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BOOK REVIEWS

Receptor Biochemistry. A Practical Approach. Edited by E. C. HULME. The Practical Approach Series. Series Editors: D. RICKWOOD and B. D. HAMES. Published October 1990 by Oxford University Press, New York. ISBN: 0-19-963092-5. No. of pages: 326. Price at March 1991: US $83.00.

Structural studies on cell–surface receptors of pharmacological importance have made great strides in recent years. To a considerable extent, this has resulted from the application of the powerful and universal techniques of DNA cloning to the study of these scarce and difficult molecules. As a result, the amino-acid sequences of a large and increasing number of cell–surface receptors have been, and are being determined.

An important outcome has been to emphasize the evolutionary and structural similarities that exist at the sequence level within the various classes of cell–surface hormone, neurotransmitter, and growth factor receptors, to the extent that certain broad categories of structural generalization are now probably acceptable on the basis of sequence data alone. A related advance has been the application of techniques of site-directed mutagenesis, and the construction of chimeric receptors. These have been at their most powerful when they have, in effect, involved the swapping of whole domains between related receptors with different functional properties, and have enabled an outline to be inked in of those parts of specific receptor sequences that are probably involved in effector functions, or interactions of various kinds.

This volume covers the following main topics:

—Solubilization, purification, and molecular characterization of receptors: principles and strategy.
—Purification and molecular characterization of muscarinic acetylcholine receptors.
—Dopamine receptors: isolation and molecular characterization.
—Opioid receptors.
—Photoaffinity labelling and purification of the β-adrenergic receptor.
—α_2-Adrenergic receptor purification.
—Purification of nicotinic acetylcholine receptors.
—Purification and molecular characterization of the γ-aminobutyric acid$_A$ receptor.
—Purification of the epidermal growth factor receptor from A431 cells.
—Peptide mapping and the generation and isolation of sequenceable peptides from receptors.
—Expression of receptor genes in cultured cells.
—Structural deductions from receptor sequences.
—Appendix. Receptor-binding studies, a brief outline.

This volume would be very useful for biologists, molecular biologists, biochemists, pharmacologists, endocrinologists, biophysicists, as well as advanced students and researchers.

Receptor–Effector Coupling. A Practical Approach. Edited by E. C. HULME. The Practical Approach Series. Series Editors: D. RICKWOOD and B. D. HAMES. Published November 1990 by Oxford University Press, New York. ISBN: 0-19-963094-1. No. of pages: 224. Price at May 1991: US $70.00.

The majority of receptors mediating transmembrane signalling can be classified into three structural and functional categories or groups as follows:

(1) Receptors with a single transmembrane segment joining an extracellular ligand binding domain to a cytoplasmic domain. The latter usually has catalytic activity, most often tyrosine kinase, although there are several important exceptions.
(2) Receptors which are oligomeric in structure, with each subunit composed of a polypeptide chain having several transmembrane segments. The oligomer bears ligand-binding sites in the extracellular domain, and encompasses a ligand-gated ion channel of defined ionic specificity.
(3) Receptors which are monomeric, each molecule being composed of a single polypeptide chain thought to traverse the membrane seven times. This forms a helical cluster which contains a ligand-binding site, and, on the cytoplasmic surface, several loops which recognize, bind and activate specific heterotrimeric GTP-binding proteins (G-proteins) in an agonist-dependent manner. The activated GTP-liganded G-proteins then mediate a wide variety of events, both at the cell surface by opening specific ion channels, and within the cell by activating enzymes which produce or break down second messengers such as cyclic AMP, inositol triphosphate, diacyl glycerol, and arachidonic acid.

The following main topics are covered in this volume:

—Preparation of G-proteins and their subunits.
—Receptor–G-protein complexes in solution.
—Reconstitution of hormone-sensitive adenylate cyclase and tyrosine kinases.
—Interactions of muscarinic acetylcholine receptors (mAChRs) with G-proteins.
—Polyphosphoinositide turnover.
—Measurement and control of intracellular calcium.
—Molecular pharmacology of ion channels using the patch clamp.
—Phosphate-labelling studies of receptor tyrosine kinases.

This volume would be very useful for biologists, physiologists, molecular biologists, and advanced students.