

Blood Cell Biochemistry

**Volume 1
Erythroid Cells**

**Edited by
J. R. Harris**

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Contributors

- Henry R. V. Arnstein** Division of Biomolecular Sciences, Department of Biochemistry, King's College London, London WC2R 2LS, England
- Grzegorz Bartosz** Laboratory of Biophysics of Development and Aging, Department of Biophysics, University of Lodz, 90-237 Lodz, Poland
- Sophia A. Bonanou-Tzedaki** Division of Biomolecular Sciences, Department of Biochemistry, King's College London, London WC2R 2LS, England
- Augusta Brovelli** Department of Biochemistry, Faculty of Science, University of Pavia, 27100 Pavia, Italy
- Z. Ioav Cabantchik** Department of Biological Chemistry, Institute of Life Sciences, Hebrew University, Jerusalem, Israel 91904; and Laboratory of Cell Biology and Genetics, National Institute of Diabetes and Kidney Diseases, National Institutes of Health, Bethesda, Maryland 20892, USA
- Jean-Pierre Cartron** Unité INSERM U76, Institut National de Transfusion Sanguine, 75015 Paris, France
- Yves Colin** Unité INSERM U76, Institut National de Transfusion Sanguine, 75015 Paris, France
- Bernhard Deuticke** Department of Physiology, Medical Faculty, Technical University, D-5100 Aachen, Federal Republic of Germany
- Ofer Eidelman** Department of Biological Chemistry, Institute of Life Sciences, Hebrew University, Jerusalem, Israel 91904
- Klas Forsbeck** Research and Development, Kabi, S-112 87 Stockholm, Sweden
- Minoru Fukuda** La Jolla Cancer Research Foundation, La Jolla, California 92037, USA
- Reinhard Grebe** Department of Physiology, Medical Faculty, Technical University, D-5100 Aachen, Federal Republic of Germany

- Cees W. M. Haest** Department of Physiology, Medical Faculty, Technical University, D-5100 Aachen, Federal Republic of Germany
- J. Robin Harris** North East Thames Regional Transfusion Centre, Brentwood, Essex CM15 8DP, England
- Marie-Jeanne Heynen** Department of Hematology, University Hospital, B-3000 Leuven, Belgium
- Shinichi Kudo** La Jolla Cancer Research Foundation, La Jolla, California 92037, USA
- Hans U. Lutz** Laboratory for Biochemistry, Swiss Federal Institute of Technology, ETH-Zentrum, CH-8092 Zurich, Switzerland
- Makoto Nakao** Department of Biochemistry, Tokyo Medical and Dental University School of Medicine, Tokyo, Japan
- Greg B. Ralston** Department of Biochemistry, University of Sydney, Sydney, New South Wales 2006, Australia
- Samuel M. Rapoport** Institute of Biochemistry, Humboldt University of Berlin, School of Medicine (Charité), DDR-1040 Berlin, German Democratic Republic
- Catherine Rice-Evans** Department of Biochemistry and Chemistry, Royal Free Hospital School of Medicine, London NW3 2PF, England
- Stephen T. Sawyer** Division of Hematology, Department of Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee 37232, USA
- Tankred Schewe** Institute of Biochemistry, Humboldt University of Berlin, School of Medicine (Charité), DDR-1040 Berlin, German Democratic Republic
- Marilyn J. Telen** Division of Hematology/Oncology, Department of Medicine, and Immunohematology Laboratory, Transfusion Service, Duke University Medical Center, Durham, North Carolina 27710, USA
- Bernd-Joachim Thiele** Institute of Biochemistry, Humboldt University of Berlin, School of Medicine (Charité), DDR-1040 Berlin, German Democratic Republic

Preface

This series of books, devoted to aspects of blood cell biochemistry, development, immunology, and ultrastructure, has evolved and separated from the long-established Plenum series *Subcellular Biochemistry*. It is the intention of these volumes to draw together related areas of investigation and to provide, in the fullness of time, complete coverage of this rapidly advancing important biomedical discipline. Both fundamental and medically applied topics, dealing with normal and pathological cells, will be included.

This, the first volume of the series, contains a diverse collection of chapters, all of which relate to erythroid cells. The range of material included is extremely broad and the authors have used contrasting technical approaches, both within their personal experimental studies and within their manuscripts. This has led to the production of a very interesting compilation, which does, nevertheless, possess a strong overall thematic unity. As with all edited volumes, some topics of importance and interest are not included. This may be because of oversight on my part, as editor, or because the authors originally selected failed to submit their manuscript by the agreed-upon submission date. For these omissions I take full responsibility and trust that at least some of the topics omitted, for instance membrane cation transport systems, will be covered within a future volume of the series.

This book commences with two chapters of a developmental nature. The first, by Marie-Jeanne Heynen, deals with ultrastructural aspects of erythroid development, and the second, by Marilyn J. Teten, with the expression of erythroid membrane protein antigens. These are followed by two chapters that relate to the life-span and removal from the circulation of the erythrocyte. Grzegorz Bartosz has written on *in vivo* aging of the erythrocyte with emphasis upon membrane changes, and Hans U. Lutz has contributed a chapter on erythrocyte clearance that deals in depth with current ideas on the role of immunological aspects in erythrocyte removal. Then follows a group of seven chapters with a strong biochemical content. Sophia A. Bonanou-Tzedaki and Henry R. V. Arnstein have written on macromolecular synthesis and degradation during terminal erythroid cell development, and Samuel M. Rapoport and his colleagues discuss the maturational breakdown of mitochondria and other organelles in reticulocytes. Two chapters then relate to the red blood cell cytoskeleton. The first, by Makoto Nakao, discusses from a broad biochemical and ultrastructural stance the function and structure of the cytoskeleton, and

Greg B. Ralston then deals more specifically with spectrin-actin interactions. My own chapter on the biochemistry and transmission electron optical imaging of some oligomeric proteins and enzymes from erythroid cells emphasizes the strength of this technical combination for structural studies on high-molecular-weight proteins. The molecular genetics and biochemistry of the glycoporphins are presented by Jean-Pierre Cartron and his colleagues; then follows a detailed discussion from Z. Ioav Cabantchik of the red blood cell anion transport system. The next two chapters, on erythroid receptors, strongly complement one another. Stephen T. Sawyer writes on the distribution and structure of the erythropoietin receptors and their role in receptor-mediated endocytosis, and Klas Forsbeck deals with the transferrin receptor and iron accumulation in erythroid cells. The final group of three chapters deals with pathological and drug-induced changes of the erythrocyte. Iron-mediated oxidative stress in erythrocytes is considered from a strongly biochemical stance by Catherine Rice-Evans, and her chapter is followed by the contribution of Augusta Brovelli on erythrocyte-mediated damage in hemolytic anemias. A detailed consideration of the action of drugs on the erythrocyte membrane from Bernhard Deuticke and his colleagues completes this exciting volume.

Having studied erythrocyte membrane proteins since the commencement of my research career in 1965, it has been a pleasant task to compile and edit this volume, which draws on so many interesting aspects of current studies on developing and mature erythroid cells. It is my hope that this book may be of widespread interest and use to those studying or wishing to know about erythroid cells.

J. R. Harris

Brentwood

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