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Revised August 1988
ACKNOWLEDGMENTS

In Appreciation

The Editorial Board appreciates the help of all who have worked for The FASEB Journal during the last year. Below are the names of those who reviewed manuscripts submitted for publication. The work of such referees in helping maintain the journal's standards of publication and ensuring clear and accurate reporting is indispensable. Our sincere thanks to all of you.

In turn, FASEB is grateful to the members of the Editorial Board who have served and whose names are recorded on the title pages of each issue.

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A comprehensive FJ Calendar is published 4 times a year (January, April, July, and October). Only new listings appear in other months.

JANUARY 1989

FEBRUARY 1989
3-5 Drugs for the '90s, Colony Beach Resort, Longboat Key, Florida, USA. Thelma Bassett, U. of Miami South Campus, 12500 S.W. 152nd St., Miami, FL 33177, USA.

6-7 Public Health Significance of Natural Toxicants in Animal Feeds Symposium, Transpontomac Plaza Conference Center, Alexandria, Virginia, USA. Dr. Val Richard Beasley, Dept. of Veterinary Biosciences, Coll. of Veterinary Med., U. of Illinois, 2001 S. Lincoln Ave., Urbana, IL 61801, USA.

12-16 33rd Annual Meeting of the Biophysical Society, Cincinnati, Ohio, USA. Emily M. Gray, Administrative Director, 9650 Rockville Pike, Bethesda, MD 20814, USA.

13-16 2nd Symposium on Host Regulated Developmental Mechanisms in Vector Arthropods, Best Western Inn, Vero Beach, Florida, USA. Dr. D. Borovsky, Office of Conferences, IFAS, U. of Florida, Bldg. 639, Gainesville, FL 32511, USA.

17-18 Current Status of Future Directions of Immunonconjugates Monoclonal Antibody-Based Imaging and Treatment, Miami, Florida, USA. Div. of Continuing Med. Education, D23-3, U. of Miami, Sch. of Med., P.O. Box 01690, Miami, FL 33101, USA.

MARCH 1989

18-19 36th Annual Conference of the Microcirculatory Society, New Orleans Convention Center, New Orleans, Louisiana, USA. Dr. Roland N. Patman, Dept. of Physiology, Box 551 MCV ST, Med. Coll. of Virginia, Richmond, VA 23298, USA.

20-21 15th Annual Meeting of the American Society of Preventive Oncology, Hyatt Regency, Bethesda, Maryland, USA. Dr. Richard R. Love, American Society of Preventive Oncology, 1300 University Ave.-7C, Madison, WI 53706, USA.

APRIL 1989
3-5 Structure, Molecular Biology and Pathology of Collagen, Hyatt Regency, Bethesda, Maryland, USA. Conference Director, The New York Academy of Sciences, 2 E. 62nd St., New York, NY 10021, USA.


24-26 Chromatographic Separation of Enantiomers, Henry VIII Hotel and Conference Center, St. Louis, Missouri, USA. Dr. Daniel W. Armstrong, Dept. of Chemistry, U. of Missouri-Rolla, Rolla, MO 65401, USA.

MAY 1989
4-12 Tissue Culture in Neurobiology, Saskatchewan, Canada. S. Federoff, Dept. of Anatomy, U. of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0, Canada.


JUNE 1989
11-16 Renal Hemodynamics: Integrative and Cellular Control Mechanisms, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

15-17 Fertility in the Great Apes, Atlanta, Georgia, USA. Dr. Kenneth G. Gould, Yerkes Regional Primate Research Center, Emory U., Atlanta, GA 30322, USA.

18-23 Cellular and Molecular Genetics, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer
JULY 1989

2-7 Ubiquitin, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

2-7 Gastrointestinal Tract: Regulation of Organ/Cellular Functions, FASEB Summer Research Conferences, Copper Mountain, Colorado, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

9-14 Calcium and Cell Function, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

9-14 Genetic Recombination and Genome Rearrangements, FASEB Summer Research Conferences, Copper Mountain, Colorado, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

AUGUST 1989

6-11 The Neurobiology of CNS Injury, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

13-18 Molecular Neurogenetics, FASEB Summer Research Conferences, Saxtons River, Vermont, USA. Dr. Robert W. Krauss, Executive Director, FASEB Summer Conferences, 9650 Rockville Pike, Bethesda, MD 20814, USA.

AUGUST 1990

26-31 First World Congress of Biomechanics, U. of California, San Diego, La Jolla, California, USA. Dr. G. W. Schmid-Schoenbein, AMES - Bioengineering, R-012, U. of California, San Diego, La Jolla, CA 92093, USA.

SEPTEMBER 1990

9-14 10th International Thyroid Congress, Jerusalem, Israel. Secretariat, 10th International Thyroid Congress, P.O. Box 50006, Tel-Aviv, 61500, Israel.

Reviewed by Stephen Zimniak, Department of Biochemistry and Molecular Biology, University of Miami School of Medicine, Miami, Florida 33101, USA

Until recently the mechanism of steroid hormone action was considered one of the established tenets of endocrinology, but that hypothesis is being reevaluated. Since the independent establishment of the "two-step translocation model" by Drs. Jensen and Gorski in the late 1960s, numerous studies have been conducted and interpreted with that model in mind. The stated purpose of this book is to appraise the "current status of steroid hormone receptors, and to capture the controversy as to the actual intracellular localization..." To accomplish this goal, the editor has invited many of the protagonists responsible for the reassessment of steroid hormone action.

The book is divided into two parts. The first (introduced by Dr. Jensen) is concerned with the traditional biochemical methods used to evaluate steroid hormone receptor localization within target cells. In the first chapter, Dr. Jensen comes out in support of the new hypothesis that the nucleus is the primary site for both unoccupied and occupied steroid receptors. On the other hand, he continues to defend the two-step mechanism of steroid hormone action. Rather than a translocation of occupied receptors from cytoplasm to nucleus, the essential event in this process is the temperature-dependent activation of the hormone-receptor complex. Receptor activation after the formation of the hormone-receptor complex has always been an integral part of the mechanism of steroid action and in this regard the original hypothesis is still correct.

Despite Dr. Jensen's introduction, much of the data in chapter 2 is presented as if the cytoplasmic to nuclear translocation was still extant even though the author professed agreement with the revised model. And yet this chapter is an interesting and in-depth presentation of the factors involved with differential steroid responsiveness, including receptor defects, local steroid metabolism, autocrine factors, and secondary receptor sites (i.e., membrane receptors). Both this chapter and a later one introduce the current dilemma in regard to steroid antagonists, which was based on the translocation mechanism, but neither author takes the opportunity to expound on a new hypothesis.

The next two chapters are involved with the interaction of steroid receptors with nuclear components. Both chapters present convincing evidence on the existence of hormone-receptor acceptor sites and their role in steroid hormone action. As a counterpart to these chapters, a chapter discussing the interaction of steroid hormone receptor with DNA should have been included, even though this interaction was covered in an earlier volume of this series (Interaction of Steroid Hormone Receptors with DNA, edited by M. Slsyser, Ellis Horwood, Chichester, 1985, 242 pp.).

After these chapters on nuclear localization of steroid receptors, the heterogeneity of nuclear receptors is discussed in a chapter that emphasizes the cell enucleation technique that Welchons and Gorski first used to localize steroid receptors within cells. The evidence for nuclear localization of steroid receptors is presented, followed by a discussion of the physicochemical properties of steroid receptors.

The last chapter in this section is concerned with the association of steroid hormone receptors with membranes. The distribution, specificity, and characteristics of these receptors are discussed and the biological significance of membrane steroid receptors is advanced.

The second part of the book is devoted to the histochemical localization of receptors for steroid hormones. After Dr. Jensen's eloquent introduction to part I, a similar overview would have been appropriate for this section. Dr. Chamness' chapter (placed in the middle of part II), a critique of cytomechanical localization, would have best served that purpose. Moreover, his in-depth analysis of the use of fluorescent ligands for receptor localization is extraordinary. If he had discussed each method to that extent, his chapter would be a compelling final chapter.

The other chapters in this part of the book are equally informative. The limitations of histochemical methods are discussed and the newer technology used to overcome several of these limitations is also presented. In the chapter on autoradiography, the authors present some of the experiments that were in many ways responsible for the current upheaval in steroid hormone action.

The last two chapters of the book deal with the development and application of antibodies to steroid receptors, specifically those for progestins and estrogens. As is characteristic of this book, recognized authorities in the field have written these chapters and have presented the techniques, validation, and application of the use of antibodies to receptors clearly.

On the whole, this book is well written and informative. It will certainly be of use not only to graduate students, postdoctorals, and endocrine fellows, but also to established scientists entering the receptor field. Each chapter is extremely well referenced and usually introduces a historical perspective before bringing the reader up to date with the current methodology. In many chapters, the techniques are sufficiently outlined so as to reproduce the method without further research and, if the methods are not presented in detail, invariably the pertinent references are given at the end of each chapter. This book would certainly be valuable to scientists who wish to understand the current state of steroid hormone action.


Reviewed by Joseph T. Neary, Departments of Pathology and Biochemistry and Molecular Biology, University of Miami School of Medicine and Veterans Administration Medical Center, Miami, Florida 33125, USA

Since the pioneering work of Guillemin, Schally, and their colleagues in the 60's, astounding advances have been made in the field of neuropeptides. From a purely quantitative point of view, the number of peptides found in the brain far exceeds that of classical transmitters. More importantly, neuropeptide research has led to new concepts in neurobiology. Our notions of neuronal function and chemical transmission have been altered by the findings that both a classical neurotransmitter and a neuropeptide can exist in the same neuron and that release of neuropeptides from sites other than stereotypy synapses can have profound effects on brain function. Moreover, with the availability of high pressure liquid chromatography as well as hybridoma and recombinant DNA technologies, it is no longer necessary to start with hundreds of thousands of tissues to obtain enough purified material to study the structural properties and physiological effects of a peptide on the nervous system. Thus, a review of neuropeptide research strategies is both useful and timely.

A wide range of topics is covered in the 12 chapters: postranslational processing of peptide precursors, antibody production and radioimmunoassays, immunocytochemical localization, peptide release, receptor identi-

Reviewed by Lucie Smith, Department of Biochemistry, Dartmouth Medical School, Hanover, New Hampshire 03756, USA

The introduction to this book states that this is to be part of a two-volume set; the second volume will cover the chemical aspects of cytochromes c. References are made to the second volume throughout the text. To quote the authors, "The two volumes should be seen as a single review." As far as I can tell from conversations with Springer-Verlag, volume 2 has not been published. This is unfortunate, since anyone not already familiar with the structure and chemistry of cytochromes c will have difficulty following much of the discussion.

The first four chapters discuss the location and classification of c-type cytochromes. The classification is a logical one, based on such factors as size, heme content, amino acid chains. But for the chapter to be understandable, a knowledge of cytochrome c structures is essential. A greater exposition of the nature and the variations of the different assay methods would have been most helpful. Perhaps that was also to be part of the second volume.

Chapter 2 covers the participation of cytochromes c in mitochondrial electron-transport reactions. Here there is in-depth coverage of experiments on issues being debated since binding reaction sites and interpretation of kinetics of reaction, ending with a consideration of the probable mechanism of electron transport. A lot of work supporting the different possibilities is quoted, and the authors favor one mechanism. But it is clear that the final answer is not yet in. One problem in all of the experiments quoted is that sometimes the experimental conditions were not the same — particularly when comparing cytochrome c oxidation with its reduction — and this is not always made clear. This chapter will interest researchers who want to know about the nature of reactions of membrane-bound oxidases and reductases with cytochrome c in the respiratory chain system.

Chapter 3 catalogs the distribution of c-type cytochromes in bacteria and in photosynthetic tissues and their participation in oxidation-reduction reactions in chemolitho- and photosynthesis as well as in the bacterial respiratory chain and in nitrate and sulfate respiration. The extensive distribution of cytochromes c in various electron transport processes is impressive. Again, some knowledge of the chemical aspects from a second volume or an equivalent source is essential. This chapter compares reactions involving membrane-bound cytochromes c with those that appear to involve cytochromes c in solution in the periplasmic space of bacteria, a subject of current interest. The significant work on cytochrome c-deficient mutants of microorganisms is not covered.

The last chapter is about biosynthesis of c-cytochromes and its control, a subject with recent and exciting developments and one that gives insight into the whole subject of hemoprotein synthesis, the posttranslational modification of proteins and their intracellular transport.

The most recent references in the bibliography are for 1985, but some 1986-1987 references are included in an appendix and are so indicated in the text.

Along with a volume describing the chemical aspects of cytochromes c, this book would be useful to experimenters needing information about the span of electron transport reactions involving c-type cytochromes. The discussions of the authors of some of the controversial subjects will be interesting to old hands in cytochrome research, but the price is high for this small book.
tated that a comment be made on each article revealed by a computer search of the topic. In some cases, this extends to large tabulations of multiple references for varied phenomena and species, which adds little to the already swollen bibliographies. Fortunately, the majority of the authors avoid this and provide more succinct and critical distillations of their fields without losing the balanced treatment that an effort of this magnitude allows. The coverage is comprehensive to the point of being overwhelming. An excellent balance is generally achieved, however, although topics such as puberty, which encompasses three chapters, may have been overemphasized. There is excellent coverage of gametes and early development, male and female gonads, neuroendocrine aspects, cyclicity, pregnancy, behavioral features, and reproductive endocrinology. The extensive indexing and individual tables of contents for each chapter, as well as the authors’ careful partitioning of subject matter within chapters, guides the reader easily through the information. Achieving consistency in indexing, however, is not always successful; for example, reproductive behavior ascribable to Bruce is indexed, but that from Whitten, found on the same page, is not.

The approach is predominantly physiological, although the perspective also reflects the strong influence of anatomy, biochemistry, molecular biology, and clinical medicine on this discipline. Discussions range from morphological and functional aspects of particular reproductive systems, to properties of hormones and regulatory factors, to delineation of peptide sequences, and to descriptions of reproductive behaviors. Although the title is broader, the scope is limited to mammalian reproduction, as indicated by the stated goal. The material is predominantly from research on animals, but includes consideration of information from human studies as appropriate.

The volumes are obviously intended for the knowledgeable professional or advanced student as a reference source, and not as a textbook or collection of casual reviews. An outstanding blend of basic information with recent advances, well suited to this intent, is achieved. However, the quality and quantity of illustrations are highly variable. It seems as likely that a time-worn representation of the hormones of the menstrual cycle will be found as a thoughtful diagram combining new and old hypotheses or pathways.

A major strength of this work is the quality of the contributing authors: nearly all are acknowledged participating experts. Because of this, many chapters contain valuable insights and comparisons of primary observations cited in the general literature. The goal of a scholarly treatise is thus convincingly accomplished. Although this work cannot be characterized as concise, it could displace several shelves of individual texts. Thus, coupled with the superior treatment of reproductive physiology, justifies the purchase of these volumes at the expense of other specialized texts, even if only a few topics are of immediate interest. The strength of this contribution is reflected in a statement in the foreword by Roy O. Greep: “The expertise that is represented by the numerous contributors to this work is so impressive that I am humbled even to contemplate adding anything of note.”


Reviewed by Eli A. Friedman, Department of Medicine, SUNY Health Science Center at Brooklyn, New York 11203, USA

Successful application of mechanical devices to sustain life upon failure of a vital organ system began with Willem J. Kolff’s design, fabrication, and testing of an artificial kidney. Laboring under the adversity imposed by the German occupation of Holland in 1943, Kolff built a rotating wooden drum on which sausage casing containing blood was exposed to a saline and potassium containing solution (dialysate). Treatment for several hours permitted extraction of sufficient urea and other solutes to wake the patient from uremic coma, which if acute and reversible, meant recovery. Kolff emigrated to the United States at the end of World War II where his extraordinary drive and undaunted vision was the major force behind the establishment of departments devoted to artificial kidneys and hearts in the 1960s. Kolff’s important observation that blood turned red during its passage through the artificial kidney was the spark that promoted the concept of a membrane artificial lung now used in cardiac bypass devices in every major surgery department. At the Cleveland Clinic and later the Artificial Organ Institute at the University of Utah, Kolff gathered a team devoted to improvement in hemodialyzers (as the artificial kidney’s membrane core came to be called), heart-lung machines, and completely bionic hearts.

Modified Kolff artificial kidneys served as the nidus for genesis of renal care departments in Boston, Cleveland, New York, Montreal, Lund, and Paris. During the Korean war, the artificial kidney permitted salvage of severely traumatized soldiers (as depicted in an episode of MASH). Once hemodialysis was shown to be able to permit recovery from acute renal failure, there followed: 1) the derivative development by Belding Scribner, at the University of Washington, of chronic (maintenance) intermittent hemodialysis, which now is applied to 250,000 patients worldwide, and 2) cadaver kidney transplantation for more than 8000
individuals annually. No factor was more responsible for the birth of Nephrology as a speciality than the growing success in keeping the ravages of chronic uremia at bay.

Rather than preside over a continuing celebration of past accomplishments, Kolff chose to force the future of what is now termed bionics. In Kolff’s laboratory the first implantable artificial heart was developed and implanted. Kolff’s associates are perfecting a completely implantable artificial heart. Other associates of Kolff strive to replace lost sight and hearing. The march toward a device to substitute for missing cell function in diabetes is also based in part on experiments by workers supported by Kolff.

*Artificial Organs* recounts much but not all of the Kolff Story. A sampling of chapters connected mainly by their authors’ association with Kolff recount birth of artificial organs, present state of the artificial heart, studies of membrane plasmapheresis, and isolation of xenogeneic islets of Langerhans for human transplantation. Bionic eyes and ears are discussed in the context of substitution for disrupted neurons. The effect on ethical values of spare parts medicine is also considered.

As for Kolff’s present writings, he proffers two marvelous chapters: “Obscure Projects,” the recounting of things that might have been, and “The Future of Artificial Organs and of Us All,” in which the growing risk of nuclear annihilation is weighed in the hope that by speaking out those who have seen the ghost of Christmas future may, like Scrooge, be able to alter a not inevitable fatal outcome.

Everyone immersed in research in or use of bionic devices would benefit from reading *Artificial Organs*. Kolff is a giant whose contributions have changed medicine for the good. His friends, students, and disciples are in faculties from Asia to South America. This text is one of the last that can be written about organ substitution without constant reference to molecular events, recombinant DNA technology, and cellular modification. All that Kolff needed to make a dream come true were heparin, cellophane, salt, and hard work.


Four FASEB members win Nobel Prize. Three members of FASEB societies were awarded the 1988 Nobel Prize in Medicine for helping develop drugs to fight AIDS, herpes, leukemia, malaria, heart disease, and stomach ulcers.

Gertrude B. Elion, M. S., 70, a retired member of both ASBMB and ASPET, and George H. Hitchings, Ph.D., D.Sc., 83, a retired member of ASBMB, began collaborating in 1944 at the Burroughs Wellcome Company. Drs. Hitchings and Elion are now scientists emeritus at the Wellcome Research Laboratories in North Carolina. Both have worked on drugs to battle cancers, and have been credited for helping pave the way for the development of AZT.

The third Nobel Prize winner was Sir James Black, FRS and FRCP, an honorary member of ASPET and professor of an analytical pharmacology unit at the Kings College School of Medicine in England. His work on the interactions between receptors on cells and the chemicals that attach to them led to the development of drugs for treating heart disease and peptic ulcers.

Robert Huber, an honorary member of ASBMB, shared the Prize in Chemistry with Johann Deisenhofer and Hartmut Michel for being "the first to succeed in unraveling the full details of how a membrane-bound protein is built up, revealing the structure of the molecule atom by atom." Dr. Huber is managing director of the Max Planck Institute for Biochemistry in Martinsried, West Germany. Each recipient will receive a $130,000 cash award.

Follow-up: LSRO completes study on estimating exposure to substances in the food supply. The Life Sciences Research Office has completed a report entitled "Estimation of Exposure to Substances in the Food Supply." The report, prepared for the Food and Drug Administration, is based on discussions of an ad hoc panel that explored issues and approaches involved in estimating human exposure to substances in the diet and focused on 1) issues of importance for making exposure estimates for various types of substances in foods, target populations, and timespans and 2) approaches that can be used with extant databases to estimate exposure. Estimation procedures were addressed by a process of disaggregation (examination of particular sources of variation). A statistical model that identified sources of variation in estimates of the 90th centile of usual intake was developed to describe an estimate for a single time point. Possible approaches were discussed for using existing databases to forecast human exposure to substances in the food supply.

The report is available for $20.00 (prepaid) from the FASEB Special Publications Office, 9650 Rockville Pike, Bethesda, MD 20814. (Maryland residents please add 5% sales tax.)

The American Society for Cell Biology
and
The American Society for Biochemistry and Molecular Biology
Joint Meeting

The American Society for Cell Biology (ASCB) and the American Society for Biochemistry and Molecular Biology (ASBMB) will hold a joint meeting at the Moscone Convention Center in San Francisco, January 29–February 2, 1989. The morning and afternoon symposia and poster presentations will encompass the broad interests shared by both societies. The program appears below; for more detailed information, call the ASCB (301-530-7153) or the ASBMB (301-530-7145) or write to either Society at 9650 Rockville Pike, Bethesda, MD 20814, USA.

Morning Symposia

Protein Folding
Organizer: B. W. Matthews
Speakers: F. M. Richards, R. Sauer, and B. W. Matthews

Post-Transcriptional Mechanisms of Gene Regulation
Organizer: D. W. Cleveland

Speakers: A. Hinnebusch and C. Higgins

Iron-Coupled Transport
Organizer: H. R. Kaback
Speakers: H. R. Kaback, P. J. Henderson, E. M. Wright, and P. Maloney

Molecular Dynamics in Biology
Organizer: T. D. Pollars
Speakers: M. Levin, R. Sharon, G. Eisenman, and H. E. Huxley

Protein Targeting and Membrane Traffic in Cell-Free Systems
Organizer: S. R. Pfeffer

Animal Development from Eggs to Embryo
Organizer: D. A. Melton
Speakers: D. A. Melton, J. D. McGhee, and G. Struhl

In Vitro Models of Cell Differentiation
Organizer: E. V. Fuchs
Speakers, E. V. Fuchs, B. M. Spigelman, H. Weintraub, and E. V. Fuchs

Mitosis: Genetic and Structural Analysis
Organizer: W. C. Earnshaw
Speakers: G. G. Borisy, W. C. Earnshaw, and P. Nurse

Molecular Genetics of Neuronal Development in Insects
Organizer: C. S. Goodman
Speakers: G. Rubin, C. S. Goodman, and Y. N. Jan

Catalytic Antibodies
Organizer: R. A. Lerner
Speakers: R. A. Lerner, S. Bankovic, D. Hilvert, and P. G. Schultz

Mechanisms of Sex Determination
Organizer: B. Baker
Speakers: D. Page, J. Kimble, and B. Baker

DNA-Protein Interaction
Organizer: C. O. Pabo
Speakers: C. Pabo, J. M. Berg, and P. B. Sigler
Cell Interactions with Extracellular Matrix
Organizer: K. M. Yamada
Speakers: R. O. Hynes, K. M. Yamada, and B. de Crombrugghe

Transcription and Transcription Factors
Organizer: R. Tjian
Speakers: S. Jackson, R. Roeder, P. J. Godowski, and L. Guarente

Cell and Molecular Approaches to Memory
Organizer: E. Kandel

Afternoon Symposia
Protein Translocation Across Membranes
Protein Radical Involvement in Biological Catalysis
Molecular Motors
Inhibition of Gene Function in Higher Eukaryotes
Growth Factor Receptors
Glycosyl Transferases: Structure and Function
RNA Splicing/Processing
Structure, Function, and Modulation of Voltage-Sensitive Ion Channels

X-Ray and Site-Directed Mutagenesis Studies of Pyridoxyl and Pyruvoyl Enzymes
Protein Phosphorylation
DNA Replication
Chromosome Structure and Function
Actin Binding Proteins
Extracellular Matrix
Signaling in Early Development
Protein Structure
Endocytosis
Chromatin Structure of Active Genes
Enzyme Mechanisms: Novel Cofactors and Active Site Structures
Mitosis
Protein Kinase C
Calcium and Signaling
Growth and Differentiation Factors
Cell Polarity
DNA Repair
New Approaches to Genetic Analysis of the Mouse
Drug-Induced DNA Degradation
Dynamic Aspects and Differential Expression of Intermediate Filaments
Nuclear Transport
Basement Membranes
Cell Cycle
Growth of Axons and Myelin

Plenary Lectures
Lipmann Lecture
Small Ribonucleoproteins: Building Blocks of Nuclear Functions
Lecturer: J. A. Steitz, Yale University

Signal Transduction and Transformation
Lecturer: M. E. Wigler, Cold Spring Harbor Laboratory

Nuclear Receptors as Inducible Enhancers
Lecturer: P. Chambon, Institute de Chimie Biologique, Strasbourg

Inositol Lipids and Calcium Signaling
Lecturer: M. Berridge, University of Cambridge, UK

ASBMB-Merck Lecture
Neutralization of Small RNA Viruses by Antibodies and Antiviral Agents
Lecturer: M. G. Rossmann, Purdue University

William C. Rose Lecture
A Perspective of the Binding Change Mechanism for ATP Synthesis
Lecturer: P. D. Boyer, University of California, Los Angeles

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