
The Cell in Medical Science

edited by Felix Beck
and John B. Lloyd

vol 2

The Cell in Medical Science

Volume 2: Cellular Genetics, Development and Cellular Specialization

edited by

F. BECK, *Department of Anatomy, University of Leicester*
and

J. B. LLOYD, *Research Unit in Biochemistry, Keele University*

1974



Academic Press
London New York

A Subsidiary of Harcourt Brace Jovanovich, Publishers

ACADEMIC PRESS INC. (LONDON) LTD.
24/28 Oval Road,
London NW1

United States Edition published by
ACADEMIC PRESS INC.
111 Fifth Avenue
New York, New York 10003

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Library of Congress Catalog Card Number: 78-172366
ISBN: 0 12 084202 5

PRINTED IN GREAT BRITAIN BY
WILLMER BROTHERS LIMITED, BIRKENHEAD

Preface

The increasing importance of cell biology in Medical Science is becoming clear to clinicians and laboratory scientists alike. It is the meeting ground of many traditional disciplines and forms a central theme for many others. Its impact on subjects as diverse as immunology and neurobiology is already very great and one cannot but appreciate the potential that the application of its techniques and discipline must have for the future.

Many excellent introductory books of cell biology are available but beyond these one has in general to pass either to reviews or to original articles in order to probe more deeply. The present volumes are designed for readers who already have an elementary knowledge of cell biology; they present various aspects of the subject in depth and try to indicate some of the directions in which contemporary cell biology is moving and the methods it uses. No attempt is made to provide a comprehensive cover of cell biology, but the topics are chosen so as to produce a coherent work rather than a series of unconnected essays. We are greatly indebted to our contributors for their willingness to work within a number of constraints and for their patience with a multitude of editorial requests made to help us achieve our aims.

Volume 1 of this book is concerned with the generalized cell unit, and its chapters deal with the biophysical and biochemical basis of the structure and function of the chief subcellular organelles. Volume 2 contains a series of chapters on the relationship of the cell to developmental processes both within the cell itself and in the organism as a whole. There follow chapters on specific cellular specializations, particularly within the neuromuscular system. Here morphological adaptation for specific functional purposes is described in detail. This theme is again followed in Volume 3 where connective tissues, various endocrines, absorptive and secretory cells are dealt with. Volume 4 begins with three chapters on metabolic control mechanisms, and these are followed by chapters on the relationship between the cell and its environment in various pathological states; immunological processes, inflammation, wound healing and carcinogenesis are treated within this framework.

We believe this book will be of value to senior undergraduate students and to research workers looking for summaries on a variety of related topics concerned with cell structure and function. The contributors have been asked to provide only brief bibliographies which enable the reader to develop his own interest; the chapters do not attempt to include an extensive review of the literature.

Like many before us, we are indebted to Academic Press for the patience, forbearance and unfailing courtesy of numerous members of their staff.

F. BECK

University of Leicester

J. B. LLOYD

University of Keele

February 1974

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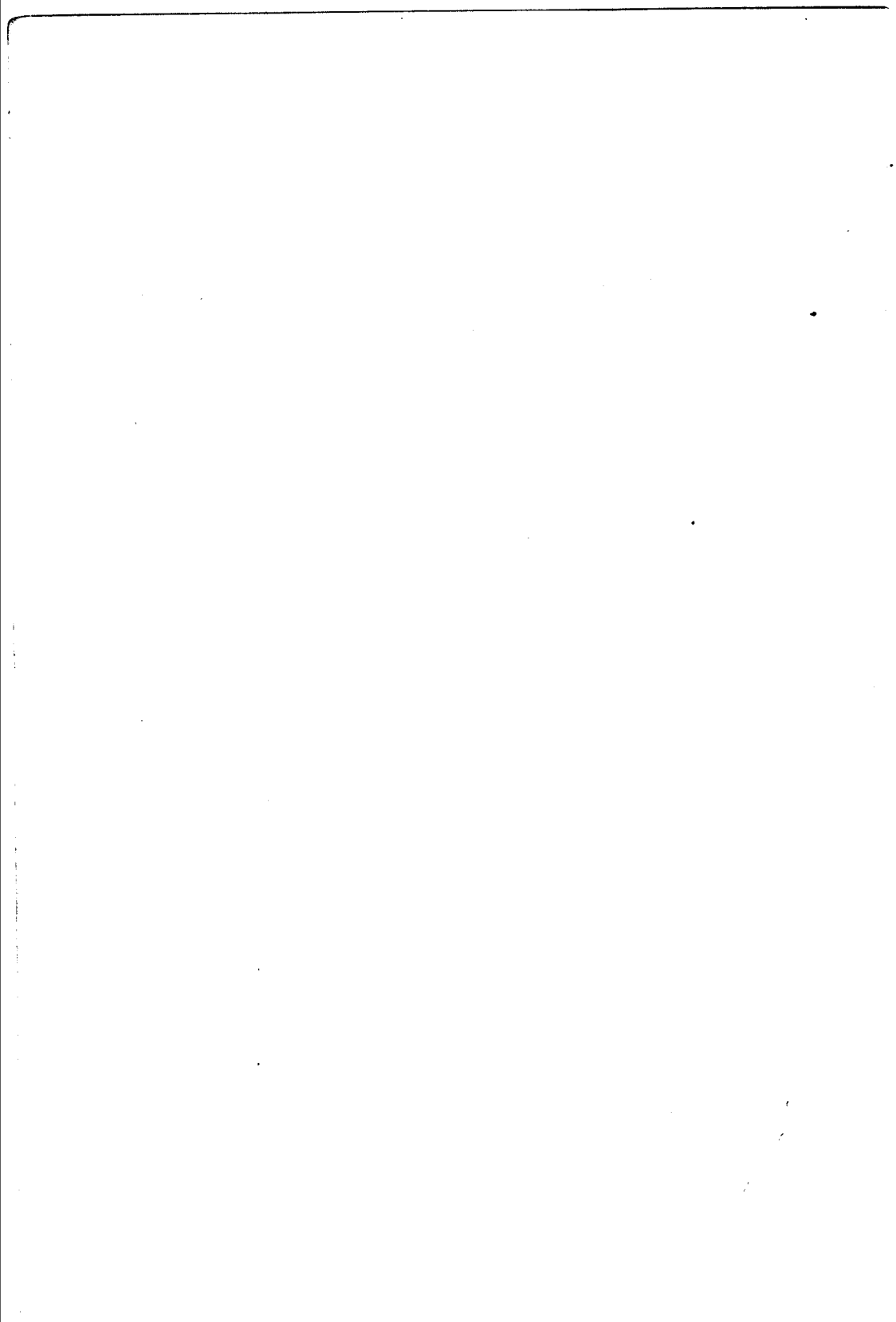
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Cellular Genetics and Development



9. Biochemical Genetics

C. W. PARR

*Department of Biochemistry, The London Hospital Medical College,
London, England*

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I. INTRODUCTION

Like classical genetics, the study of genetics at the biochemical level is based on the concept that all living organisms contain within themselves the discrete hereditary determinants or "elements" that were first proposed by Mendel. These factors, now called genes, have permanence in that they are inherited unchanged. Mendel was fortunate in that he chose to study characters that could be identified and counted in subsequent generations in an exact manner, and he was able to show that such characters reflected the activities of single genes. Much of our present understanding of the biochemical mechanisms of inheritance has also come as a consequence of the study of clearly segregating characters, determined by one or at most by a few genes. Characters such as height and intelligence, which do not segregate in a clear-cut manner and are generally considered to be controlled by a number of genes, are too complex, as yet, for analysis in biochemical terms.

Some of the earliest information pointing to a relationship between