

Advances in General and Cellular Pharmacology

VOLUME 1

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Advances in General and Cellular Pharmacology

VOLUME 1

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PLENUM PRESS · NEW YORK AND LONDON

Library of Congress Cataloging in Publication Data

Main entry under title:

Advances in general and cellular pharmacology.

Includes bibliographies and index.

1. Pharmacology. 2. Cells, Effect of drugs on. I. Narahashi, Toshio. II. Bianchi, Carmine Paul, 1927- [DNLM: 1. Pharmacology-Periodicals. 2. Cells-Drug effects-Periodicals. W1 AD612]

RM300.A38 1975 615'.1 75-38640

ISBN-13: 978-1-4615-8200-7

e-ISBN-13: 978-1-4615-8198-7

DOI: 10.1007/978-1-4615-8198-7

©1976 Plenum Press, New York

Softcover reprint of the hardcover 1st edition 1976

A Division of Plenum Publishing Corporation

227 West 17th Street, New York, N.Y. 10011

United Kingdom edition published by Plenum Press, London

A Division of Plenum Publishing Company, Ltd.

Davis House (4th Floor), 8 Scrubs Lane, Harlesden, London, NW10 6SE, England

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Preface

Knowledge of the mechanism of action of drugs at cellular, subcellular, or molecular levels is of vital importance not only in giving the basis of interpretation of the systemic action of drugs but also in improving existing drugs; in designing new forms of drugs; and in giving the basis of therapeutic applications. Classical pharmacology, concerning the action of drugs at integrated levels, does not necessarily give sufficient information as to the mechanism of action of drugs. A variety of sophisticated concepts utilizing the methods of physics, chemistry, biophysics, biochemistry, and physiology must be synthesized to understand the mechanism of action. Only since the last decade, however, have these techniques been fully applied to pharmacological investigations. It is of utmost importance to realize that a new dimension of pharmacological research has indeed emerged as a result of such a multidisciplinary approach; this approach is encompassed in general and cellular pharmacology.

Such recent studies of drug actions have led to a number of important findings. Certain chemicals and drugs were found to possess highly specific actions on cellular functions, so that they are widely being used as powerful tools for the study of a variety of physiological and pharmacological problems. Our knowledge of the cellular mechanisms of drug action has provided the basis for interpreting the systemic effects of the drugs and insight into the molecular mechanism involved.

For example, the puffer fish poison tetrodotoxin was shown to cause a highly specific inhibition of the sodium conductance increase in nerve membranes, thereby blocking impulse conduction. This stimulated research along this line and led to important contributions as to the mechanism of action of some other neuroactive toxins or agents such as batrachotoxin and local anesthetics. Applications of intracellular microelectrode techniques

to cardiac pharmacology have unveiled a variety of important features concerning the mode of action of antiarrhythmic and other cardiac drugs. Recent developments and applications of biochemical and physiological techniques have made it possible to clarify the nature of cholinergic and adrenergic receptors in the postsynaptic membranes, a contribution with an immense pharmacological impact and importance.

General and cellular pharmacology is a multidisciplinary field requiring integration of many fields of knowledge at a high level to achieve an appropriate understanding of drug action. It has developed rather recently and will continue to be a fertile field where a number of challenging accomplishments are expected to be made in the coming years. General and cellular pharmacology represents a modern-day approach to the mechanism of cellular drug action and provides a virgin field for many stimulating achievements in the future.

This new series of books, *Advances in General and Cellular Pharmacology*, is intended to provide a forum for this field. Each expert is to contribute an in-depth review on his own field from his own point of view. Therefore, one should not expect comprehensive review articles from this series of books, but to find newer approaches and techniques with solid theoretical and experimental bases.

Toshio Narahashi
C. Paul Bianchi

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