autoreactive lymphocytes that may cause an autoimmune disease. Development of autoimmune disease is regulated by the complement of genetic risk and protective alleles as well as by exposure to known and unknown environmental insults.

The encyclopedia will introduce the reader to processes of immune activation and quiescence that is required for self-tolerance. Both infectious and non-infectious mechanisms of immune activation are addressed. Moreover, tissue-specific immune function and immune pathologies are addressed in detail.

All authors are experts in their field, and all entries include a bibliography that provides further reading material. This encyclopedia is the first line in learning about specific immune mechanisms in health and disease. It has been designed to be useful to the new learner and to the expert alike.

June 2014

Betty Diamond
Manhasset, NY, USA

Anne Davidson
Manhasset, NY, USA

Editors
Ian R. Mackay’s research career, mostly directed to autoimmunity, began in 1956 in the Clinical Research Unit (CRU) of the Walter & Eliza Hall Institute and Royal Melbourne Hospital (RMH), Melbourne, Australia. It comprehended associations between disorders of immunological function and clinical expressions in diseases of obscure causation. Research laboratories in the Hall Institute and supervision of a 27-bed general medical ward in the adjacent RMH encouraged one to think of autoimmunity holistically rather than via any single disease. A particular interest in autoimmunity and liver and a collaboration with D Carleton Gajdusek pointed to autoimmune responses in causation of two major entities, chronic active hepatitis and primary biliary cirrhosis (PBC). The detection of autoimmune reactivity of a monoclonal plasma paraprotein was a key element in Burnet’s formulation of the Clonal Selection Theory of Acquired Immunity. Mackay’s later return to PBC in the molecular era (1980s) in research with M Eric Gershwin resulted in cloning and identification of the gene for the disease-associated “mitochondrial” autoantigen of PBC, the E2 subunit of pyruvate dehydrogenase complex (PDC-E2). In autoimmune hepatitis, levels in serum of transaminase enzymes were found to reflect ongoing hepatocellular damage, so providing a monitor of efficacy of immunosuppressive drugs prednisolone and azathioprine and, in the 1960s, the first long-term treatment trial established their benefit. This drug combination remains today as the standard therapy for autoimmune hepatitis.
In the early 1960s, Mackay became sufficiently convinced of the reality of autoimmunity to compile with F MacFarlane Burnet the first authoritative text (1963). Thereafter, he made research contributions on numerous autoimmune diseases, thyroiditis, multiple sclerosis, myasthenia gravis, pemphigus, and gastritis. With “Reg” Strickland, gastritis was separated into Type A (autoimmune) and Type B (later, bacterial) gastritis, foreshadowing bacterial infection in peptic ulcer disease. Mackay became a major protagonist for the early development of the specialty of Clinical Immunology and with Senga Whittingham laid out specifications for the practice of this specialty. In the 1980s, the RMH drew on the CRU to establish an AIDS service, and observations made on human papillomavirus (HPV) infection in rectal swabs of homosexual men led to Ian Frazer’s development in Brisbane of an HPV vaccine for prevention of virus-induced cervical cancer.

In 1987, Mackay relocated to the Department of Biochemistry, Monash University, where with Merrill Rowley an autoimmunity laboratory was established for further investigation of PBC, Type 1 (autoimmune) diabetes, and rheumatoid arthritis. The laboratory sought to identify in various autoimmune diseases molecular epitopes (auto-epitopes) using contemporary techniques including antibody screening of phage-displayed random peptide libraries. A notable achievement arising from collaborations at Monash with James Whisstock, Gus Fenalti, and others was the crystallization of both isoforms of glutamic acid decarboxylase (GAD) 65 and 67, revealing the 3D structure and “molecular positioning” of the reactive antibody epitopes of the autoantigenic 65kD isoform and differences from the non-autoantigenic 67 kD isoform. This work is ongoing.
Noel R. Rose received his basic training in microbiology at Yale University followed by PhD and MD degrees at the University of Pennsylvania and State University of New York at Buffalo. He was appointed to the faculty at Buffalo in 1951, where he began his research career. His early studies under the tutelage of Professor Ernest Witebsky searched properties of the organ-specific antigens that characterize the unique functions of normal and malignant cells. In the course of these investigations, he discovered that he could produce an autoimmune disease in the thyroid gland by immunization with the major thyroid protein thyroglobulin. Until that time, it was generally accepted that in only a few “privileged sites” in the body were such pathogenic autoimmune responses possible. These studies opened the modern era of research on the autoimmune diseases and set the direction of Rose’s career since that time. In the 1960s, he investigated the requisite conditions for inducing autoimmune disease and the delineation of the basic immunologic and pathological processes. He included studies on other organs, such as the pancreas, as well as allergic diseases. In 1971, he and his colleagues discovered the first major gene that is responsible for susceptibility to autoimmune diseases and proved that it was a member of the major histocompatibility complex. At that time, he moved his laboratory to Wayne State University in Detroit, where he and his colleagues carried out detailed studies on the genes responsible for autoimmune disease of the thyroid gland. He also performed early experiments of the regulatory role of the thymus-derived lymphocytes and other studies related to unique enzymes of specialized cells, especially prostatic cancer. In 1981, Rose moved to Johns Hopkins University, where he created a department devoted to studies of immunity and infection. He directed much of his research to infectious agents and chemicals that induce autoimmune disease. A major effort was devoted to developing an experimental model of autoimmune heart disease produced in genetically prepared mice by infection with a virus that led work to the first identification of a well-defined antigen responsible for cardiac inflammation. Investigations on this model revealed a stepwise process that leads from infection to initial harmless autoimmunity to later life-threatening autoimmune disease.

In addition to his research, Rose has been deeply involved in the clinical practice of immunology. He directs a diagnostic immunology laboratory; he
serves as expert consultant to the World Health Organization and as director of the WHO Collaborating Center for Autoimmune Disorders. He chaired the first committee on clinical immunology of the American Association of Immunologists and was co-founder of the Clinical Immunology Society. He was editor-in-chief of the first six volumes of the Manual of Clinical Immunology co-sponsored by the American Association of Immunologists and the American Society for Microbiology.

Throughout his career, Rose has had the opportunity of working with a number of leading investigators including Pierre Grabar at the Pasteuer Institute, Paris; Henry Isliker at the Swiss Institute for Cancer Research; Sir James Gowans at Oxford University; and Sir Gustav Nossal and Ian Mackay at the Walter and Eliza Hall Institute in Australia. While at the Hall Institute, Rose was invited to prepare a book describing the broad area of autoimmune disorders. He joined with Mackay in producing the first volume of the book, *The Autoimmune Diseases*, which is now in its fifth edition.

At Johns Hopkins, he continues to teach in medicine and public health and directs an active research laboratory. He also heads the Center for Autoimmune Disease Research, which facilitates communication and collaboration among specialists in the different facets of autoimmune disease research.
Editors

Betty Diamond  The Feinstein Institute for Medical Research, Manhasset, NY, USA

Adjunct Professor of Microbiology and Immunology and Medicine, Albert Einstein College of Medicine, BX, NY, USA

Ralph and Maureen Nappi, Professor, Department of Medicine, Hofstra-North Shore LIJ School of Medicine, Manhasset, NY, USA

Betty Diamond received an MD from Harvard Medical School in 1973. She performed a residency in Internal Medicine at Columbia Presbyterian Medical Center and then a postdoctoral fellowship in Immunology with Dr. Matthew Scharff at the Albert Einstein College of Medicine. She is currently Head of the Autoimmune Disease Center at the Feinstein Institute for Medical Research and on the faculty of the Albert Einstein College of Medicine.

Dr. Diamond’s research has focused on the induction and pathogenicity of anti-DNA antibodies in Systemic Lupus Erythematosus. She received the Outstanding Investigator Award of the ACR in 2001, the Lee Howley Award from the Arthritis Foundation in 2002, and the Recognition Award from the National Association of MD-PhD Programs in 2004 and was elected to the Institute of Medicine in 2006. Dr. Diamond has served on the Scientific Council of NIAMS and the Board of Directors of the American College of Rheumatology. She is past president of the American Association of Immunologists.
Dr. Diamond’s laboratory has demonstrated that a subset of anti-DNA antibodies cross-reacts with the NMDA receptor. These antibodies can mediate neuronal apoptosis in the hippocampus leading to a memory deficit or in the amygdala leading to a behavioral alteration. These antibodies are present in serum and cerebrospinal fluid and correlate with symptoms of neuropsychiatric lupus. These studies show that lupus antibodies can cause aspects of neuropsychiatric lupus in a noninflammatory fashion and create a paradigm for antibody-mediated changes in brain function in many conditions. With colleagues at the Feinstein Institute, she has generated a potential therapeutic to prevent neurotoxicity from these antibodies.
Anne Davidson, MBBS, The Feinstein Institute for Medical Research, NY, USA

Anne Davidson, received her MBBS degree from the University of Melbourne, Australia, and is a board-certified rheumatologist. She is currently an Investigator at the Feinstein Institute for Medical Research, New York, and Professor of Molecular Medicine at Hofstra North Shore-LIJ School of Medicine, New York, USA.

Dr. Davidson’s research is focused on pathogenesis and therapy of SLE. She has worked extensively with mouse models of SLE, using newly discovered pathways of immune activation to determine the mechanisms of action of novel therapies for SLE. The results of these studies are then used to design mechanistic studies in the context of human SLE clinical trials. A main focus of the laboratory is to understand how B-cell tolerance is dysregulated in SLE. A second area of interest is to understand the mechanisms of inflammation within the SLE kidney, using a combination of systems biology and functional studies. She is a past recipient of the Dubois Award for SLE Research and the ACR Basic Science Distinguished Investigator Award.

Dr. Davidson is a member of the NIH study section PBKD and cochairs the grant review committee of the animal models subsection for the Lupus Research Institute. She is currently the Chair of the Scientific Advisory Council for the Rheumatology Research Foundation of the ACR.
Section Editors

Robert H. Shmerling  Division of Rheumatology, Beth Israel Deaconess Medical Center; Department of Medicine, Harvard Medical School, Boston, MA, USA

Fernando Macian  Department of Pathology, Albert Einstein College of Medicine, Bronx, NY, USA
George C. Tsokos  Division of Medical Sciences, Harvard Medical School; Division of Rheumatology, Beth Israel Deaconess Medical Center, Boston, MA, USA

Patrick Bertolino  Liver Immunology group, Centenary Institute & AW Morrow Gastroenterology and Liver Centre, University of Sydney, Sydney, NSW, Australia
Michael Rubin  Department of Neurology, Weill Cornell Medical College, New York, NY, USA

Robert B. Zurier  Autoimmune and Musculoskeletal Diseases Center, Feinstein Institute for Medical Research, Manhasset, NY, USA
Mariana J. Kaplan  Systemic Autoimmunity Branch, Intramural Research Program, National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health, Bethesda, MD, USA

Lloyd Mayer  (Deceased)  Department of Medicine - Allergy & Immunology, Mount Sinai Medical Center, New York, USA
Andrew G. Franks, Jr., Dermatology and Medicine (Rheumatology), Skin Lupus and Autoimmune Connective Tissue Disease Section, New York University School of Medicine, New York, NY, USA

Brad H. Rovin Division of Nephrology, The Ohio State University Wexner Medical Center, Columbus, OH, USA
Ignacio E. Sanz  Division of Rheumatology, Emory University School of Medicine, Atlanta, GA, USA

Laurence Morel  Department of Pathology, Immunology, and Laboratory Medicine, University of Florida, FL, USA
Contributors

David H. Adams  Centre for Liver Research & NIHR BRU, Institute of Biomedical Research, University of Birmingham Medical School & UHB NHS Foundation Trust, College of Medical and Dental Sciences, Edgbaston, Birmingham, UK

Naveed H. Akhtar  Division of Hematology and Medical Oncology, Department of Medicine, Weill Cornell Medical College, New York, NY, USA

Ioannis Alexiou  University General Hospital of Larissa, Larissa, Hellas

Elizabeth Ang  Boston Children’s Hospital, Boston, MA, USA

Jose Aramburu  Immunology Unit, Department of Experimental and Health Sciences, Universitat Pompeu Fabra, Barcelona, Spain

Frank C. Arnett  Division of Rheumatology, The University of Texas Health Science Center at Houston, Houston, TX, USA

Department of Internal Medicine, University of Texas Health Science Center, Houston, TX, USA

Shervin Assassi  Division of Rheumatology, The University of Texas Health Science Center at Houston, Houston, TX, USA

Sara Atwater  Department of Medicine, Georgia Health Sciences University and, Charlie Norwood VAMC, Augusta, GA, USA

Amy Baek  Department of Molecular and Integrative Physiology, University of Michigan, Ann Arbor, MI, USA

Alan N. Baer  Division of Rheumatology, Johns Hopkins University School of Medicine, Baltimore, MD, USA

Rakesh K. Bakshi  Department of Microbiology, University of Alabama at Birmingham, Birmingham, AL, USA

Gemma D. Banham  Renal Immunobiology, School of Immunity and Infection, College of Medical Sciences, University of Birmingham, Birmingham, West Midlands, UK

Nusrat Banka  Department of Dermatology, University of British Columbia, Vancouver, BC, Canada
Anne Bärenwaldt  Department of Biomedicine, University of Basel, Basel, Switzerland

Jonathan Barratt  John Walls Renal Unit, Leicester General Hospital and Department of Infection, Immunity & Inflammation, University of Leicester, Leicester, UK

Department of Infection, Immunity and Inflammation, University of Leicester, Leicester, UK

Paul Basciano  Division of Hematology and Medical Oncology, Department of Medicine, Weill Cornell Medical College, New York, NY, USA

Joan M. Bathon  Department of Medicine, Division of Rheumatology, Columbia University Medical Center College of Physicians and Surgeons, New York, NY, USA

Volker Benseler  Klinik und Poliklinik für Chirurgie Universitätsklinikum Regensburg, Regensburg, Germany

Department of Surgery, University of Regensburg, Regensburg, Bavaria, Germany

Joan W. Berman  Department of Pathology, Albert Einstein College of Medicine, Bronx, NY, USA

Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, NY, USA

Patrick Bertolino  Liver Immunology group, Centenary Institute & AW Morrow Gastroenterology and Liver Centre, University of Sydney, Sydney, NSW, Australia

Daniel J. Birmingham  Division of Nephrology, Department of Internal Medicine, The Davis Heart and Lung Research Institute, Ohio State University Medical Center, Columbus, OH, USA

Paul Blair  Division of Medicine, Centre for Rheumatology Research, University College London, London, UK

Matthew D. Blunt  Department of Pharmacology, University of Bath, Bath, Somerset, UK

Elisa Boden  Department of Gastroenterology, Virginia Mason Hospital Benaroya Research Institute, Seattle, WA, USA

Massimo Bottini  Sanford-Burnham Medical Research Institute, La Jolla, CA, USA

Nunzio Bottini  Division of Cellular Biology, La Jolla Institute for Allergy and Immunology, La Jolla, CA, USA

David G. Bowen  AW Morrow Gastroenterology and Liver Centre and Liver Immunology Group, Centenary Institute, Royal Prince Alfred Hospital and University of Sydney, Sydney, NSW, Australia
Joanna Boyd  John Walls Renal Unit, Leicester General Hospital and Department of Infection, Immunity & Inflammation, University of Leicester, Leicester, UK

Elizabeth J. Brant  UNC Center for Kidney Disease, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

Jason Broker  New York Medical College, Valhalla, NY, USA

Juliane Brueckner  Department of Immunology, Mount Sinai School of Medicine, New York, NY, USA

M. J. Kristine Bunagan  Department of Dermatology, University of British Columbia, Vancouver, BC, Canada

Xosé R. Bustelo  Centro de Investigación del Cáncer/Cancer Research Center, CSIC-University of Salamanca, Salamanca, Spain

Matthew Butcher  Department Microbiology and Molecular Cell Biology, Eastern Virginia Medical School, Norfolk, VA, USA

Leonard H. Calabrese  Department of Rheumatic and Immunologic Diseases, Section of Clinical Immunology, Cleveland Clinic Foundation, Cleveland, OH, USA

Elke C. Calamia  Department of Internal Medicine III, Cardiology, University of Heidelberg, Nürnberg, Germany

Roy Calne  University of Cambridge, Cambridge, UK

National University of Singapore, Singapore

Bridget T. Carey  Department of Neurology, Weill Cornell Medical College, New York, NY, USA

John D. Carter  Internal Medicine, University of South Florida, Tampa, FL, USA

Paolo Casali  Department of Immunology and Microbiology, University of Texas Health Science Center at San Antonio, San Antonio, TX, USA

Flavia V. Castelino  Division of Rheumatology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Spero Cataland  Department of Internal Medicine, Division of Nephrology, The Ohio State University Medical Center, Columbus, OH, USA

Vinod Chandran  Centre for Prognosis Studies in the Rheumatic Diseases University of Toronto Psoriatic Arthritis Clinic, Toronto Western Hospital, Toronto, ON, Canada
Christopher Chang  Department of Pediatrics, Division of Allergy and Immunology, Nemours/A.I. duPont Hospital for Children, Thomas Jefferson University, Wilmington, DE, USA

Jae C. Chang  Division of Hematology & Oncology, Department of Medicine, Chao Family Comprehensive Cancer Center, University of California Irvine School of Medicine, University of California Irvine Medical Center, Orange, CA, USA

W. Winn Chatham  Division of Clinical Immunology and Rheumatology, University of Alabama at Birmingham, Birmingham, AL, USA

Chee Kay Cheung  John Walls Renal Unit, Leicester General Hospital and Department of Infection, Immunity & Inflammation, University of Leicester, Leicester, UK

Cecilia B. Chighizola  Department of Clinical Sciences and Community Health, Division of Rheumatology, University of Milan, Istituto G. Pini and IRCCS Istituto Auxologico Italiano, Milan, Italy

Laurent Chorro  Department of Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, NY, USA

Maren Claus  Leibniz Research Center for Working Environment and Human Factors, IfADo, Dortmund, Germany

Victoria Cogger  Centre for Education and Research on Ageing (CERA), and the ANZAC Medical Research Institute, University of Sydney, Sydney, Australia

William G. Couser  Division of Nephrology, University of Washington, Seattle, WA, USA

David G. Le Couteur  Centre for Education and Research on Ageing (CERA), and the ANZAC Medical Research Institute, University of Sydney, Sydney, Australia

Lori R. Covey  Department of Cell Biology and Neuroscience, Rutgers University, The State University of New Jersey, Piscataway, NJ, USA

Maureen A. Cox  Department of Microbiology, University of Alabama at Birmingham, Birmingham, AL, USA

Ian Nicholas Crispe  Department of Pathology, University of Washington, Seattle, WA, USA

José Carlos Crispín  Department of Medicine, Division of Rheumatology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Marinos C. Dalakas  Department of Pathophysiology, Neuroimmunology Unit, National University of Athens Medical School, Athens, Greece

Thomas Jefferson University, Philadelphia, PA, USA

Abhishek Das  Division of Infection and Immunity, UCL, London, UK
Anne Davidson  The Feinstein Institute for Medical Research, Manhasset, NY, USA

Paul F. Dellaripa  Division of Rheumatology, Brigham and Women’s Hospital, Boston, MA, USA

Guo-Min Deng  Department of Microbiology and Immunology, Nanjing Medical University, Nanjing, Jiangsu, China

Eran Diamant  Department of Biotechnology, Israel Institute for Biological Research, Ness-Ziona, Israel

Matthew J. Diamond  Division of Nephrology, Georgia Health Sciences University, Augusta, GA, USA

Department of Medicine, Georgia Health Sciences University and, Charlie Norwood VAMC, Augusta, GA, USA

Paul E. DiCorleto  Department of Cellular and Molecular Medicine, Cleveland Clinic Lerner Research Institute and Cleveland Clinic, Lerner College of Medicine, Cleveland, OH, USA

Department of Biological, Geological, and Environmental Sciences, Cleveland State University, Cleveland, OH, USA

Department of Physiology and Biophysics, Case Western Reserve University, Cleveland, OH, USA

Kyla Driest  Department of Pediatrics, The Ohio State University and Nationwide Children’s Hospital, Columbus, OH, USA

Jan Dutz  Department of Dermatology and Skin Science, University of British Columbia, Vancouver, BC, Canada

Stephanie Edelmann  Institute of Molecular Immunology, Helmholtz Zentrum München, Munich, Germany

Petros Efthimiou  Division of Rheumatology, New York Methodist Hospital, Brooklyn, NY, USA

Weill Cornell Medical College, NY, USA

Amro Elbalkhi  Division of Clinical Immunology and Rheumatology, University of Alabama at Birmingham, Birmingham, AL, USA

Urs Eriksson  Department of Internal Medicine, GZO – Zurich Regional Health Center, Wetzikon, Switzerland

Division of Cardioimmunology, Department of Cardiovascular Research, Institute of Physiology, University of Zurich, Zurich, Switzerland

Eliseo A. Eugenin  Public Health Research Institute (PHRI), UMDNJ, Newark, NJ, USA

Department of Microbiology and Molecular Genetics, UMDNJ, Newark, NJ, USA
David Fiorentino  Department of Dermatology, Stanford University Medical Center, Stanford, CA, USA

Deborah J. Fowell  Center for Vaccine Biology and Immunology, Department of Microbiology and Immunology, University of Rochester, Rochester, NY, USA

George E. Fragoulis  Department of Pathophysiology, School of Medicine, University of Athens, Athens, Greece

Andrew G. Franks Jr.  Dermatology and Medicine (Rheumatology), Skin Lupus and Autoimmune Connective Tissue Disease Section, New York University School of Medicine, New York, NY, USA

João Furtado  Department of Internal Medicine, Egas Moniz Hospital, Lisbon, Portugal

Elena V. Galkina  Department Microbiology and Molecular Cell Biology, Eastern Virginia Medical School, Norfolk, VA, USA

Christopher J. Gamper  Department of Oncology, Johns Hopkins University, School of Medicine, Baltimore, MD, USA

Estrella García-González  Rheumatology Unit, Department of Clinical Medicine and Immunological Sciences, University of Siena, Siena, Italy

Vesna D. Garovic  Division of Nephrology and Hypertension, Mayo Clinic, Rochester, MN, USA

Ronald L. George Jr.  Division of Rheumatology and Immunology, Department of Medicine, Duke University Medical Center, Durham, NC, USA

Laura Geraldino-Pardilla  Division of Rheumatology, Department of Medicine, Columbia University, College of Physicians and Surgeons, New York, NY, USA

Mehran Ghoreishi  Department of Dermatology and Skin Science, University of British Columbia, Vancouver, BC, Canada

Jon T. Giles  Division of Rheumatology, Department of Medicine, Columbia University, College of Physicians and Surgeons, New York, NY, USA

Dafna D. Gladman  Centre for Prognosis Studies in the Rheumatic Diseases University of Toronto Psoriatic Arthritis Clinic, Toronto Western Hospital, Toronto, ON, Canada

Alexandros P. Grammatikos  Division of Rheumatology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Eric L. Greidinger  Division of Rheumatology, Miami VAMC and University of Miami Miller School of Medicine, Miami, FL, USA

Alexei A. Grom  Division of Rheumatology ML4010, UC Department of Pediatrics, Cincinnati Children’s Hospital Medical Center, University of Cincinnati College of Medicine, Cincinnati, OH, USA
Luca G. Guidotti  Division of Immunology, Transplantation and Infectious Diseases, San Raffaele Scientific Institute, Milan, Italy
Department of Immunology & Microbial Sciences, The Scripps Research Institute, La Jolla, CA, USA

Ahmet Gül  Department of Internal Medicine, Division of Rheumatology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

Göran K. Hansson  Department of Medicine, Experimental Cardiovascular Research Unit, Center for Molecular Medicine, Karolinska University Hospital, Stockholm, Sweden

Matthias Hardtke-Wolenski  Department of Gastroenterology, Hepatology and Endocrinology, Hannover Medical School, Hannover, Germany

Tasma Harindhanavudhi  Department of Medicine, University of Minnesota, Minneapolis, MN, USA

Daniel P. Harris  Department of Cellular and Molecular Medicine, Cleveland Clinic Lerner Research Institute and Cleveland Clinic, Lerner College of Medicine, Cleveland, OH, USA
Department of Physiology and Biophysics, Case Western Reserve University, Cleveland, OH, USA

Georges Hauptmann  Institute of Immunology, Louis Pasteur University, Strasbourg, France

Lee A. Hebert  Department of Internal Medicine, Division of Nephrology, The Ohio State University Medical Center, Columbus, OH, USA

Christian Michael Hedrich  Department of Medicine, Division of Rheumatology, Beth Israel Deaconess Medical Center, Boston, MA, USA
Children’s Hospital Dresden, Pediatric Rheumatology and Immunology Section, University Medical Center “Carl Gustav Carus” Technical University Dresden, Dresden, Germany

Vigo Heissmeyer  Institute of Molecular Immunology, Helmholtz Zentrum München, Munich, Germany

Johannes Herkel  Department of Medicine, University Medical Centre Hamburg-Eppendorf, Hamburg, Germany

David Hildeman  Department of Pediatrics, Division of Cellular and Molecular Immunology, Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, USA
Division of Cellular and Molecular Immunology in the Department of Pediatrics, University of Cincinnati and Children’s Hospital Medical Center, Cincinnati, OH, USA
Gary Hoffman  Department of Rheumatic and Immunologic Diseases, Cleveland Clinic Main Campus, Lerner College of Medicine, Cleveland, OH, USA

Marc S. Horwitz  Department of Microbiology and Immunology, University of British Columbia, Vancouver, BC, Canada

Hui-Chen Hsu  Department of Medicine, Division of Clinical Immunology and Rheumatology, University of Alabama at Birmingham, School of Medicine, Birmingham, AL, USA

Alan P. Hudson  Wayne State University, Detroit, MI, USA

Mohamad Imam  Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, MN, USA

Pietro Invernizzi  Liver Unit and Center for Autoimmune Liver Diseases, Humanitas Clinical and Research Center, Rozzano, MI, Italy

David A. Isenberg  Centre for Rheumatology, Department of Medicine, UCL Division of Medicine, University College London Hospital, London, UK

Yoshinaga Ito  Department of Experimental Pathology, Institute for Frontier Medical Sciences, Kyoto University, Sakyo-ku, Kyoto, Japan

Elmar Jaeckel  Department of Gastroenterology, Hepatology and Endocrinology, Hannover Medical School, Hannover, Germany

David Jayne  Department of Medicine, University of Cambridge, Cambridge, UK

Melanie S. Joy  UNC Center for Kidney Disease, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

Skaggs School of Pharmacy and Pharmaceutical Sciences, University of Colorado|Anschutz Medical Campus, Aurora, CO, USA

Denise A. Kaminski  Department of Medicine, University of Rochester, Rochester, NY, USA

Mariana J. Kaplan  Systemic Autoimmunity Branch, Intramural Research Program, National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health, Bethesda, MD, USA

Ziya Kaya  Department of Internal Medicine III, Cardiology, University of Heidelberg, Heidelberg, Germany

Daniel F. J. Ketelhuth  Department of Medicine, Experimental Cardiovascular Research Unit, Center for Molecular Medicine, Karolinska University Hospital, Stockholm, Sweden

Atul Khasnis  Department of Rheumatic and Immunologic Diseases, Section of Clinical Immunology, Cleveland Clinic Foundation, Cleveland, OH, USA
Cecile King Department of Immunology, Garvan Institute of Medical Research, Darlinghurst, NSW, Australia

Tadamitsu Kishimoto Laboratory of Immunoregulation, Immunology Frontier Research Center, Osaka University, Osaka, Suita City, Japan

Jason S. Knight Division of Rheumatology, Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, MI, USA

Percy A. Knolle Institutes of Molecular Medicine and Experimental Immunology, Universität Bonn (ipc), Bonn, Germany

Institute of Molecular Medicine (MOMENTUM), Technische Universität, München, Germany

Alisa E. Koch Veterans’ Administration, Ann Arbor Healthcare System, Ann Arbor, MI, USA

University of Michigan, Department of Internal Medicine, Division of Rheumatology, Ann Arbor, MI, USA

Apostolos Kontzias Orthopedic and Rheumatologic Institute, Cleveland Clinic Foundation, Cleveland, OH, USA

Annegret Kuhn Department of Dermatology, University of Muenster, Muenster, Germany

Division of Immunogenetics, Tumorimmunology Program, German Cancer Research Center, Heidelberg, Germany

Sema Kurtulus Division of Cellular and Molecular Immunology in the Department of Pediatrics, University of Cincinnati and Children’s Hospital Medical Center, Cincinnati, OH, USA

Vasileios C. Kyttaris Division of Rheumatology, Harvard Medical School, Beth Israel Deaconess Medical Center, Boston, MA, USA

Aysche Landmann Division of Immunogenetics, Tumorimmunology Program, German Cancer Research Center, Heidelberg, Germany

Stefano Lanni Istituto Giannina Gaslini and Università degli Studi di Genova, Genova, Italy

Grégoire Lauvau Department of Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, NY, USA

Ehud Lavi Department of Pathology and Laboratory Medicine, Weill Cornell Medical College, New York, NY, USA

David A. Lawrence Laboratory of Immunology, Wadsworth Center, New York State Department of Health, Albany, NY, USA

Liz Lightstone Department of Medicine, Imperial College London, London, UK

Pam Lincez Department of Microbiology and Immunology, University of British Columbia, Vancouver, BC, Canada
Keith Lindor  Health Solutions, Arizona State University, Phoenix, AZ, USA

Katherine E. Lintner  Department of Pediatrics, The Ohio State University and Nationwide Children’s Hospital, Columbus, OH, USA

Mindy S. Lo  Division of Immunology, Department of Medicine, Boston Children’s Hospital, Boston, MA, USA

Ansgar W. Lohse  Department of Medicine, University Medical Centre Hamburg-Eppendorf, Hamburg, Germany

Cristina López-Rodriguez  Immunology unit, Department of Experimental and Health Sciences, Universitat Pompeu Fabra, Barcelona, Spain

Harald Loppnow  Internal Medicine III, Research Laboratory (FG6-E01), Medical Faculty, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany

Qianjin Lu  Department of Dermatology, Second Xiangya Hospital, Central South University, Hunan Key Laboratory of Medical Epigenomics, Changsha, Hunan, People’s Republic of China

Carey Lumeng  Department of Pediatrics and Communicable Diseases, University of Michigan, Ann Arbor, MI, USA

Mala Maini  Division of Infection and Immunity, UCL, London, UK

Walter P. Maksymowych  Medicine/Rheumatic Dis Unit, University of Alberta, Edmonton, AB, Canada

Lucio Manenti  Unit of Nephrology, University Hospital of Parma, Parma, Italy

Prashiela Manga  The Ronald O. Perelman Department of Dermatology and Department of Cell Biology, New York University School of Medicine, New York, NY, USA

Michael P. Manns  Department of Gastroenterology, Hepatology and Endocrinology, Hannover Medical School, Hannover, Germany

Roberta Goncalves Marangoni  Division of Rheumatology, Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

Alberto Martini  Department of Pediatrics, University of Genoa, Pediatria II, Istituto G Gaslini Largo Gaslini, Genoa, Italy

Anna V. Mathew  Department of Medicine, Division of Nephrology, University of Michigan, Ann Arbor, MI, USA

Michael Mauer  Departments of Pediatrics and Medicine, University of Minnesota, Minneapolis, MN, USA

Claudia Mauri  Division of Medicine, University College London, London, UK
Clio P. Mavragani Department of Physiology, School of Medicine, University of Athens, Athens, Greece

Lloyd Mayer Department of Immunology, Mount Sinai School of Medicine, New York, NY, USA

Stephen P. McAdoo Department of Medicine, Imperial College Renal and Transplant Centre, London, UK

Geoffrey McCaughan A.W Morrow Gastroenterology and Liver Centre, Australian National Liver Transplant Unit, Centenary Research Institute, Royal Prince Alfred Hospital, University of Sydney, Sydney, NSW, Australia

Robert S. McCuskey Department of Cellular and Molecular Medicine, College of Medicine, University of Arizona, Tucson, AZ, USA

Helen McGuire Department of Immunology, Garvan Institute of Medical Research, Darlinghurst, NSW, Australia

Iain B. McInnes Glasgow Biomedical Research Centre, University of Glasgow, Glasgow, Scotland, UK

Neha Mehta Department of Medicine, New York Presbyterian-Weill Cornell Medical Center, New York, NY, USA

Doron Melamed The Rappaport Faculty of Medicine and Research Institute, Department of Immunology, Technion – Israel Institute of Technology, Haifa, Israel

Pier Luigi Meroni Department of Clinical Sciences and Community Health, Division of Rheumatology, University of Milan, Istituto G. Pini and IRCCS Istituto Auxologico Italiano, Milan, Italy

Joan T. Merrill Clinical Pharmacology Research Program, Oklahoma Medical Research Foundation, Oklahoma City, OK, USA

Giorgina Mieli-Vergani Institute of Liver Studies, King’s College London School Medicine at King’s College Hospital, London, UK

Masayuki Mizui Division of Rheumatology, Department of Medicine, Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, MA, USA

Kevin G. Moder Division of Rheumatology, Mayo Clinic, Rochester, MN, USA

Siamak Moghadam-Kia Department of Internal Medicine, Georgetown University/Washington Hospital Center, Washington, DC, USA

University of Pittsburgh Medical Center, Pittsburg, PA, USA

Terry Moore Internal Medicine, Pediatrics, and Molecular Microbiology and Immunology; Division of Adult and Pediatric Rheumatology, Saint Louis University School of Medicine, Saint Louis, MO, USA
Matthew D. Morgan  Renal Immunobiology, School of Immunity and Infection, College of Medical Sciences, University of Birmingham, Birmingham, West Midlands, UK

Vaishali R. Moulton  Division of Rheumatology, Department of Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

John D. Mountz  Department of Medicine, Division of Clinical Immunology and Rheumatology, University of Alabama at Birmingham, School of Medicine, Birmingham, AL, USA

Haralampos M. Moutsopoulos  Department of Pathophysiology, School of Medicine, University of Athens, Athens, Greece

N. Stanley Nahman Jr.  Department of Medicine, Georgia Health Sciences University and, Charlie Norwood VAMC, Augusta, GA, USA

Nephrology Fellowship Training Program, Medical College of Georgia Georgia Health Sciences University, Augusta, GA, USA

Masashi Narazaki  Department of Respiratory Medicine, Allergy and Rheumatic Diseases, Osaka University Graduate School of Medicine, Suita City, Osaka, Japan

Jochanan E. Naschitz  Faculty of Medicine, the Technion-Israel Institute of Technology, Haifa, Israel, The Flieman Hospital, Haifa, Israel

Jennifer Nashel  Department of Medicine, Division of Rheumatology, Beth Israel Deaconess Medical Center, Harvard University School of Medicine, Boston, MA, USA

James Neuberger  Liver Unit, Queen Elizabeth Hospital, Birmingham, UK

NHS Blood and Transplant, Bristol, UK

Ruben Niesvizky  Department of Medicine – Division of Hematology/Oncology, Weill Cornell Medical College/NY Presbyterian Hospital, New York, NY, USA

Falk Nimmerjahn  Institute of Genetics, Department of Biology, University of Erlangen–Nürnberg, Erlangen, Germany

Department of Biomedicine, University of Basel, Basel, Switzerland

Uday Sankar Nori  Division of Nephrology, Comprehensive Transplant Center, The Ohio State University Medical Center, Columbus, OH, USA

Cliona O’Farrelly  School of Biochemistry and Immunology, Trinity College, The University of Dublin, Dublin 2, Ireland

Osamu Ohtani  Department of Anatomy, Tokyo Medical University, Shinjuku-ku, Tokyo, Japan
Yuko Ohtani  Department of Internal Medicine, Kuriyama Central Hospital, Yotsukaido City, Chiba, Japan

Klaus Okkenhaug  Laboratory of Lymphocyte Signalling and Development, Babraham Institute, Cambridge, UK

Ye Htun Oo  Centre for Liver Research & NIHR BRU, Institute of Biomedical Research, University of Birmingham Medical School & UHB NHS Foundation Trust, College of Medical and Dental Sciences, Edgbaston, Birmingham, UK

Seth J. Orlow  The Ronald O. Perelman Department of Dermatology and Department of Cell Biology, New York University School of Medicine, New York, NY, USA

Dimitrios A. Pappas  Department of Medicine, Division of Rheumatology, Columbia University Medical Center College of Physicians and Surgeons, New York, NY, USA

Samir V. Parikh  Department of Internal Medicine, Division of Nephrology, The Ohio State University Medical Center, Columbus, OH, USA

Saroj Parmar  Division of Hematology and Medical Oncology, Department of Medicine, Weill Cornell Medical College, New York, NY, USA

Anjali Patwardhan  Department of Pediatrics, The Ohio State University and Nationwide Children’s Hospital, Columbus, OH, USA

Roberta Pelanda  Integrated Department of Immunology, National Jewish Health and University of Colorado School of Medicine, Denver, CO, USA

Subramaniam Pennathur  Department of Medicine, Division of Nephrology, University of Michigan, Ann Arbor, MI, USA

Ruth J. Pepper  Imperial College London, London, UK

Shiv Pillai  Medicine and Health Sciences and Technology, Massachusetts General Hospital Cancer Center, Harvard Medical School, Boston, MA, USA

David J. Pinsky  Molecular and Integrative Physiology MSRB III, 7220, University of Michigan, Ann Arbor, MI, USA

David Pisapia  Department of Pathology and Laboratory Medicine, Weill Cornell Medical College, New York, NY, USA

Raoul Poupon  Service d’Hépatologie et Centre de Référence des maladies inflammatoires des voies biliaires, Pierre et Marie Curie University Paris 06, INSERM, UMR_S 938, Hôpital Saint-Antoine, AP-HP, Paris, France

Jonathan D. Powell  Department of Oncology, Johns Hopkins University, School of Medicine, Baltimore, MD, USA

Lindsey Pujanauski  Integrated Department of Immunology, University of Colorado School of Medicine and National Jewish Health, Denver, CO, USA
Charles D. Pusey  Department of Medicine, Imperial College Renal and Transplant Centre, London, UK

Chaim Putterman  Division of Rheumatology, Albert Einstein College of Medicine, Bronx, NY, USA
Department of Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, NY, USA

Victoria P. Werth  Department of Dermatology, Philadelphia V.A. Hospital, Philadelphia, PA, USA
Department of Dermatology, University of Pennsylvania, Philadelphia, PA, USA

Sarika Ramachandran  The Ronald O. Perelman Department of Dermatology, New York University School of Medicine, New York, NY, USA

Angelo Ravelli  Istituto Giannina Gaslini and Università degli Studi di Genova, Genova, Italy

Jana Raynor  Division of Cellular and Molecular Immunology in the Department of Pediatrics, University of Cincinnati and Children’s Hospital Medical Center, Cincinnati, OH, USA

William F. C. Rigby  The Geisel School of Medicine at Dartmouth, Lebanon, NH, USA

Ziv Rosman  Department of Medicine C, Wolfson Medical Center, Holon, Israel

Thomas L. Rothstein  Center for Oncology and Cell Biology, The Feinstein Institute for Medical Research, Hofstra North Shore-LIJ School of Medicine, Manhasset, NY, USA

Brad H. Rovin  Division of Nephrology, The Ohio State University Wexner Medical Center, Columbus, OH, USA

Michael Rubin  Department of Neurology, Weill Cornell Medical College, New York, NY, USA

Ornella J. Rullo  Department of Pediatrics, Division of Immunology, Allergy and Rheumatology, University of California – Los Angeles, Los Angeles, CA, USA

Kenneth G. Saag  Division of Clinical Immunology and Rheumatology, University of Alabama at Birmingham, Birmingham, AL, USA

Shimon Sakaguchi  Department of Experimental Pathology, Institute for Frontier Medical Sciences, Kyoto University, Sakyo-ku, Kyoto, Japan
Experimental Immunology, Immunology Frontier Research Center, Osaka University, Suita, Osaka, Japan
Lazaros I. Sakkas  Department of Rheumatology, Faculty of Medicine, School of Health Sciences and University General Hospital of Larissa/University of Thessaly, Larissa, Hellas

Center for Molecular Medicine, Old Dominion University, Norfolk, VA, USA

Ignacio Sanz  Department of Medicine, University of Rochester, Rochester, NY, USA

J. Vidya Sarma  Department of Pathology, University of Michigan Medical School, Ann Arbor, MI, USA

Caroline O. S. Savage  Renal Immunobiology, School of Immunity and Infection, College of Medical Sciences, University of Birmingham, Birmingham, West Midlands, UK

Marcus Nils Scherer  Department of Surgery, University of Regensburg, Regensburg, Bavaria, Germany

Hans-Jürgen Schlitt  Department of Surgery, University of Regensburg, Regensburg, Bavaria, Germany

Andreas Schnitzbauer  Department of Surgery, University of Regensburg, Regensburg, Bavaria, Germany

Harry W. Schroeder Jr.  Division of Clinical Immunology and Rheumatology, Department of Medicine, University of Alabama at Birmingham, Birmingham, USA

Anna Schurich  Division of Infection and Immunity, UCL, London, UK

Noa Schwartz  Department of Medicine, Montefiore Medical Center, Bronx, NY, USA

Hansjörg Schwertz  Department of Surgery, Division of Vascular Surgery, University of Utah School of Medicine, Eccles Institute of Human Genetics, Salt Lake City, UT, USA

Enrico Selvi  Rheumatology Unit, Department of Clinical Medicine and Immunological Sciences, University of Siena, Siena, Italy

Petros P. Sfikakis  First Department of Propedeutic & Internal Medicine, Athens University Medical School, Athens, Greece

Ravish Shah  Division of Nephrology, The Ohio State University Medical Center, Columbus, OH, USA

Jerry Shapiro  Department of Dermatology, University of British Columbia, Vancouver, BC, Canada

The Ronald O. Perelman Department of Dermatology, New York University School of Medicine, New York, NY, USA
Yaniv Sherer  Hospital Management, Tel-Aviv Sourasky Medical Center and Sackler, Tel-Aviv University, Tel-Aviv, Israel

Marie P. Shieh  Division of Hematology & Oncology, Department of Medicine, Chao Family Comprehensive Cancer Center, University of California Irvine School of Medicine, University of California Irvine Medical Center, Orange, CA, USA

Robert H. Shmerling  Division of Rheumatology, Beth Israel Deaconess Medical Center; Department of Medicine, Harvard Medical School, Boston, MA, USA

Yehuda Shoenfeld  Sackler Faculty of Medicine, Tel–Aviv University, Tel–Aviv, Israel
Zabludowicz Center for Autoimmune Diseases, Sheba Medical Center, Tel Hashomer, Israel

Leonard H. Sigal  Departments of Medicine and Pediatrics, Department of Molecular Genetics and Microbiology, UMDNJ – Robert Wood Johnson Medical School, New Brunswick, NJ, USA

Ann C. Skulas-Ray  Department of Nutritional Sciences, The Pennsylvania State University, University Park, PA, USA

Gideon P. Smith  Department of Dermatology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Andrew Smyth  Department of Medicine, National University of Ireland, Galway, Ireland

Bryan D. Sofen  The Ronald O. Perelman Department of Dermatology, New York University School of Medicine, New York, NY, USA

Nicholas A. Soter  The Ronald O. Perelman Department of Dermatology, New York University School of Medicine, New York, NY, USA

Saı¨di M’Homa Soudja  Department of Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, NY, USA

Charles Spencer  Department of Pediatrics, The Ohio State University and Nationwide Children’s Hospital, Columbus, OH, USA

Jason Springer  Department of Rheumatic and Immunologic Diseases, Cleveland Clinic, Cleveland, OH, USA

E. William St. Clair  Division of Rheumatology and Immunology, Department of Medicine, Duke University Medical Center, Durham, NC, USA

Stephanie M. Stanford  Division of Cellular Biology, La Jolla Institute for Allergy and Immunology, La Jolla, CA, USA

Todd J. Stanhope  Department of Obstetrics and Gynecology, Mayo Clinic, Rochester, MN, USA
George Stojan  Division of Rheumatology, Johns Hopkins University School of Medicine, Baltimore, MD, USA

Sarah Sullivan  Department of Immunology, Duke University, Durham, NC, USA

Zuoming Sun  Division of Immunology, Beckman Research Institute of the City of Hope, Duarte, CA, USA

Robert Sundel  Boston Children’s Hospital, Harvard Medical School, Boston, MA, USA

Nadia R. Sutton  Department of Internal Medicine, Division of Cardiovascular Medicine, University of Michigan Cardiovascular Research Center, Ann Arbor, MI, USA

Reema Syed  Division of Internal Medicine and Pediatric, Saint Louis University, Saint Louis, MO, USA

Zoltán Szekanecz  Department of Rheumatology, University of Debrecen Medical and Health Sciences Center Institute of Medicine, Debrecen, Hungary

Scott T. Tagawa  Division of Hematology and Medical Oncology, Department of Medicine, Weill Cornell Medical College, New York, NY, USA

Department of Urology, Weill Cornell Medical College, New York, NY, USA

Weill Cornell Cancer Center, New York, NY, USA

Toshio Tanaka  Department of Respiratory Medicine, Allergy and Rheumatic Diseases, Osaka University Graduate School of Medicine, Suita City, Osaka, Japan

Richard Taubert  Department of Gastroenterology, Hepatology and Endocrinology, Hannover Medical School, Hannover, Germany

To-Ha Thai  Division of Rheumatology, Department of Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Alistair Tindell  University of Glasgow, Glasgow, Scotland, UK

Thomas B. Toothaker  Associated Neurologist of Southern Connecticut, Fairfield, CT, USA

Raul M. Torres  Integrated Department of Immunology, University of Colorado School of Medicine and National Jewish Health, Denver, CO, USA

Christina Tsalapaki  Rheumatology Clinic, Evangelismos Hospital, Athens, Greece

Betty P. Tsao  Department of Medicine, Division of Rheumatology, University of California – Los Angeles, Los Angeles, CA, USA
George C. Tsokos  Division of Medical Sciences, Harvard Medical School; Division of Rheumatology, Beth Israel Deaconess Medical Center, Boston, MA, USA

Efstathia Tzatha  Department of Neurology, Weill Cornell Medical College, New York, NY, USA

Athanasios G. Tzioufas  Department of Pathophysiology, School of Medicine, University of Athens, Athens, Greece

Doris Urlaub  Leibniz Research Center for Working Environment and Human Factors, IfADo, Dortmund, Germany

Augusto Vaglio  Unit of Nephrology, University Hospital of Parma, Parma, Italy

Ritu Valiyil  Division of Rheumatology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

John Varga  Division of Rheumatology, Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

George I. Varghese  Weill Cornell Medical College, Department of Dermatology, New York, NY, USA

Mathew C. Varghese  Weill Cornell Medical College, Department of Dermatology, New York, NY, USA

Dimitrios Vassilopoulos  2nd Department of Medicine, Athens University School of Medicine, Hippokration General Hospital, Athens, Greece

Diego Vergani  Institute of Liver Studies, King’s College London School Medicine at King’s College Hospital, London, UK

Matthew S. Waitkus  Department of Cellular and Molecular Medicine, Cleveland Clinic Lerner Research Institute and Cleveland Clinic, Lerner College of Medicine, Cleveland, OH, USA

Department of Biological, Geological, and Environmental Sciences, Cleveland State University, Cleveland, OH, USA

Peter A. Ward  Department of Pathology, University of Michigan Medical School, Ann Arbor, MI, USA

Stephen G. Ward  Department of Pharmacology, University of Bath, Bath, Somerset, UK

Alessandra Warren  Centre for Education and Research on Ageing (CERA), and the ANZAC Medical Research Institute, University of Sydney, Sydney, Australia

Carsten Watzl  Leibniz Research Center for Working Environment and Human Factors, IfADo, Dortmund, Germany

Joshua Weaver  Department of Neurology, Weill Cornell Medical College, New York, NY, USA
Emma Weeding  Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, MN, USA

Jun Wei  Division of Rheumatology, Department of Medicine, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

Andrew S. Weyrich  Department of Medicine and Program in Molecular Medicine, University of Utah School of Medicine, Eccles Institute of Human Genetics, Salt Lake City, UT, USA

Wendy M. White  Department of Obstetrics and Gynecology, Mayo Clinic, Rochester, MN, USA

Peter F. Whittington  Department of Pediatrics, Feinberg School of Medicine of Northwestern University, Ann and Robert H Lurie Children’s Hospital of Chicago, Chicago, IL, USA

Haifeng Wu  Department of Pathology, The Ohio State University Medical Center, The Ohio State University, Columbus, OH, USA

Yee Ling Wu  Department of Pediatrics, The Ohio State University and Nationwide Children’s Hospital, Columbus, OH, USA

Steven Yew  Department of Medicine, University of Cambridge, Cambridge, UK

Chack Yung Yu  Department of Pediatrics, The Ohio State University and Nationwide Children’s Hospital, Columbus, OH, USA

Allan J. Zajac  Department of Microbiology, University of Alabama at Birmingham, Birmingham, AL, USA

Hong Zan  Department of Immunology and Microbiology, University of Texas Health Science Center at San Antonio, San Antonio, TX, USA

Gisele Zandman-Goddard  Department of Medicine, Wolfson Medical Center, Holon, Israel

Sackler Faculty of Medicine, Tel–Aviv University, Tel–Aviv, Israel

Xingxing Zang  Department of Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, NY, USA

Weiguo Zhang  Department of Immunology, Duke University, Durham, NC, USA

Guy A. Zimmerman  Department of Medicine, University of Utah School of Medicine, Eccles Institute of Human Genetics, Salt Lake City, UT, USA

Robert B. Zurier  Autoimmune and Musculoskeletal Diseases Center, Feinstein Institute for Medical Research, Manhasset, NY, USA