AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

9 JULY 1993
VOL. 261 • PAGES 133–264
$6.00

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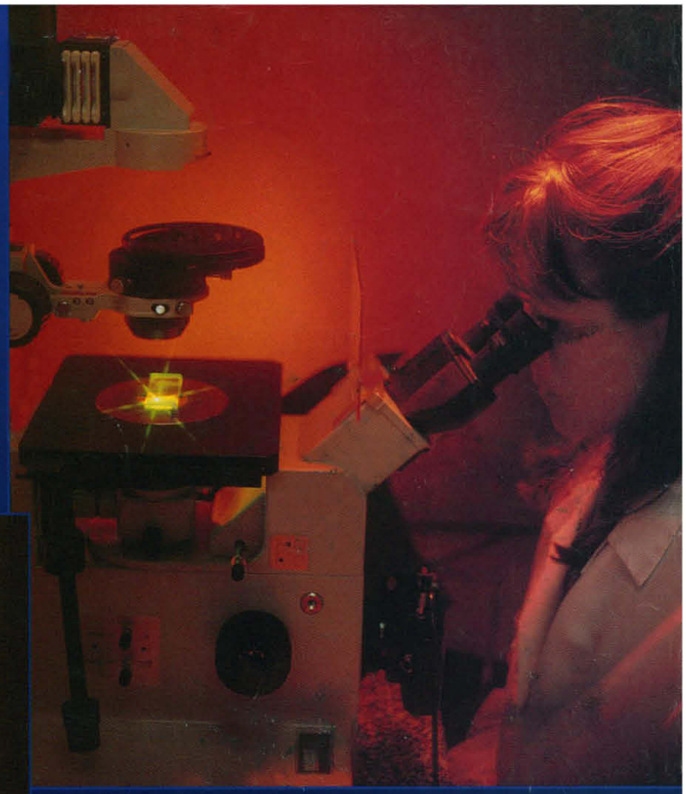
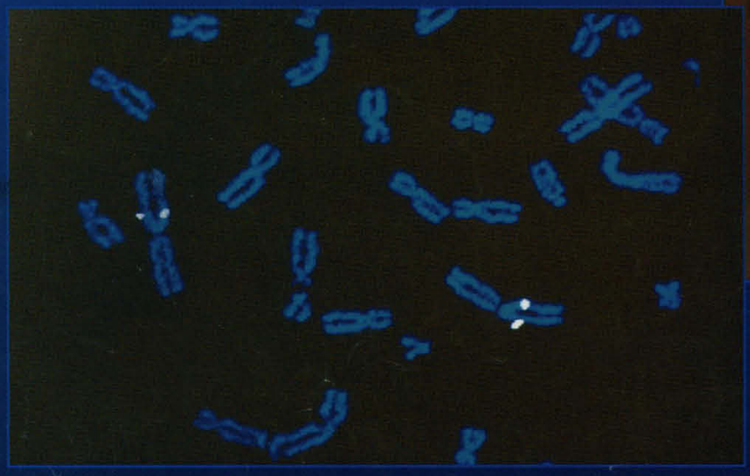
The Conference on New Research Techniques
Meeting at a Glance

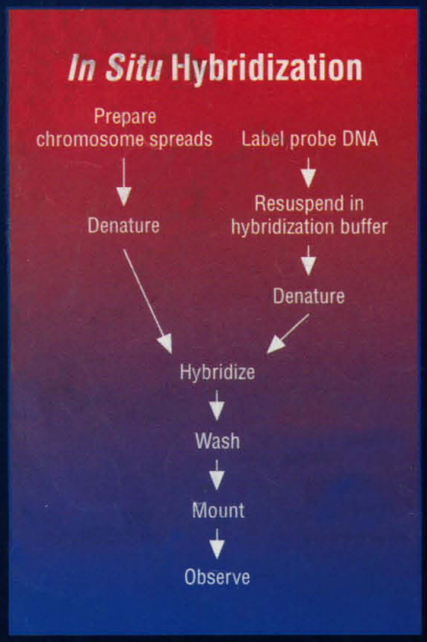
No More Sticky *IN SITU*ations

- Time Saving, Easy Detection
- Low Background
- Single Copy Gene Sensitivity





Enhanced chromosome image reproduced by kind permission of Dr. Licia Selleri and Dr. Glen Evans, Salk Institute, La Jolla, CA.



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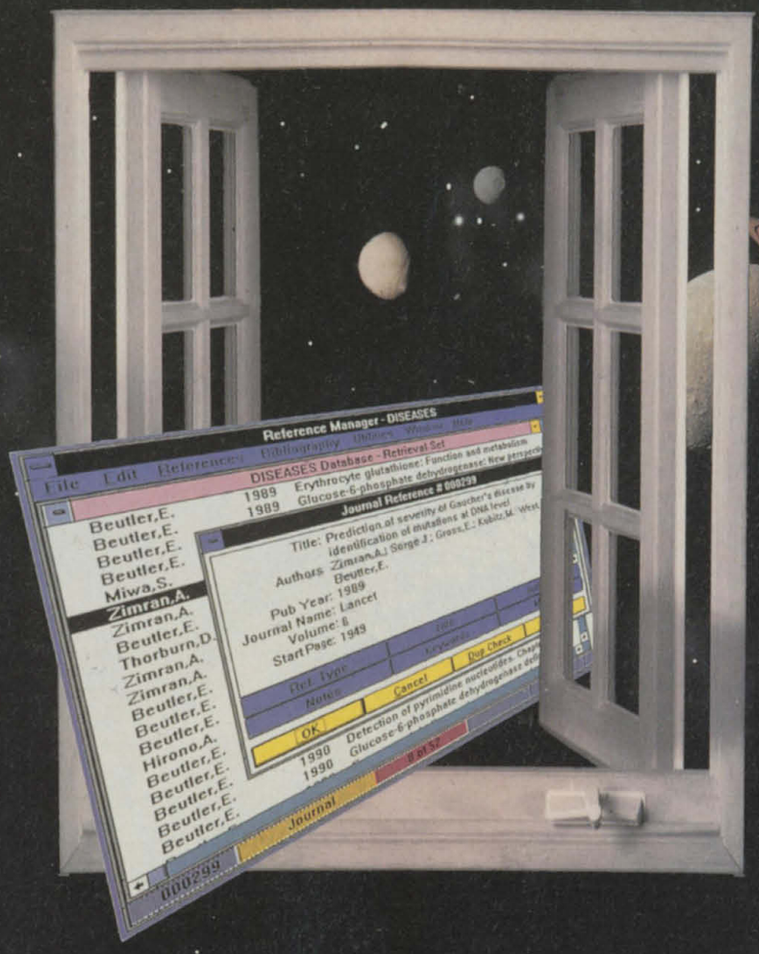

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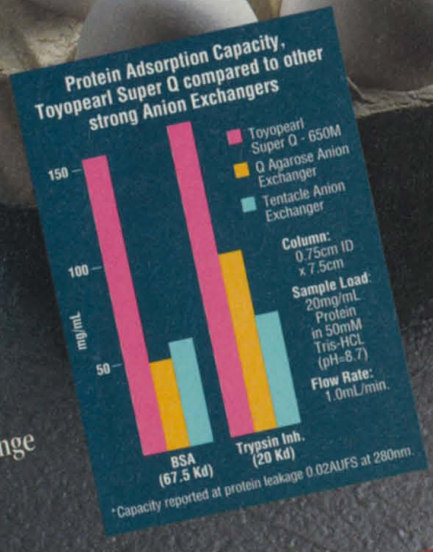

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NUMBER 5118

SCIENCE

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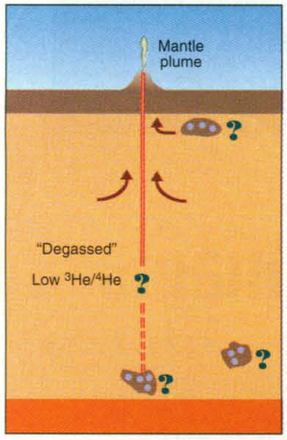
160
Are these dinosaur blood cells?



166, 168 & 170
Mantle mechanisms

POLICY FORUM

NEWS & COMMENT

RESEARCH NEWS

PERSPECTIVES

DEPARTMENTS

COVER

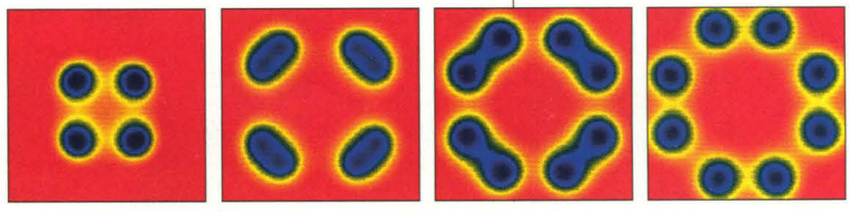
Mouse embryo at 11.5 days of development. This embryo harbors a β-galactosidase transgene linked to the promoter of the *myogenin* gene, active in skeletal muscle formation. The expression pattern of the transgene (in blue) reflects that of the endogenous *myogenin* locus and is restricted to the myotomal region of the somites and the limb buds. Mutations in the *myogenin* promoter suggest that separable regulatory elements govern *myogenin* expression in somites and limb buds. See page 215. [Photograph: Tse-Chang Cheng]

ARTICLE

RESEARCH ARTICLE

REPORTS

165, 189 & 192
A new pattern emerges



Indicates accompanying feature

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DUPONT

edited by PHIL SZUROMI

By moonlight

A thin exhalation of gases from the lunar surface is all the moon can boast of an atmosphere, but spectroscopic observations by Flynn and Mendillo (p. 184) show that it extends to surprisingly large distances. Sodium atoms efficiently scatter sunlight at the D wavelengths and had previously been detected within 100 kilometers of the moon's surface. The authors used a technique in which the disk of the moon is blocked out and found sodium as far out as five lunar radii. The density of sodium varies in a characteristic way with solar zenith angle, suggesting that solar radiation drives it and other gases from the lunar regolith.

Patterns from chemical fronts

Stationary chemical patterns have been observed that form in response to large perturbations of the system (see news story by Amato, p. 165). Lee *et al.* (p. 192) studied the iodate-ferrocyanide-sulfite reaction, which has stable regimes of high and low pH, in a continuously fed thin gel reactor. The system can be perturbed with ultraviolet light; reacting fronts grow toward one another and then stop, producing an irregular pattern. This type of pattern formation is unlike Turing patterns or chemical waves; Pearson (p. 189) presents a numerical simulation showing that a simple reaction-diffusion model can account for such patterns.

Ice cores and global circulation

New high-resolution records from Greenland ice cores are revealing many details of climate changes accompanying the last deglaciation and throughout the Holocene. The results have shown that deglaciation was interrupted and the climate became much colder abruptly about 13,000 years ago, an event known as the Younger Dryas. Mayewski *et al.* (p. 195) use analysis of the chemical species in the ice core to infer changes in atmospheric circulation—particularly the size of the polar atmospheric cell—affecting flow over Greenland during this episode. The results suggest that crustal and sea salt loading increased within about 10 years at the start of the Younger Dryas and dropped rapidly at its termination.

Preceding the main seismic event

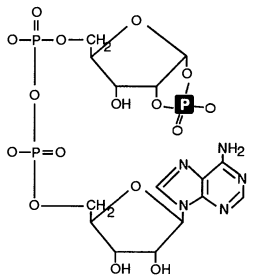
Slow precursors represent low-frequency seismic radiation, perhaps reflecting initial, gradual deformation that leads to an abrupt earthquake rupture. Their detection and analysis may thus provide a means for short-term earthquake prediction. Ihmlé *et al.* (p. 177) present an analysis of the precursor to the 1989 Macquarie Ridge earthquake, south of New Zealand. The analysis suggests that the slow precursor began 100 seconds before the main, magnitude 8.2 event and that the moment release of the precursor alone was equivalent to a magnitude 7.6 event.

Coming together

How transcription factors act to regulate transcription from binding sites located hundreds of nucleotides away from the transcription start site is unknown. Cullen *et al.* (p. 203) have studied regulation at a distance in the rat *prolactin* gene by using a nuclear ligation assay. The estrogen receptor binds to a distal regulatory region of the *prolactin* gene that is located 1550 base pairs upstream of the transcription start site. They find that the distal enhancer and the proximal promoter regions are juxtaposed in native chromatin and that this proximity is stabilized by estrogen.

Splicing metabolite

An unusual metabolite forms from nicotinamide adenine dinucleotide during the splicing of transfer RNA molecules in yeast. Culver *et al.* (p. 206) show that adenosine diphosphate–ribose 1"-2" cyclic phosphate is produced when the 2' phosphate in the spliced transfer RNA is removed by a phosphotransferase enzyme.



Formation of this product could also be observed in *Xenopus* oocytes. Because some splicing pathways bypass 2' phosphate formation, this metabolite may have another cellular function.

Targeting anticancer drugs

Immunoconjugate drugs, in which monoclonal antibodies are used to target toxic drugs to carcinoma cells, often have better activity than unconjugated drugs but may require unacceptably high doses. Trail *et al.* (p. 212) describe an immunoconjugate of doxorubicin that is effective against human tumor xenografts in rodents, in some cases at 1/20 of the maximum tolerated dose. The antibody used, BR96, binds to a cell-surface antigen that is related to the Lewis Y antigen and that is enriched on tumor cells. BR96 is rapidly internalized into endosomes and lysosomes, where the acidic environment facilitates cleavage of the hydrazone bond linking the drug to the antibody. The conjugate caused regressions of established human lung cancer in rats, which like humans express the target antigen on normal cells.

Direct inhibition of adenylyl cyclase

Hormone receptors are coupled to activation or inhibition of adenylyl cyclase (the enzyme that generates the intracellular "second messenger" cyclic adenosine monophosphate) by heterotrimeric guanine nucleotide–binding proteins (G proteins). Although activation of adenylyl cyclase is known to result from interaction with the active guanosine triphosphate–bound form of the G protein α subunit $G_{s\alpha}$, the mechanism by which adenylyl cyclase is inhibited has been more difficult to demonstrate. Taussig *et al.* (p. 218) now show that activated $G_{i\alpha}$ does directly inhibit certain isoforms of adenylyl cyclase. The effect required highly purified, myristoylated $G_{i\alpha}$ and was evident only at relatively high concentrations of $G_{i\alpha}$. The authors present a model that suggests that these concentrations of α subunits may be physiologically relevant.

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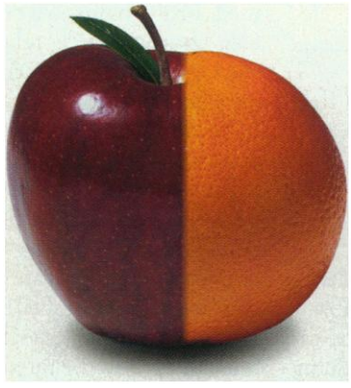

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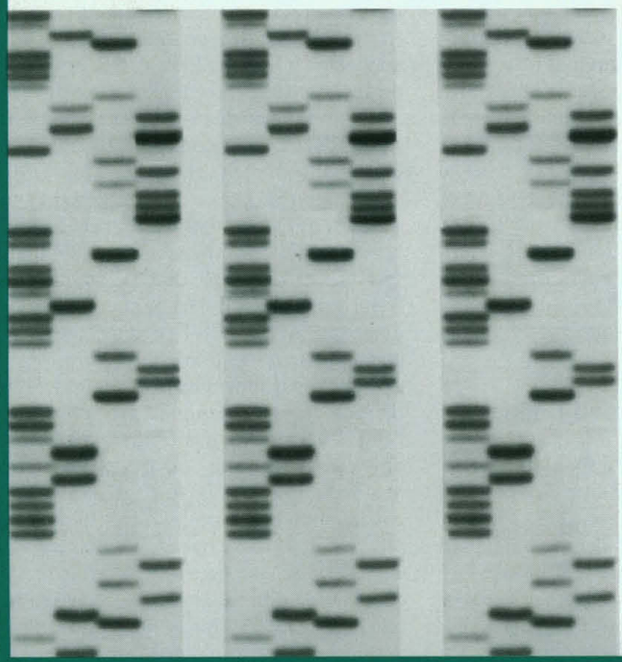

◀ Autoradiogram of chemiluminescent sequencing reaction using the CircumVent™ Phototope™ Kit. Sequencing reaction of a double-stranded DNA template using Vent$_R$™ (exo$^-$) DNA polymerase and thermal cycle sequencing procedure, followed by chemiluminescent detection. Lane order A, C, G, T.

Sears, et. al. (1992) Biotechniques 13, 626-633.

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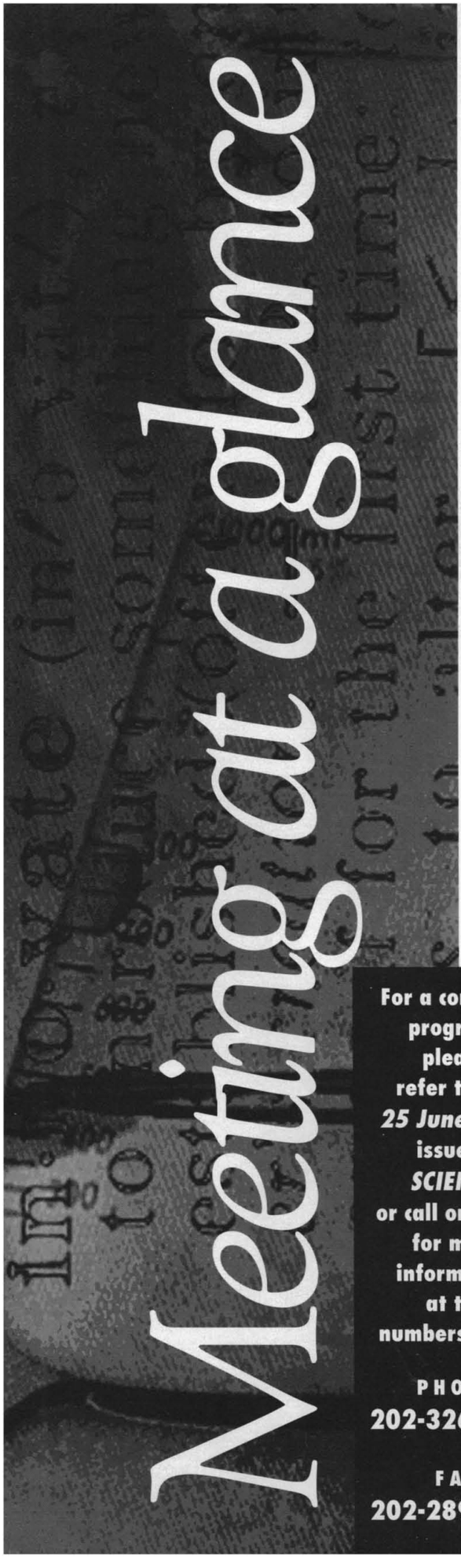

Meeting at a glance

FRIDAY, 6 AUGUST

Noon–8:00pm
REGISTRATION

Noon–6:00pm
EMPLOYMENT EXCHANGE

5:00–7:00pm
EXHIBITION OPENING AND RECEPTION

7:00–7:15pm
INTRODUCTION
Savio L.C. Woo

7:15–8:15pm
THOMAS ALVA EDISON LECTURE
Kary Mullis

8:15–9:15pm
KEYNOTE ADDRESS
George Brown, Jr.
U.S. Congress

SATURDAY, 7 AUGUST

7:00am–9:00pm
REGISTRATION

7:30am–6:00pm
EMPLOYMENT EXCHANGE

8:00–11:00am
PLENARY LECTURES
Francis S. Collins
Eric Lander
Kenneth W. Culver
Ivar Giaever

8:30am–12:45pm
CAREER DEVELOPMENT SEMINARS

10:00am–3:00pm
EXHIBITS

11:00–11:20am
COFFEE BREAK

11:20am–12:30pm
EMERGING TECHNOLOGIES
Alan Garfinkel
Flossie Wong-Staal

12:30–2:30pm
LUNCH

1:00–2:15pm
CONCURRENT EXHIBITOR WORKSHOPS

PREPARATIVE ELECTROPHORESIS TECHNIQUES
Hoefer Scientific Instruments

AUTOMATED INFRARED DNA SEQUENCING
Li-Cor

DATA ACQUISITION, ANALYSIS & PRESENTATION IN MICROSOFT WINDOWS
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CENTRIFUGAL PROTEIN CONCENTRATION WITH CENTRICELL
Polysciences, Inc.

2:30–5:00pm
CONCURRENT DISCUSSIONS
(Additional speakers to be selected from poster presenters.)

DNA AMPLIFICATION
Julian Gordon
Francois Ferre
Joseph DiCesare

OLIGONUCLEOTIDE SYNTHESIS, ANTISENSE & ANTIGENE PHARMACEUTICALS
Paul Zamecnik
Mark Matteucci

SENSORS
Raoul Kopelman
David R. Walt
Mark E. Meyerhoff

TUMOR IMMUNOGENICITY & MARKERS
Jim Allison
Gary J. Nabel

NEW MICROSCOPY
Robert D. Black

CARBOHYDRATE STRUCTURE ANALYSIS & GLYCOBIOLOGY
John C. Klock

GENE TRANSFER
Alan Colman
Oliver Smithies
George Stamatoyannopoulos

5:00–7:00pm
POSTER SESSION/ EXHIBITS

5:00–6:00pm
CAREER DEVELOPMENT SEMINARS

8:00–10:30pm
EVENING CONCURRENT PLENARY LECTURES

PATENT LAW
Lynn H. Pasahow
Kevin Kaster

SOLID PHASE SYNTHESIS
Marvin H. Caruthers
Stephen B.H. Kent

VECTOR DEVELOPMENT FOR GENE THERAPY
Joseph C. Glorioso
Richard Jude Samulski
Ron Crystal

For a complete program, please refer to the *25 June 1993* issue of *SCIENCE*, or call or fax us for more information at the numbers below

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SUNDAY, 8 AUGUST

7:00am–9:00pm
REGISTRATION

7:30am–6:00pm
EMPLOYMENT EXCHANGE

8:00–10:00am
PLENARY LECTURES
George M. Whitesides
Robert Langer
May R. Berenbaum

8:30am–12:45pm
CAREER DEVELOPMENT SEMINARS

10:00–10:30am
COFFEE BREAK

10:00am–3:00pm
EXHIBITS

10:30am–12:30pm
PLENARY LECTURES
Donald Hilvert
Steven M. Block

12:30–2:30pm
LUNCH

1:00–2:15pm
CONCURRENT EXHIBITOR WORKSHOPS

NOVEL TECHNIQUES FOR WESTERN BLOTTING & NUCLEIC ACID DETECTION/ QUANTIFICATION
Amersham Corp

TIMESAVING ULTRAFILTRATION PROTOCOLS
Amicon, Inc.

IMMUNOCHEMICAL STAINING TECHNIQUES
Dako Corp

RAPID DNA SEQUENCING WITH THE GENESPRINTER SYSTEM
Fotodyne

FLUORESCENCE IMAGE ANALYSIS
Molecular Dynamics

2:30–5:00pm
CONCURRENT DISCUSSIONS
(Additional speakers to be selected from poster presenters.)

NONINVASIVE DIAGNOSTICS
Christopher Green
Steven Kornguth
Robert Turner
James Hyde

DRUG TARGETING & LIPOSOMES
Phillip L. Felgner
W. Mark Saltzman
Kam Leong

CLINICAL IMMUNOLOGY/ IMMUNOSUPPRESSION/ VACCINES
Gene M. Shearer
Margaret A. Liu
Mario Clerici

BLOOD SUBSTITUTES
David Anderson
Thomas H. Schmitz
Antony Mathews

FLUORESCENT IN SITU HYBRIDIZATION & NONISOTOPIC DETECTION
Irena Bronstein

NMR DETERMINATION OF PROTEIN STRUCTURE
Stephen Mayo

ANTIBODY CATALYSIS
Donald Landry
Louis J. Liotta

5:00–7:00pm
POSTER SESSION/ EXHIBITS

5:00–6:00pm
CAREER DEVELOPMENT SEMINARS

8:00–10:30pm
EVENING CONCURRENT PLENARY LECTURES

ENGINEERING PROTEINS
David A. Tirrell
Charles S. Craik
Cori Gorman
David Y. Jackson

MONDAY, 9 AUGUST

7:00am–9:00pm
REGISTRATION

7:30am–6:00pm
EMPLOYMENT EXCHANGE

8:00–10:00am
PLENARY LECTURES
Robert B. Goldberg
William E. Timberlake
Robert Fraley

8:30am–12:45pm
CAREER DEVELOPMENT SEMINARS

10:00–10:30am
COFFEE BREAK

10:00am–3:00pm
EXHIBITS

10:30am–12:30pm
PLENARY LECTURES
Jack Belliveau
David Housman

12:30–2:30pm
LUNCH

1:00–2:15pm
CONCURRENT EXHIBITOR WORKSHOPS

PROPHET SYSTEM WORKSHOP
BBN Systems and Technologies

PRINCIPALS OF FLUORESCENCE POLARIZATION AND THE FPM-1 SYSTEM
Jolley Consulting & Research, Inc.

NASA ACCESS MECHANISM-GRAPHICAL USER INTERFACE INFORMATION RETRIEVAL SYSTEM
NASA Scientific and Technical Information Program

SPEEDING UP RESEARCH WITH ELECTRONIC AUTORADIOGRAPHY
Packard Instruments

INTRODUCTION TO *MATHEMATICA®*
Wolfram Research, Inc.

2:30–5:00pm
CONCURRENT DISCUSSIONS
(Additional speakers to be selected from poster presenters.)

SCREENING
Joe Gray
Michael H. Wigler

GENE SEQUENCING TOOLS: MASS SPECTROMETRY AND OTHER METHODS
R. Graham Cooks
Lloyd Smith
Charles Cantor
T. Williams Hutchens
Robert Hettich

PEPTIDES & COMBINATORIAL LIBRARIES
Ronald Hoess
William DeGrado
Richard A. Houghten
Jon Ellman

FUNCTIONAL MAGNETIC RESONANCE IMAGING
Paul A. Bottomley
Kamil Ugurbil
Charles Dumoulin
Robert R. Edelman
Thomas J. Brady

DNA DIAGNOSTICS
C. Thomas Caskey
Janet D. Rowley

DRUG DESIGN
Ray Salemme
Joan S. Brugge

GROWTH FACTORS, CYTOKINES & THEIR RECEPTORS
Joost J. Oppenheim
Michael Klagsbrun
Herb Lin
Andrew Geiser

ROBOTICS & NEURAL NETWORKS
Daniel S. Levine
Bruce Bullock
Paolo Gaudiano
Samuel Leven

AIDS RESEARCH & ANIMAL MODELS
Ronald C. Desrosiers

5:00–6:00pm
CAREER DEVELOPMENT SEMINARS

8:00–10:30pm
EVENING CONCURRENT PLENARY LECTURES

GENOMIC LIBRARIES
David C. Page
Nat Sternberg
Jean-Michel H. Vos
Melvin Simon and Hiroaki Shizuya
F. William Studier

RNA & IN VITRO GENETIC SELECTION
Jack Szostak
Julius Rebek

TUESDAY, 10 AUGUST

7:00am–3:00pm
REGISTRATION

8:00–10:00am
PLENARY LECTURES
David J. States
William R. Jacobs, Jr.
Bernardo Nadal-Ginard

9:00am–1:00pm
EMPLOYMENT EXCHANGE

10:00–10:30am
COFFEE BREAK

10:30am–12:30pm
EMERGING TECHNOLOGIES
Wah Chiu
Daniel A. Abramowicz

12:30–2:00pm
LUNCH

2:00–5:00pm
EMERGING TECHNOLOGIES
John E. Buster
Mark R. Hughes
Peter S. Linsley
Julian Rosenman
David S. Bredt

SCIENCE INNOVATION

Advance Registration Form

Science Innovation '93
Hynes Convention Center — Boston
6-10 August 1993

Hurry! Deadline for the advance registration fees is 28 July. Fax your registration form today!

REGISTRANT INFORMATION (Please type or print legibly)

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(appears on AAAS membership card and above your name on Science subscription label)

❑ Check here if you need special services due to a disability (we'll call you).

CONCURRENT DISCUSSION

Please indicate the three sessions you're most interested in attending (check three):

- ❑ DNA Amplification
- ❑ Gene Sequencing Tools
- ❑ Fluorescent In Situ Hybridization and Nonisotopic Detection
- ❑ Screening
- ❑ Peptides and Combinatorial Libraries
- ❑ NMR Determination of Protein Structure
- ❑ Antibody Catalysis
- ❑ Non-invasive Diagnostics
- ❑ Imaging
- ❑ DNA Diagnostics
- ❑ Oligonucleotide Synthesis and Antisense Pharmaceuticals
- ❑ Drug Design
- ❑ Drug Targeting and Liposomes
- ❑ Clinical Immunology, Immunosuppression and Vaccines
- ❑ Growth Factors/ Cytokines/Receptors
- ❑ Tumor Immunogenicity and Markers
- ❑ Blood Substitutes
- ❑ AIDS Research and Animal Models
- ❑ Chemical Communication
- ❑ Plant Development
- ❑ New Microscopy
- ❑ Sensors
- ❑ Robotics and Neural Networks
- ❑ Carbohydrate Structure Anaylsis
- ❑ Gene Transfer

MEETING FEES

Registration fees[1] (Check one box only)

Category	*Advance by 28 July '93*	*On Site*
❑ Regular AAAS member	$295	$395
❑ Regular nonmember	$395	$495
❑ Student[2]/Postdoc AAAS member	$125	$200
❑ Student[2]/Postdoc nonmember	$175	$250

❑ If registering at the student rate, check here and attach a copy of your student ID card.

Luncheon Fees (Check all that apply)

❑ Lunch, Saturday 7 August	$21
❑ Lunch, Sunday 8 August	$21
❑ Lunch, Monday 9 August	$21
❑ Lunch, Tuesday 10 August	$21

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Meeting registration fee[4] ..... $ _____

Luncheon fee total ..... $ _____

Membership dues (if joining now) ..... $ _____

Total amount ..... $ _____

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Credit card number

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Mail your completed registration form in the envelope provided or send to: Science Innovation '93, P.O. Box 630285, Baltimore, MD 21263. Or fax (credit card payments only) to 202-289-4021. If you have any questions, call 202-326-6450.

AS3KS

IMPORTANT FOOTNOTES

[1] Deadline for advance registration is 28 July! Registrations received after this date will not be processed, however, you may register on site at the Hynes Convention Center beginning at noon on 6 August. One-day registration is available on site only at the following rates: Regular member-$195, regular nonmember-$245, student member-$95, student nonmember-$125.

[2] To qualify for student rate, you must be a graduate or undergraduate student and must attach a copy of your student ID card. Registrations received without appropriate verification will be charged at the Regular rates.

[3] Membership: $47 of dues plus international postage fees are allocated to *Science*. Canadian dues include GST. Please allow 6-8 weeks for receipt of first issue of *Science*.

[4] Cancellations must be received in writing by 23 July 1993. No refunds will be made for cancellations received after this date. Refunds are subject to a $50 cancellation charge. No refunds will be processed until after the meeting.

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AP in '93!

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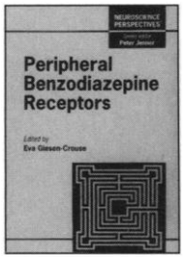

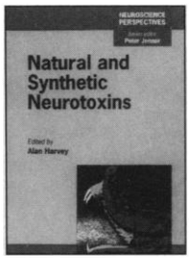

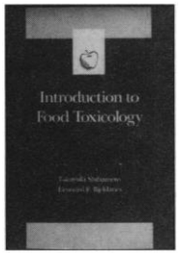

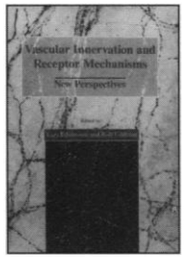

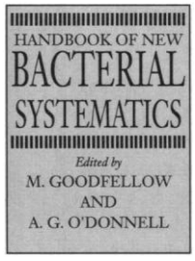

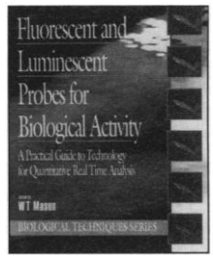

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