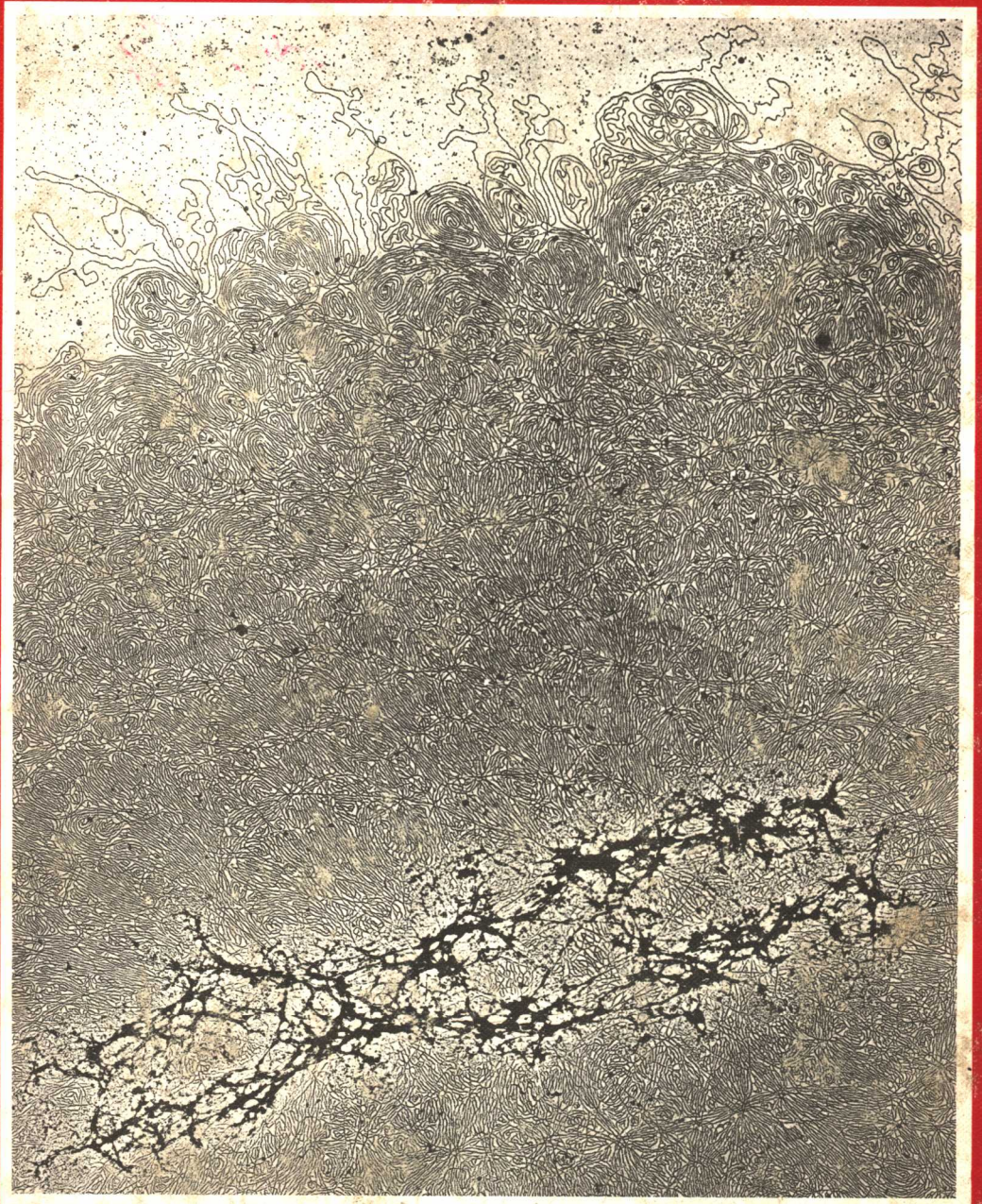


# Cell and Molecular Biology

De Robertis & De Robertis



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Seventh Edition

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Listed here is the latest translated edition of this book together with the language of the translation and publisher.

Portuguese (*1st Edition*)—El Ateneo, Buenos Aires, Argentina

French (*1st Edition*)—University of Laval, Quebec, Canada

Hungarian (*2nd Edition*)—Akademiai Kiado, Budapest, Hungary

Italian (*2nd Edition*)—Editore Nicola Zannichelli,  
Bologna, Italy

Japanese (*2nd Edition*)—Asakura, Tokyo, Japan

Polish (*2nd Edition*)—Panstwowe Wydawnictwo, Naukowe  
Warsaw, Poland

There is also a Russian translation, *2nd Edition*.

*cover photo:* Histone-depleted metaphase chromosome from a human HeLa cell. A scaffold or core, having the shape characteristic of a metaphase chromosome, is surrounded by a halo of DNA. The halo consists of many loops of DNA, each anchored in the scaffold at its base; most of the DNA exists in loops at least 10-30  $\mu\text{m}$  long. (From J. R. Paulson and U. K. Laemmli, *Cell* 12:817-828, 1977, Copyright © M.I.T.)

Cell and Molecular Biology

ISBN 0-03-056749-1

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0 1 2 3 074 9 8 7 6 5 4

This edition is a tribute to the memory of Prof. Francisco A. Saez, our former co-author, who passed away in 1975. He was a great scientist and a master who contributed with unfailing dedication to the development of cytogenetics throughout the Latin-American countries. It is most unfortunate that he is no longer with us to continue in the wonderful experience of writing about discoveries in cell and molecular biology.

# PREFACE

Biological life has an immense variety of forms that arose by the process of evolution, but all living organisms share a master plan of structural and functional organization. This book is about the building blocks—*cells* and *molecules*—that constitute the unity of the living world.

Progress in our field of science has been so rapid that during the lifetime of this book, first published in 1946, we have witnessed the most revolutionary discoveries, such as those involving the ultrastructure and macromolecular organization of cell components and the molecular basis of the genetic code and gene expression. This tremendous progress necessitated making extensive revisions every five years and changing the original title, *General Cytology*, to *Cell Biology* in 1965 and to *Cell and Molecular Biology* in the present edition. This text has been entirely rewritten and should be considered a new book rather than a new edition.

The present title reflects the fact that molecular biology, which deals with the fundamental roles of nucleic acids and proteins, cannot be separated from cell biology, which deals with the cell as the structural and functional unit of life. In this edition we have attempted to integrate the most recent advances in molecular biology with our knowledge of the structure and function of cells, while taking into account the work of classical cytologists—often forgotten these days—which laid the foundations of our understanding of the living cell.

E. De Robertis  
E. M. De Robertis, Jr.  
Sept. 1979

# ACKNOWLEDGMENTS

We have been stimulated in our task by the good reception that previous editions have received in their Spanish, Portuguese, Italian, French, Hungarian, Polish, Russian, and Japanese translations. We want especially to thank Professors A. Bajer, E. Carlson, G. A. O'Donovan, S. Gerbi, L. J. Kleinsmith, H. Masover, G. E. Palade, B. Strauss, and other reviewers who wish to remain anonymous. All of them, through their suggestions and criticisms of various editions, have greatly contributed to the improvement of this book.

Among the illustrations, we have included the original micrographs and designs of many experiments that led to major discoveries in cell biology. It is fortunate that the organization of the cell can now be visualized even at the macromolecular level. We hope that these experiments will help the students to recognize the way in which scientific progress is made. We especially wish to express our gratitude to our colleagues who have contributed to the illustrations of this edition:

K. Akert, J. M. Anderson, P. A. Armond, C. J. Arntzen, G. F. Bahr, A. D. Bangham, W. Barnes, B. Barrell, E. K. F. Bautz, H. Beevers, G. Bennett, M. L. Birnstiel, G. Blobel, B. R. Brinkley, R. J. Britten, H. G. Callan, S. J. Chan, S. Cohen, D. P. Costello, A. C. Cuello, S. De Petris, J. T. Finch, W. W. Franke, A. Globus, R. D. Goldman, E. González, R. G. Goss, P. Greengard, U. Groeschel-Stewart, J. B. Gurdon, M. D. Hatch, J. Herkovits, F. Hucho, H. Huxley, J. D. Jamieson, M. Jamrich, J. Kezer, D. E. Kohne, G. Kreibich, U. K. Laemmli, S. Latt, R. A. Laskey, C. P. Leblond, P. Leder, R. C. Lewandowski, J. R. McIntosh, V. A. Mc Kusick, O. L. Miller, Jr., C. Milstein, H. H. Mollenhauer, D. J. Morré, J. A. Nathanson, E. Neher, G. L. Nicolson, T. W. O'Brien, Y. Okada, A. L. Olins, M. Osborn, M. P. Osborn, G. E. Palade, B. Pearse, J. Pecci Saavedra, A. Pellegrino de Iraldi, D. J. Pitts, K. R. Porter, D. M. Prescott, E. Racker, M. C. Raff, S. W. Rasmussen, N. R. Ringertz, D. Röhme, D. D. Sabatini, O. Sanchez, R. E. Savage, U. Scheer, W. Schiebler, J. B. Schvartzman, L. A. Staehelin, T. L. Steck, D. F. Steiner, E. F. Stevens, D. L. Taylor, J. O. Thomas, H. Thoenen, P. N. Uwin, L. Van Deenen, K. Weber, A. Worcel, J. J. Yunis.

Mr. Robert Lakemacher and all the staff of W. B. Saunders Company have contributed immensely to improving the presentation of this textbook. We are particularly happy with the work of the Art Department.

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## Part 5

## THE NUCLEUS AND CHROMOSOMES

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