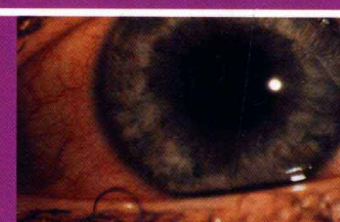
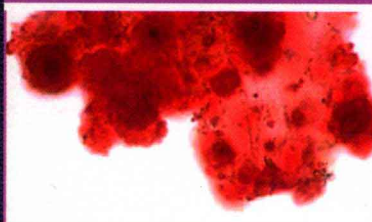
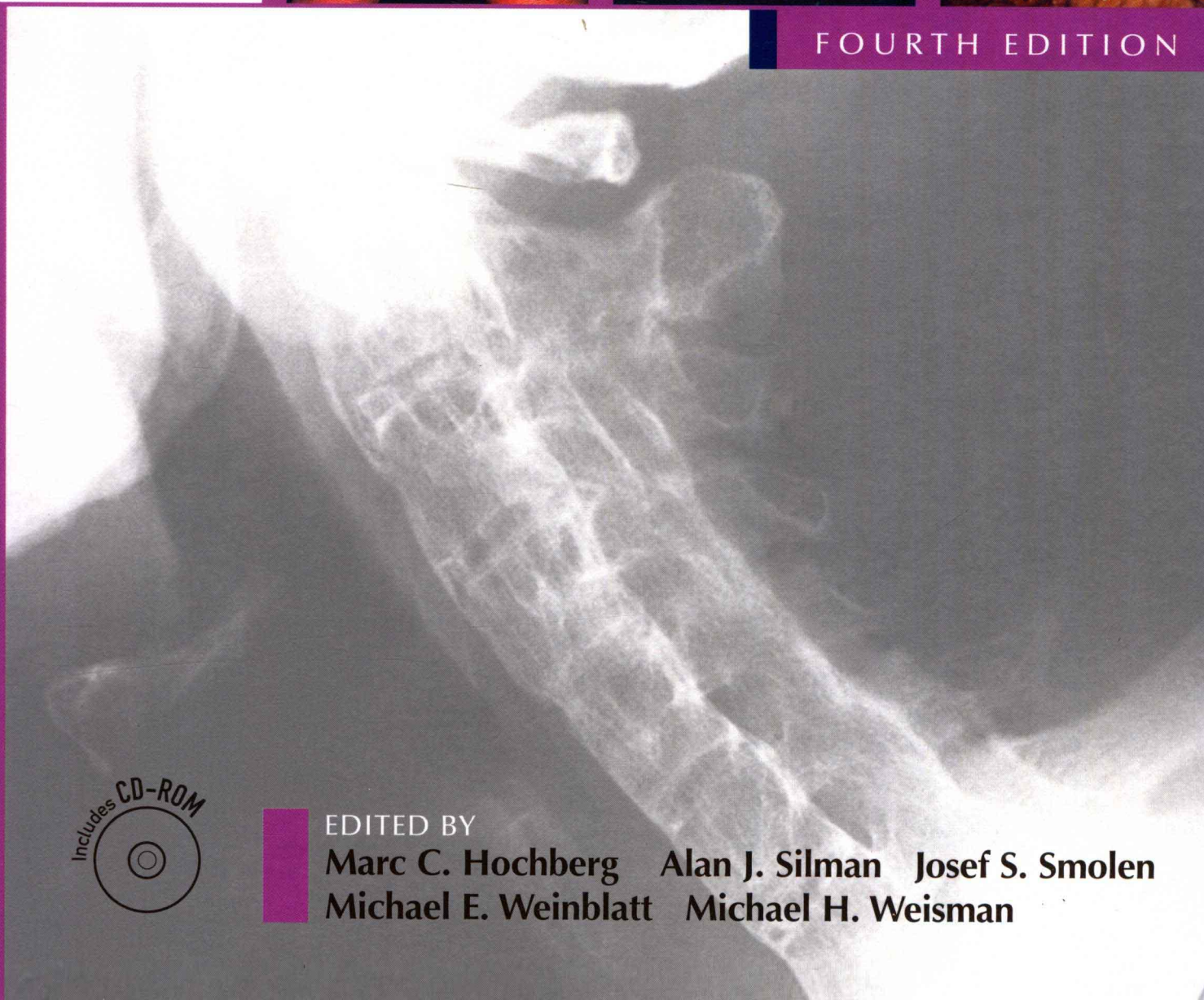


VOLUME 1

RHEUMATOLOGY



FOURTH EDITION



MOSEBY
ELSEVIER

EDITED BY
Marc C. Hochberg Alan J. Silman Josef S. Smolen
Michael E. Weinblatt Michael H. Weisman

FOURTH EDITION

RHEUMATOLOGY

Marc C. Hochberg, MD MPH

Professor of Medicine;
Head, Division of Rheumatology and Clinical Immunology
University of Maryland School of Medicine
Baltimore, Maryland, USA

Alan J. Silman, MSC MD FRCP FMEDSCI

Medical Director, Arthritis Research Campaign
Chesterfield, UK;
Professor, Rheumatic Diseases Epidemiology
University of Manchester
Manchester, UK

Josef S. Smolen, MD

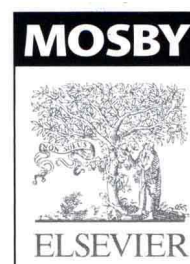
Professor of Medicine;
Chairman, Division of Rheumatology,
Department of Internal Medicine III,
Medical University of Vienna;
Chairman, Second Department of Medicine
Center for Rheumatic Diseases
Hietzing Hospital
Vienna, Austria

Michael E. Weinblatt, MD

John R. and Eileen K. Riedman Professor of Medicine
Harvard Medical School
Division of Rheumatology, Immunology and Allergy
Brigham and Women's Hospital
Boston, Massachusetts, USA

Michael H. Weisman, MD

Chief, Division of Rheumatology
Cedars-Sinai Hospital;
Professor of Medicine
University of California, Los Angeles School of Medicine
Los Angeles, California, USA



MOSBY

ELSEVIER

An imprint of Elsevier Limited

© 2007, Elsevier Limited. All rights reserved.

The right of Marc C. Hochberg, Alan J. Silman, Josef S. Smolen, Michael E. Weinblatt and Michael H. Weisman to be identified as authors of this work has been asserted in accordance with the Copyright, Designs and Patents Act 1988

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Publishers. Permissions may be sought directly from Elsevier's Health Sciences Rights Department, 1600 John F. Kennedy Boulevard, Suite 1800, Philadelphia, PA 19103-2899, USA: phone: (+1) 215 239 3804; fax: (+1) 215 239 3805; or, e-mail: healthpermissions@elsevier.com. You may also complete your request on-line via the Elsevier homepage (<http://www.elsevier.com>), by selecting 'Support and contact' and then 'Copyright and permission'.

First published 1996

Second edition 2001

Third edition 2004

Fourth edition 2007

Reprinted 2008

ISBN: 978-0-323-03364-0

ISBN: 978-0-323-04429-5 (E-dition)

ISBN: 978-0323-04430-1 (Online)

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

Library of Congress Cataloging in Publication Data

A catalog record for this book is available from the Library of Congress

Notice

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our knowledge, changes in practice, treatment and drug therapy may become necessary or appropriate. Readers are advised to check the most current information provided (i) on procedures featured or (ii) by the manufacturer of each product to be administered, to verify the recommended dose or formula, the method and duration of administration, and contraindications. It is the responsibility of the practitioner, relying on their own experience and knowledge of the patient, to make diagnoses, to determine dosages and the best treatment for each individual patient, and to take all appropriate safety precautions. To the fullest extent of the law, neither the Publisher nor the Editors/Authors assumes any liability for any injury and/or damage to persons or property arising out or related to any use of the material contained in this book. It is the responsibility of the treating practitioner, relying on independent expertise and knowledge of the patient, to determine the best treatment and method of application for the patient.

The Publisher

ELSEVIER your source for books,
journals and multimedia
in the health sciences
www.elsevierhealth.com

Working together to grow
libraries in developing countries

www.elsevier.com | www.bookaid.org | www.sabre.org

ELSEVIER **BOOK AID** **Sabre Foundation**
International

Printed in *Spain*

08 09 10 10 9 8 7 6 5 4 3 2

The
Publisher's
policy is to use
paper manufactured
from sustainable forests

PREFACE

The fourth edition of *Rheumatology* is:

- The most comprehensive, authoritative rheumatology text, designed to meet the complete needs of all practicing and academic rheumatologists as well as arthritis related health care professionals and scientists interested in disorders of the musculoskeletal system.
- Firmly grounded on modern medical science, integrating the relevant basic biology with current clinical practice.
- Easily accessible, user-friendly, and a beautifully illustrated colour publication.
- Consistent in style and format, and each chapter is written to a strict template and rigorously edited.
- A genuinely international book, with editors, authors and material drawn from all over the world.
- Fully up-to-date, with carefully selected references to original work and key reviews up to and including articles published in the peer-reviewed literature through 2007.

THE FOURTH EDITION OF *RHEUMATOLOGY* IS A COMPREHENSIVE AND EXCITING BOOK

The international team of editors representing the entire spectrum of academic and clinical rheumatology and biomedical, clinical and epidemiological research, has again brought together a group of internationally renowned authors to deliver essential information on the scientific basis of rheumatic disease and the definition, epidemiology, pathophysiology, clinical features, and management of all musculoskeletal and rheumatic diseases.

This edition builds on the success of the third edition. *Rheumatology 3e* was noted to be "[An] outstanding reference work ... the single text one should own ... A remarkable accomplishment, notable for its comprehensiveness as well as its wisdom" (JAMA). We

have retained all the unique features of the book. We have continued to use templates for each chapter, and have pursued a rigorous editorial policy in order to ensure that the content and format of the book remain both consistent and of the highest possible standard.

The introductory section, as well as that on principles of therapy, has been expanded with the inclusion of new chapters on signal transduction, innate immunity, nutrition and emerging therapeutic targets. A new section on imaging has been added. Every chapter has either been carefully revised or, in many cases, completely rewritten. There is new information on basic biomedical science, clinical therapeutics, disease and outcome assessment, and patient management and rehabilitation. While much new information has been added, we have also either combined or deleted eight chapters, so that the total extent of the book is now almost 200 pages shorter. We have also continued to improve the index, in order to make it easier for the reader to find the material that he or she wants.

The fourth edition includes a CD-ROM of the images in the book downloadable in Powerpoint® as well as access to www.rheumtext.com to enable rapid electronic searches of the contents of the entire 2-volume set. You will also find a complete library of easily downloadable electronic images, links to PUBMED and key society web sites, self-assessment tests, outcome measurement tools and patient information and continuous content updates.

The production of the fourth edition of *Rheumatology* has been a greatly enjoyable team effort. We would like to thank every one of the authors who have contributed to this or any previous edition of the book, as well as the excellent team at Elsevier. We look forward to bringing you a fifth edition of *Rheumatology* at the beginning of the next decade.

LIST OF CONTRIBUTORS

Aryeh M. Abeles, MD

Assistant Professor
Division of Rheumatic Diseases
University of Connecticut Health Center
Farmington, CT
USA
Inflammation

Abby G. Abelson, MD

Associate Staff
Department of Rheumatic and Immunologic Disease
Cleveland Clinic
Cleveland, OH
USA
Management of osteoporosis

Stephen B. Abramson, MD

Professor of Medicine and Pathology
Department of Rheumatology and Medicine
New York University School of Medicine
Hospital for Joint Diseases
New York, NY
USA
Neuropeptides, Free Radicals and Inflammation

David Maxwell Adlam, MBBS, BDS

Consultant Maxillofacial Surgeon
Addenbrooke's Hospital
Cambridge
UK
Temporomandibular pain syndrome

Shizuo Akira, MD, PhD

Professor
Research Institute for Microbial Diseases
Department of Host Defense
Osaka University
Suita, Osaka
Japan
Principles of Innate Immunity

Abdul-Wahab Al-Allaf, MD, MSc

Consultant Rheumatologist and Honorary Senior Lecturer
King Faisal Specialist Hospital and Research Centre
Riyadh
Saudi Arabia
Raynaud's Phenomenon

Graciela S. Alarcon, MD, MPH

Professor, Jane Knight Lowe Chair of Medicine
Division of Clinical Immunology and Rheumatology
The University of Alabama
Birmingham, AL
USA
Antibiotics

Daniel A. Albert, MD

Professor of Medicine
University of Pennsylvania
Philadelphia, PA
USA
Miscellaneous arthropathies

Roy D. Altman, MD

Professor of Medicine
Chief of Rheumatology and Immunology
University of Miami School of Medicine;
Clinical Director
Geriatric Research, Education and Clinical Center

University of Miami Veterans Affairs Medical Center
Miami, FL
USA
Clinical features of OA

Antonios O. Aliprantis, MD, PhD

Rheumatology Division
Brigham and Women's Hospital
Boston, MA
USA
Relapsing polychondritis

Paul Anderson, MD, PhD

Professor of Medicine
Division of Rheumatology, Immunology Allergy
Brigham and Women's Hospital
Boston, MA
USA
Principles of Adaptive Immunity

Christian E. Antoni, MD

Department of Medicine III
Friedrich Alexander University Erlangen
Erlangen
Germany
Psoriatic arthritis: etiology and pathogenesis

Cynthia B. Aranow, MD

Assistant Professor of Medicine
Columbia University
Columbia Presbyterian Medical Center
New York, NY
USA
Treatment of non-renal lupus

Marc A. Asher, MD

Professor of Orthopaedic Surgery
University of Kansas Medical Center
Kansas City, KS
USA
Legg-Perthes and other hip diseases in children

Alan Nathaniel Baer, MD

Associate Professor of Medicine
Department of Medicine
Eerie County Medical Center
Buffalo, NY
USA
Metabolic and Drug Induced Myopathies

Les Barnsley, BMed, PhD

Associate Professor
Head, Department of Rheumatology
Concord Hospital
Sydney
Australia
Neck Pain

Thomas Bardin, MD

Professor of Rheumatology
Federation de Rhumatologie
Hospital Lariboisiere
Paris
France
Primary Hyperlipidemias and Xanthomas

Joan Marie Bathon, MD

Professor of Medicine
Director, John Hopkins Arthritis Center
Division of Rheumatology

Baltimore, MD
USA
Management of Rheumatoid Arthritis: Synovitis

Michael J. Battistone, MD

Staff Physician
Salt Lake City Veterans Affairs Medical Center
Division of Rheumatology
University of Utah School of Medicine and Health Sciences Center
Salt Lake City, UT
USA
Disease-modifying antirheumatic drugs 3: methotrexate

Michael A. Becker, MD

Professor of Medicine
University of Chicago Medical Center
Chicago, IL
USA
Etiology and Pathogenesis of Gout

Jill J. F. Belch, MD

Professor of Medicine
Ninewells Hospital
Dundee
UK
Systemic sclerosis: Raynaud's phenomenon

Nicholas Bellamy, MD

Professor of Rehabilitation Medicine
Centre of National Research on Disability & Rehabilitation Medicine (CONROD)
The University of Queensland
Brisbane, Queensland
Australia
Principles of Outcome Assessment

Nadia Belmatoug, MD

Senior Staff Physician & Consultant in Rheumatology
Department of Internal Medicine
Hôpital Beaujon
Clichy
France
Gaucher's disease

Basia Belza, PhD, RN

Associate Professor
Department of Bio-behavioral Nursing and Health Systems
University of Washington School of Medicine
Seattle, WA
USA
Multidisciplinary Approach to RA

Michael Benjamin, PhD

Professor of Musculoskeletal Biology and Sports Medicine Research School of Biosciences
Cardiff University
Cardiff
UK
Enthesopathies

Brian Maslin Berman, MD

Professor of Family & Community Medicine
University of Maryland School of Medicine
Center for Integrative Disease
Baltimore, MD
USA
Complementary and Alternative Medicine

Bonnie L. Bermas, MD

Assistant Professor of Medicine
Harvard Medical School;
Associate Rheumatologist, Robert B. Bringham Arthritis
Center
Brigham and Womens' Hospital
Boston, MA
USA
Drugs in Pregnancy

John P. Bilezikien, MD

Professor of Medicine and Pharmacology
Columbia University
New York, NY
USA
Hyperparathyroidism

Carol M. Black, MD

Professor of Rheumatology
Centre for Rheumatology
Royal Free and University College
London
UK
Management of Scleroderma

Philip Blazar, MD

Assistant Professor
Department of Orthopaedic Surgery
Brigham and Women's Hospital
Boston, MA
USA
The Wrist and Hand

Jane Frances Bleasel, MBBS, PhD

Head of Department of Rheumatology
Institute of Rheumatology and Orthopaedics
Royal Prince Alfred Hospital
Camperdown, New South Wales
Australia
Hemophilia
TN Board
Principles of arthritis surgery
TN Board

Nikolai Bogduk, BSc(Med), MB BS, PhD, MD, DSc, DipAnat, DipPainMed

Director
Department of Clinical Research
Royal Newcastle Hospital
Newcastle, New South Wales
Australia
Anatomy and biomechanics of the spine

Markus Böhm, MD

Department of Dermatology
University of Münster
Münster
Germany
Skin in rheumatic disease

Marcy B. Bolster, MD

Associate Professor of Medicine
Medical University of South Carolina
Charleston, SC
USA
Clinical Features of Systemic Sclerosis

Stefano Bombardieri, MD

Professor of Rheumatology
Department of Internal Medicine
Istituto di Patologia Medica dell 'Università di Pisa
Azienda Ospedaliera Pisana
Pisa
Italy
Cryoglobulinemia

David G. Borenstein, MD

Clinical Professor of Medicine
The George Washington University Medical Center
Washington, DC
USA
Lumbar spine disorders

Dimitrios T. Boumpas, MD

Chairman, Department of Internal Medicine
University of Crete Medical School
Heraklion
Greece
Treatment-Renal Involvement

Richard M. Brasington MD

Associate Professor of Medicine
Division of Rheumatology
Washington University School of Medicine
St. Louis, MO
USA
Clinical Features of Rheumatoid Arthritis

Ferdinand Breedveld, MD

Professor of Rheumatology
Department of Rheumatology
Leiden University Medical Center
Leiden
The Netherlands
Emerging Therapeutic Targets; Small Molecules

Barry Bresnihan, MD

Professor of Rheumatology
St Vincent's University Hospital
Dublin
Ireland
Cytokine neutralizers: IL Inhibitors

Anne C. Brower, MD

Professor and Chair
Eastern Virginia Medical School
Norfolk, VA
USA
Seronegative spondyloarthropathies: imaging

Ian Norman Bruce, MD

Senior Lecturer in Rheumatology
Rheumatism Research Centre
University of Manchester
Manchester
UK
Psoriatic Arthritis: Clinical Features

J. Christopher Buckland-Wright, BSc, AKC, PhD, DSc

Professor of Radiological Anatomy
The University of London
Applied Clinical Research Centre
King's College London School of Biomedical Sciences
London
UK
Imaging of Osteoarthritis

William D. Bugbee, MD

Associate Professor
Department of Orthopedics
University of California
San Diego, CA
USA
The Hip

Marwan A.S. Bukhari, MSc, PhD

Consultant Rheumatologist
University Hospitals of Morecambe Bay
Royal Lancaster Infirmary
Lancaster
UK
Mucopolysaccharidoses

Nicholas D. Bushar, MD

Graduate Student
Department of Surgery
University of Maryland School of Medicine
Baltimore, MD
USA
Signal transduction

Joel Buxbaum, MD

Professor
Head Division of Rheumatology Research
Department of Molecular and Experimental Medicine
LaJolla, CA
USA
The Amyloidoses

Leonard H. Calabrese, DO

Professor of Medicine
Cleveland Clinic
Lerner College of Medicine of Case Western Reserve
University
R.J. Fasenmyer Chair of Clinical Immunology
Vice Chairman, Department of Rheumatic and
Immunologic Diseases
Cleveland, OH
USA
Rheumatic aspects of HIV Infection and Other
Immunodeficient States
Primary Angiitis of the Central Nervous System

Jeffrey P. Callen, MD

Professor of Medicine (Dermatology)
Chief, Division of Dermatology
Louisville, KY
USA
Cutaneous Vasculitis & Panniculitis

Juan J. Canoso, MD

Adjunct Professor of Medicine
Tufts University
Boston, MA
USA
Rheumatology
ABC Medical Center
Mexico City, Mexico
Aspiration and Injection of Joints and Periarticular
Tissues

Hilary A. Capell, MD

Consultant Rheumatologist of Honorary Senior Lecturer
North Glasgow University Hospitals Division
Centre for Rheumatic Diseases
Glasgow
UK
Sulphasalazine

John C. Carey, MD

University of Utah Medical Center
Salt Lake City, UT
USA
Management of osteoporosis

Luis Jose Catoggio, MD, PhD

Head, Rheumatology Section
Section Rheumatologia
Hospital Italiano de Buenos Aires
Buenos Aires
Argentina
Management of Inflammatory Muscle Disease

Timothy Edward Cawston, BSc, PhD

Professor of Rheumatology
School of Clinical Medical Sciences
Musculoskeletal Research Group
The Medical School

University of Newcastle
Newcastle
UK
Tissue Destruction and Repair

Sumapa Chaiamnuay, MD
Fellow in Rheumatology
Division of Clinical Immunology and Rheumatology
Department of Medicine
The University of Alabama at Birmingham
Birmingham, AL
USA
Antibiotics

Michael Denis Chard, MBBS, MD
Consultant Rheumatologist
Worthing Hospital
Worthing
UK
The Elbow

Lan X. Chen, MD, PhD
Clinical Assistant Professor
Penn Presbyterian Rheumatology
Philadelphia, PA
USA
Other Crystal Associated Arthropathies

Ernest Choy, MD
Consultant Senior Lecturer
Director of Sir Alfred Baring Garrod Clinical Trials Unit
Academic Department of Rheumatology
Weston Education Centre
King's College London
London
UK
Immunotherapies: T cell, B cell, Complement

Daniel Clauw, MD
Professor of Medicine
Division of Rheumatology
Chronic Pain and Fatigue Research Center
The University of Michigan
Ann Arbor, MI
USA
Fibromyalgia and Related Syndromes

Philip J. Clements, MD, MPH
Professor of Medicine/Rheumatology
David Geffen School of Medicine at UCLA
Los Angeles, CA
USA
Immunosuppressives (Chlorambucil, Cyclosporin, Cytoxan, Imuran, Mofetil, Tacrolimus)

Jonathan S. Coblyn, MD
Associate Professor of Medicine
Harvard Medical School;
Director, Clinical Rheumatology
Brigham and Womens' Hospital
Boston, MA
USA
The Heart in Rheumatic Disease

Nona T. Colburn, MD
Clinical Fellow
Genetics and Genomics Branch
National Institute of Arthritis and Musculoskeletal and Skin Diseases
National Institutes of Health
Bethesda, MD
USA
Hereditary periodic fevers

Laura A. Coleman, PhD, RD
Research Specialist
Epidemiology Research Center
Marshfield Clinic Research Foundation
Marshfield, WI
USA
Nutrition in rheumatic disease

Felicia Cosman, MD
Associate Professor of Clinical Medicine
Regional Bone Center
Helen Hayes Hospital
West Haverstraw, NY
USA
Pathogenesis of Osteoporosis

Paul Creamer, MD
Consultant Rheumatologist
Southmead Hospital
Bristol
UK
Neuropathic Arthropathy

Lindsey A. Criswell, MD, MPH
Professor of Medicine
Division of Rheumatology
University of California, San Francisco
San Francisco, CA
USA
Genetics of the Major Histocompatibility Complex in RA

Bruce N. Cronstein, MD
Professor of Medicine, Pathology, and Pharmacology
New York University School of Medicine
New York, NY
USA
Pharmacogenomics

Mary K. Crow, MD
Professor of Medicine
Benjamin M. Rosen Chair in Immunology and Inflammation Research
Hospital for Special Surgery
New York, NY
USA
Cellular Immunology in Systemic Lupus Erythematosus

John J. Cush, MD
Director of Clinical Rheumatology
Baylor Research Institute;
Professor of Medicine and Rheumatology
Baylor University Medical Center – Dallas
Dallas, TX
USA
Cytokine Neutralizers: TNF Alpha

Vivette D. D'Agati, MD
Professor of Pathology
Columbia University College of Physicians & Surgeons
New York, NY
Immunopathology of Systemic Lupus Erythematosus

Seamus E. Dalton, MD, BS
Consultant in Rehabilitation and Sports Medicine
North Sydney Orthopaedic and Sports Medicine Center
Sydney, New South Wales
Australia
The Shoulder

Chad L. Deal, MD
Head, Center for Osteoporosis and Metabolism Bone Disease, Cleveland Clinic
Cleveland, OH
USA
Management of Osteoporosis

Karel De Ceulaer, MD
Consultant Rheumatologist
Trade Centre
Kingston
Jamaica
Joint and Bone Lesions in Hemoglobinopathies

Chris Deighton, MD
Consultant Rheumatologist
Department of Rheumatology
Derbyshire Royal Infirmary
Derby
UK
Genetics of Rheumatoid Arthritis

David L. Delano, PhD
Postdoctoral Scientist
New York University School of Medicine
New York, NY
USA
Pharmacogenomics in Rheumatology

Alessandra Della Rossa, MD
Department of Internal Medicine
Division of Rheumatology
University of Pisa
Pisa
Italy
Cryoglobulinemia

Pierre D. Delmas, MD, PhD
Professor of Medicine
Claude Bernard University of Lyon;
Director, INSERM Research
Hôpital E Herriot
Lyon
France
Investigations of Bone: Biochemical Markers

David Dempster, MD
Associate Professor of Clinical Medicine
Regional Bone Center
Helen Hayes Hospital
West Haverstraw, NY
USA
Pathogenesis of osteoporosis

Gregory J. Dennis, MD
Director, Clinical Care and Training
National Institutes of Arthritis and Musculoskeletal and Skin Disease
National Institutes of Health
Bethesda, MD
USA
Rheumatic Manifestations of Endocrine Disease

Christopher P. Denton, PhD
Senior Lecturer & Consultant Rheumatologist
Centre for Rheumatology
Royal Free Hampstead NHS Trust
London
UK

John Denton, MSc
Research Fellow
Division of Degenerative Medicine
The University of Manchester
Manchester
UK
Synovial Fluid Analysis

Jan Dequeker, MD, PhD
Professor Emeritus of Rheumatology
Department of Rheumatology
University Hospitals

Hospitals K.U. Leuven
Leuven
Belgium
Bone Structure and Function

John Dixon, MA. Mch (Orth)
Consultant Orthopaedic Oncology Surgeon
Nash House
Bristol
UK
Tumors of Bone

Michael Doherty, MD
Professor of Rheumatology
Academic Rheumatology
Clinical Sciences Building
City Hospital
Nottingham
UK
Calcium Pyrophosphate Crystal-Associated Arthropathy

Robyn Domsic, MD
Assistant Professor of Medicine
Division of Rheumatology and Clinical Immunology
University of Pittsburgh
Pittsburgh, PA
USA
Epidemiology and Classification of Systemic
Lupus Erythematosus

Rachelle Donn, MB, ChB, PhD
Lecturer in Molecular Genetics
ARC/EU
Stopford Building
Manchester
UK
Etiology and Pathogenesis of JRA

Mary Anne Dooley, MD, MPH
Associate Professor of Medicine
Division of Rheumatology Department of Medicine
Thurston Arthritis Research Center
Chapel Hill, NC
USA
Drug Induced Lupus

Maxime Dougados, MD
Professor of Rheumatology
Hospital Cohn
Paris
France
Management of Limbs Osteoarthritis

Michael F. Drummond, DPhil, MCom, BSc
Professor of Health Economics at the Centre for Health
Economics
University of York
York
UK
Principles of Health Economics and Application to
Rheumatic Disorders

Roland M. du Bois, MA, MD
Professor of Respiratory Medicine
Consultant Physician
Royal Brompton Hospital
London
England
UK
The Lung in Rheumatic Disease

Brandon E. Earp, MD
Clinical Fellow of Orthopaedic Surgery
Department of Orthopaedic Surgery
Brigham and Women's Hospital

Boston, MA
USA
The Wrist and Hand

Keith B. Elkon, MD
Professor, Medicine and Head
Division of Rheumatology;
Adjunct Professor, Immunology
Department of Medicine
University of Washington
Seattle, WA
USA
Autoantibodies in SLE

Paul Emery, MA, MD
Arc Professor of Rheumatology
Head of the Academic Section of Musculoskeletal
Disease
Chapel Averton Hospital
Leeds
UK
Evaluation and Management of Early IA

Bryan Thomas Emmerson, AO, MD, PhD
Emeritus Professor of Medicine
Department of Medicine
University of Queensland
Princess Alexandra Hospital
Brisbane, Queensland
Australia
The Management of Gout

John M. Esdaile, MD, MPH
Professor of Medicine
University of British Columbia;
Scientific Director
Arthritis Research Centre of Canada
Vancouver, BC
Canada
Adult Stills Disease

Luis R. Espinoza, MD
Professor and Chief
Section of Rheumatology
Department of Medicine
Louisiana State University Health Sciences Center
New Orleans, LA
USA
Mycobacterial, Brucella, Fungal, and Parasitic Arthritis

Adel G. Fam, MD (deceased)
Professor Emeritus of Medicine
Sunnybrook Health Sciences Centre
Division of Rheumatology
University of Toronto
Toronto, Ontario
Canada
The Ankle and Foot

Donna Farber, PhD
Associate Professor of Surgery
University of Maryland School of Medicine
Baltimore, MD
USA
Signal transduction

Anders Fasth, MD, PhD
Professor of Pediatric Immunology
Department of Pediatrics
Göteborg University
Göteborg
Sweden
Clinical Features, Special Problems and Presentations in
Children

Kenneth G. Faulkner, PhD
Chief Scientist
GE Healthcare
Associate Adjunct Professor
University of Wisconsin
Madison, WI
USA
DXA and Measurement of Bone

Clair Francomano, MD
Senior Investigator
Chief, Human Genetics & Integrative Medicine Section
Laboratory of Genetics
National Institute of Aging
National Institutes of Health
Bethesda, MD
USA

Jaap Fransen, PhD
Department of Rheumatology
Radboud University
Nijmegen Medical Center
Nijmegen
The Netherlands
Evaluation and outcome of the patient with established
rheumatoid arthritis

Anthony John Freemont, MD
Professor of Osteoarticular Pathology
The University of Manchester
Manchester
UK
Synovial Fluid Analysis

Izzett Fresco, MD
Associate Professor of Medicine
University of Istanbul
Istanbul
Turkey
Behçet's Syndrome

Kevin B. Fricka, MD
Chief Resident
Department of Orthopaedics
University of California
San Diego, CA
USA
The hip

Marvin J. Fritzler, MD, PhD
Faculty of Medicine
University of Calgary
Calgary, AB
Canada
Laboratory Tests in Rheumatic Disorders

Daniel Furst, MD
Carl M. Pearson Professor of Rheumatology
Geffen School of Medicine at the University of Los
Angeles
Rehabilitation Institute
Los Angeles, CA
USA
Immunosuppressives (Chlorambucil, Cyclosporin,
Cytoxan, Imuran, Mofetil, Tacrolimus)

Sherine E. Gabriel, MD, MSc
Professor of Medicine and Epidemiology
Mayo Clinic
Rochester, MN
USA
Principles of Health Economics and Application to
Rheumatic Disorders

Bernat Galarraga, LMC, MRCP

Clinical Lecturer
The Institute of Cardiovascular Research
Vascular and Inflammatory Diseases
Research Unit University Division of Medicine and
Therapeutics
Ninewells Hospital and Medical School
Dundee
UK
Raynaud's Phenomenon

Gregory Gardner, MD

Adjunct Associate Professor
Bone and Joint Physician
Orthopaedics and Sports Medicine
University of Washington School of Medicine
Seattle, WA
USA
The musculoskeletal system and joint physiology

Boel Andersson Gäre, MD, PhD

Associate Professor in Pediatrics
Department of Child Public Health
Qulturum
Jönköping
Sweden
Clinical Features, Special Problems and Presentations in
Children

Patrick Garnero, DSc, PhD

Director of Research
Synarc
Lyon
France
Investigations of Bone: Biochemical Markers

J.S. Hill Gaston, MA, BM, PhD

Professor of Rheumatology
Department of Medicine
University of Cambridge
Addenbrooke's Hospital
Cambridge
UK
Cellular Immunity in RA

Allan C. Gelber, MD, MPH, PhD

Associate Professor of Medicine
Director, Rheumatology Fellowship Program
Johns Hopkins University School of Medicine
Baltimore, MD
USA
Classification and Epidemiology of Inflammatory
Vascular Disease

Danielle Marie Gerlag, MD

Assistant Professor of Medicine
Division of Clinical Immunology and Rheumatology
Academic Medical Center
Amsterdam
The Netherlands
Minimally Invasive Procedures

Piet Geusens, MD, PhD

Professor of Rheumatology
Department of Medicine/Rheumatology
University Hospital
Maastricht
The Netherlands
Osteoporosis: Clinical Features

Terrence Gibson, MD

Consultant Physician
Department of Rheumatology
Guy's Hospital
London

UK

Clinical Features of Gout

John Tyler Giles, MD

Assistant Professor of Medicine
John Hopkins University
John Hopkins Arthritis Center
Baltimore, MD
USA
Management of Rheumatoid Arthritis: Stynovitis

Ellen M. Ginzler, MD, MPH

Professor of Medicine
SUNY-Downstate Medical Center
Brooklyn, NY
USA
Systemic Lupus Erythematosus: Treatment of Non-
Renal Lupus

Dafna D. Gladman, MD

Professor of Medicine
Centre for Prognosis Studies in the Rheumatic Disease
Toronto Western Hospital
Toronto, Ontario
Canada
SLE Clinical Features

Caroline Gordon, MA, MD

Reader in Rheumatology
University of Birmingham
Consultant Rheumatologist
Sandwell and West Birmingham Hospitals
Birmingham
UK
Assessing Disease Activity and Outcome in Systemic
Lupus Erythematosus

Jörg J. Goronzy, MD

Director
Kathleen B. and Mason I. Lowence
Center for Human Immunology
Department of Medicine
Atlanta, GA
USA
Polymyalgia rheumatica and giant cell arteritis

Simon Görtz, MD

Research Fellow
Department of Orthopaedic Surgery
University of California, San Diego
La Jolla, CA
USA
The hip

Rachel Gorodkin, MBChB, MRCP, MPhil

ARC Clinical Research Fellow
University of Manchester and Salford Royal
Hospitals NHS Trust
UK
Algodystrophy/Reflex Sympathetic Dystrophy
Syndrome

Elena Gournelos

The Complementary Medicine Program
University of Maryland School of Medicine
Baltimore, MD
USA
Complementary and Alternative Medicine

Rodney Grahame, CBE, MD

Hypermobility Clinic
Professor,
Centre for Rheumatology
UCL Hospitals
London

UK

Hypermobility Syndrome

Ellen M. Gravallese, MD

Chief, Division of Rheumatology
Professor of Medicine and Cell Biology
University of Massachusetts Medical School
Worcester, MA
USA
Rheumatoid Synovitis and Pannus

Michael J. Green, MRCP, MBChB

Consultant Rheumatologist
Department of Rheumatology
York Hospital
York
UK
Evaluation and Management of Early IA

Loïc P. Guillevin, MD

Professor of Medicine
Department of Internal Medicine
Hospital Cochin
Universite Paris 5
Paris
France
Churg-Strauss syndrome

Karlene Hagley

c/o Karel De Ceulaer, MD
Consultant Rheumatologist
Trade Centre
Kingston
Jamaica
Joint and Bone Lesions in Hemoglobinopathies

Alan J. Hakim, MB, Bchir, MA

Consultant Rheumatologist and General Physician
Hypermobility Clinic
Centre for Rheumatology
London
UK
Hypermobility Syndrome

Vedat Hamuryudan, MD

Professor of Medicine
Cerrahpasa Medical Faculty
University of Istanbul
Istanbul
Turkey
Bechet's Syndrome

Boulos Haraoui, MD

Associate Professor of Medicine
Department of Rheumatology
Hospital Notre Dame du-CHUM
Montreal, Quebec
Canada
Leflunomide

John B. Harley, MD, PhD

Professor of Medicine
University of Oklahoma;
Member and Head, Arthritis and Immunology Program
Oklahoma Medical Research Foundation
University of Oklahoma Health Science Center
Oklahoma City, OK
USA
Genetics of lupus

E. Nigel Harris, MD

Vice Chancellor
The University of the West Indies
Kingston
Jamaica

Antiphospholipid Syndrome: Diagnosis and Management

Johanna Mieke Wilhelmina Hazes, MD, PhD
Erasmus University Medical Center
Department of Rheumatology
The Netherlands
Management of Extra-Articular Disease and Complications

Dick Heinegård, MD, PhD
Professor of Cell and Molecular Biology
Department of Experimental Medical Science
Section for Cell and Matrix Biology
Lund University
Lund
Sweden
Articular Cartilage

Jenny E. Heller, MPhil
Division of Rheumatology
Brigham and Women's Hospital
Boston, MA
USA
Lyme Disease

Elisabeth Market Hermann, MD
Department of Internal Medicine IV (Rheumatology, Immunology, Nephrology)
Wiesbaden
Germany
Septic Arthritis, Osteomyelitis, Gonococcal and Syphilitic Arthritis

Ariane L. Herrick, MD
Senior Lecturer in Rheumatology
The University of Manchester
Rheumatic Disease Centre
Division of Medicine & Neurosciences -Hope
Clinical Sciences Building
Hope Hospital
Salford
UK
Algodystrophy/Reflex Sympathetic Dystrophy Syndrome

Gary S. Hoffman, MD, MS
Professor and Harold C. Schott Chairman
of Rheumatic and Immunologic Diseases
Lemer College of Medicine
Cleveland Clinic Foundation
Cleveland, OH
USA
Wegener's Granulomatosis and Lymphomatoid Granulomatosis

Vernon M. Holers, MD
Professor of Medicine and Immunology
Division of Rheumatology
University of Colorado Health Sciences Center
Denver, CO
USA
The Complement System

Tracy S. Holtzman, MS, PT
Physical Therapist
Division of Rheumatology/Immunology
St. Louis, MO
USA
Rehabilitation in Juvenile Idiopathic Arthritis

Oswaldo Hübscher, MD
Associate Professor of Medicine (Rheumatology)
CEMIC Medical School
Buenos Aires

Argentina
Pattern Recognition in Arthritis

Thomas WJ Huizinga, MD
Professor of Rheumatology
Leiden University Medical Center
Leiden
The Netherlands
Other Drugs in Rheumatic Disease
Emerging therapeutic targets

Gabor G. Illei, MD
Head, Sjögren's Syndrome Clinic
Gene Therapy and Therapeutics Branch
National Institute of Dental and Craniofacial Research
National Institutes of Health (NIH)
Bethesda, MD
USA
The Netherlands
Treatment-Renal Involvement

Robert Inman, MD
Professor of Rheumatology
Department of Medicine and Rheumatology
Toronto Western Hospital
Toronto
Canada
Reactive Arthritis: Etiology and Pathogenesis

Zacharia Issac, MD
Instructor Physical Medicine & Rehabilitation
Harvard Medical School
Director, Interventional Physiatry
Brigham & Women's Hospital
Orthopedic/Arthritis Center
Boston, MA
USA
Lumbar Spine Disorders

Maura Daly Iversen, PT, DPT, ScD, MPH
Professor and Associate Director
MGH Institute of Health Professions
Boston, Massachusetts
Instructor in Medicine
Division of Rheumatology, Immunology & Allergy
Brigham & Women's Hospital
Harvard Medical School
Cambridge, MA
USA
Arthritis Patient Education: From the Clinical Encounter to a Public Health Approach

Douglas A. Jabs, MD, MBA
Professor of Ophthalmology and Medicine
The John Hopkins University School of Medicine
Professor of Epidemiology
The John Hopkins Bloomberg School of Public Health
The Wilmer Eye Institute
Baltimore, MD
USA
The Eye and Rheumatic Disease

Joanne Marie Jordon, MD, MPH
Associate Professor, Medicine & Orthopaedics
Thurston Arthritis Research Center
University of North Carolina
Chapel Hill, NC
USA
Epidemiology and Classification of OA

Melanie S. Joy, Pharm D
Associate Professor of Medicine
University of North Carolina
School of Medicine, Division of Nephrology
and Hypertension

Chapel Hill, NC
USA
Systemic Lupus Erythematosus: Drug-Induced Lupus

Bashar Kahaleh, MD
Professor of Medicine
Division of Rheumatology
Medical College of Ohio
Toledo, Ohio
USA
Etiology and Pathogenesis of Systemic Sclerosis

Tsuneyasu Kaisho, MD, PhD
Team Leader
Laboratory for Host Defense, RCAI, RIKEN
Yokohama City, Kanagawa
Japan
Principles of Innate Immunity

C.G.M. Kallenberg, MD, PhD
Head, Department of Clinical Immunology, University
Medical Center Groningen
Groningen
The Netherlands
Biology and Immunopathogenesis of Vasculitis

Yuka Kanno, MD, PhD
Staff Scientist
Lymphocyte Cell Biology Section
Molecular Immunology and Inflammation Branch
National Institute of Arthritis and Musculoskeletal and Skin Diseases
Bethesda, MD
USA
Principles and techniques in molecular biology

Dimitrios G. Kassimos, MSc, MD
Consultant Rheumatologist
Rheumatology Unit
401 Military Hospital of Athens
Athens
Greece
Neuropathic arthropathy

Daniel L. Kastner, MD, PhD
Chief, Genetics and Genomics Branch
National Institute of Arthritis and Musculoskeletal and Skin Diseases
National Institutes of Health
Bethesda, MD
USA
Molecular Biology

Jeffrey N. Katz, MD, MSc
Associate Professor of Medicine and Orthopaedic Surgery
Division of Rheumatology, Immunology and Allergy
Brigham and Women's Hospital
Boston, MA
USA
Lumbar Spine Disorders

Arthur F. Kavanaugh, MD
Professor of Medicine
University of California San Diego;
Director, Center for Innovative Therapy
Division of Rheumatology, Allergy, Immunology
University of California, San Diego
La Jolla, CA
USA
Cytokine Neutralizers: TNF Alpha

Tomisaku Kawasaki, MD
Director, Kawasaki Disease Research Center
Chiyodo-Ku, Tokyo
Japan
Kawasaki Disease

Peter R. Kay, MBChB, BA
Consultant Orthopaedic Surgeon
Wrightington Hospital for Joint Disease
Wigan
UK
Principles of Arthritis Surgery

Richard A. Kay, MB, ChB, PhD, ILTM
Senior Lecturer
Unit of Cellular and Molecular Biology
The Dental School
University of Dundee Medical School
Dundee
UK
The principles of adaptive immunity

Andrew Keat, MD
Consultant Rheumatologist
Dept. of Rheumatologist
Northwick Park Hospital
Harrow, Middlesex
Reactive Arthritis: Clinical Features and Treatment

Jennifer A. Kelly, BS
Arthritis and Immunology Program
Oklahoma Medical Research Foundation
Oklahoma City, OK
USA
Genetics of lupus

Edward C. Keystone, MD
Professor of Medicine and Director
The Rebecca MacDonald Centre for Arthritis and Autoimmunity
Mount Sinai Hospital
Toronto, ON
Canada
Leflunomide

Munther A. Khamashta, MD, PhD
Senior Lecturer and Consultant Physician
Lupus Unit
The Rayne Institute
St. Thomas Hospital
London
UK
Antiphospholipid Syndrome: Diagnosis and Management

Gabrielle Helen Kingsley, MB, PhD
Reader in Rheumatology
GKT School of Medicine
King's College London and
Consultant Rheumatologist
University Hospital Lewisham
Immunotherapies: T Cell, B Cell, Complement

Marisa Klein-Gitelman, MD
Division of Pediatric Immunology and Rheumatology
Northwestern University Medical School
The Children's Memorial Hospital
Chicago, IL
USA
Connective tissue disease in children

Lloyd Berl Klickstein, MD, PhD
Assistant Professor of Medicine
Brigham & Women's Hospital
Boston, MA
USA
Dialysis Arthroplasty

Alisa E. Koch, MD
William D. Robinson and Frederick
Huetwell Endowed Professor

University of Michigan Health System
Internal Medicine/Rheumatology and Veterans'
Administration
Ann Arbor, MI
USA
Angiogenesis in RA

Matthew F. Koff, PhD
Senior Research Fellow
Biomechanics and Motion Analysis Laboratory
Mayo Clinic
Rochester, MN
USA
Biomechanics of Peripheral Joints

Virginia B. Krauss, MD, PhD
Associate Professor of Medicine
Division of Rheumatology
Duke University Medical Center
Durham, NC
USA
Rare OA: Ochronosis, Kashanbeck, Castleman's Disease

Guenther J. Krejs, MD
Professor & Chairman
Department of Medicine
Karl-Franzens University
Medizinische Klinik
Graz
Austria
Gastrointestinal Tract and Rheumatic Disease

Hilal Maradit Kremers, MD, MSc
Assistant Professor of Medicine
Mayo Clinic
Rochester, MN
USA
Principles of Health Economics and Application to Rheumatic Disorders

Peter Kroling, MD
Professor of Physical Medicine
Institute of Med. Balneology and Climatology
Ludwig-Maximilians-University
Munich
Germany
Principles of Rehabilitation

Nancy E. Lane, MD
Director and Endowed Professor
Aging Center, Medicine and Rheumatology
University of California at Davis Medical Center
Sacramento, CA
USA
Bone Structure and Function

Robert Landewé, MD
Associate Professor
Department Internal Medicine/Rheumatology
University Hospital Maastricht
Maastricht
The Netherlands
Classification and Epidemiology of Spondylitis

Philipp Karl Lang, MD, MBA
Associate Professor
Director, Musculoskeletal Division
Department of Radiology
Brigham and Women's Hospital
Boston, MA
USA
MRI

Carol A. Langford, MD, MHS
Director, Center for Vasculitis

Department of Rheumatic and Immunologic Diseases
The Cleveland Clinic Foundation
Cleveland, OH
USA
Takayasu's Arteritis

Thomas J. Learch, MD
Assistant Professor of Radiology
Department of Radiology
Keck School of Medicine
University of Southern California
Los Angeles, CA
USA
Imaging of rheumatoid arthritis

George Thomas Lewith, MA, DM
Senior Research Fellow, University of Southampton
Visiting Professor, University of Westminster
Complementary Medicine Research Unit
Primary Medical Care
Aldermoor Health Centre
Southampton
UK
Complementary and Alternative Medicine

Carol B. Lindsley, MD
Professor and Chair,
Director, Pediatric Rheumatology
Department of Pediatric
University of Kansas Medical Center
Kansas City, KS
USA
Legg-Perthes and Other Hip Diseases in Children

Geoffrey Owen Littlejohn, MD, MPM, MBBS
Associate Professor of Medicine
Department of Rheumatology
Monash Medical Center
Clayton, Victoria
Australia
Diffuse Idiopathic Skeletal Hyperstosis

L. Stefan Lohmander, MD, PhD
Professor of Orthopaedics
Department of Orthopaedics
Lund University
Lund University Hospital
Lund
Sweden
Osteoarthritis: Pathology and Pathogenesis

Pilar Lorenzo, PhD
Scientist
Department of Cell and Molecular Biology
Lund University
Lund
Sweden
Articular Cartilage

Carlos J. Lozada, MD
Associate Professor of Medicine
Director, Rheumatology Training Program
Division of Rheumatology and Immunology
The University of Miami
Miami, FL
USA
Clinical features of OA

Thomas Luger, MD
Professor of Dermatology
Department of Dermatology
University of Munster
Münster
Germany
Skin and Rheumatic Disease

Ingrid E. Lundberg, MD, PhD

Professor of Rheumatology
Rheumatology Unit
Department of Medicine
Karolinska University Hospital
Karolinska Institutet
Stockholm
Sweden
Etiology and Pathogenesis of Inflammatory Disease

Harvinder S. Luthra, MD

John F. Finn Minnesota Arthritis Foundation
Professor Emeritus; Chair, Division of Rheumatology
Mayo Clinic College of Medicine
Rochester, MN
USA
Relapsing Polychondritis

Alex MacGregor MD, MA

Honorary Consultant
Twin Research & Epidemiology Unit
St. Thomas' Hospital
London
UK
Classification and Epidemiology

Megan MacNeil

Fellow
University of Texas Medical School
Houston, TX
USA
Assessing Disease Activity and Outcome in
Scleroderma

Rajan Madhok, MD

Consultant Physician & Rheumatologist
Centre for Rheumatic Diseases
Glasgow Royal Infirmary
Castlestree
Glasgow
UK
Sulphasalazine

Maren Lawson Mahowald, MD

Professor of Medicine University of Minnesota
Rheumatology Section Chief
Minneapolis VA Medical Center
Minneapolis, MN
USA
Principles of Opiate Management

Walter P. Maksymowych, MD

Senior Scholar Alberta Heritage Foundation
for Medical Research
Professor of Medicine
University of Alberta
Edmonton, Alberta
Canada
Etiology, Pathogenesis and Pathology of Ankylosing
Spondylitis

Susan Manzi, MD, MPH

Associate Professor of Medicine and Epidemiology
University of Pittsburgh
Lupus Center of Excellence
Pittsburgh, PA
USA
Epidemiology and Classification

Joan C. Marini, MD, PhD

Chief, Bone and Extracellular Matrix Branch
National Institute of Child Health and Human
Development
National Institutes of Health
Bethesda, MD
USA
Heritable Connective Tissue Disorders

Pierre Maroteaux, MD

Hôpital des Enfants Malades
Paris
France
Mucopolysaccharidoses

Javier Marquez, MD

Visiting Scholar
Section of Rheumatology
Department of Medicine
Louisiana State University Health Sciences Center
New Orleans, Louisiana
USA
Mycobacterial, Brucella, Fungal, and Parasitic Arthritis

Manuel Martiuez-Laviu, MD

Professor of Rheumatology
National Institute of Cardiology
National Autonomous University
of Mexico
Juau Badiuuu
Mexico
Clubbing and Hypertrophic Osteoarthropathy

Eric L. Matteson, MD, MPH

Professor of Medicine
Division of Rheumatology
Mayo Clinic of Medicine
Rochester, MN
USA
Extraarticular Features of Rheumatoid Arthritis and
Systemic Involvement

Maureen D. Mayes, MD, MPH

Professor of Medicine
Department of Internal Medicine
Division of Rheumatology
University of Texas
Houston Medical School
Houston, TX
USA
Assessing Disease Activity and Outcome in Scleroderma

Rex M. McCallum, MD

Clinical Professor of Medicine
Division of Rheumatology
Duke University School of Medicine
Durham, NC
USA
Cogan's syndrome

Geraldine M. McCarthy, MD

Consultant Rheumatologist
Mater Misericordiae University Hospital;
Adjunct Associate Professor,
Department of Clinical Pharmacology
Royal College of Surgeons in Ireland
Dublin
Ireland
Basic Calcium Phosphate Crystal Deposition Disease

Dennis McGonagle, PhD

MRC Clinician Scientist
Professor of investigative Rheumatology
Molecular Medicine Unit
University of Leeds
The School of Biomedical Sciences
Leeds
UK
Enthesopathies

Iain B. McInnes, BSc, MBChB, PhD

Professor of Experimental Disease
Centre for Rheumatic Diseases
University of Glasgow
Glasgow Royal Infirmary
Glasgow

UK

Emerging Therapeutic Targets

Lachy McLean, MD, PhD

Clinical Immunology and Analgesia
Merck and Company
Rahway, NJ
USA
Etiology and Pathogenesis of Gout

Thomas A. Medsger, Jr., MD

Professor of Medicine
Division of Rheumatology & Clinical Immunology
University of Pittsburgh School of Medicine
Pittsburgh, PA
USA
Clinical Features, Classification and Epidemiology of
Inflammatory Disease

L. Joseph Melton, III, MD

Michael M. Eisenberg Professor
Department of Health Sciences Research
Mayo Clinic College of Medicine
Rochester, MN
USA
Epidemiology, Classification and History of
Osteoporosis

Herman Mielants, MD

Professor of Rheumatology
Department Rheumatology
University Hospital
Gent
Belgium
Enteropathic Arthropathies: Diagnosis and Treatment
Gastrointestinal tract and rheumatic disease

Michael L. Miller, MD

Division of Pediatric Immunology and Rheumatology
Northwestern University Medical School
The Children's Medical Hospital
Chicago, IL
USA
Connective tissue disease in children

Paul D. Miller, MD

Clinical Professor of Medicine
University of Colorado School of Medicine;
Director, Colorado Center for Bone Research
Lakewood, CO
USA
Renal Osteodystrophy

Marian A. Minor, PT, MSPH, PhD

Professor of Physical Therapy
Department of Physical Therapy
School of Health Professions
University of Missouri
Columbia, MO
USA
Multidisciplinary Approach to RA

Dimitris I. Mitsias, MD, PhD

Fellow
Department of Pathophysiology
University of Athens Medical School
Athens
Greece
Sjögren's syndrome

Mila Mituszova, MD

Consultant Rheumatologist
National Institute of Rheumatology and Physiotherapy
Budapest
Hungary
History, Epidemiology, and Classification of Crystal-
Related Arthropathies

Professor Girish M. Mody

Professor of Rheumatology
Nelson R. Mandela School of Medicine
University of KwaZulu Natal
Congella, Durban
South Africa
Acute Rheumatic Fever

Paul A. Monach, MD, PhD

Rheumatology Fellow
Brigham & Women's Hospital
Boston, MA
USA
Rheumatoid Synovitis and Pannus

Jorge Morales-Torres, MD

Professor of Rheumatology
Hospital Aranda De La Parra
Leon
Mexico
Antiquity of Rheumatoid Arthritis

Luc Mouthon, MD

Department of Internal Medicine
Hôpital Cochin
Université Paris
Paris
France
Churg-Strauss Syndrome

Haralampos M. Moutsopoulos, MD

Department of Pathophysiology
School of Medicine
University of Athens
Athens
Greece
Sjögrens Syndrome

Gregory R Mundy, MD

John A. Oates Chair in Translational Medicine
Director, Vanderbilt Center for Bone Biology
Professor of Medicine, Pharmacology, Orthopedics,
Cancer Biology
Center for Bone Biology
Vanderbilt University Medical Center
Nashville, TN
USA
Bone Structure and Function

Stanley J. Naides, MD

Thomas B. Halliwell Professor of Medicine
Professor of Microbiology & Immunology &
Pharmacology
Chief, Division of Rheumatology
Department of Rheumatology
Penn State Hershey Medical Center
Hershey, PA
USA
Viral Arthritis

David J. Nashel, MD

Professor of Medicine
George Washington & Georgetown
University
VA Medical Center
Washington, DC
USA
Entrapment Neuropathies and Compartment
Syndromes

Bernard Nazieres, MD

Professor of Rheumatology
Department of Rheumatology
Rangueil University Hospital
Toulouse
France
Osteonecrosis

Rebecca Neame, MD

Department of Rheumatology
King's Mill Hospital, Mansfield Road
Sutton-in-Ashfield
UK
Calcium pyrophosphate dehydrate crystal-associated
arthropathy

Philip J. O'Connor, MRCP

Consultant Musculoskeletal Radiologist
Department of Radiology
Chapel Allerton Hospital
Leeds
UK
Musculoskeletal ultrasound

Chester V. Oddis, MD

Professor of Medicine
Division of Rheumatology & Clinical Immunology
University of Pittsburgh School of Medicine
Pittsburgh, PA
USA
Clinical Features, Classification and Epidemiology of
Inflammatory Disease

Patrick T. O'Gara, MD

Associate Professor of Medicine, Harvard Medical
School;
Director, Clinical Cardiology;
Vice Chairman, Clinical Affairs
Brigham and Women's Hospital
Boston, MA
USA
The Heart in Rheumatic Disease

Francesca I. Okoye, MD, PhD

Graduate Student
Department of Surgery
University of Maryland School of Medicine
Baltimore, MD
USA
Signal transduction

William E.R. Ollier, PhD

Professor of Immunogenetics
Centre for Integrated Genomic
Medical Research
Machester University
Manchester
UK
Genetic Factors in Rheumatic Disease

K. Sigvard Olsson, MD, PhD

Associate Professor
Section of Hematology and Coagulation
Sahlgrenska University Hospital
Gothenburg
Sweden
Hemochromatosis

Philippe Orcel, MD, PhD

Professor of Rheumatology
Federation de Rheumatologie
Centre Viggo Petersen
Hôpital Lariboisiere
Paris
France
Gaucher's Disease

John J. O'Shea, MD

Chief, Molecular Immunology and Inflammation
Branch
National Institute of Arthritis, Musculoskeletal and Skin
Diseases
National Institutes of Health

Bethesda, MD

USA

Molecular Biology

Lauren M. Pachman, MD

Professor of Paediatrics
Interim Director, Disease Pathogenesis Program
The Children's Memorial Research Centre
Northwestern University, Feinberg School of Medicine
Chicago, IL
USA
Connective Tissue Diseases in Children

Christian Pagnoux, MD

Department of Internal Medicine,
Hôpital Cochin,
Université Paris
Paris
France
Churg-Strauss Syndrome

Amy S. Paller, MD

Professor and Chair
Department of Dermatology
Children's Memorial Hospital
Chicago, IL
USA
Localized Scleroderma and Idiopathic and
Environmentally Induced Scleroderma Variants

Gabriel S. Panayi, ScD, MD

ARC Professor of Rheumatology
Department of Rheumatology
Guy's, King's and St Thomas' School of Medicine
King's College, Guy's Hospital
London
UK
Immunotherapies: T Cell, B Cell, Complement

Carlo Patrino, MD

Professor of Pharmacology
University of Rome "La Sapienza"
Ospedale Sant' Andrea
Roma
Italy
NSAIDS

Jeremy David Perry, BSC (accr) MB

Consultant Rheumatology
Department of Rheumatology
The Royal London Hospital
Bancroft Road
London
UK
Sports Medicine: The Clinical Spectrum of Injury

Michelle Petri, MD, MPH

Professor of Medicine
Division of Rheumatology
Johns Hopkins University School of Medicine
Baltimore, MD
USA
Pregnancy in SLE and Neonatal Lupus

Ross E. Petty, MD, PhD

Professor, Division of Rheumatology
Department of Pediatrics
University of British Columbia and British Columbia's
Children's Hospital
Vancouver, BC
Canada
Classification and Epidemiology of Juvenile Idiopathic
Arthritis

Michael H. Pillinger, MD

Associate Professor of Medicine and Pharmacology
Departments of Medicine (Rheumatology) and
Pharmacology and VAMC
NYU Medical Center
New York, NY
USA
Inflammation

Carlos Pineda, MD

Associate Professor of Rheumatology
Instituto Nacional de Cardiologia
Tlalpan
Mexico
Clubbing and Hypertrophic Osteoarthropathy

Gyula Poór, MD, PhD, DSc

Professor of Rheumatology
Semmelweis University Medical School, Budapest
Director General
National Institute of Rheumatology and Physiotherapy
Budapest
Hungary
History, Epidemiology, and Classification of Crystal-Related Arthropathies

Luminita Pricop, MD

Associate Scientist
Hospital for Special Surgery
New York, NY
USA
Immunopathology of Systemic Lupus Erythematosus

Anne-Marie Prieur, MD

Médecin des Hôpitaux
Unité de Rhumatologie Pédiatrique
Hôpital Necker Enfants-Malades
Paris
France
JIA Management

Mark A. Quinn, MRCP, MBChB

Consultant Rheumatologist
Department of Rheumatology
York Hospital
North Yorkshire UK
Evaluation and Management of Early IA

Rosalind Ramsey-Goldman, MD, DrPH

Professor of Medicine
Northwestern University Feinberg School of Medicine
Chicago, IL
USA
Epidemiology and Classification

Elaine F. Remmers, PhD

Staff Scientist
Genetics and Genomics Branch
National Institute of Arthritis and Musculoskeletal and Skin Diseases
National Institutes of Health
Bethesda, MD
USA
Molecular Biology

John Reveille, MD

Professor of Medicine
Director of the Division of Rheumatology
The University of Texas
Health Science Center
Houston, TX
USA
Clinical Features of Ankylosing Spondylitis

Christopher Ritchlin, MD

Associate Professor of Medicine

Director, Clinical Immunology Research Ctr
Allergy Immunology & Rheumatology Unit
University of Rochester School of Medicine & Dentistry
New York, NY
USA
Psoriatic Arthritis: Management

Ronenn Roubenoff, MD, MHS, FACP, FACP

Senior Director
Department of Molecular Medicine
Millennium Pharmaceuticals
Cambridge, MA, USA;
Professor (Adjunct)
Friedman School of Nutrition Science and Policy
Associate Professor (Adjunct)
Medical School
Tufts University
Boston, MA
USA
Nutrition in Rheumatic Disease

Andrew David Rowan, BSc(Hons), PhD

Reader in Molecular Rheumatology
School of Clinical Medical Sciences (Rheumatology)
The Medical School
University of New Castle, Framlington Place
Newcastle-upon-Tyne
UK
Tissue Destruction and Repair

Mishaela R. Rubin, MD

Assistant Professor of Clinical Medicine
College of Physicians and Surgeons at Columbia
University
New York, NY
USA
Hyperparathyroidism

Violeta Rus, MD

Assistant Professor of Medicine
University of Maryland School of Medicine
Department of Medicine
Division of Rheumatology and Clinical Immunology
Baltimore, MD
USA
History of Systemic Lupus Erythematosus

Anthony S. Russell, MD

Professor Emeritus
University of Alberta
Edmonton, AB
Canada
Antiquity of spondyloarthropathies

Kenneth G. Saag, MD, MSc

Associate Professor of Medicine
Division of Clinical Immunology and Rheumatology
University of Alabama at Birmingham Department of Medicine
Birmingham, AL
USA
Systemic Corticosteroids in Rheumatology

Jane E. Salmon, MD

Professor of Medicine
Hospital for Special Surgery
New York, NY
USA
Immunopathology of Systemic Lupus Erythematosus

David C. Salonen, BSc, MD, FRCP

Assistant Professor of Medical Imaging and Orthopedics
Department of Medical Imaging
Toronto Western Hospital
Toronto, Ontario

Canada

Seronegative Spondyloarthropathies: Imaging

Daniel J. Salzberg, MD

Assistant Professor of Medicine
Director, Nephrology Fellowship Training Program
University of Maryland Medical Center
Baltimore, MD
USA
The kidney and rheumatic disease

Philip SamBrook, MD

Professor of Rheumatology
Department of Rheumatology
Royal North Shore Hospital
Sydney
Australia
Glucocorticoid-Induced Osteoporosis

Tore Saxne, MD, PhD

Professor of Rheumatology
Department of Rheumatology
Lund University Hospital
Lund
Sweden
Articular Cartilage

Lisabeth V. Scalzi, MD

Associate Professor
Pennsylvania State University
Milton S. Hershey Medical Center
Children's Hospital
Hershey, PA
USA
History of Pediatric Rheumatology

Hans-Georg Schaible, MD

Professor
Institute of Physiology/Neurophysiology
Friedrich Schiller University of Jena
Jena
Germany
Scientific Basis of Pain

Ralph Schumacher, MD

Professor of Medicine
University of Pennsylvania
VA Medical Center
Philadelphia, PA
USA
Miscellaneous Arthropathies Including Synovial Tumors and Foreign Body Synovitis

David G.I. Scott, MBChB, MD

Consultant Rheumatologist and Honorary Professor
Department of Rheumatology
Norfolk & Norwich University Hospital
Norwich
UK
Polyarteritis Nodosa and Microscopic Polyangiitis

Brooke Seidemann

Administrative Assistant
Center for Integrative Medicine
University of Maryland School of Medicine
Baltimore, MD
USA
Complementary and Alternative Medicine

Peter L. Selby, MD

Consultant Physician and Honorary Senior Lecturer
University of Manchester Department of Medicine
Manchester Royal Infirmary
Manchester
UK
Rickets and Osteomalacia

Guy Serre, MD, PhD

Professor of Cell Biology
University Toulouse III
Hopital Pupan
Toulouse
France
Autoantibodies in RA

Margaret Seton, MD

Assistant Professor of Medicine
Arthritis Unit
Massachusetts General Hospital
Boston, MA
USA
Paget's Disease of the Bone

Nancy A. Shadick, MD, MPH

Assistant Professor of Medicine
Division of Rheumatology
Brigham & Women's Hospital
Boston, MA
USA
Lyme Disease

Frederic Shapiro, MD

Associate Professor of Orthopedic Surgery
Harvard Medical School
Children's Hospital Boston
Boston, MA
USA
Metabolic, drug-induced, and other non-inflammatory myopathies

Prodromos I. Sidiropoulos, MD

Lecturer, Department of Rheumatology
University of Crete Medical School
Heraklion
Greece
Treatment-Renal Involvement

Richard M. Siegel, MD

Autoimmunity Branch
National Institute of Arthritis, Musculoskeletal and Skin Diseases
National Institutes of Health
Bethesda, MD
USA
Principles and techniques in molecular biology

Joachim Sieper, MD, PhD

Professor of Internal Medicine and Rheumatology
Medical Department I Rheumatology
Charite University Medicine Berlin
Campus Benjamin Franklin
Berlin
Germany
Management of Ankylosing Spondylitis

Alan J. Silman, MSC, MD

Medical Director, Arthritis Research Campaign
Chesterfield;
Professor Rheumatic Diseases Epidemiology
University of Manchester
Manchester
UK
Classification and epidemiology

Richard M. Silver, MD

Professor of Medicine and Pediatrics
Director, Division of Rheumatology
Medical University of South Carolina
Charleston, SC
USA
Clinical Features of Systemic Sclerosis

Shonni J. Silverberg, MD

Professor of Clinical Medicine
Columbia University
New York, NY
USA
Hyperparathyroidism

Peter A Simkin, MD

Adjunct Professor of Orthopaedics
Division of Rheumatology
University of Washington
Seattle, WA
USA
The Musculoskeletal System and Joint Physiology

Barry P. Simmons, MD

Professor of Orthopedic Surgery
Department of Orthopedic Surgery
Brigham and Women's Hospital
Harvard Medical School
Boston, MA
USA
The wrist and hand

Nora G. Singer, MD

Assistant Professor
Division of Pediatric Disease and Rheumatology and
the Division of Rheumatic Disease
CASE School of Medicine
Rainbow Babies & Children's Hospital & University
Hospitals
Cleveland, OH
USA
History of Pediatric Rheumatology

Edwin A. Smith, MD

Professor of Medicine
Division of Rheumatology and Immunology
Medical University of South Carolina
Charleston, SC
USA
Systemic sclerosis: etiology and pathogenesis

Malcolm Douglas Smith, MBBS, PhD, BSc

Professor in Medicine
Rheumatology Unit
Repatriation General Hospital
Daw Park, South Australia
Australia
The Synovium

Stacy E. Smith, MD

Assistant Professor of Radiology
Division of Musculoskeletal Imaging
Department of Diagnostic Imaging
University of Maryland School of Medicine
Baltimore, MD
USA
Conventional Radiography and CT

Taunton R. Southwood, MD

Professor of Paediatric Rheumatology
Institute of Child Health
Birmingham Children's Hospital
Birmingham
UK
Evaluation of musculoskeletal and rheumatic disorders in children

Tim D. Spector, MD, MSC

Director
Twin Research Unit
St. Thomas Hospital
Lambeth Palace Road
London
UK
Genetics of Osteoarthritis

E. William St. Clair, MD

Professor of Rheumatology and Immunology
Duke University Medical Center
Durham, NC
USA
Cogan's syndrome

Virginia Steen, MD

Professor of Medicine
Georgetown University
Washington, DC
USA
Epidemiology and Classification of Scleroderma

Guenther Steiner, PhD

Professor of Biochemistry
Division of Rheumatology
Department of Internal Medicine
Medical University of Vienna
Vienna
Austria
Autoantibodies in RA

John H. Stone, MD, MPH

Associate Professor of Medicine
Division of Rheumatology
Director, The John Hopkins Vasculitis Ctr
Baltimore, MD
USA
Wegener's Granulomatosis and Lymphomatoid Granulomatosis

Millicent A. Stone, MD

Consultant Rheumatologist
Royal National Hospital for Rheumatic Diseases
Bath
UK
Reactive arthritis: etiology and pathogenesis

Gerold Stucki, MD, MS

Professor
Department of Physical Medicine
University Hospital Munich
Munich
Germany
Principles of Rehabilitation

Roger D. Sturrock, MD

Professor of Rheumatology
Centre for Rheumatic Diseases
Medicine- Division of Immunology, Infection & Inflammation
Royal Infirmary,
Glasgow
Disease-Modifying Antirheumatic Drugs 1:
Antimalarials and Gold

Deborah P.M. Symmons, MD, MFPH

Professor
ARC Epidemiology Unit
University of Manchester
Epidemiologic Concepts and Classification of Rheumatology
Manchester
UK
Epidemiologic Concepts and Classification of Rheumatology

Zoltan Szekanecz, MD

Division Chief
Rheumatology Division
Third Department of Medicine
The University of Debrecen Medical and Health Sciences Center
Debrecen
Hungary
Angiogenesis in RA

Ilona Szer, MD

Director
Pediatric Rheumatology Division
Children's Hospital San Diego
San Diego, CA
USA
Henoch-Shönlein Purpura

Paul-Peter Tak, MD, PhD

Department of Clinical Immunology and Rheumatology
University of Amsterdam
Academic Medical Center
Amsterdam
The Netherlands
Minimally Invasive Procedures

Antonio Tavoni, MD

Rheumatologist
Department of Internal Medicine
University of Pisa
Pisa
Italy

Mohamed M. Thabet, MD

Department of Internal Medicine
Assiut University Hospital
Assiut
Egypt
Other drugs in rheumatic disease

Jennifer E. Thorne, MD

Assistant Professor of Ophthalmology
Division of Ocular Immunology
Wilmer Eye Institute
Baltimore, MD
USA
The Eye and Rheumatic Disease

Auli Toivanen, MD, Dr Med Sc

Professor of Medicine (Emerita)
Department of Medicine
Turku University
Turku
Finland
Reactive arthritis: Clinical features and treatment

Carl Turesson, MD, PhD

Fellow in Rheumatology
Department of Rheumatology
Malmo University Hospital
Sweden
Extraarticular Features of Rheumatoid Arthritis and Systemic Involvement

Athanasios G. Tzioufas, MD

Assistant Professor and Consultant Rheumatologist
Department of Pathophysiology
School of Medicine
University of Athens
Panepistimiopolis
Goudi Area
Greece
Sjögrens Syndrome

Murray B. Urowitz, MD

Professor of Medicine, University of Toronto
Director, Centre for Prognosis Studies in the Rheumatic Diseases and University of Toronto Lupus Clinic
Toronto Western Hospital
Toronto, ON
Canada
SLE-Clinical Features

Wim B. van den Berg, PhD

Professor of Experimental Rheumatology
Rheumatology Research and Adv Ther.
University Medical Center Nijmegen
Geert Grooteplein
Nijmegen
The Netherlands
Animal Models of RA

Desiré van der Heijde, MD

Professor of Rheumatology
University Hospital Maastricht
Maastricht
The Netherlands
Classification and Epidemiology of Spondylitis

Sjef van der Linden, MD, PhD

Professor of Rheumatology
Department of Internal Medicine
Division of Rheumatology
University Hospital of Maastricht
Maastricht
The Netherlands
Classification and epidemiology of spondyloarthritis

Piet LCM van Riel, MD

Professor of Rheumatology
Radboud University Nijmegen Medical Center
Rheumatology
Nijmegen
The Netherlands
Evaluation and Outcome of the Patient with Established RA

John Varga, MD

Professor of Medicine
Division of Rheumatology
Northwestern University
Feinberg School of Medicine
Chicago, IL
USA
Localized Forms of Scleroderma

Dimitrios Vassilopoulos, MD

Assistant Professor of Medicine – Rheumatology
Athens University School of Medicine
Hippokraton General Hospital
Athens
Greece
Rheumatic Aspects of HIV Infection and other Immunodeficient States

Patrick Venables, MD

Professor
Kennedy Institute of Rheumatology
Faculty of Medicine
London
UK
Please Insert Chapter Title Here.

Eric M. Veys, MD

Professor of Rheumatology
Department of Rheumatology
University Hospital
Gent
Belgium
Overlap Syndromes
Gastrointestinal tract and rheumatic disease

Richard J. Wakefield, BM

Senior Lecturer and Honorary Consultant in Rheumatology
Academic Department of Musculoskeletal Medicine
Leeds General Infirmary
Leeds

UK

Ultrasound

Jennifer G. Walker, MBBS, FRACP

Rheumatologist
Department of Rheumatology
Repatriation General Hospital
Daw Park, South Australia
Australia
Synovium

Richard Watts, MA, DM

Consultant Rheumatologist, Department of Rheumatology Ipswich Hospital
Honorary Senior Lecturer, School of Medicine, Health Policy and Practice
University of East Anglia
Ipswich
UK
Polyarteritis nodosa and microscopic polyangiitis

Matthew R. Weir, MD

Professor and Director
Division of Nephrology
University of Maryland School of Medicine
Baltimore, MD
USA
The Kidney and Rheumatic Disease

Athol U. Wells, MBChB, MD

Professor of Respiratory Medicine
Royal Brompton Hospital
London
UK
The Lung in Rheumatic Disease

Paco Welsing, MSC

Epidermiologist
University Medical Centre Nijmegen
Nijmegen
The Netherlands
Evaluation and Outcome of the Patient with Established RA

Sterling Gaylord West, MD

Professor of Medicine
Division of Rheumatology
Department of Medicine
University of Colorado Health Science Center
Denver, CO
USA
Sarcoidosis

Cornelia Weyand, MD, PhD

Director, Lowance Center of Human Immunology
Emory University School of Medicine
Atlanta, GA
USA
Polymyalgia Rheumatica and Giant Cell Arteritis

Allan Sture Wiik, MD, PhD

Consultant
Department of Autoimmunology
Statens Serum Institut
Copenhagen
Denmark
Laboratory Tests in Rheumatic Disorders

Frances M.K. Williams, MD

Twin Research and Genetic Epidemiology Unit
St. Thomas' Hospital
London
UK
The genetics of osteoarthritis

H. James Williams, MD

Thomas E. and Rebecca D. Jeremy
 Presidential Endowed Chair for Arthritis Research
 Division of Rheumatology
 University of Utah School of Medicine and Health
 Sciences Center
 Salt Lake City, UT
 USA
 Disease-modifying antirheumatic drugs 3:
 methotrexate

Frank A. Wollheim, MD, PhD

Professor of Rheumatology
 Department of Rheumatology
 Lund University Hospital
 Lund
 Sweden
 Osteoarthritis: Pathology and Pathogenesis

Anthony D. Woolf, BSc, MBBS

Professor of Rheumatology
 Peninsula Medical School
 Universities of Exeter and Plymouth;
 Consultant Rheumatologist
 Duke of Cornwall Department of Rheumatology
 Royal Cornwall Hospital
 Truro
 UK
 History and Physical Examination

Jane Worthington, MD

Reader in Molecular Genetics
 ARC Epidemiology Unit
 University of Manchester
 Manchester
 England

UK

Genetic Factors in Rheumatic Disease

Howard B. Yeon, MD

Department of Orthopedic Surgery
 Children's Hospital;
 Department of Orthopedic Surgery
 Brigham and Women's Hospital;
 Harvard Medical School
 Boston, MA
 USA
 The knee

John Wright, MD

Orthopedic Surgeon
 Department of Orthopedic Surgery
 Brigham & Women's Hospital
 Boston, MA
 USA
 The knee

Hasan Yazici, MD

Professor of Medicine
 Chief, Department of Medicine and Division of
 Rheumatology
 Cerrahpasa Medical Faculty
 University of Istanbul
 Istanbul
 Turkey
 Behçet's Syndrome

Edward H. Yelin, PhD

Professor of Medicine and Health Policy
 Rosalind Russell Medical Research Center for Arthritis
 San Francisco, CA
 USA

The Worldwide Economic and Functional Impact of
 Rheumatic Disease

John Robert York, MD

Clinical Associate Professor
 Department of Rheumatology
 Institute of Rheumatology and Orthopaedics
 The Royal Prince Alfred Hospital
 Camperdown, NSW
 Australia
 Australia
 Hemophilia

Sebahattin Yurdakul, MD

Professor of Medicine
 Department of Rheumatology Cerrahpasa Medical
 Faculty
 University of Istanbul
 Istanbul
 Turkey
 Behçet's Syndrome

Guangju Zhai, MD

Genetic Epidemiologist
 Twin Research and Genetic Epidemiology Unit
 St Thomas' Hospital
 London
 UK
 The genetics of osteoarthritis