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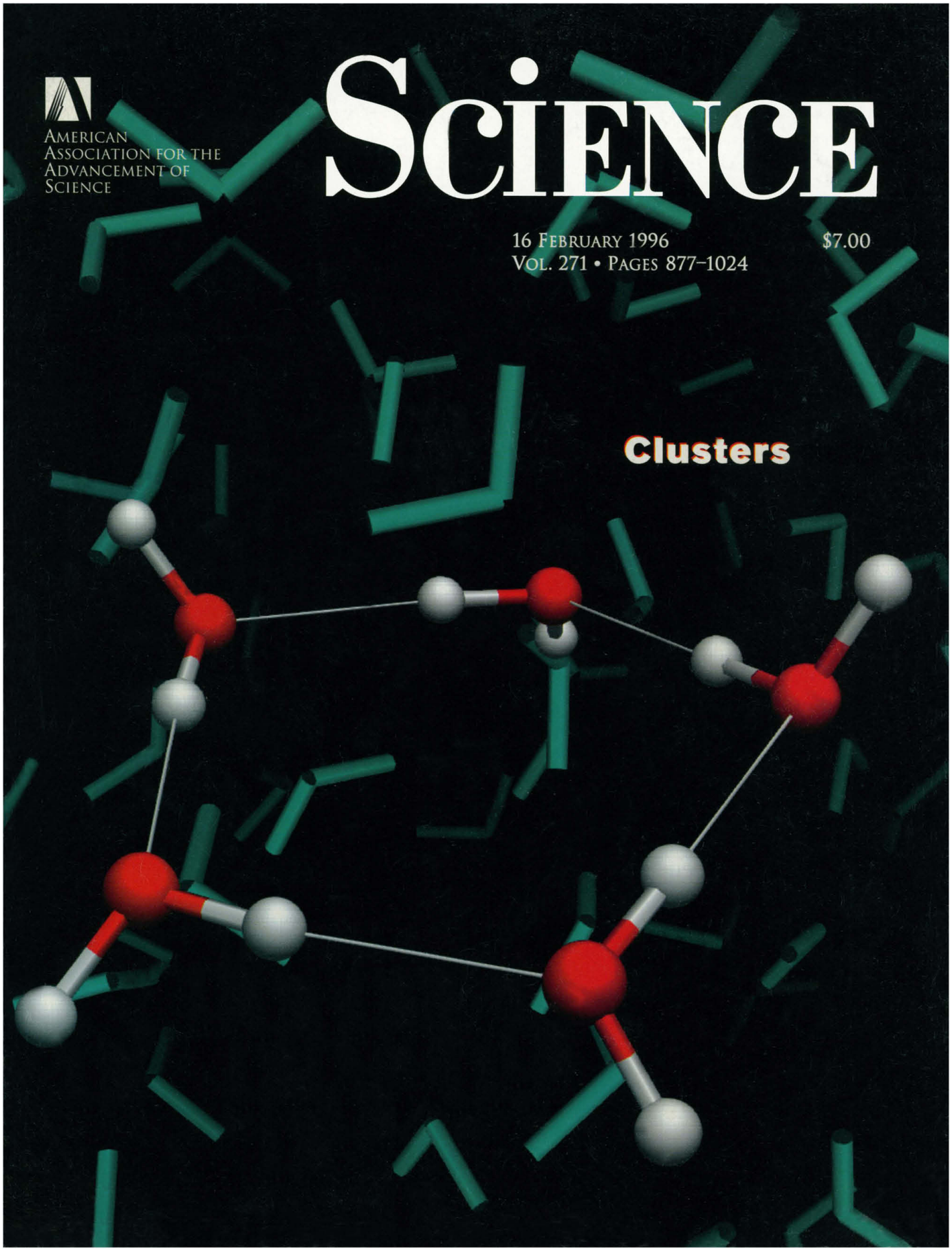

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2

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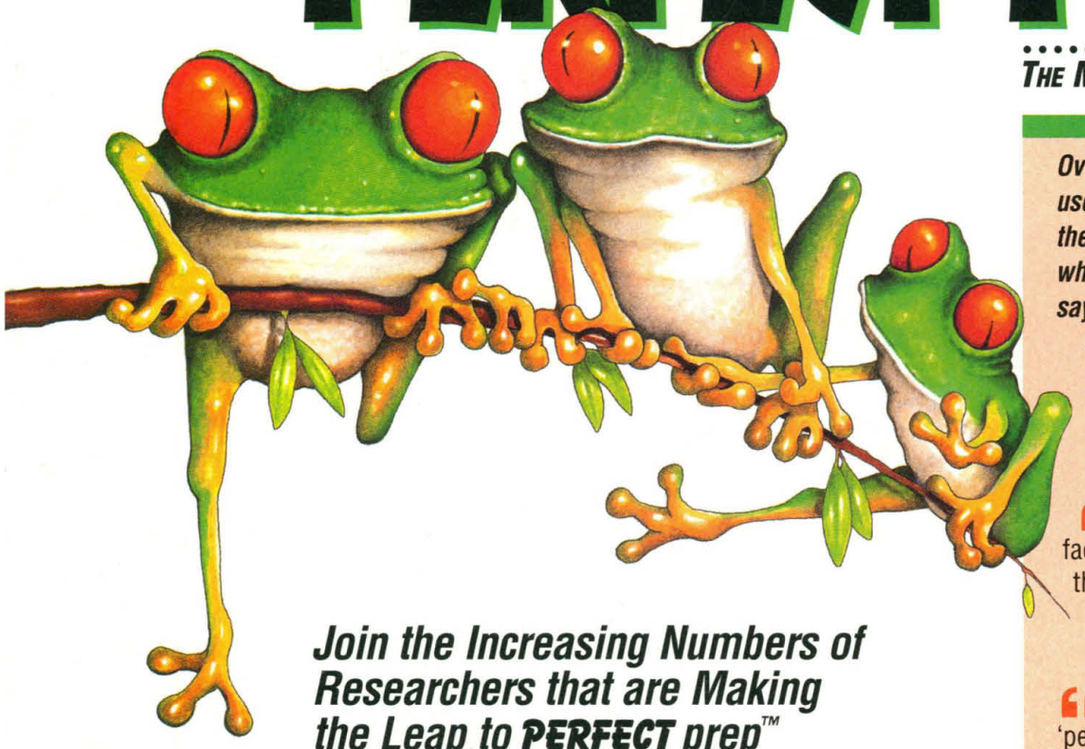

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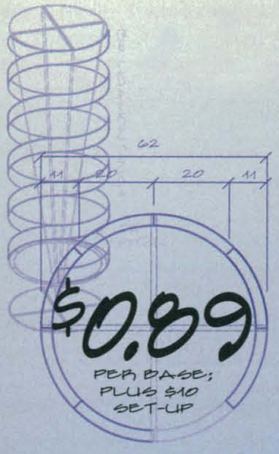

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NUMBER 5251

SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

BIG SCIENCE

898

Big squeeze in Britain

969

Making gels by adding water

NEWS & COMMENT

RESEARCH NEWS

CLUSTERS

NEWS

ARTICLES

PERSPECTIVES

RESEARCH ARTICLE

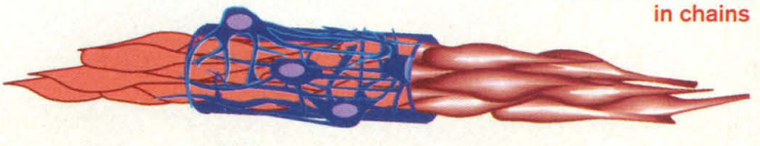
DEPARTMENTS

COVER

The isolated water pentamer adopts a ring structure, with each molecule acting as a single donor and single acceptor of a hydrogen bond. The average separation between oxygen atoms (red spheres) is 2.76 angstroms. Similar water pentagons are prominent structures in the dynamic hydrogen-bonding network revealed in computer simulations of liquid water, like that depicted in the background. See page 929 in the Special Section on clusters beginning on page 920, and a related Report (page 963). [Image: Tim Robinson, Chemistry Graphics Facility, University of California, Berkeley]

REPORTS

978
Neurons traveling in chains



Indicates accompanying feature

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Glacial washout

Ice core records indicate that the atmosphere during the last glacial maximum was dustier than today's atmosphere. Recent evidence also suggests that the tropical ocean surface waters were about 5°C cooler. Yung *et al.* (p. 962) propose that these observations reflect a weakened hydrologic cycle. Using a model of dust transport, the authors suggest that the hydrologic cycle was reduced by about a factor of 2 during glacial times.

Smart gel

When water is added to a polymer such as gelatin, a hydrogel is formed, which is stabilized by a three-dimensional polymer network. Such hydrogels are important, for example, in muscles or in contact lenses. Warriner *et al.* (p. 969) have discovered a class of hydrogels with unusual properties. These materials form lamellar gels from liquid-like phases upon addition of water, and redissolve into a liquid-like phase upon further water addition. The lamellar gel phase does not contain a solid component, and in the future could be used, for example, to incorporate biologically active membrane proteins.

Enlightened galaxies

Some galaxies are in the shape of disks, and some but not all of these exhibit substantial thickness. The formation mechanism that led to such distributions of stars is still a puzzle. Sridhar and Touma (p. 973) report a dynamic model of disk formation that invokes levitation—a process by which stars captured into a particular type of resonance acquire high vertical energy and so become distributed above and below the disk plane. The model may improve understanding of the origins of our own galaxy, which is intermediate between thin disk and the thicker halo galaxy shape.

Aging universe

Features of our galaxy called globular clusters can be used to help estimate the age of the universe: The ages of the oldest of these star clusters provide a lower bound. Observational data on globular clusters are in conflict with the age estimated from the expansion of the universe as expressed in the Hubble constant, however. Chaboyer *et al.* (p. 957) present the results of a Monte Carlo study of stellar evolution that was used to estimate the ages of the 17 oldest clusters in the Milky Way. The simulations produced a lower bound of 12.07 billion years and a median age of 14.56 billion years. The authors conclude that such ages constrain cosmological models, especially compared with Hubble Space Telescope results that put the age at less than about 10 billion years.

Chain gang

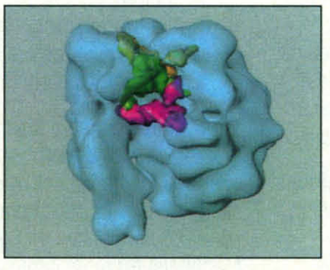
Unlike most neurons in the adult brain, a small population of cells in the subventricular zone generates offspring that migrate to the olfactory bulb. Lois *et al.* (p. 978) show that these cells migrate in chains, the members of which are held together by membrane specializations. The chains are ensheathed by another cell type, likely glial cells. This chain migration may also be used by other neurons for tangential migration through neural tissue during development.

Control of resistance

The response to infection by parasites like *Leishmania major* was thought to be regulated by the production of interleukin-4 (IL-4), which was blamed for generating a nonproductive immune response and preventing the appropriate response from resolving the infection. However, when Noben-Trauth *et al.* (p. 987) removed the IL-4 gene from a susceptible mouse strain, the mice did not become resistant, raising the possibility that something else may control the response. Güler *et al.* (p. 984) used an in vitro system and found that susceptibility may hinge on the loss of the susceptible T cell's capacity to generate IL-12, which induces the protective response, rather than on IL-4 inducing the inappropriate response. See also a news story by Marx (p. 912).

Translation operation

The ribosome executes the final step of translation, the conversion of a linear sequence of nucleotides into a linear sequence of



amino acids. Transfer RNA (tRNA) molecules act as intermediaries—on the one hand mirroring the sequence of nucleotides through hydrogen bonding interactions and, on the other, placing covalently bound amino acids into position to be linked together by the ribosomal machinery. Three ribosomal tRNA-binding sites are known; these correspond roughly to the tRNA carrying the new amino acid to be added, the tRNA carrying the already-linked amino acids, and the exiting tRNA. Agrawal *et al.* (p. 1000) present a three-dimensional cryoelectron microscopy map of how the tRNAs fit within these sites and move through the ribosome.

Quality control

When mistakes are made during protein synthesis the resulting polypeptides are rapidly degraded. Keiler *et al.* (p. 990) report the discovery of a form of quality control for newly synthesized proteins even before their synthesis is complete. In bacteria that were making a protein from a defective messenger RNA, a peptide tag that marked the protein for immediate degradation was added during synthesis. This unprecedented mechanism is discussed in an accompanying Perspective by Jentsch (p. 955).

Poor reception

Mice with *diabetes* mutations and rats with *fatty* mutations are severely obese and usually develop diabetes. This phenotype resembles that of *obese* mice, which are defective in synthesis of leptin, a secreted protein that regulates body fat content. Genetic mapping studies by Chua *et al.* (p. 994; see also news story by Barinaga, p. 913) reveal the molecular logic underlying the phenotypic similarity. Their results suggest that the *diabetes* and *fatty* phenotypes are due to mutations in the newly characterized receptor for leptin, expressed in the brain.

Increased productivity

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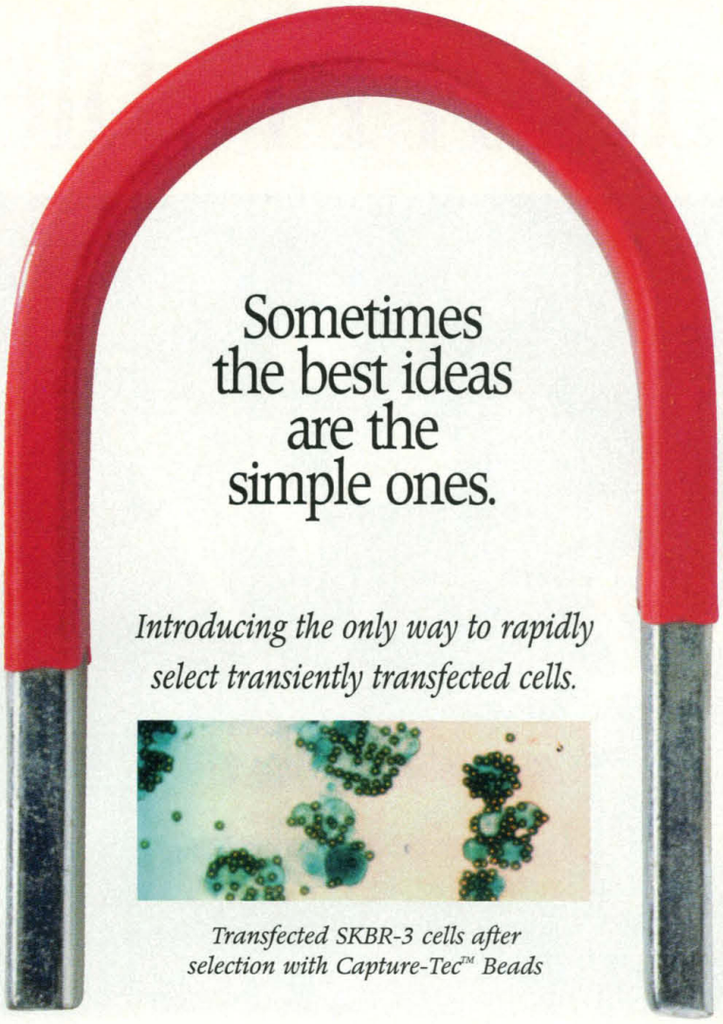

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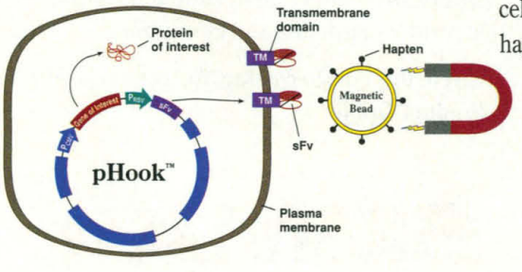

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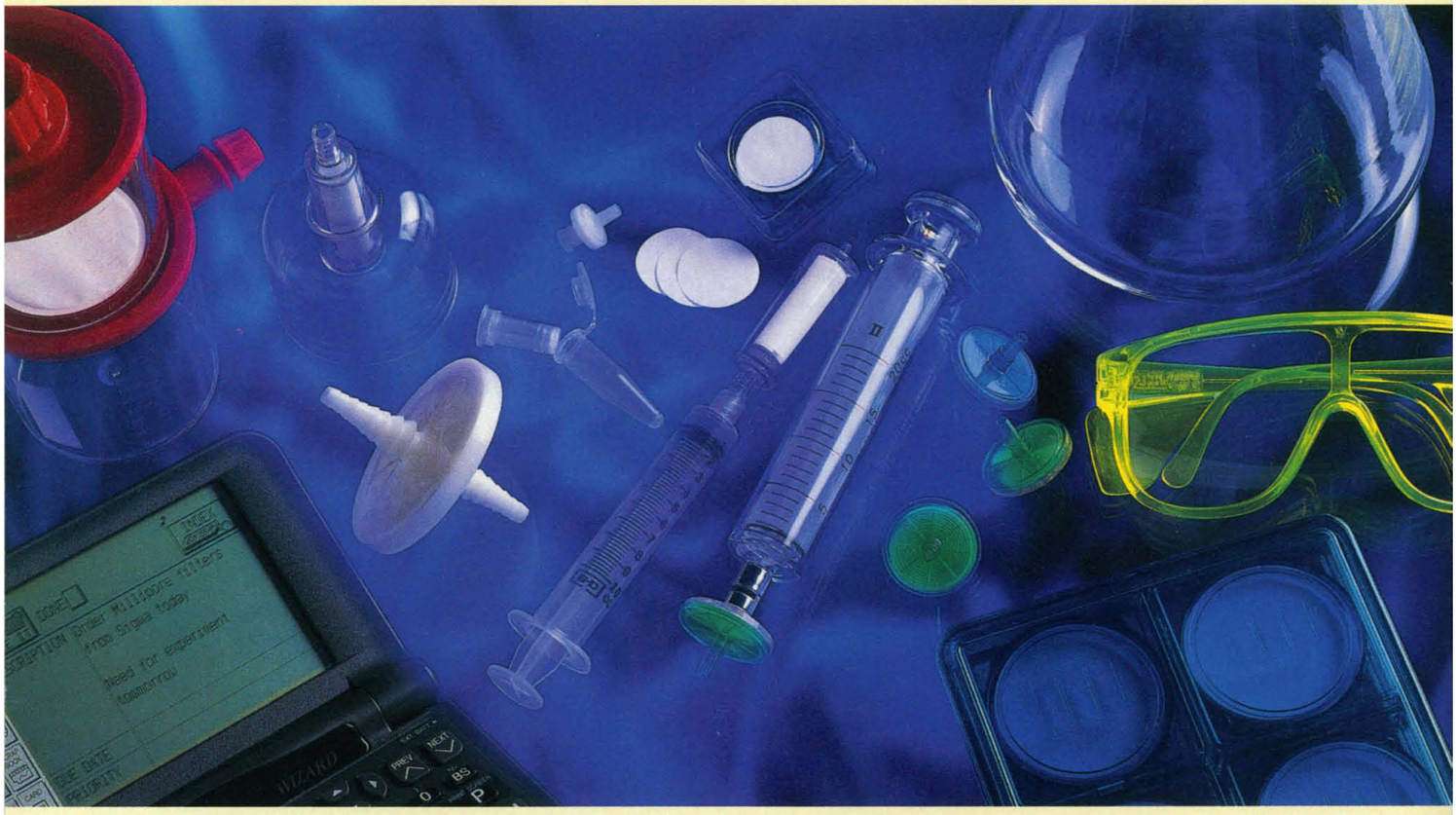

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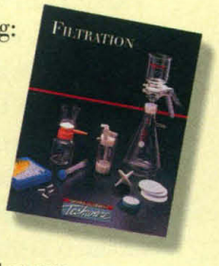

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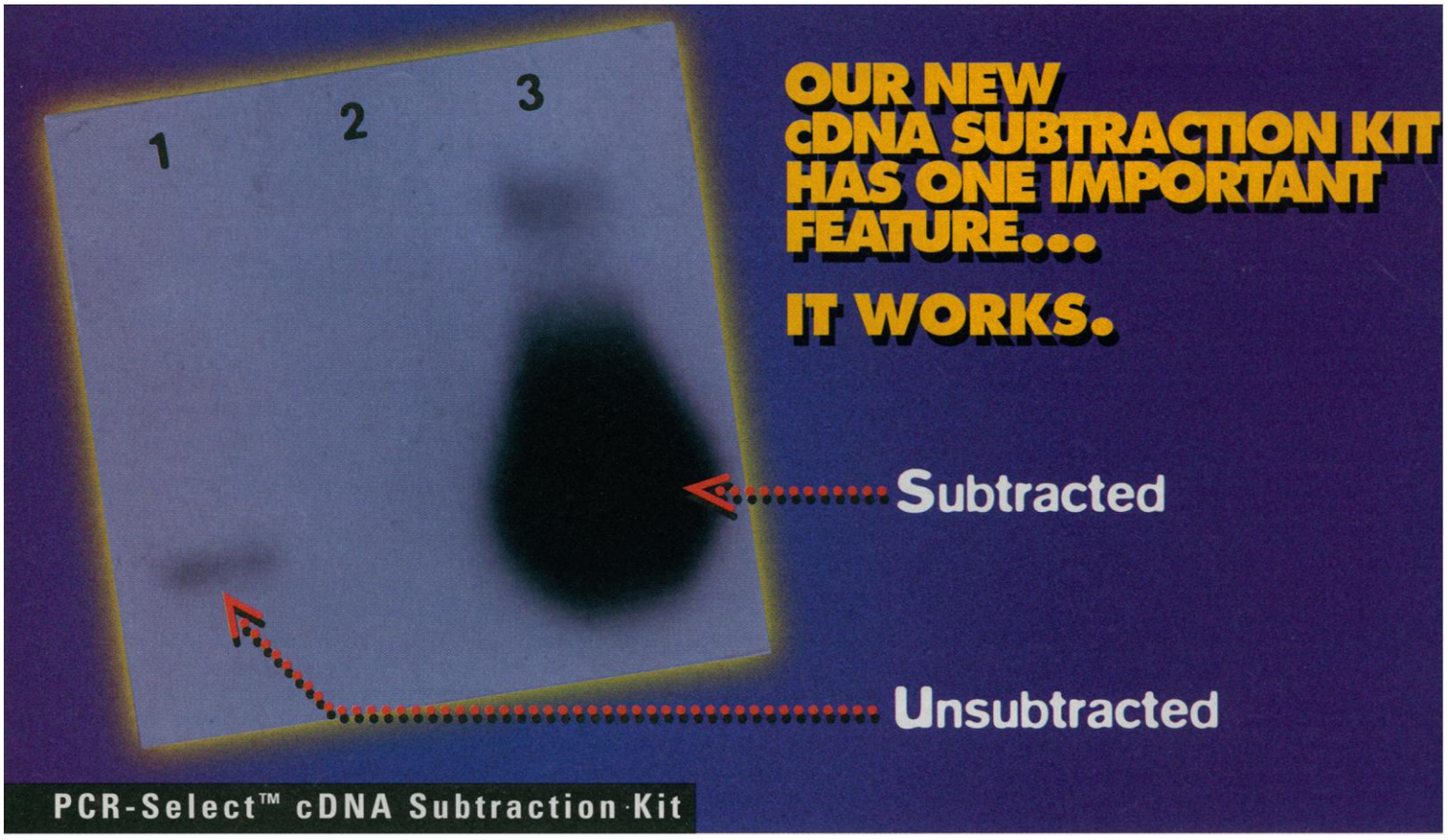
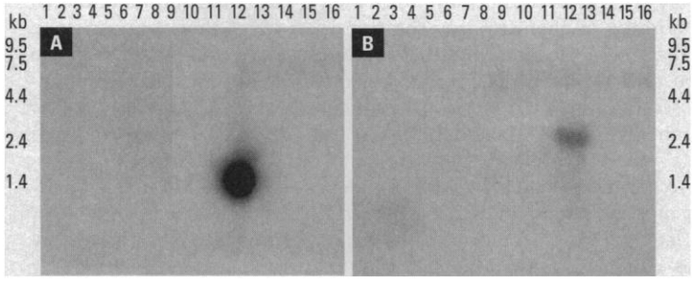


Above photo: Southern blot analysis showing enrichment of IL-2 receptor, known to be activated in human Jurkat T-cells by PHA/PMA treatment. Lane 1: unsubtracted cDNA, treated cells. Lane 2: unsubtracted cDNA, untreated cells. Lane 3: subtracted cDNA, treated cells. A dramatic reduction of the abundant housekeeping gene, G3PDH, was also seen (data not shown).



Northern blot analysis of two selected representative cDNA clones from a testis-specific library. Testis cDNA was subtracted against a mixture of cDNAs from 10 different tissues. The subtracted testis-specific cDNA was cloned into a plasmid vector, and 10 randomly selected clones were used to probe Human Multiple Tissue Northern Blots containing 2 µg of poly A^+ RNA from the indicated tissues. All 10 clones hybridized only to testis RNA. The exposure times needed to generate signal ranged from 5 hr (Panel A) to 7 days (Panel B), indicating that abundant and relatively rare cDNAs were obtained. Lanes 1-16: heart (1), brain (2), placenta (3), lung (4), liver (5), skeletal muscle (6), kidney (7), pancreas (8), spleen (9), thymus (10), prostate (11), testis (12), ovary (13), small intestine (14), colon (15), peripheral blood leukocyte (16).

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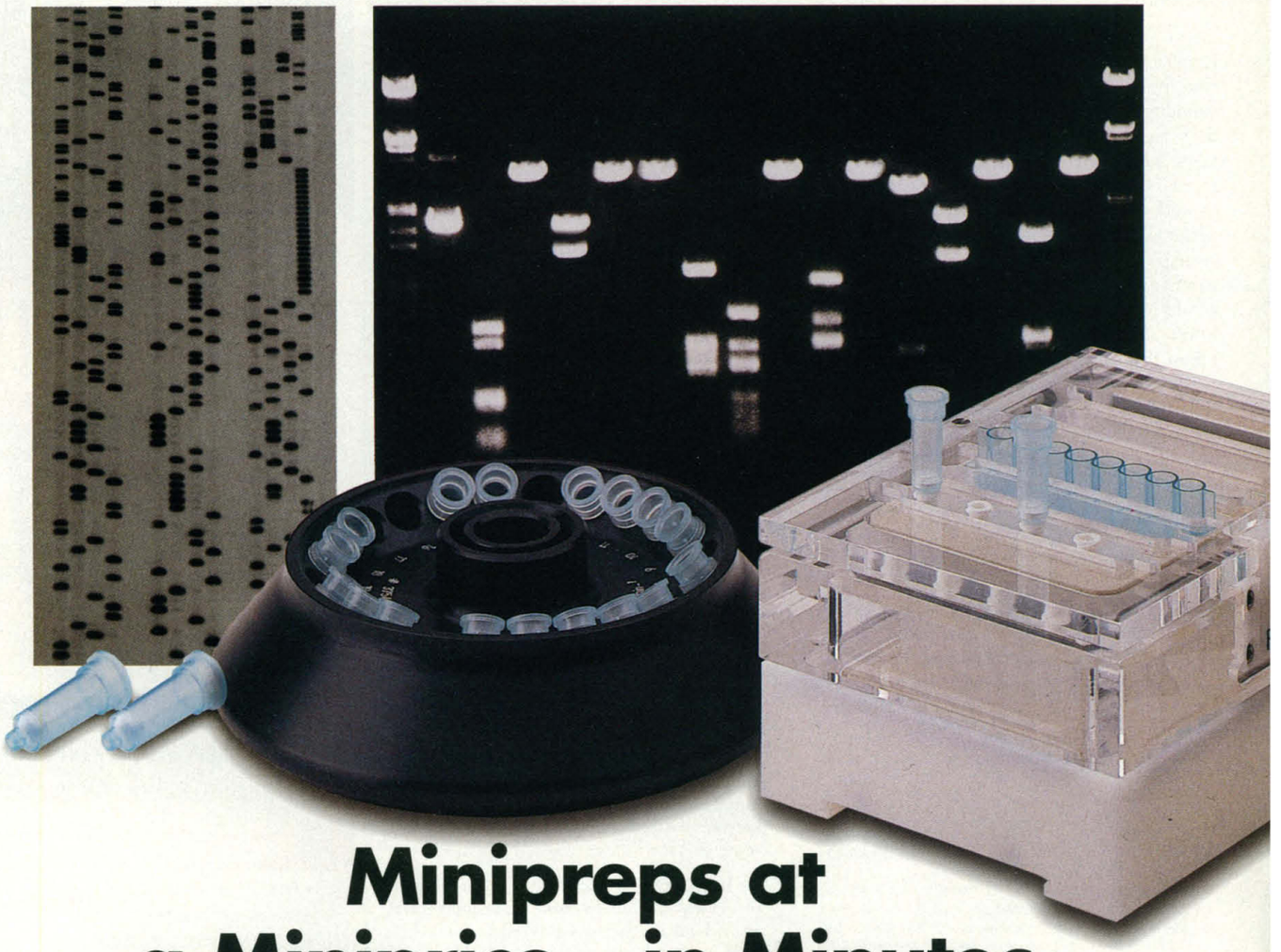

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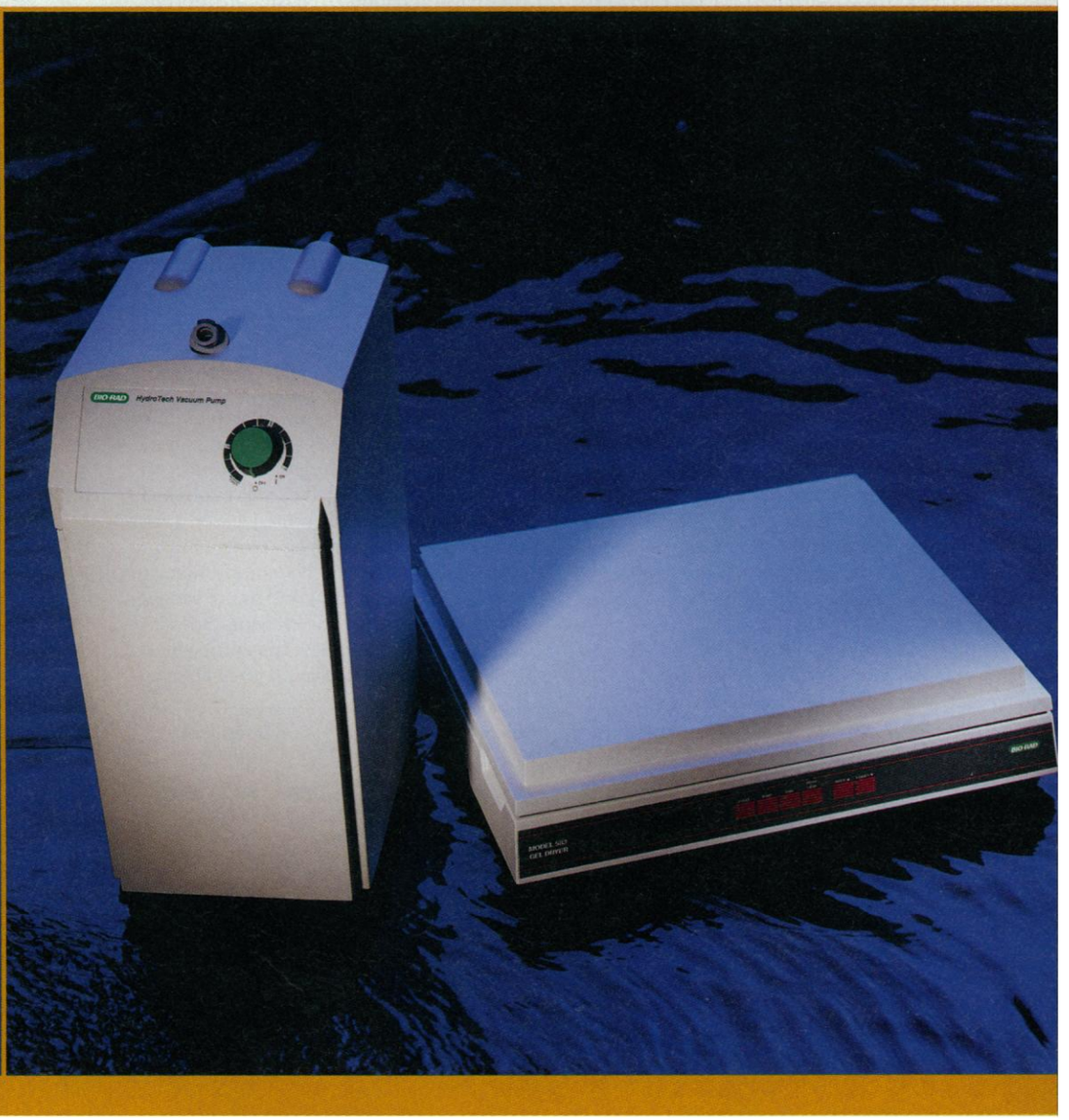

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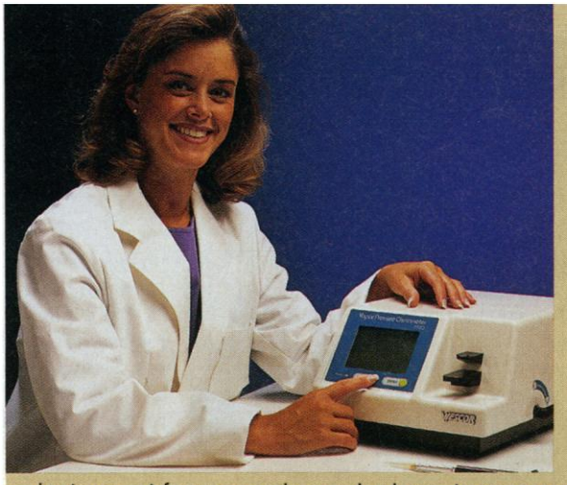

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Science and Technology in an Era of Downsizing

21st Annual AAAS Colloquium on Science and Technology Policy

April 17-19, 1996 • The Omni Shoreham Hotel

The AAAS Science & Technology Policy Colloquium provides a forum in which federal and industrial policymakers and members of the scientific, engineering, and academic communities can participate in an open discussion of issues relating to science and technology policy.

The Colloquium occurs after the release of the President's budget but before final congressional action, thus allowing for the timely exchange of information about the budget and the consequences of various policy issues involving science and technology.

WHO SHOULD ATTEND: Scientists, administrators, industrial R&D managers, policymakers, academicians, association officials, federal grant recipients, students, and others with an interest in science and technology policy.

PROGRAM OVERVIEW

WEDNESDAY, APRIL 17

(registration opens 12 noon; program starts at 2 p.m.)

KEYNOTE:
John H. Gibbons, *Assistant to the President for Science and Technology,* and *Director, OSTP.*

BUDGETARY AND POLICY CONTEXT FOR R&D IN FY 1997 (Plenary Symposium)

- Congressional Perspectives on S&T Issues for FY 1997 (Rep. Robert S. Walker*, *Chairman, House Science Committee*)
- Overview of Federal Budget Proposals for R&D in FY 1997 (Stephen D. Nelson and Kei Koizumi, *AAAS*)
- A View from Academic Institutions (Frank H. T. Rhodes*, *President Emeritus, Cornell University; Chairman, National Science Board*)

The William D. Carey Lecture
(public invited): Maxine Singer, *President, Carnegie Institution of Washington*

THURSDAY, APRIL 18

CHANGING RATIONALES FOR PUBLIC SECTOR SUPPORT OF R&D: RETHINKING WHY/HOW GOVERNMENT SHOULD SUPPORT SCIENCE (Plenary Symposium) (Irwin Feller, organizer)

- History of the Issue and Distinctions Between Basic and Applied Research (Richard R. Nelson)
- New Models of S&T's Role in the Economy (Paul Romer)
- The Issues from a Conservative Perspective (Claude Barfield)
- Criteria for the Choice of Federal Support (Frank Press)
- A Researcher's View of the Issues

LUNCHEON ADDRESS:
Laura D'Andrea Tyson*, *Assistant to the President for Economic Policy*

CONCURRENT SYMPOSIA

- Corporate R&D Responses to the New Funding and Policy Environment (John McShefferty, organizer)
- State-Federal Issues in R&D (Albert H. Teich, organizer)
- Getting Outside the Box: Disciplinary Science in an Interdisciplinary World (Jon M. Vogel,organizer)

MAJOR R&D AGENCY BUDGETS FOR FY 1997
(Concurrent small group sessions)
4:30 DOD • NIH • NSF • DOI
5:15 DOE • NASA • DOC (NIST, NOAA)

FRIDAY, APRIL 19

BREAKFAST ADDRESS:
Neal Lane*, Director, NSF

THE GLOBAL CONTEXT FOR U.S. S&T POLICIES (Plenary Symposium) (Richard W. Getzinger, organizer)

- R&D in the Major Industrialized Nations: Policies, Processes, and Levels of Support
- Cross-national Investment in R&D: U.S. R&D Investment Abroad and Foreign Investment in the U.S.
- Government Policies and the Siting of Private-Sector Facilities: Views from U.S. and Foreign Firms
- The Role of S&T Policies in the Economic Growth of East Asia/Pacific Rim Nations

LUNCHEON ADDRESS:
Virginia V. Weldon*, *Senior VP for Public Policy, Monsanto Co.; Member, PCAST*

*INVITED SPEAKER

Budget discussions will be supplemented by *AAAS Report XXI: Research and Development, FY 1997,* a comprehensive analysis of the proposals for the FY 1997 budget, prepared by AAAS and a group of its affiliated scientific, engineering, and higher education associations. Registrants will receive this report either at the Colloquium or shortly afterward (depending upon when R&D budget proposals are released); the *1996 AAAS Science and Technology Policy Yearbook* (containing most of the Colloquium addresses, plus other significant items) in early fall; and *Congressional Action on R&D in the FY 1997 Budget* later in the fall.

REGISTER NOW by completing and returning the enclosed form. For further information, contact: Directorate for Science and Policy Programs, AAAS, 1333 H Street, NW, Washington, DC 20005. Fax: (202) 289-4950. E-mail: snelson or syoung@aaas.org. Phone: (202) 326-6600 (for information). To register by phone, call (202) 326-7075 (automated service.) A more detailed version of the Colloquium program can be found on the AAAS homepage on the World Wide Web: http://www.aaas.org.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

AAAS Colloquim on Science & Technology Policy

April 17-19, 1996 The Omni Shoreham Hotel, Washington, DC

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TO REGISTER BY MAIL, send this registration form with payment to:
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Deadline for advance registration is April 2, 1996[1]

REGISTRATION FEES	Non-member	AAAS Member
Regular	$260	$234
Nonprofit[2]	$200	$180
Student[2]	$75	$67

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Lunch (Fri. 19 April)	$38

TOTAL AMOUNT DUE: $ ________

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[1] After April 2, register in person at the Omni Shoreham beginning at 12:00 p.m., April 17. On-site registration fees are $15 higher than advance registration fees.

[2] Nonprofit rates apply only to employees of government, academic, and nonprofit organizations. Student rates apply only to full-time undergraduate and graduate students and retirees.

[3] Refund requests for registration fees and meal tickets must be submitted in writing (to the address or fax number above) by April 10, 1996, and will be processed after the Colloquium: no refunds will be made for cancellations received after April 10.

Publications: All registrants receive *AAAS Report XXI: Research & Development, FY 1997* and the 1996 *AAAS Science and Technology Policy Yearbook* after the meeting and *Congressional Action on R&D in the FY 1997 Budget* in the fall.

✂ -

THE OMNI SHOREHAM HOTEL RESERVATION FORM

AAAS S&T POLICY COLLOQUIM APRIL 17-19, 1996

(After March 27, 1996, guest rooms and rate availability may be restricted)

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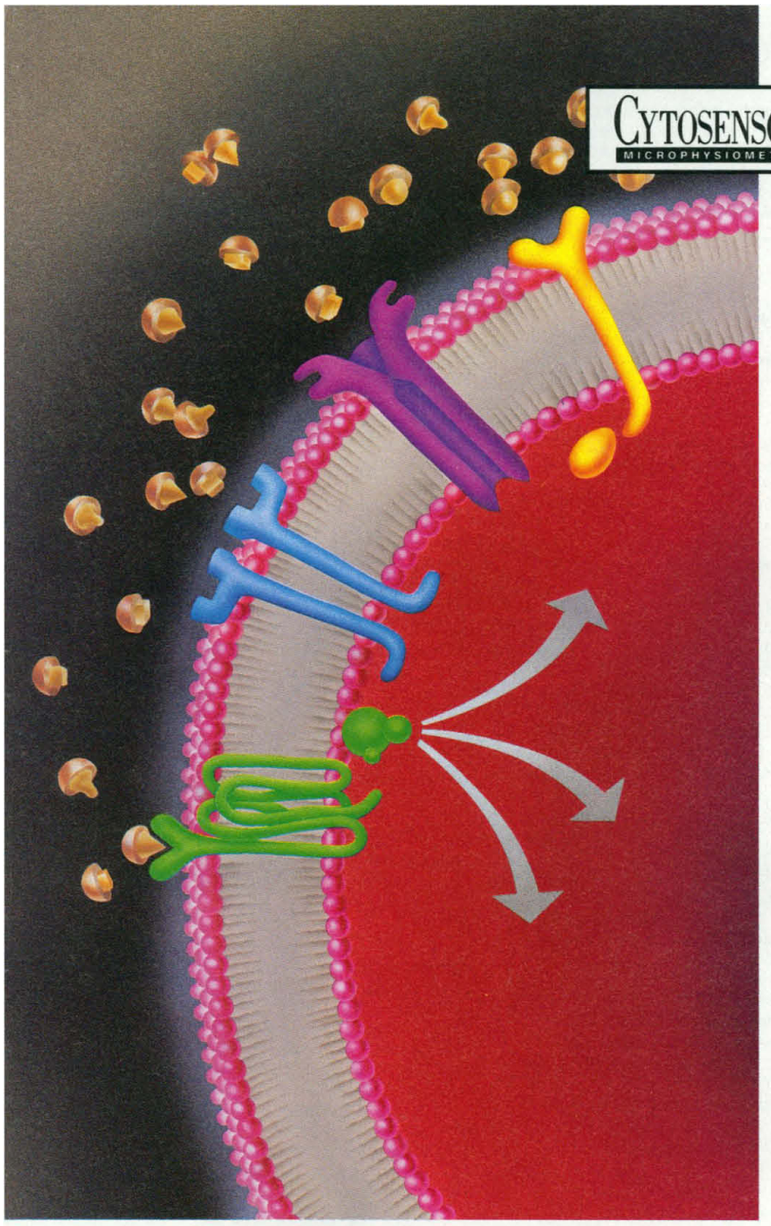

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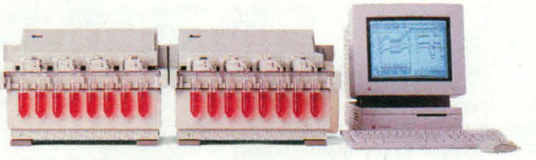

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1. *Science* **257**, 1906-1912, (1992) 2. *J. NIH Research* **5**, 69, (1993)

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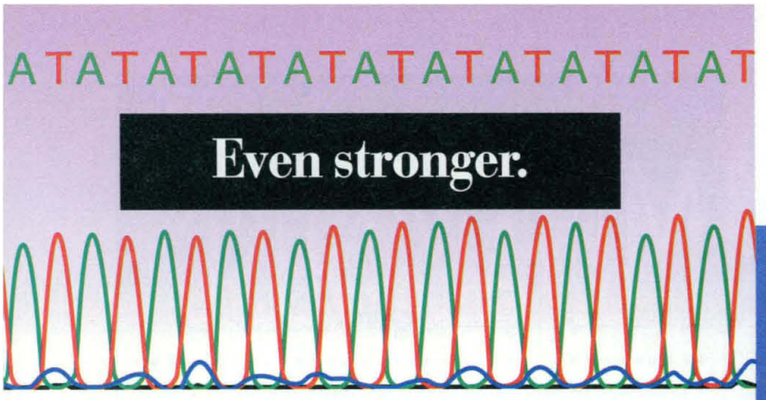

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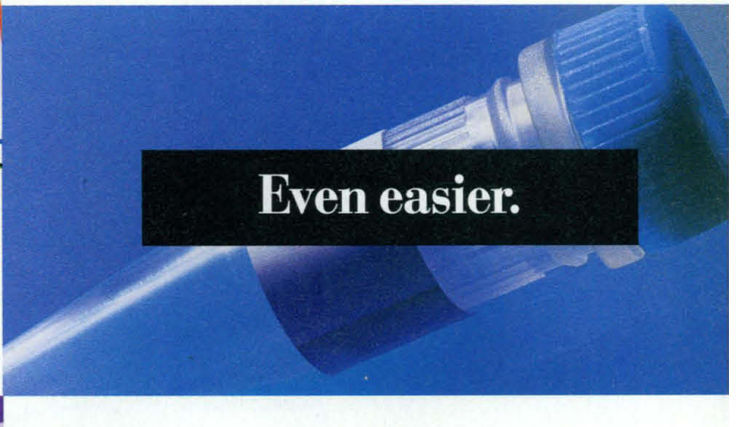

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