

Kenneth Kaushansky Marshall A. Lichtman Josef T. Prchal Marcel M. Levi Oliver W. Press Linda J. Burns Michael A. Caligiuri

丰译 陈 竺 陈赛娟

威廉姆斯血液学 Williams Hematology

第9版



二人民卫生出版社

威廉姆斯血液学

Williams Hematology

第 9 版

主 编 Kenneth Kaushansky
Marshall A. Lichtman
Josef T. Prchal
Marcel M. Levi
Oliver W. Press
Linda J. Burns
Michael A. Caligiuri

主 译 陈 竺 陈赛娟

副主译 吴德沛 黄晓军 赵维莅

图书在版编目 (CIP) 数据

威廉姆斯血液学/(美)肯尼斯·柯尚斯基 (Kenneth Kaushansky)主编;陈竺,陈赛娟主译.— 北京:人民卫生出版社,2018

ISBN 978-7-117-27377-0

I. ①威··· Ⅱ. ①肯···②陈···③陈··· Ⅲ. ①血液学Ⅳ. ①R331. 1

中国版本图书馆 CIP 数据核字(2018)第 210188 号

人卫智网 www.ipmph.com 医学教育、学术、考试、健康,

购书智慧智能综合服务平台

人卫官网 www. pmph. com 人卫官方资讯发布平台

版权所有,侵权必究!

Tenent I telect

Step V. W. bovill

armed I who I

Michael A. Callgius

THE SECOND SECOND

吳德油 黃原羊 越帆花

威廉姆斯血液学

主 译:陈 竺 陈赛娟

出版发行: 人民卫生出版社(中继线 010-59780011)

地 址:北京市朝阳区潘家园南里19号

邮 编: 100021

E - mail: pmph @ pmph. com

购书热线: 010-59787592 010-59787584 010-65264830

印 刷:北京盛通印刷股份有限公司

经 销:新华书店

开 本: 889×1194 1/16 印张: 138

字 数:5970 千字

版 次: 2018年10月第1版 2018年10月第1版第1次印刷

标准书号: ISBN 978-7-117-27377-0

定 价: 920.00元

打击盗版举报电话: 010-59787491 E-mail: WQ @ pmph. com

(凡属印装质量问题请与本社市场营销中心联系退换)

威廉姆斯血液学

Williams Hematology

第9版

Kenneth Kaushansky Josef T. Prchal

Oliver W. Press

Michael A. Caligiuri

Marshall A. Lichtman Marcel M. Levi Linda J. Burns

14 陈赛娟

赵维莅 黄晓军

(按汉语拼音排序)

陈竺 陈芳源 陈苏宁 陈赛娟

健 黄晓军 胡豫 黄河

任瑞宝 吴德沛 王学锋

肖志坚 奚晓东 赵维莅 周光飚

朱力

Kenneth Kaushansky, Marshall A. Lichtman, Josef T. Prchal, Marcel M. Levi, Oliver W. Press, Linda J. Burns, Michael A. Caligiuri Williams Hematology, 9th edition

978-0-07-183300-4

Copyright © 2016 by McGraw-Hill Education.

All Rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including without limitation photocopying, recording, taping, or any database, information or retrieval system, without the prior written permission of the publisher.

This authorized Chinese translation edition is jointly published by McGraw-Hill Education and People's Medical Publishing House. This edition is authorized for sale in the People's Republic of China only, excluding Hong Kong, Macao SAR and Taiwan.

Copyright © 2018 by McGraw-Hill Education and People's Medical Publishing House.

版权所有。未经出版人事先书面许可,对本出版物的任何部分不得以任何方式或途径复制或传播,包括但不限于复印、录制、录音,或通过任何数据库、信息或可检索的系统。

本授权中文简体字翻译版由麦格劳-希尔(亚洲)教育出版公司和人民卫生出版社合作出版。此版本经授权仅限在中华人民 共和国境内(不包括香港特别行政区、澳门特别行政区和台湾)销售。

版权©2018 由麦格劳-希尔(亚洲)教育出版公司与人民卫生出版社所有。 本书封面贴有 McGraw-Hill Education 公司防伪标签,无标签者不得销售。

敬告

本书的作者、译者及出版者已尽力使书中的知识符合出版当时普遍接受的标准。但医学在不断地发展,随着科学研究的不断探索,各种诊断分析程序和临床治疗方案以及药物使用方法都在不断更新。强烈建议读者在使用本书涉及的诊疗仪器或药物时,认真研读使用说明,尤其对于新的产品更应如此。出版者拒绝对因参照本书任何内容而直接或间接导致的事故与损失负责。

需要特别声明的是,本书中提及的一些产品名称(包括注册的专利产品)仅仅是叙述的需要,并不代表作者推荐或倾向于使用这些产品;而对于那些未提及的产品,也仅仅是因为限于篇幅不能——列举。

本着忠实于原著的精神,译者在翻译时尽量不对原著内容做删节。然而由于著者所在国与我国的国情不同,因此一些问题的处理原则与方法,尤其是涉及宗教信仰、民族政策、伦理道德或法律法规时,仅供读者了解,不能作为法律依据。读者在遇到实际问题时应根据国内相关法律法规和医疗标准进行适当处理。

图字:01-2017-2914

试读结束: 需要全本请在线购买: www.ertongbook.com

藝 直 浙江大学医学院附属第一医院

蔡佳翌 上海交通大学医学院附属仁济医院

蔡文治 苏州大学附属第一医院

蔡晓红 上海交通大学医学院附属瑞金医院

蔡亚楠 中国医学科学院血液学研究所血液病医院

曹丽娟 苏州大学附属第一医院

陈 猛 中国医学科学院血液学研究所血液病医院

陈 竺 上海交通大学医学院附属瑞金医院

陈芳源 上海交通大学医学院附属仁济医院

陈启微 苏州大学附属第一医院

陈赛娟 上海交通大学医学院附属瑞金医院

陈苏宁 苏州大学附属第一医院

崔文燕 郑州大学第二附属医院

戴 菁 上海交通大学医学院附属瑞金医院

戴克胜 苏州大学附属第一医院

范 祎 苏州大学附属第一医院

范钰晗 苏州大学附属第一医院

方 怡 上海交通大学医学院附属仁济医院

房 芳 军事科学院军事医学研究院

付婉彬 上海交通大学医学院附属仁济医院

龚凇颂 上海交通大学医学院附属瑞金医院

龚玮佳 上海交通大学医学院附属瑞金医院北院

郭 宁 军事科学院军事医学研究院

郭 涛 华中科技大学同济医学院附属协和医院

韩 悦 苏州大学附属第一医院

韩晓凤 上海交通大学医学院附属仁济医院

何巧梅 上海交通大学附属第一人民医院

侯 健 上海交通大学医学院附属仁济医院

胡 虎 浙江大学医学院

胡 豫 华中科技大学同济医学院附属协和医院

胡淑鸿 苏州大学唐仲英医学研究院血液学研究中心

胡永仙 浙江大学医学院附属第一医院

黄 河 浙江大学医学院附属第一医院

黄洪晖 上海交通大学医学院附属仁济医院

黄慧君 中国医学科学院血液学研究所血液病医院

黄晓军 北京大学人民医院

贾雅丽 军事科学院军事医学研究院

蒋亦彬 苏州大学附属第一医院

焦 波 上海交通大学医学院附属瑞金医院

焦 蒙 中国医学科学院血液学研究所血液病医院

来晓瑜 浙江大学医学院附属第一医院

雷 航 上海交通大学医学院附属瑞金医院

李 锋 解放军南京总医院

李 云 苏州大学附属第一医院

李小秋 复旦大学附属肿瘤医院

李艳华 军事科学院军事医学研究院

李中伟 徐州医科大学江苏省肿瘤生物治疗研究所

郦梦云 苏州大学附属第一医院

廖丹颖 华中科技大学同济医学院附属协和医院

刘 丹 徐州医科大学江苏省肿瘤生物治疗研究所

刘 佳 上海交通大学医学院附属仁济医院

刘 婕 中国科学院动物研究所

刘 萍 上海交通大学医学院附属瑞金医院

刘 莹 湖北医药学院

刘晨萱 上海交通大学医学院附属瑞金医院

刘庶慈 徐州医科大学江苏省肿瘤生物治疗研究所

刘霜竹 苏州大学附属第一医院

刘一鸣 军事科学院军事医学研究院

刘元昉 上海交通大学医学院附属瑞金医院

刘跃均 苏州大学附属第一医院

刘真真 上海交通大学医学院附属瑞金医院

陆晔玲 上海交通大学医学院附属瑞金医院

路莎莎 上海交通大学医学院附属仁济医院

梅 恒 华中科技大学同济医学院附属协和医院

倪蓓文 上海交通大学医学院附属仁济医院

宁楠楠 上海交通大学医学院附属瑞金医院

裴雪涛 军事科学院军事医学研究院

戚嘉乾 苏州大学附属第一医院

钱 露 军事科学院军事医学研究院

覃金华 军事科学院军事医学研究院

曲洺逸 军事科学院军事医学研究院

曲士强 中国医学科学院血液学研究所血液病医院

任 远 苏州大学附属第一医院

任丽洁 苏州大学唐仲英医学研究院血液学研究中心

任瑞宝 上海交通大学医学院附属瑞金医院

沈 杨 上海交通大学医学院附属瑞金医院

沈莉普 上海交通大学医学院附属仁济医院

盛广影 苏州大学附属第一医院

师 伟 中华医学会北京分会

施 明 徐州医科大学江苏省肿瘤生物治疗研究所

施 晴 上海交通大学医学院附属瑞金医院

石 威 华中科技大学同济医学院附属协和医院

石红霞 北京大学人民医院

史仲珣 中国医学科学院血液学研究所血液病医院

宋献民 上海交通大学附属第一人民医院

唐 亮 华中科技大学同济医学院附属协和医院

唐朝君 苏州大学唐仲英医学研究院血液学研究中心

唐古生 海军军医大学附属长海医院

唐雅琼 苏州大学附属第一医院

王 婷 上海交通大学医学院附属仁济医院

王峰蓉 北京大学人民医院

王培鸿 上海交通大学医学院附属瑞金医院

王如菊 苏州大学附属第一医院

王思涵 军事科学院军事医学研究院

王学锋 上海交通大学医学院附属瑞金医院

王彦艳 上海交通大学医学院附属瑞金医院

王钰箐 上海交通大学医学院附属瑞金医院

王兆钺 苏州大学附属第一医院

王治东 军事科学院军事医学研究院

吴 敏 上海交通大学医学院附属瑞金医院

吴德沛 苏州大学附属第一医院

吴小津 苏州大学附属第一医院

吴瑛婷 同济大学附属第一妇婴保健院

武 艺 苏州大学唐仲英医学研究院血液学研究中心

奚闻达 上海交通大学医学院附属瑞金医院

奚晓东 上海交通大学医学院附属瑞金医院

习佳飞 军事科学院军事医学研究院

夏治洲 上海交通大学医学院附属瑞金医院

肖 丹 上海交通大学医学院附属仁济医院

肖 菲 上海交通大学医学院附属仁济医院

肖浩文 浙江大学医学院附属邵逸夫医院

肖新华 上海交通大学医学院附属瑞金医院

肖志坚 中国医学科学院血液学研究所血液病医院

谢小燕 军事科学院军事医学研究院

徐 岚 上海交通大学医学院附属仁济医院

徐 婷 苏州大学附属第一医院

许小宇 苏州大学附属第一医院

薛胜利 苏州大学附属第一医院

颜文青 广东省人民医院

杨冰玉 苏州大学附属第一医院

杨建民 海军军医大学附属长海医院

姚海雷 军事科学院军事医学研究院

姚如恩 上海交通大学医学院附属上海儿童医学中心

殷 杰 苏州大学附属第一医院

殷婷玉 上海交通大学医学院附属仁济医院

尤 涛 苏州大学附属第二医院

余 建 浙江大学医学院附属第一医院

余自强 苏州大学附属第一医院

郁婷婷 上海交通大学医学院附属上海儿童医学中心

喻 艳 苏州大学附属第一医院

岳 文 军事科学院军事医学研究院

曾 泉 军事科学院军事医学研究院

曾一梅 上海交通大学医学院附属瑞金医院北院

张 波 华中科技大学同济医学院附属协和医院

张 艳 上海交通大学医学院附属瑞金医院

张博文 军事科学院军事医学研究院

张聚斌 苏州大学附属第一医院

张蕾丝 苏州大学附属第一医院

张旻玥 上海交通大学医学院附属仁济医院

张苏江 上海交通大学医学院附属瑞金医院北院

张秀丽 上海交通大学医学院附属瑞金医院

赵 茜 解放军南京总医院

赵丽丽 苏州大学附属第一医院

赵维莅 上海交通大学医学院附属瑞金医院

赵妍敏 浙江大学医学院附属第一医院

郑伟燕 浙江大学医学院附属第一医院

钟 华 上海交通大学医学院附属仁济医院

周光飚 国家癌症中心/中国医学科学院肿瘤医院

周剑峰 华中科技大学同济医学院附属同济医院

周景艺 上海交通大学医学院附属仁济医院

周军年 军事科学院军事医学研究院

朱 力 苏州大学唐仲英医学研究院血液学研究中心

朱坚轶 上海交通大学医学院附属仁济医院

朱雄增 复旦大学附属肿瘤医院

主鸿鹄 北京大学人民医院

作者名单

Charles S. Abrams, MD [121]

Professor of Medicine, Pathology and Laboratory Medicine
Vice Chair for Research & Chief Scientific Officer
Department of Medicine
University of Pennsylvania School of Medicine
Philadelphia, Pennsylvania

Archana M. Agarwal, MD [50]

Department of Pathology University of Utah/ARUP Laboratories Salt Lake City, Utah

Doru T. Alexandrescu, MD [122]

Department of Medicine Division of Dermatology University of California, San Diego VA San Diego Health Care System San Diego, California

Carl E. Allen, MD, PhD [71]

Associate Professor of Pediatrics Texas Children's Cancer Center/Hematology Baylor College of Medicine Houston, Texas

Karl E. Anderson, MD, FACP [58]

Professor, Departments of Preventative Medicine and Community
Health, Internal Medicine, and Pharmacology and Toxicology
University of Texas Medical Branch
Galveston, Texas

Kenneth Anderson, MD [107]

Dana-Farber Cancer Institute Boston, Massachusetts

Daniel A. Arber, MD [63]

Ronald F. Dorfman, MBBch, FRCPath Professor in Hematopathology Professor of Pathology Stanford University School of Medicine Stanford University Medical Center Stanford, California

Andrew S. Artz, MD, MS [9]

Associate Professor of Medicine University of Chicago Chicago, Illinois

Farrukh T. Awan, MD [92]

Associate Professor of Internal Medicine
Division of Hematology
Department of internal Medicine
The Ohio State University Comprehensive Cancer Center
Columbus, Ohio

Jennifer Babik, MD, PhD [24]

Division of Infectious Diseases Department of Medicine University of California San Francisco, California

Robert A. Baiocchi, MD, PhD [90]

Associate Professor of Medicine Division of Hematology Department of Internal Medicine The Ohio State University Columbus, Ohio

Kelty R. Baker, MD [51]

Clinical Assistant Professor Baylor College of Medicine Houston, Texas

Anannya Banga, PhD, [30]

Assistant Professor
Department of Genetics
Cell Biology, and Development, Stem Cell Institute
University of Minnesota
Minneapolis, Minnesota

Jeffrey A. Barnes [22]

Instructor in Medicine Dana-Farber Cancer Institute Harvard Medical School Boston, Massachusetts

Philip A. Beer, MRCP, FRCPath, PhD [85]

Wellcome Trust Sanger Institute
Wellcome Trust Genome Campus, Hinxton
Cambridge, United Kingdom

Rafael Bejar, MD, PhD [87]

Division of Hematology and Oncology Moores Cancer Center University of California San Diego La Jolla, California

Joel S. Bennett, MD [121]

Professor of Medicine Division of Hematology-Oncology University of Pennsylvania School of Medicine Philadelphia, Pennsylvania

Carolina Berger, MD [26]

Fred Hutchinson Cancer Research Center Seattle, Washington

Robert F. Betts, MD [82]

Professor of Medicine, Emeritus Division of Infectious Diseases University of Rochester Medical Center Rochester, New York

Bruce Beutler, MD [20]

Regental Professor and Director
Center for the Genetics of Host Defense
Raymond and Ellen Willie Distinguished Chair in Cancer Research in
Honor of Laverne and Raymond Willie Sr.
University of Texas Southwestern Medical Center
Dallas, Texas

Lisa Beutler, MD, PhD [24]

Department of Medicine UCSF School of Medicine San Francisco, California

Neil Blumberg, MD [137]

Professor and Director, Clinical Laboratories and Transfusion Medicine Department of Pathology and Laboratory Medicine University of Rochester Rochester, New York

Niels Borregaard, MD, PhD [66]

Professor of Hematology Department of Hematology University of Copenhagen Copenhagen, Denmark

Prithviraj Bose, MD [16]

Assistant Professor Department of Leukemia University of Texas MD Anderson Cancer Center Houston, Texas

Rondeep S. Brar, MD [4]

Clinical Assistant Professor of Medicine (Hematology and Oncology) Stanford University School of Medicine Stanford, California

Paul Bray, MD [112]

Professor Director, Division of Hematology Jefferson University Philadelphia, Pennsylvania

Alessandro Broccoli, MD [101]

Institute of Hematology "L. e A. Seràgnoli" University of Bologna Bologna, Italy

Virginia C. Broudy, MD [81]

Professor of Medicine Scripps Professor of Hematology University of Washington Seattle, Washington

Francis K. Buadi, MD [108]

Division of Hematology Mayo Clinic Rochester, Minnesota

Harry R. Buller, MD [133]

Professor of Medicine, Department of Vascular Medicine Academic Medical Center Amsterdam, The Netherlands

Linda J. Burns, MD [1]

National Marrow Donor Program/Be The Match Vice President and Medical Director Health Services Research Minneapolis, Minnosata

John C. Byrd, MD [92]

D. Warren Brown Chair of Leukemia Research
Professor of Medicine, Medicinal Chemistry, and Veterinary
Biosciences
Director, Division of Hematology
Department of Medicine
The Ohio State University
Columbus, Ohio

Bradley R. Cairns, PhD [12]

Howard Hughes Medical Institute
Professor and Chair
Department of Oncological Sciences
Huntsman Cancer Institute
University of Utah School of Medicine
Salt Lake City, Utah

Michael A. Caligiuri, MD [6, 73, 78, 79]

Professor and Director, The Ohio State University Comprehensive Cancer Center CEO, James Cancer Hospital and Solove Research Institute The Ohio State University Columbus, Ohio

Jaime Caro, MD [56]

Professor of Medicine
Department of Medicine
Thomas Jefferson University
Cardeza Foundation for Hematologic Research
Philadelphia, Pennsylvania

Jorge J. Castillo, MD [109]

Assistant Professor of Medicine Dana-Farber Cancer Institute Harvard Medical School Boston, Massachusetts

Bruce A. Chabner, MD [22]

Professor of Medicine Massachusetts General Hospital Cancer Center Harvard Medical School Boston, Massachusetts

Richard W. Childs, MD [77]

Clinical Director, NHLBI Chief, Section of Transplantation Immunotherapy National Heart, Lung, and Blood Institute, NIH Bethesda, Maryland

James M. Cleary, MD, PhD [22]

Instructor in Medicine Dana-Farber Cancer Institute Harvard Medical School Boston, Massachusetts

Theresa L Coetzer, MD [46]

Head: Red Cell Membrane Unit
Department of Molecular Medicine and Haematology
National Health Laboratory Service
University of the Witwatersrand
Wits Medical School
Johannesburg, South Africa

Claudia S. Cohn, MD [138]

Assistant Professor, Laboratory Medicine and Pathology University of Minnesota Minneapolis, Minnesota

Barry S. Coller, MD [112, 120]

Head

Allen and Frances Adler Laboratory of Blood and Vascular Biology Physician-in-Chief Vice President for Medical Affairs The Rockefeller University New York, New York

Gregory C. Connolly, MD [25]

Department of Medicine Lipson Cancer Center Rochester Regional Health System Rochester, New York

Myra Coppage [137]

Associate Professor of Laboratory Medicine Department of Pathology and Laboratory Medicine University of Rochester Rochester, New York

Michiel Coppens, MD, PhD [130]

Department of Vascular Medicine Academic Medical Center Amsterdam, The Netherlands

Francesca Cottini, MD [107]

Dana-Farber Cancer Institute Boston, Massachusetts

Gay M. Crooks, MB, BS, FRACP [74]

Professor

Departments of Pathology & Laboratory Medicine and Pediatrics David Geffen School of Medicine University of California, Los Angeles Los Angeles, California

Adam Cuker, MD, MS [118]

Assistant Professor of Medicine & of Pathology and Laboratory
Medicine

Perelman School of Medicine at the University of Pennsylvania Philadelphia, Pennsylvania

Yun Dai, MD [16]

Associate Professor of Medicine Department of Medicine Massey Cancer Center Virginia Commonwealth University Richmond, Virginia

David C. Dale, MD [65]

Professor of Medicine Department of Medicine University of Washington Seattle, Washington

Chi V. Dang, MD, PhD [14]

Professor and Director Abramson Cancer Center University of Pennsylvania Philadelphia, Pennsylvania

Utpal P. Davé, MD [5]

Division of Hematology/Oncology Department of Medicine Vanderbilt University Medical Center Nashville, Tennessee

Randy Daughters, PhD [30]

Assistant Professor
Department of Genetics
Cell Biology, and Development, Stem Cell Institute
University of Minnesota
Minneapolis, Minnesota

Philippe de Moerloose, MD [125]

Professor Division of Angiology and Haemostasis University of Geneva Faculty of Medicine Geneva, Switzerland

Madhav Dhodapkar, MBBS [21]

Arthur H. and Isabel Bunker Professor of Medicine (Hematology) and Professor of Immunobiology Chief, Section of Hematology, Department of Internal Medicine Clinical Research Program Leader, Hematology Program Yale Cancer Center

New Haven, Connecticut

Angela Dispenzieri, MD [108]

Division of Hematology Mayo Clinic Rochester, Minnesota

Reyhan Diz-Küçükkaya, MD [117]

Associate Professor
Department of Internal Medicine
Division of Hematology
Istanbul University
Istanbul Faculty of Medicine
Istanbul, Turkey

Anne G. Douglas, BA [67, 68]

Student, Perelman School of Medicine University of Pennsylvania (Class of 2017) Philadelphia, Pennsylvania

Steven D. Douglas, MD [67, 68]

Professor and Associate Chair Department of Pediatrics Perelman School of Medicine University of Pennsylvania Children's Hospital of Philadelphia Philadelphia, Pennsylvania

Martin Dreyling, MD [100]

Department of Internal Medicine III Medical Center of the University of Munich Munich, Germany

Ann M. Dvorak, MD [63]

Senior Pathologist, Professor of Pathology Department of Pathology Beth Israel Deaconess Medical Center Harvard Medical School Boston, Massachusetts

Dustin Dzube, MD [22]

Resident Physician Massachusetts General Hospital Harvard Medical School Boston, Massachusetts

Yvonne A. Efebera, MD, MPH [78]

Associate Professor of Internal Medicine Division of Hematology Department of Internal Medicine The Ohio State University Columbus, Ohio

Deborah Elstein, PhD [72]

Gaucher Clinic Shaare Zedek Medical Center Jerusalem, Israel

William B. Ershler, MD [9]

Scientific Director Institute for Advanced Studies in Aging and Geriatrics Falls Church, Virginia

Miguel A. Escobar, MD [123]

Professor of Medicine and Pediatrics Division of Hematology University of Texas Health Science Center at Houston Director, Gulf States Hemophilia and Thrombophilia Center Houston, Texas

Andrew G. Evans, MD, PhD [102]

Assistant Professor
Department of Pathology and Laboratory Medicine
University of Rochester Medical Center
Rochester, New York

Ross M. Fasano, MD [55]

Assistant Professor
Emory University School of Medicine
Departments of Pathology and Pediatric Hematology
Assistant Director, Children's Healthcare of Atlanta Transfusion
Services
Associate Director, Grady Health System Transfusion Service
Atlanta, Georgia

Charles W. Francis, MD [25]

Hematology/Oncology Division University of Rochester Medical Center Rochester, New York

Aharon G. Freud, MD, PhD [6, 94]

Assistant Professor Department of Pathology The Ohio State University Columbus, Ohio

Jonathan W. Friedberg, MD [102]

Samuel Durand Professor of Medicine Director, Wilmot Cancer Institute University of Rochester Medical Center Rochester, New York

Hua Fung, MD [29]

Case Western Reserve University University Hospital of Cleveland Cleveland, Ohio

Stephen J. Galli, MD [63]

Mary Hewitt Loveless, MD, Professor
Professor of Pathology and of Microbiology and Immunology
Chair, Department of Pathology
Stanford University School of Medicine
Stanford University Medical Center
Stanford, California

Tomas Ganz, MD, PhD [37, 42, 43]

Departments of Medicine and Pathology, David Geffen School of Medicine University of California, Los Angeles Los Angeles, California

Randy D. Gascoyne, MD, FRCPC [96]

Clinical Professor of Pathology
Research Director, Centre for Lymphoid Cancers
Departments of Pathology and Advanced Therapeutics British
Columbia Cancer Agency, the BC Centre Research Center and
University of British Columbia
Vancouver, British Columbia, Canada

Terry B. Gernsheimer, MD [139]

Professor of Medicine
Department of Medicine, Division of Hematology
University of Washington School of Medicine
Seattle Cancer Care Alliance
Seattle, Washington

Stanton Gerson, MD [29]

Director, Case Comprehensive Cancer, Seidman Cancer Center & National Center for Regenerative Medicine
Distinguished University Professor
Case Western Reserve University
University Hospital of Cleveland
Cleveland, Ohio

Morie A. Gertz, MD, MACP [108]

Division of Hematology
Mayo Clinic
Rochester, Minnesota

Larisa J. Geskin, MD, FAAD [103, 105]

Associate Professor of Dermatology and Medicine
Director, Division of Cutaneous Oncology and Comprehensive Skin
Cancer Center
Department of Dermatology
Columbia University
New York, New York

David Ginsburg, MD [126]

Professor, Department of Internal Medicine, Human Genetics and Pediatrics
Investigator, Howard Hughes Medical Institute
Life Sciences Institute
University of Michigan
Ann Arbor, Michigan

Lucy A. Godley, MD, PhD [13]

Section of Hematology/Oncology
Department of Medicine and The University of Chicago
Comprehensive Cancer Center
The University of Chicago
Chicago, Illinois

Steven Grant, MD [16]

Professor of Medicine and Biochemistry
Shirley and Sture Gordon Olsson Professor of Oncology
Associate Director
Translational Research, Massey Cancer Center
Virginia Gommonwealth University Health Sciences Center
Richmond, Virginia

Anthony R. Green, PhD, FRCP, FRCPath, FMedSci [85]

Professor of Haematology Cambridge Institute for Medical Research and Stem Cell Institute University of Cambridge Cambridge, United Kingdom

Ralph Green, MD, PhD, FRCPath [41, 44]

Professor of Pathology and Medicine University of California Davis Medical Center Sacramento, California

Xylina T. Gregg, MD [38]

Director of Laboratory Services
Utah Cancer Specialists
Salt Lake City, Utah

Michael R. Grever, MD [93]

Chair and Professor
Department of Internal Medicine
Bertha Bouroncle MD and Andrew Pereny Chair in Medicine
The Ohio State University
Columbus, Ohio

John Gribben, MD, DSc, FRCP, FRCPath, FMedSci [76]

Chair of Medical Oncology
Barts Cancer Institute
Centre for Haemato-Oncology
Queen Mary University of London
London, United Kingdom

John H. Griffin, PhD [114]

Professor
Department of Molecular and Experimental Medicine
The Scripps Research Institute
La Jolla, California

Katherine A. Hajjar, MD [115, 135]

Professor of Pediatrics
Brine Family Professor, Department of Cell and Developmental
Biology
Professor of Medicine
Well Cornell Medical College
Attending Pediatrician
New York Presbyterian Hospital

Robert D. Harrington, MD [81]

Professor of Medicine University of Washington Seattle, Washington

New York, New York

Jeanne E. Hendrickson, MD [55]

Associate Professor
Departments of Laboratory Medicine and Pediatrics
Yale University School of Medicine
New Haven, Connecticut

Paul C. Herrmann, MD, PhD [52]

Associate Professor and Chair Department of Pathology and Human Anatomy Loma Linda University School of Medicine Loma Linda, California

Steven Horwitz, MD [104]

Department of Medicine
Memorial Sloan Kettering Cancer Center
New York, New York

Annie L. Hsieh, MD [14]

Department of Pathology Johns Hopkins University, School of Medicine Baltimore, Maryland

Zachary R. Hunter, PhD [109]

Bing Center for Waldenstrom's Macroglobulinemia Dana-Farber Cancer Institute Instructor of Medicine, Harvard Medical School Boston, Massachusetts

Russell D. Hull, MD [133]

Professor
Department of Medicine
University of Calgary
Active Staff
Department of Internal Medicine
Foothills Hospital
Calgary, Alberta, Canada

Achille Iolascon, MD, PhD [39]

Professor of Medical Genetics Dept. of Molecular Medicine and Medical Biotechnologies University Federico II of Naples Naples, Italy

Joseph E. Italiano Jr., PhD [112]

Associate Professor of Medicine Brigham and Women's Hospital Harvard Medical School Boston, Massachusetts

Benjamin Izar, MD, PhD [22]

Post-doctoral Scientist
Dana-Farber Cancer Institute and Broad Institute
Associate Physician, Brigham and Women's Hospital
Harvard Medical School
Boston, Massachusetts

Siegfried Janz, MD, DSc [105]

Division of Hematology/Oncology & Blood and Marrow Transplantation Department of Pathology, Carver College of Medicine University of Iowa Health Care Iowa City, Iowa

Jill M. Johnsen, MD [126]

Assistant Member, Research Institute
Bloodworks Northwest
Puget Sound Blood Center
Assistant Professor, Division of Hematology
Department of Medicine
University of Washington
Seattle, Washington

Lynn B. Jorde, PhD [10]

H. A. and Edna Benning Presidential Professor
Department of Human Genetics
University of Utah School of Medicine
Salt Lake City, Utah

Bindu Kanapuru, MD [9]

Institute for Advanced Studies in Aging and Geriatrics Falls Church, Virginia

Kenneth Kaushansky, MD, MACP [17, 18, 111, 116, 119]

Senior Vice President, Health Sciences Dean, School of Medicine SUNY Distinguished Professor Stony Brook Medicine State University of New York Stony Brook, New York

Nigel S. Key, MB, ChB, FRCP [123]

Harold R. Roberts Distinguished Professor of Medicine Director, University of North Carolina Hemophilia and Thrombosis Center Chapel Hill, North Carolina

Thomas J. Kipps, MD, PhD [75]

Evelyn and Edwin Tasch Chair in Cancer Research
Professor of Medicine
Division of Hematology/Oncology
Deputy Director for Research Operations
Moores UCSD Cancer Center
University of California, San Diego
La Jolla, California

Mark J. Koury, MD [5]

Division of Hematology/Oncology Department of Medicine Vanderbilt University Medical Center Nashville, Tennessee

Abdullah Kutlar, MD [49]

Professor of Medicine Georgia Sickle Cell Center Medical College of Georgia Sickle Cell Center Augusta, Georgia

Robert A. Kyle, MD [110,]

Professor of Medicine Laboratory Medicine and Pathology Mayo Clinic Rochester, Minnesota

Lewis L. Lanier, PhD [77]

Professor Department of Microbiology and Immunology University of California, San Francisco San Francisco, California

Richard A. Larson, MD [91]

Section of Hematology/Oncology
Department of Medicine and the Comprehensive Cancer Center
University of Chicago
Chicago, Illinois

Michelle M. Le Beau, PhD [13]

Section of Hematology/Oncology
Department of Medicine and the Center Research Center
University of Chicago
Chicago, Illinois

Frank W.G. Leebeek, MD, PhD [128]

Professor of Hematology
Department of Hematology
Erasmus University Medical Center
Rotterdam, The Netherlands

Marcel Levi, MD, PhD [116, 122, 129]

Department of Medicine/Vascular Medicine
Academic Medical Center
University of Amsterdam
Amsterdam, The Netherlands

Marshall A. Lichtman, MD [1, 35, 53, 64, 69, 70, 83, 86, 88, 89, 95, 106]

Professor of Medicine and of Biochemistry and Biophysics University of Rochester Medical Center Rochester, New York

Jane L. Liesveld, MD [88, 89]

Professor of Medicine (Hematology-Oncology)
James P. Wilmot Cancer Institute
University of Rochester Medical Center
Rochester, New York

Ton Lisman, PhD [128]

Professor of Experimental Surgery
Surgical Research Laboratory and Section of Hepatobiliary Surgery
and Liver Transplantation
Department of Surgery
University Medical Center, Groningen
Groningen, The Netherlands

John S. (Pete) Lollar III, MD [127]

Aflac Cancer Center and Blood Disorders Services
Department of Pediatrics
Emory University
Atlanta, Georgia

Christine Lomas-Francis, MSc, FIBMS [136]

Technical Director
Laboratory of Immunohematology and Genomics
New York Blood center
New York, New York

José A. Lópéz, MD [117]

Chief Scientific Officer
Bloodworks Northwest
Professor of Medicine and Biochemistry
University of Washington
Seattle, Washington

Robert Lowsky, MD [23]

Division of Blood and Marrow Transplantation Stanford University Stanford, California

Gerard Lozanski, MD [93]

Director, Hematopathology
Medical Director
Flow Cytometry Laboratory
Associate Professor—Clinical
Department of Pathology
The Ohio State University
Columbus, Ohio

Naomi L. C. Luban, MD [55]

Professor, Pediatrics and Pathology
George Washington University Medical Center
Division Chief, Laboratory Medicine
Director, Transfusion Medicine/Donor Center
Children's National Medical Center
Washington, D.C.

Crystal L. Mackall, MH [21]

Head, Immunology Section and Chief, Pediatric Oncology Branch National Cancer Institute Bethesda, Maryland

Aaron J. Marcus, MD* [115]

Professor of Medicine
Weill Cornell Medical College
Attending Physician
New York Harbor Healthcare System
New York, New York

Elaine R. Mardis, PhD [11]

Robert E. and Louise F. Dunn Distinguished Professor of Medicine Co-director, The Genome Institute, Division of Genomics and Bioinformatics, Department of Medicine, Washington University School of Medicine

Siteman Cancer Center, Washington University School of Medicine Saint Louis, Missouri

Fabienne McClanahan, MD, PhD [76]

Barts Cancer Institute
Centre for Haemato-Oncology
Queen Mary University of London
London, United Kingdom

Kenneth L. McClain, MD, PhD [71]

Professor of Pediatrics Texas Children's Cancer Center/Hematology Baylor College of Medicine Houston, Texas

Jeffrey McCullough, MD [138]

Professor Department of Laboratory Medicine and Pathology American Red Cross Professor, Transfusion Medicine University of Minnesota Medical School Minneapolis, Minnesota

Janice McFarland, MD [137]

Blood Center of Southeast Wisconsin Milwaukee, Wisconsin

Shannon L. Meeks, MD [127]

Aflac Cancer Center and Blood Disorders Services

Department of Pediatrics

Emory University

Atlanta, Georgia

Neha Mehta, MD [104]

Department of Medicine Memorial Sloan Kettering Cancer Center New York, New York

Marzia Menegatti, MD [124]

Angelo Bianchi Bonomi Hemophilia and Thrombosis Center Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico University of Milan Milan, Italy

Giampaolo Merlini, MD [109]

Director, Center for Research and Treatment of Systematic Amyloidoses University Hospital Policlinico San Matteo Professor, Department of Medicine University of Pavia Pavia, Italy

Dean D. Metcalfe, MD [63]

Chief, Laboratory of Allergic Diseases Chief, MCBS/LAD NAID/National Institute of Health Bethesda, Maryland

H. A. Mettine Bos, HA, PhD [113]

Assistant Professor
Division of Thrombosis and Hemostasis
Einthoven Laboratory for Experimental Vascular Medicine
Leiden University Medical Center
Leiden, The Netherlands

Saskia Middeldorp, MD, PhD [130]

Department of Vascular Medicine
Academic Medical Center
Amsterdam, The Netherlands

Martha P. Mims, MD, PhD [8]

Professor of Medicine Section Chief, Section of Hematology/Oncology Baylor College of Medicine Houston, Texas

Constantine S. Mitsiades, MD, PhD [22]

Assistant Professor of Medicine Dana-Farber Cancer Institute Harvard Medical School Boston, Massachusetts

Joel Moake, MD [51]

Senior Research Scientist and Associate Director Biomedical Engineering Laboratory Rice University Houston, Texas

Narla Mohandas, D.Sc [31]

Red Cell Physiology Laboratory New York Blood Center New York, New York

Emile R. Mohler III, MD [134]

Director, Vascular Medicine
Professor of Medicine
Division of Cardiovascular Medicine
Perelman School of Medicine at the University of Pennsylvania
Philadelphia, Pennsylvania

Jeffrey J. Molldrem, MD [27]

Professor of Medicine Stem Cell Transplantation and Cellular Therapy, MD Anderson Cancer Center Houston, Texas

Alison Moskowitz, MD [104]

Department of Medicine Memorial Sloan Kettering Cancer Center New York, New York

Laurent O. Mosnier, PhD [114]

Associate Professor
Department of Molecular and Experimental Medicine
The Scripps Research Institute
La Jolla, California

William A. Muller, MD, PhD [115]

Magerstadt Professor and Chair
Department of Pathology
Feinberg School of Medicine
Northwestern University
Chicago, Illinois

Natarajan Muthusamy, DVM, PhD [73]

Professor of Medicine Division of Hematology Department of Internal Medicine The Ohio State University Columbus, Ohio

Kalyan Nadiminti, MD [105]

Division of Hematology/Oncology & Blood and Marrow Transplantation Department of Pathology, Carver College of Medicine University of Iowa Health Care Iowa City, Iowa

Srikanth Nagalla, MBBS, MS [56]

Assistant Professor of Medicine
Division of Hematology
Cardeza Foundation for Hematologic Research
Thomas Jefferson University
Philadelphia, Pennsylvania

Kavita Natrajan, MBBS [49]

Associate Professor of Medicine Division of Hematology/Oncology Georgia Regents University Augusta, Georgia

Marguerite Neerman-Arbez, PhD [125]

Professor
Department of Genetic Medicine and Development
University of Geneva Faculty of Medicine
Geneva, Switzerland

Robert S. Negrin, MD [23]

Division of Blood and Marrow Transplantation Stanford University Stanford, California

Luigi D. Notarangelo, MD [80]

Professor of Pediatrics and Pathology Harvard Medical School Jeffrey Modell Chair of Pediatric Immunology Research Division of Immunology, Children's Hospital Boston Boston, Massachusetts

Hans D. Ochs, MD [80]

Professor of Pediatrics Jeffrey Modell Chair of Pediatric Immunology Research Division of Immunology Seattle Children's Research Hospital Department of Pediatrics University of Washington Seattle, Washington

Elizabeth O'Donnell, MD [107]

Massachusetts General Hospital Boston, Massachusetts

Mark J. Osborn, PhD [30]

Assistant Professor Pediatrics Blood and Marrow Transplantation, Stem Cell Institute University of Minnesota Minneapolis, Minnesota

Charles H. Packman, MD [54]

Professor of Medicine University of North Carolina School of Medicine Levine Cancer Institute, Hematologic Oncology and Blood Disorders Charlotte, North Carolina

James Palis, MD [7] University of Rochester Medical Center Rochester, New York

Charles J. Parker, MD [40]

Professor of Medicine Division of Hematology and Bone Marrow Transplantation University of Utah School of Medicine Salt Lake City, Utah

Flora Peyvandi, MD [124]

Angelo Bianchi Bonomi Hemophilia and Thrombosis Center Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico University of Milan Milan, Italy

John D. Phillips, PhD [58]

Associate Professor of Medicine Division of Hematology University of Utah School of Medicine Salt Lake City, Utah

Mortimer Poncz, MD [118]

Jane Fishman Grinberg Professor of Pediatrics Perelman School of Medicine at the University of Pennsylvania Children's Hospital of Philadelphia Philadelphia, Pennsylvania

Prem Ponka, MD [59]

Professor of Physiology and Medicine Lady Davis Institute McGill University Montreal, Quebec, Canada

Pierluigi Porcu, MD [94]

Professor of Internal Medicine Division of Hematology, and Comprehensive Cancer Center The Ohio State University Columbus, Ohio

Jaroslav F. Prchal, MD [84]

Director, Department of Oncology St. Mary's Hospital Montreal, Quebec, Canada

Josef T. Prchal, MD [32, 33, 34, 45, 50, 57, 59, 84, 86]

The Charles A. Nugent, M.D., and Margaret Nugent Professor Division of Hematology, Pathology, and Genetics University of Utah Salt Lake City, Utah Department of Pathophysiology First Faculty of Medicine Charles University Prague, Czech Republic

Oliver W. Press, MD, PhD [95, 97, 98, 99]

Acting Senior Vice President, Fred Hutchinson Cancer Research Center

Acting Director, Clinical Research Division, FHCRC Recipient, Dr. Penny E. Peterson Memorial Chair for Lymphoma Research

Professor of Medicine and Bioengineering University of Washington Seattle, Washington

Gordana Raca, MD, PhD [13]

Section of Hematology/Oncology Department of Medicine and The University of Chicago Comprehensive Cancer Center University of Chicago Chicago, Illinois

Noopur Raje, MD [107]

Massachusetts General Hospital Boston, Massachusetts

Jacob H. Rand, MD [131]

Professor of Pathology and Medicine Director of Hematology Laboratory Montefiore Medical Center The University Hospital for the Albert Einstein College of Medicine Bronx, New York

A. Koneti Rao, MD [120]

Sol Sherry Professor of Medicine
Director of Benign Hematology, Hemostasis and Thrombosis
Co-Director, Sol Sherry Thrombosis Research Center
Temple University School of Medicine
Philadelphia, Pennsylvania

Gary E. Raskob, PhD [133]

Dean, College of Public Health Regents Professor, Epidemiology and Medicine The University of Oklahoma Health Science Center Oklahoma City, Oklahoma

Vishnu VB Reddy, MD [45]

Department of Pathology, University of Alabama in Birmingham, Birmingham, Alabama

John C. Reed, MD, PhD [15]

Pharmaceutical Research & Early Development Roche Innovation Center-Basel Basel, Switzerland

Majed A. Refaai, MD [138]

Associate Professor Department of Pathology and Laboratory Medicine University of Rochester Medical Center Rochester, New York

Marion E. Reid, PhD, DSc (Hon.) [136]

(Retired) New York Blood Center New York, New York

Pieter H. Reitsma, PhD [113]

Professor in Experimental Molecular Medicine Division of Thrombosis and Hemostasis Einthoven Laboratory for Experimental Vascular Medicine Leiden University Medical Center Leiden, The Netherlands

Andrew R. Rezvani, MD [23]

Division of Blood and Marrow Transplantation Stanford University Stanford, California

Katayoun Rezvani, MD [27]

Professor of Medicine Stem Cell Transplantation and Cellular Therapy MD Anderson Cancer Center Houston, Texas

Paul G. Richardson, MD [22]

Professor of Medicine Dana-Farber Cancer Institute Harvard Medical School Boston, Massachusetts

Stanley R. Riddell, MD [26]

Member, Clinical Research Division Fred Hutchinson Cancer Research Center Seattle, Washington

Jia Ruan, MD, PhD [135]

Associate Professor Department of Medicine Weill Cornell Medical College Associate Attending Physician New York Presbyterian Hospital New York, New York

Daniel H. Ryan, MD [2, 3]

Professor Emeritus
Department of Pathology and Laboratory Medicine
University of Rochester Medical Center
Rochester, New York

J. Evan Sadler, MD, PhD [132]

Ira M. Lang Professor of Medicine Washington University School of Medicine St. Louis, Missouri

Andrew I. Schafer, MD [134]

Professor of Medicine,
Director, The Richard T. Silver Center for Myeloproliferative
Neoplasms,
Weill Cornell Medical College
New York, New York

Stanley L. Schrier, MD [4]

Professor of Medicine (Hematology) Active emeritus Division of Hematology Stanford University School of Medicine Stanford, California

Christopher S. Seet, MD [74]

Department of Medicine
Division of Hematology/Oncology
David Geffen School of Medicine
University of California
Los Angeles, California

George B. Segel, MD [7, 35]

Professor of Pediatrics, Emeritus Professor of Medicine University of Rochester Medical Center Rochester, New York

Uri Seligsohn, MD [116, 129]

Professor of Hematology and Director
Amalia Biron Research Institute of Thrombosis and Hemostasis
Sheba Medical Center
Tel-Hashomer and Sackler Faculty of Medicine
Tel Aviv University
Tel Aviv, Israel

Sanford J. Shattil, MD [121]

Professor and Chief, Division of Hematology-Oncology
Department of Medicine
University of California, San Diego
Adjunct Professor of Molecular and Experimental Medicine
The Scripps Research Institute
La Jolla, California