Also in this issue:

- Structural biology of tissue factor
- Short-term control of glucokinase activity
- Immunophilins in protein folding and immunosuppression
- Angiogenesis and colonization in the tumor metastatic process
- Cytogenetic approaches in human cancer genes
- Cell adhesion molecules in liver function

Tissue Printing

Volume 8, Number 6

April 1, 1994
Take a positive step....
Become a member of the Protein Society

Join 2,800 colleagues who enjoy Society benefits that include....

12 Issues of Protein Science... an emerging, revolutionary monthly publication. Cutting-edge original articles devoted to advancing research on the chemical structure, cellular function, and regulation of diverse proteins are presented. Every issue of the journal includes a Diskette Appendix which greatly facilitates the communication of scientific information with the ability to access the abstracts and references for all papers in the issue, along with coordinates, sequences, and other data. Plus, the complete volumes 1 (1992) and 2 (1993) are available on CD Rom which include the Diskette Appendices, the PIR-International Protein Sequence Database, and the Brookhaven Protein Structure Data Bank.

Apply Today!
The next step is yours!

YES! I want to join the Protein Society for 1994.

[Form fields for name, organization, address, city, state, zip, country, etc.]

CHECK ONE DUFS BOX:  
- Full Member $125  
- Student Member $ 50*
- OPTIONAL Air Mail $ 75
* Students must attach a letter from Department Chair certifying student status.

Maryland residents add 5% sales tax.

CD Rom, Volumes 1 and 2  
- $15.00 U.S.  
- $18.00 Canada/Mexico  
- $22.00 Elsewhere, surface  
- $26.00 Elsewhere, air

TOTAL PAID: $_____

You will receive Mac or MS DOS diskettes.

Send me: □ MAC diskettes  
□ MS DOS diskettes

For more information call 800-99-AMINO

To expedite your order charge and fax. Or mail your charge or check order to:
Do you know what you're missing for only $39?

**THE FASEB JOURNAL**

A library in itself and the #1 review and communication journal covering the whole of biology.

---

**FEATURES**

- Invited reviews
- Innovations in methodology
- Original communications
- Articles covering public affairs
- News items about research funding people, and institutions
- Calendar of Scientific Events
- New Products
- Employment Opportunities
- Hypotheses Section

**PLUS 2 thematic issues—**

- Nutrient-Gene Interactions
- Model Systems for Neurogenesis

**PLUS 3 abstract issues from—**

- Experimental Biology 94
- APS, ASPET, ASP, AAI, AIN/ASCN, AAF
- ASBMB 1994 Annual Meeting

**PLUS the Journal is 100% guaranteed!**

We are so certain of your satisfaction that should you become dissatisfied, you may cancel your subscription at any time and receive a refund for the unused portion.
The Journal of Biological Chemistry

This portable, compact library is published 6 times a year. Each disk contains two months of the JOURNAL on one disk. It can be accessed by PC/Windows™, Apple® Macintosh® and UNIX® computers.

COMPACT DISKS
1992 Disks — $45.00
1993 Disks — $50.00
1994 Disks — $60.00
Non-member subscribers must have a subscription to the printed version. Residents of Canada and Maryland should add applicable sales tax.

To order your Compact Disks please contact:
American Society for Biochemistry and Molecular Biology
9650 Rockville Pike
Bethesda, Maryland 20814-3996
(301) 530-7145
FAX: (301) 571-1824

SYSTEM REQUIREMENTS

IBM™ PC-Compatibles
DynaText™ requires an IBM™ PC or PC-compatible with an 80386SX processor or higher, running DOS 4.1 or higher and Windows™ 3.1 or higher in enhanced mode with virtual memory. A minimum of 2 MB of RAM and 2 MB of free hard-disk space are required. A VGA monitor required as a minimum for use with the Browser. A CD-ROM drive with Microsoft® MSCDEX ver. 2.0 or higher is required.

System Recommendations
In addition to the requirements listed above, 4 MB of RAM is suggested. A Super VGA driver (256 colors), and 800 x 600 resolution provides more display area in the Browser.

Macintosh®
DynaText™ for the Macintosh® requires 4MB of RAM, and 2MB hard disk space. A Macintosh® compatible CD-ROM drive with Foreign File Access installed is required. System 7 or higher and Color Quickdraw required. A color display (256 colors), and 800 x 600 resolution that provides more display area, is highly suggested.

UNIX®
Unix® workstations running Motif® and X11R4 or X11R5, including: Sparc™, running SunOS 4.1.x (also under Open Windows™ 3.0); HP® 9000 Series 700-800, running HP®/UX™ 8.0; SG® running IRIS® 4.0.x; DECstation, running ULTRIX 4.2.x; ISO-9660 compatible CD-ROM drive.
State-of-the-Art Reviews in the May issue of The FASEB Journal

State-of-the-Art Reviews

The reverse transcriptase of HIV-1: from enzymology to therapeutic intervention. L. Tarragó-Litvak, M-L. Andreole, G.A. Nevinsky, L. Sanit-Cottin and S. Litvak

Intracerebral transplantation: basic and clinical applications to the neonate. L. J. Fisher and F. H. Gage

Pharmacological regulation of AP-1 transcription factor DNA binding activity. K. R. Pannbacker

Obesity, diabetes, and neoplasia in yellow AY'/'rice: ectropic expression of the agouti gene. T. T. Yen, A. M. Gill, L. G. Frigeri

Molecular properties of epithelial, amiloride-blockable Na+ channels. H. Garty

State-of-the-Art Reviews

Peptide secretion: what do we know? A. J. Bean, X. Zhang and T. Horkof

Cell surface downmodulation of CD4 following infection of HIV-1. R. Galezizues, S. Bour, and M. A. Weinberg

Iron nutrition in elderly individuals. M. A. Johnson, J. G. Fischer, B. A. Bowman, and E. W. Gunter

Evolving concepts in molecular pathology. C. A. Kappel, C. J. Bieberich, and G. Jay

Mechanisms of methylmercury-induced neurotoxicity. W. D. Atchison and M. F. Hare

T Cell energy. J. M. LaSalle and D. A. Hafer

Articles in Press

Serial Review


State-of-the-Art Reviews

Cover: Physical print on a dry film of Sobu glue of the upper surface of Portulaccia (purslane) leaf. See Verrier and Ye, pages 378-384.

Designed to report on rapidly changing developments in biological sciences, The FASEB Journal publishes brief, definitive, original research communications and state-of-the-art reviews, as well as editorials, letters, a book list, news items, calendar, public affairs, and employment opportunities. The views expressed in articles are those of the authors and not necessarily those of the Federation. All manuscripts are subject to review and approval by the Editors before publication. Copyright © 1994 by the Federation of American Societies for Experimental Biology. Printed at Lancaster Press, Lancaster, Pennsylvania.

All rights reserved. Requests for any reproduction of copyrighted material except the first page of a regular article should be made in writing to the Executive Editor, The FASEB Journal, 9650 Rockville Pike, Bethesda, MD 20814-3998, USA, and should include an explicit statement of intended use and detailed specification of the material to be reproduced. Telephone 301-530-7000.

COPYRIGHT: An individual may make a single copy of an article for personal use. The code at the bottom of the first page of an article indicates the copyright owner's consent that additional copies of the article may be made provided that the stated fee is paid through the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970.

Original communications or proposals for reviews, prepared as described in the Information for Authors (see volume 8, no. 1), should be sent to the Editor-in-Chief. Dr. W. J. Whelan, The FASEB Journal, MC23, PG. Box 06929, Miami, FL 33101-0692, USA, or if a private courier is used, to the University of Miami School of Medicine, Gautier Building, Room 307, 1101 W. 15th Street, Miami, FL 33136-1019, USA.

Subscription price US$ and its possessions: members of Corporate Societies $39 per year; nonmembers (personal) $495 per year; institutional $1275 per year; Student $39 per year with certification. Mexico/Canada add $20 postage; other foreign add $48 (expedited delivery). All subscriptions entered on a calendar-year basis only and payable in advance. Single issues, except Abstracts issues, $22. Subscriptions and orders should be sent to The FASEB Journal, Subscription Department, 9650 Rockville Pike, Bethesda, MD 20814-3998, USA; 301-530-7027, In Japan, contact USACO Corp., 13-12 Shinbashii 1-Chome, Minato-Ku, Tokyo, 105 Japan; tel. J38274; fax 03-383-2709.

EXECUTIVE EDITOR
Linda L. Acuff, 301-530-7107
fax 301-571-1855

ASSISTANT EXECUTIVE EDITOR
Sandra W. Jacobson, 301-530-7104

COPY EDITOR
Kendall Steele, 301-530-7102

ASSISTANT TO EDITOR-IN-CHIEF
Carmen Martinez, 301-530-7206
fax 301-530-7695

DIRECTOR OF MARKETING
Linda L. Acuff, 301-530-7107
fax 301-571-1855

MANAGING EDITOR
Lee Fisher, 301-530-7028
fax 301-530-7001

COMPTROLLER
John R. Rice, 301-530-7096
fax 301-530-7001

EMPLOYMENT OPPORTUNITIES
Thomas Trudue, Manager
FASEB Placement Service
301-530-7200
fax 301-530-7001

FASEB MAILING ADDRESS:
9650 Rockville Pike
Bethesda, MD 20814-3998, USA

EDITORIAL BOARD
Karen Berg
University of Oslo
Robert M. Berne
University of Virginia School of Medicine
Pierri Chambon
Institut de Chimie Biologique
Gwen V. Childs
U of Texas Medical Branch
Brian F. C. Clark
Aarhus University
Walter Colli
Universidade de Sao Paulo
Robert J. Cousins
University of Florida
Thomas S. Edgington
The Scripps Research Institute
Ray W. Fuller
Lilly Research Laboratories
John W. Fundor
Baker Medical Research Institute
Michael W. Gray
Dohouus University
Paul Greengard
Rockefeller University
Wayne A. Hendrickson
Columbia University
Sarah Hitchcock-DeGregori
Robert Wood Johnson
Medical School
Ann L. Hubbard
Johns Hopkins School of Medicine
Bernard Jeanrenaud
Université de Genève
Thomas J. Klindt
National Institutes of Allergies and Infectious Diseases
Tadamitsu Kishimoto
Osaka University Medical School
George Klein
Karolinska Institutet
Hans L. Kornberg
University of Cambridge
Byron G. Lane
University of Toronto
Kathryn F. LeNeoue
Harley Medical Center
Charles P. Leblond
McGill University
Edward H. Leitew
The Jackson Laboratory

Members of FASEB Societies are invited to apply for the Visiting Scientists Program for Minority Institutions. The program is funded by the National Institute of General Medical Sciences (NIGMS), National Institutes of Health, as a part of the Minority Access to Research Careers (MARC) Program.

The program goal is to provide minority institutions an opportunity to strengthen their research and teaching capabilities by drawing upon the talents of outstanding scientists from other institutions.

**Visiting Scientists Will...**

- Spend 2 to 5 days at minority institutions
- Provide host institutions with advice on research, curriculum and graduate opportunities
- Deliver lectures and seminars
- Assist in the preparation of grant proposals
- Have travel, per diem, and expenses paid

**Volunteering is Rewarding**

- Represent your institution and Society
- Share your knowledge with undergraduate students, specifically minority students
- Establish communication channels between institutions
- Contribute to the advancement of research and science

**Volunteer Today!**

- Complete and return the application provided. Or, for more details contact:

  FASEB  
  Life Sciences Research Office  
  MARC Program  
  9650 Rockville Pike  
  Bethesda, MD 20814-3998  
  Tel: (301) 530-7030  
  Fax: (301) 571-1876

Application deadline is June 3, 1994
VISITING SCIENTIST
Federation of American Societies for Experimental Biology

VISITING SCIENTISTS FOR MINORITY INSTITUTIONS PROGRAM

Name of Applicant: _____________________________________________

Society Membership(s):  
- APS  
- ASPET  
- AIN  
- ASCB  
- AAA  
- ASBMB  
- ASIP  
- AAI  
- BIOPHY SOC

Applicant's Home Institution: _______________________________________

Business Address: ________________________________________________

Home Address: ___________________________________________________

Telephone:  WORK: (____) ___________________ HOME: (____) __________

Period of Availability: ____________________________________________

Subject Of Lectures:
1) ________________________________________________________________
2) ________________________________________________________________
3) ________________________________________________________________

Experience in Similar Programs:
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

PROFESSIONAL BACKGROUND

Areas of Research and/or Special Interest:
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Teaching Experience:

<table>
<thead>
<tr>
<th>University or College</th>
<th>Department</th>
<th>Subject Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EDUCATIONAL BACKGROUND

<table>
<thead>
<tr>
<th>University or College</th>
<th>Degree</th>
<th>Year</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Honors and Awards: _____________________________________________

APPLICATION
BioBits

Three individual members of FASEB societies have been selected for the fellowship of the Royal Society of London. These are Paul W. Mak (AAI and former member of the Editorial Board of The FASEB Journal), David H. MacLennan (ASMB, AAI), and Julian E. Davies (ASMB).

The Federation Board elected Ralph A. Bradshaw (ASMB, ASCB) vice president of FASEB, effective July 1, 1994. As such, he will be president of FASEB next year.

Bradshaw is a professor in the Department of Biological Chemistry at the University of California, Irvine. He has concentrated his research on structure-function relationships in proteins and enzymes and on polypeptide growth factors and their receptors. He is a fellow of the American Association for the Advancement of Science and a member of the American Chemical Society and the New York Academy of Sciences, among others.

Effective January 10, 1994, The Scientist, published by the Institute of Scientific Information, is being provided free of charge to members of all FASEB Societies except the American Society for Investigative Pathology. Those receiving this complimentary subscription are reminded that for it to continue they should return the postcard that has been sent to them for this purpose.

The American Society for Testing and Materials (ASTM) is inviting papers for a symposium on Validation Practice for Biotechnology Products, which will be held April 24—25, 1995, in Gaithersburg, Md. The symposium will present methods and validation practices used to comply with current Good Manufacturing Practices of the U.S. Food and Drug Administration and innovative approaches and methods for meeting requirements; Submittal forms and additional information are available from Dorothy Savini, Symposia Operations, ASTM, 1916 Race St., Philadelphia, PA 19103-1187, USA; or 215-299-2617. Submission deadline is June 22, 1994.


Recent studies hinting that estrogen replacement therapy may help prevent Alzheimer's disease have caused neuroscientists to express "relief" that the word about the hormone's importance to the health of the human brain will be known, according to an article in The New York Times, March 8, 1994. The neuroscientists are also exploring the mechanisms through which estrogen may protect against Alzheimer's and other types of dementia, the article said.

The family of Robert Wood Johnson IV, great-grandson of the founder of Johnson & Johnson, has given $10 million to the Juvenile Diabetes Foundation International, the largest private gift ever received by this organization for diabetes research. Johnson's 14-year-old daughter became a victim of the disease 6 years ago.

The National Disease Research Interchange (NDRI) provides well-characterized human cells, tissues, and organs through a national network of more than 200 hospitals, eye, ear, and tissue banks, and organ procurement agencies. Since its founding in 1980, the interchange has collected almost 75,000 human tissues and organs to study more than 100 different diseases including cancer, Alzheimer's disease, diabetes, Down's syndrome, Parkinson's disease, hepatitis, and schizophrenia. NDRI-trained professionals are available 24 hours a day to recover specimens for research.

Researchers who want to avail themselves of NDRI's services are required to complete a written application, which is then peer reviewed by the interchange's committee of scientific advisors. NDRI then works with each scientist who may specify donor characteristics, tissue processing methods, types of preservation and media required, and delivery schedules. To receive an application, call 800-222-6374 or fax 215-557-7154.

Office of Technology Assessment (OTA)

OTA concluded in a report that health risk assessment research is itself "at risk" because of inadequate research resources. A 44-page summary of Research on Health Risk Assessment (GPO stock no. 052-003-01360-6) is available free by calling 202-224-8996.

A Background Paper that examines how well the U.S. Global Change Research Program and NASA's Earth Observing System of satellites are fulfilling their scientific objectives concludes that maintaining the relevance of scientific research to the decision-making process over the long term requires effective methods to integrate and communicate research results from diverse disciplines. Copies of Global Change Research and NASA's Earth Observing System (GPO stock no. 052-003-01358-4) are available for $3.25 by calling 202-783-3283.

Another Background Paper discusses the possibility that biopolymers may soon play a role in changing patterns of resource use and waste generation as a result of harnessing the enzymes found in nature or by transforming agricultural or marine feedstocks. Copies of the 92-page report Biopolymers: Making Materials Nature's Way (GPO stock no. 052-003-01352-5) are available for $5.50 by calling 202-783-3283.

In Biological Components of Substance Abuse and Addiction, OTA describes the effects that drugs of abuse exert on the individual and the biological status of the individual taking drugs. It is the first of two documents being published as part of an assessment of Technologies for Understanding the Root Causes of Substance Abuse and Addiction. The second publication will discuss the complex interactions of biochemical, physiological, and sociological factors leading to substance abuse and addiction. Copies of the first Background Paper (GPO stock no. 052-003-01350-9) are available for $4.25 by calling 202-783-3283.
Communications Capsules

The following are capsule summaries of research communications appearing in this issue.

PLASMAMEMBRANE Ca\textsuperscript{2+}-PUMP IN DIFFERENTIATION

Intracellular Ca\textsuperscript{2+} homeostasis is pivotal for many eukaryotic cell functions including growth and differentiation. The calmodulin-dependent plasma membrane ATPase (PMCA) is a specific Ca\textsuperscript{2+}-transporting protein responsible for Ca\textsuperscript{2+} extrusion. A characteristic feature of PMCA is its high enzyme variant diversity. As the function of this diversity is unknown, we investigated whether PMCA isozymes and/or splicing variants occur in a differentiation-specific manner (Harnnes et al., pages 428-435). Our results show that the mRNA expression pattern changes significantly during myogenic and neuronal differentiation. Forced expression of the myogenic differentiation factor myogenin in fibroblasts is sufficient to direct mRNA expression of PMCA variants in a muscle-specific manner. These results suggest that the PMCA variants differ in their functional properties to meet tissue- and developmental-stage-specific requirements for modulation of intracellular Ca\textsuperscript{2+}.

BIDIRECTIONAL REGULATION OF Na\textsuperscript{+}, K\textsuperscript{+}-ATPase activity

Na\textsuperscript{+}, K\textsuperscript{+}-ATPase is a major determinant of electrolyte balance and membrane potential in kidney, brain and other tissues. Consistent with the physiological importance of this enzyme, Aperia et al. (pages 436-439) have obtained evidence that its activity is regulated via a number of signal transduction pathways that control its state of phosphorylation. Some first messengers inhibit Na\textsuperscript{+}, K\textsuperscript{+}-ATPase activity apparently by activation of cAMP-dependent protein kinase or cGMP-dependent protein kinase and phosphorylation of Na\textsuperscript{+}, K\textsuperscript{+}-ATPase. Other first messengers increase Na\textsuperscript{+}, K\textsuperscript{+}-ATPase activity apparently by activating a Ca\textsuperscript{2+}-dependent protein phosphatase (calcineurin). The model provides a molecular basis for the bidirectional regulation of Na\textsuperscript{+}, K\textsuperscript{+}-ATPase activity in various tissues in response to first messengers with opposing physiological actions.

DIABETES AND GENE THERAPY

To study the feasibility of gene therapy for diabetes, transgenic mice expressing the PEPCK/human insulin chimeric gene were generated (Valera et al., pages 440-447). These mice are healthy and normoglycemic and express human insulin in a physiologically regulated manner in the liver. In contrast to control mice, transgenic animals treated with streptozotocin showed a marked decrease in blood glucose levels and a normalization of glucose metabolism in the liver. These findings provide an indication in vivo that gene therapy for diabetes may be possible.

CD4\textsuperscript{+} T CELLS INCREASED BY N-ACETYLGLUCOSAMINE

HIV-infected individuals and SIV-infected macaques have, on the average, decreased cytochrome and glutathione levels. Kinscherf et al. (pages 448-451) determined whether variations of the intracellular glutathione levels are correlated with changes of CD4\textsuperscript{+} T cell numbers in general, i.e., also in the absence of the virus. A study on healthy human subjects now shows 1) that this is the case and 2) that T cell numbers of persons with suboptimal glutathione levels may be increased by oral doses of N-acetylglycine (NAC). The study suggests that treatment of HIV infection with NAC does not necessarily need to aim at reconstituting optimal glutathione levels to improve CD4\textsuperscript{+} T cell numbers. Low numbers of CD4\textsuperscript{+} T cells were seen not only in persons with suboptimal but also with superoptimal glutathione levels.

American Society for Biochemistry and Molecular Biology
85th Annual Meeting
Washington, D.C.
May 21-25, 1994

The following summarizes lectures and symposia topics at ASBMB's Annual Meeting and at its two satellite meetings. The latter begin Friday and Saturday morning, May 20 and 21. These and the numerous poster sessions are detailed in the Program, which will be mailed to pre-registrants in mid-April.

**Satellite Meeting: Structure and Function of Protein Kinases and Phosphatases**

**Lecture**


**Symposia**

Structural features of kinases and phosphatases. Participants: S. Taylor (chair); E. J. Goldsmith; Z. Zhang; M. Overduin; R. A. Harris; D. A. Walsh; A. C. Nairn.

Protein:protein interactions in kinase cascades. Participants: J. Scott (chair); J. Avruch; B. Yashar; C. J. Marshall; T. R. Burke, Jr.; M. Mumbly; D. J. Dietzen.

Mechanisms and specificity of kinases and phosphatases. Participants: A. Newton (chair); D. J. Graves; Z-Y. Zhang; J. A. Adams; D. S. Lawrence; B. Neel; L. C. Cantley.

**Regulatory mechanisms of kinases and phosphatases. Participants:** J. Avruch (chair); H. Piwnica-Worms; D. R. Mar- shak; M. D. Uhler; D. L. Brautigan; A. A. DePaoli-Roach.

**Satellite Meeting: The Cytochromes P450: Structure, Function, Regulation and Genetics**

**Symposia**

Function and regulation of cytochromes P450. Participants: J. Trant and A. Hilde-
bradt (cochairs); R. A. Prough; M. Franklin; J. B. Schenkman; J. Werringloer; M. R. Waterman.

Mammalian enzymes which metabolise endogenous compounds. Participants: T. Matsubara and C. Fisher (cochairs); J. H. Capdevila; Y. Ishimura; J. I. Mason; E. R. Simpson; B. S. S. Masters.

Regulation of expression of cytochromes P450 and regulated genes. Participants: S. Orrenius and R. Kato (cochairs); E. F. Johnson; T. Omura; F. J. Gonzalez; J. P. Whitlock, Jr.; C. B. Pickett.

Structure-function studies on cytochromes P450. Participants: I. C. Gunzalus and R. Kato (cochairs); V. Ulrich; M. J. Coon; M. Negishi; J. A. Peterson.

Annual Meeting

Lectures

Cellular signaling by tyrosine phosphorylation. J. Schlessinger.

The RNA world. Function and regulation of sigma factors in E. coli. C. Gross.


ASBMB-McGraw Award. A trail of research: from lipos acid to multitienzyme complexes. L. J. Reed.

Protein targeting and membrane traffic. Components and mechanisms involved in protein translocation across the ER membrane. T. A. Rapoport.

Schering-Plough Young Investigator Award. Crystal structures of peptide complexes of SH2 domains. J. Kuriyan.


Herbert A. Sober Award. Formation of active aspartate transcarbamylase from incomplete and circularly permuted polypeptide chains. H. K. Schachman.

Symposia

RNA splicing. Participants: C. Guthrie (chair); J. Abelson; D. Rio; A. M. Pyle.

The genome project: mathematical and experimental approaches. Participants: F. Collins (chair); R. Waterston; P. Brown; M. Waterman; P. D. Drew.

Developmental control of the cell cycle. Participants: E. Harlow (chair); T. Orr-Weaver; K. Nasmyth; J. R. Nevin; C. J. Sherr; E. Harlow.

RNA structure at high resolution. Participants: I. Tinoco (chair); A. Pardi; J. R. Williamson; S. R. Holbrook.

Innovative techniques for biomolecular research. Participants: L. H. Ericsson and R. Niece (cochairs); M. F. Bean; K. A. Walsh; P. Matsudaira.


Protein phosphorylation/dephosphorylation: structural basis for protein function. Participants: S. Taylor and J. Dixon (cochairs); J. D. Scott; A. C. Newton; S-H. Kim; M. A. Saper; D. Barford.

Enzymology of DNA replication. Participants: B. Stillman (chair); C. Greider; N. R. Cozzarelli; B. Alberts; I. R. Lehman.

Ribozymes. Participants: N. R. Pace (chair); H. F. Noller; M. D. Been; M. J. Moore; T. Tuschl.

New approaches to college science education. Participants: J. D. Smith (chair); H. B. White III; R. S. Feldberg; W. L. Dills, Jr.

In vitro selection of novel RNA structures. Participants: L. Gold (chair); M. Yarus; A. D. Ellington; S. Wang; J. Wyatt.

Transcriptional machines and chromatin function. Participants: M. Grunstein (chair); G. Felsenfeld; D. K. Hawley; M. E. Dahlman.

The Washington Connection. Technology transfer: government, industry and academic perspectives. Participants: D. Vapnek (organizer); R. Celeste (moderator); D. A. Chamblee; P. Needleman; P. Sharp.

Receptors and their communication with other proteins. Participants: A. J. Pawson (chair); T. Pawson; S. A. Courtneidge; N. K. Tonks; R. J. Lefkowitz; S. E. Shoelson.

Protein folding in vivo and in vitro. Participants: D. Agard (chair); F. U. Harl; A. Helenius; P. S. Kim; D. A. Agard.

Women and minorities in science: successes in industry and academia. Participants: A. Wolfson (chair); S. Malcolm, E. DeLiso; R. Simon.

Vesicular traffic. Participants: S. Schmid (chair); R. Schekman; S. D. Emr; T. F. J. Martin.

Regulatory networks of gene expression. Participants: M. Levine (chair); K. E. O'Shea; M. Gilman; C. Desplan.

The Washington Connection. Science and public policy. Participants: H. K. Schachman (chair); H. Varmus; N. Lane; S. L. Boehlert.

Molecular Motors. Participants: D. Cleveland (chair); J. A. Theriot; T. E. Kreis; R. Vallee.

GTP-binding proteins and signal transduction. Participants: H. Hamm (chair); F. Wittinghofer; M. Sprinzl; R. A. Kahn; P. Wedegaertner; T. L. Z. Jones.

Special Session

Research integrity and the handling of misconduct allegations. Participants: A. R. Price (organizer); O. W. McBride; A. Schechter; H. K. Schachman.

Workshop

Extremozymes: biocatalysis under extraordinary conditions.