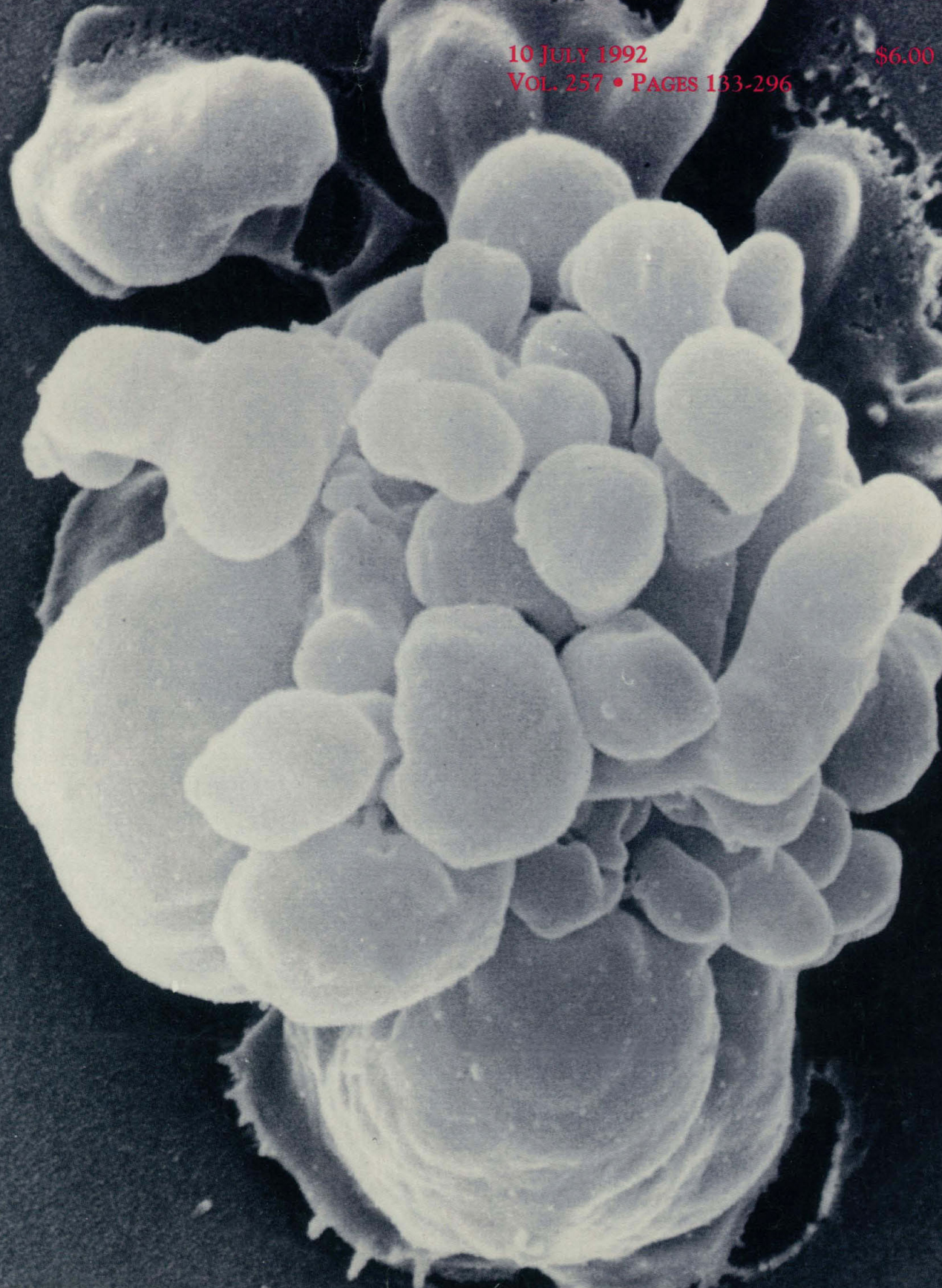


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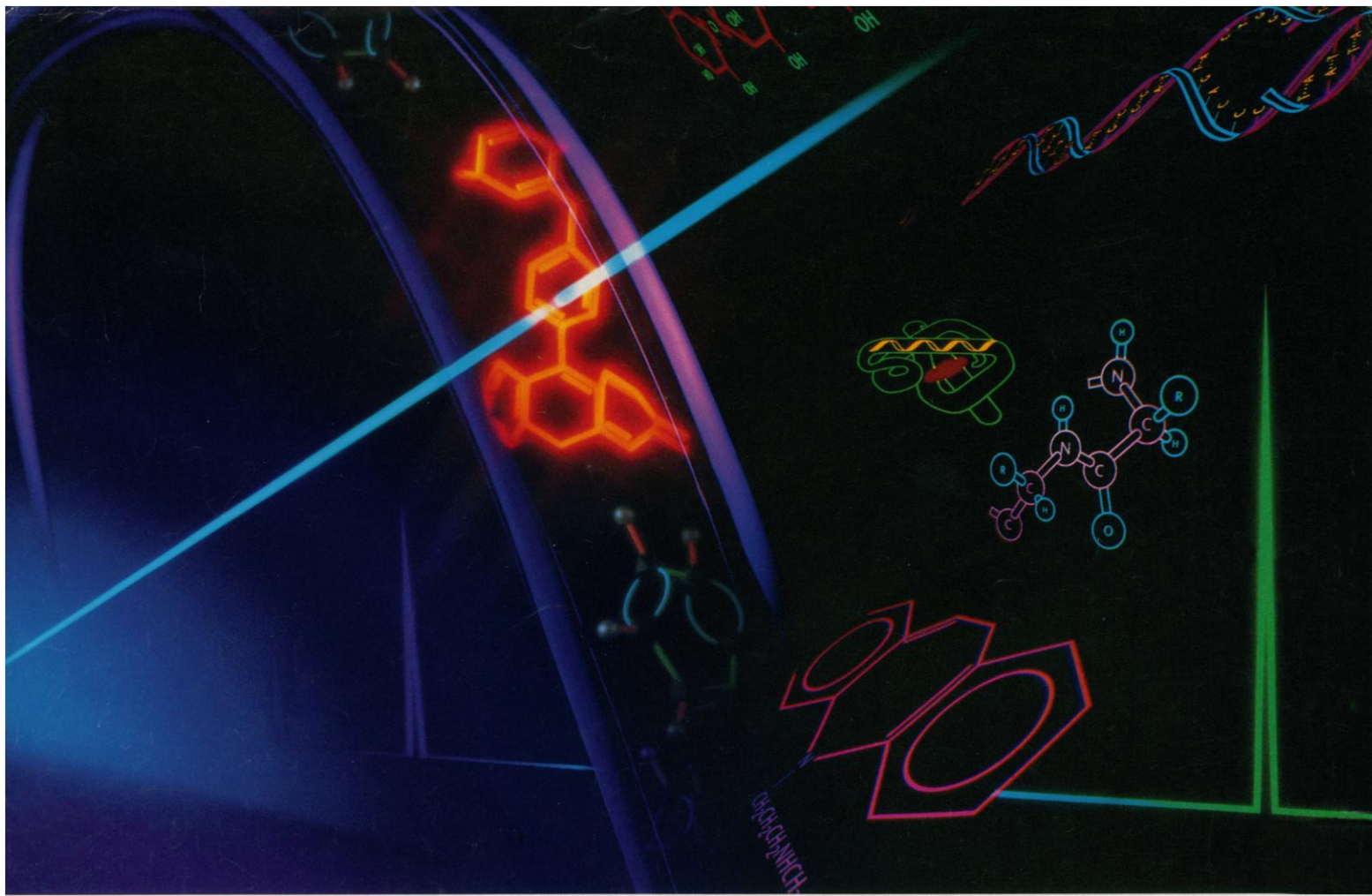
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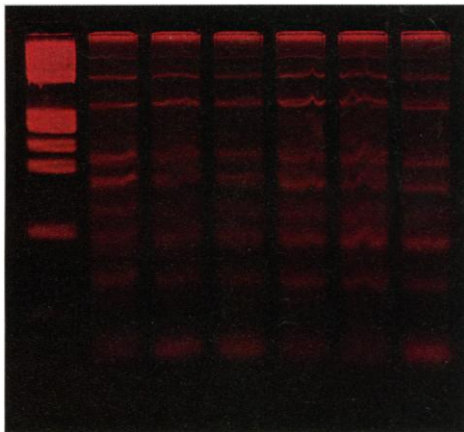
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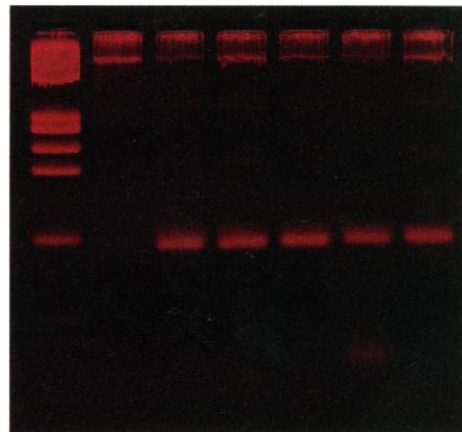
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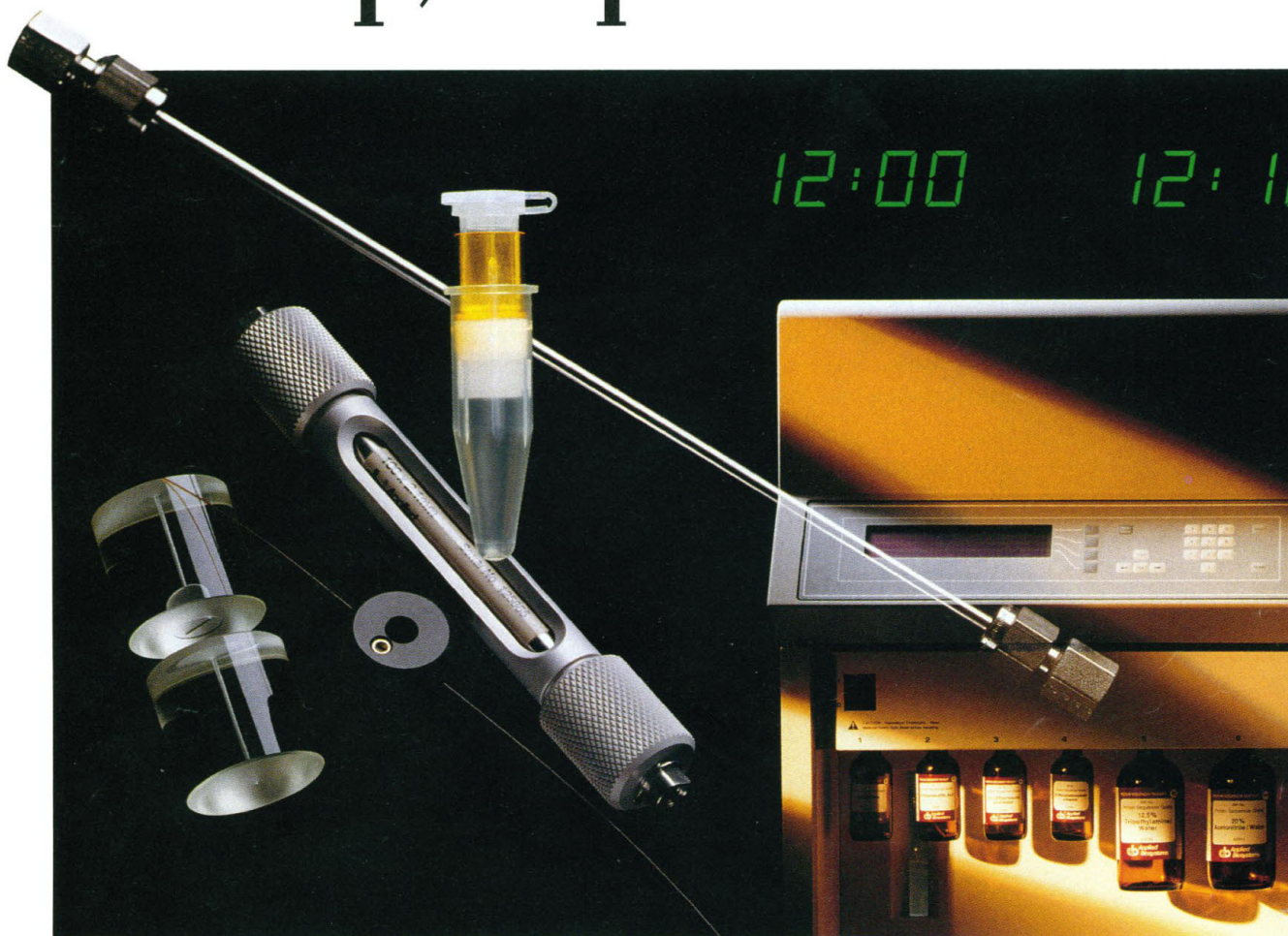


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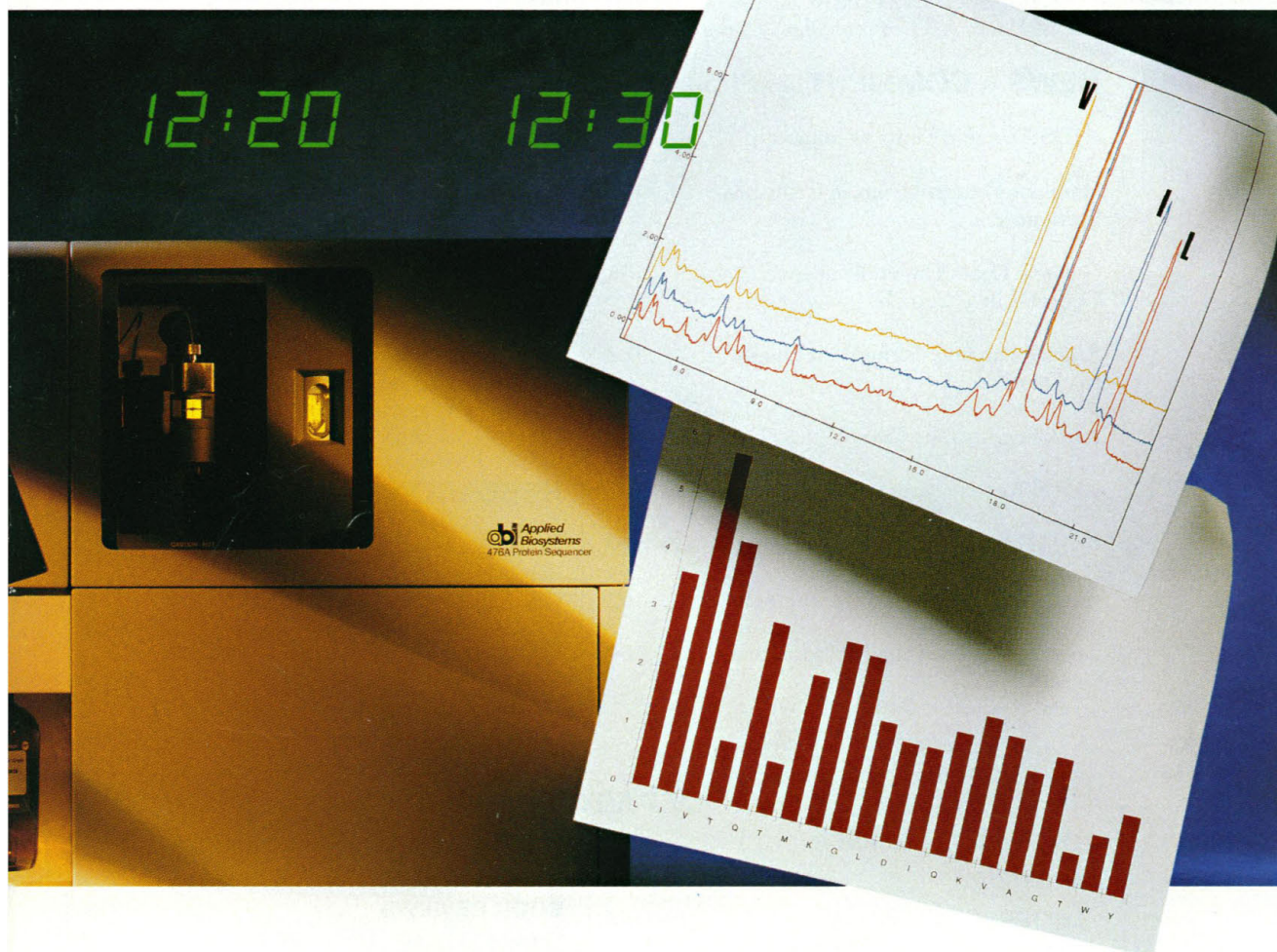
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Scanning electron micrograph of a T hybridoma cell undergoing activation-induced apoptotic cell death 6 hours after activation with a monoclonal antibody to the CD3 $\epsilon$  molecule. Activation-induced apoptosis in T

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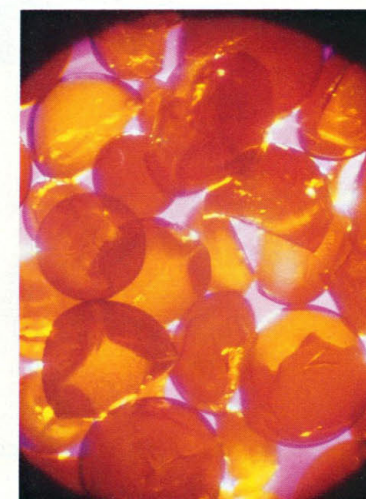
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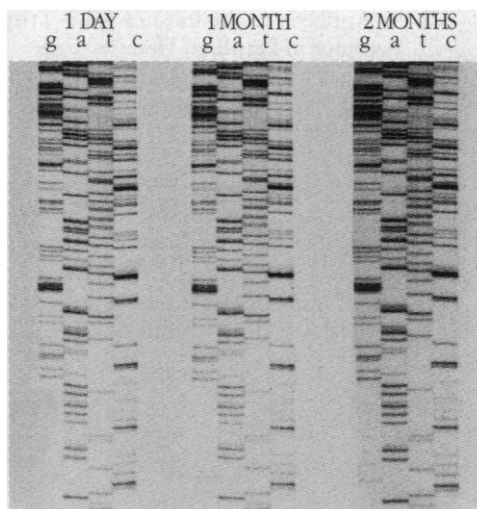
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## Welding under water

Pyroclastic volcanic explosions on land, such as occurred at Mount St. Helens, produce huge amounts of ash that can settle into large tuffs; as the thick layers of hot ash settle and slowly cool, glass and pumice shards commonly weld together and form a distinct texture in which air bubbles collapse and glass shards deform plastically. In contrast, subaqueous pyroclastic eruptions were thought to mix with water and cool too rapidly to weld. Kokelaar and Busby (p. 196), however, describe evidence for welding in an ancient submarine ash flow tuff from California. To account for the welding, they suggest that in subaqueous eruptions, most material is incorporated into a steadily flowing particulate stream in which water is excluded.

## Attractive yet transparent

Most magnetic materials at room temperature are opaque. Mesoscopic materials—particles in the range of 10 to 100 angstroms—may be one route to incorporating magnetic properties into a transparent material. Ziolo *et al.* (p. 219) have synthesized and characterized an iron oxide-polymer nanocomposite that exhibits a high degree of light transmission for visible wavelengths. Measurements show that the iron oxide particles have unusual magnetic properties: they are small enough that bulk magnetic properties have vanished, yet they are strongly susceptible to magnetization by an external field. Potential applications might include magnetic storage of data and electro-optical device fabrication.

## C<sub>60</sub> and C<sub>70</sub> in Precambrian rocks

Fullerene molecules have now been found in nature. Fullerenes might be present in the atmospheres of carbon-emitting stars, but the astrophysical data are still ambiguous and searches for fullerenes in meteorites have turned up nothing to date. Buseck *et al.* (p. 215; see news story by Amato, p. 167) report the discovery of C<sub>60</sub> and C<sub>70</sub> in a carbon-rich Precambrian rock found near the town of Shunga in Karelia, Russia. The authors obtained high-resolution transmission electron micrographs and mass spectra of carbon films from fracture walls inside the rock. The puzzle now is how the fullerenes formed in this geological environment.

## Subsurface chemistry

Hydrogen can adsorb below the surface of metals and can show enhanced chemical reactivity compared with hydrogen adsorbed on the metal surface. Johnson *et al.* (p. 223) show that methyl groups (CH<sub>3</sub>) adsorbed on a well-defined nickel surface [the (111) face of a single crystal] react with subsurface hydrogen to form methane, but that hydrogen adsorbed at surface sites is unreactive under the same conditions. Molecular beam methods were needed to prepare a surface with only subsurface hydrogen. These studies help clarify the chemistry of subsurface hydrogen, whose role has been suggested from studies of industrially important heterogeneous catalysts.

## Early eukaryotes

The time and origin of the eukaryotes has been uncertain; several estimates have been about 1.7 to 1.8 billion years ago. Han and Runnegar (p. 232) now describe coiled megascopic fossils that resemble *Grypania spiralis*, a probable eukaryotic alga, from 2.1-billion-year-old rocks in Michigan. Because *Grypania* are thought to be organelle-bearing eukaryotes, the eukaryotes most likely evolved much earlier.

## Wilms tumor targets

The p13 region of human chromosome 11 is associated with Wilms tumor, a hereditary malignancy of the kidney that occurs in children. The *wt1* gene has been isolated from this region and appears to function in the development of Wilms tumor as well as in kidney and gonadal development. Bickmore *et al.* (p. 235) studied the DNA-binding properties of alternative forms of the protein encoded by *wt1*. Binding to DNA occurs through zinc finger structures in these molecules, and alternative splicing of the gene produces molecules with different spacings between the zinc fingers. The minor product has high affinity for the binding site for the early growth response family of proteins, whereas the major product, which contains three extra amino acids between two of the zinc fingers, is specific for a binding site not recognized by the minor form. Thus the *wt1* gene products generated by alternative splicing may have different cellular targets.

## Restoring immunity against CMV

In immunodeficient persons, such as persons with AIDS or those undergoing cancer chemotherapy or receiving trans-

plants, infectious agents that are normally kept in check by T cell responses can proliferate. For example, infection with cytomegalovirus (CMV) usually does not produce symptoms in healthy individuals, but CMV infection in immune-compromised individuals can cause blindness, pneumonia, and ultimately death. Riddell *et al.* (p. 238; see news story by Hoffman, p. 166) show that immunity against CMV in humans can be restored by adoptive transfer of T cells. Cytotoxic CD8<sup>+</sup> T cells specific for CMV were isolated from the bone marrow of donors who were infected with CMV. These T cells were cloned and propagated in an in vitro system and then infused into the bloodstream of bone marrow transplant recipients. The recipients did not show any toxic responses, and the cytotoxic effects of the clones appeared to be persistent.

## Syntaxins and synapses

Neurotransmitters are released when synaptic vesicles fuse with the presynaptic plasma membrane in response to an increase in the concentration of intracellular calcium. However, the molecular mechanisms by which vesicles associate with the membrane and fuse with it are not known. Bennett *et al.* (p. 255) describe two proteins called syntaxins that might participate in this process. The syntaxins directly associate with synaptotagmin, a protein that exists in the synaptic vesicle membrane, and also appear to interact with the N-type calcium channel. The syntaxins might take part in docking of synaptic vesicles near calcium channels in the presynaptic membrane.



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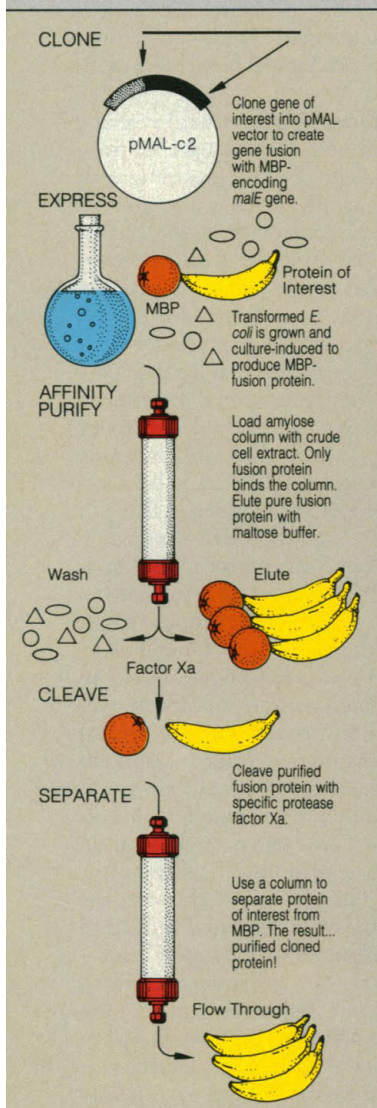
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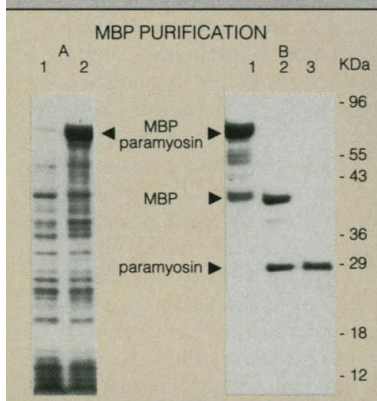
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SDS-polyacrylamide gel electrophoresis of fractions from the purification of MBP-paramyosin-ΔSal. A: Lane 1: uninduced cells. Lane 2: induced cells. B: Lane 1: purified protein eluted from amylose column with maltose. Lane 2: purified protein after factor Xa cleavage. Lane 3: paramyosin fragment eluted from second amylose column.



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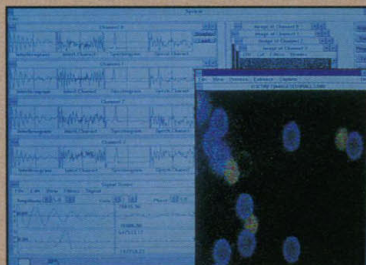
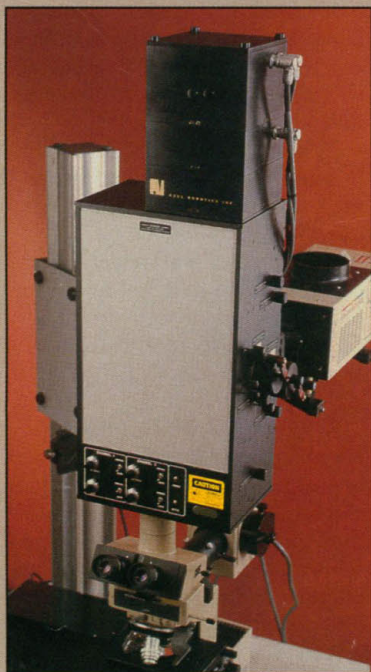
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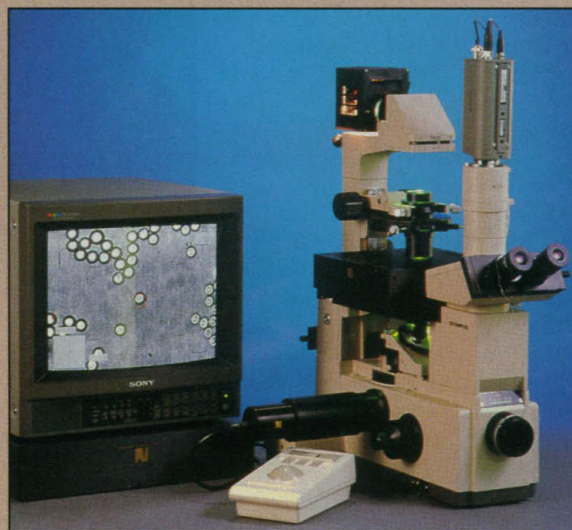
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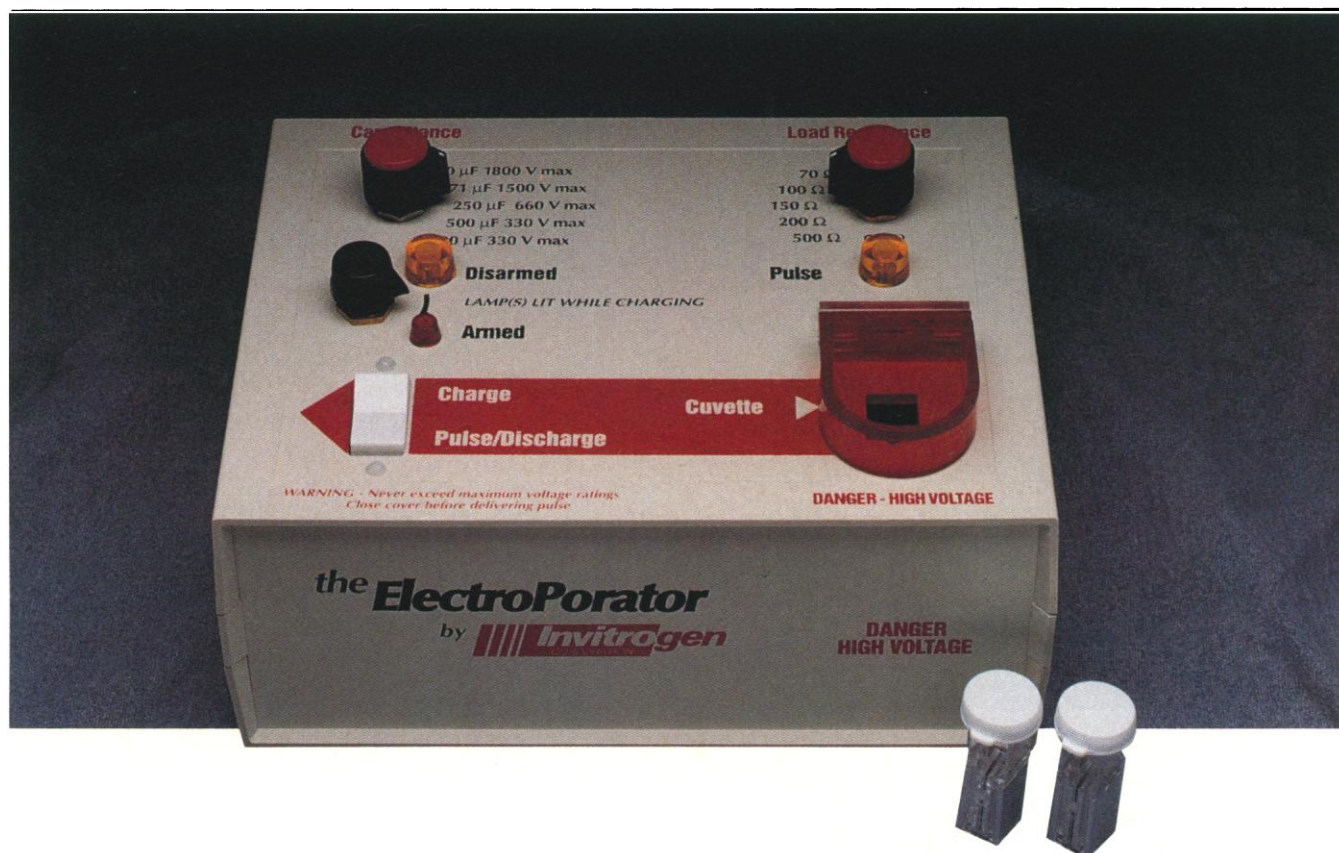


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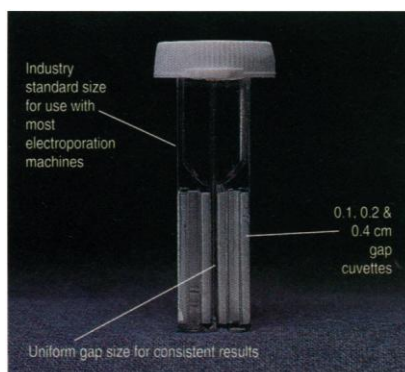
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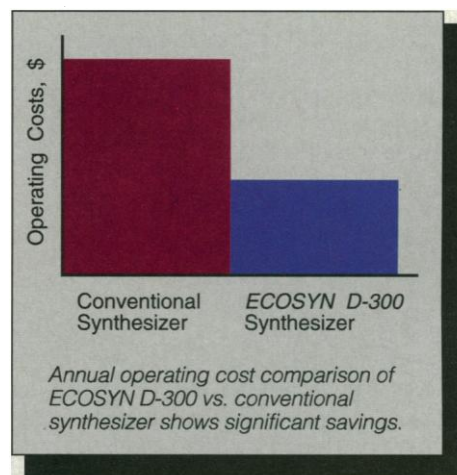
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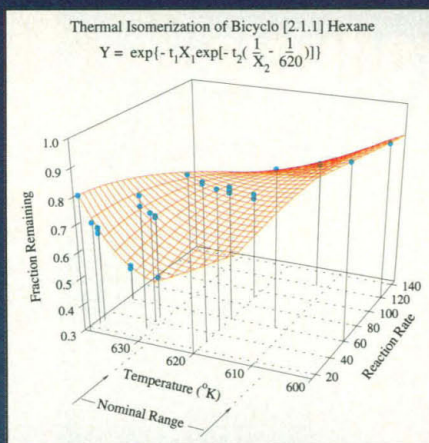
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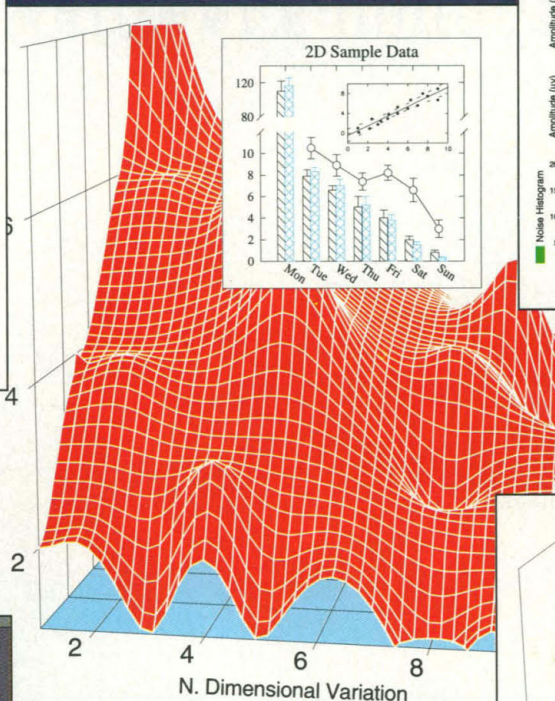
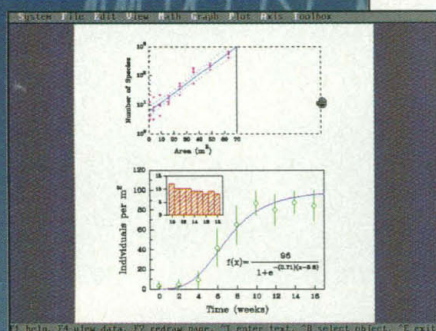
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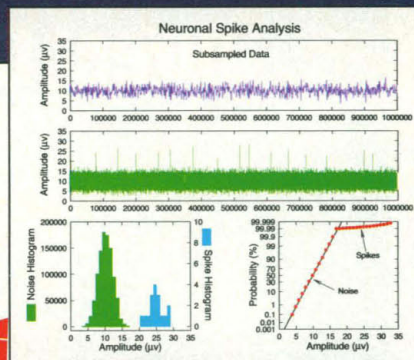


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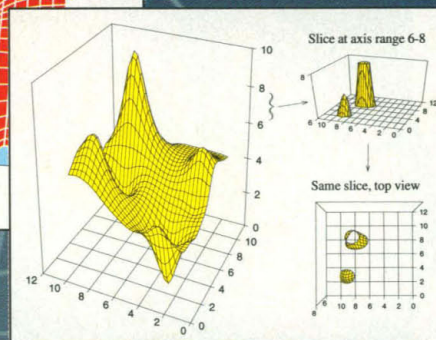
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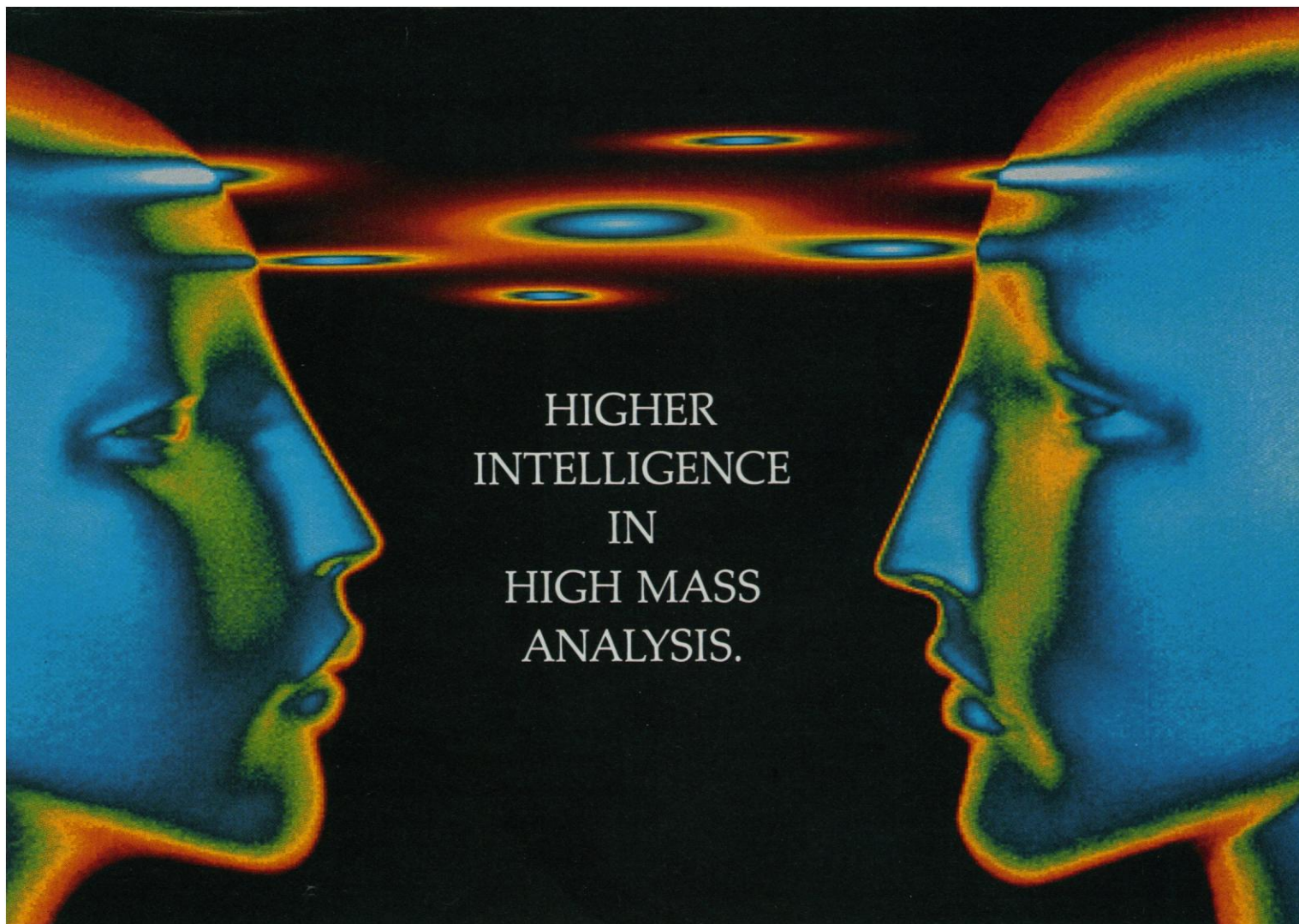
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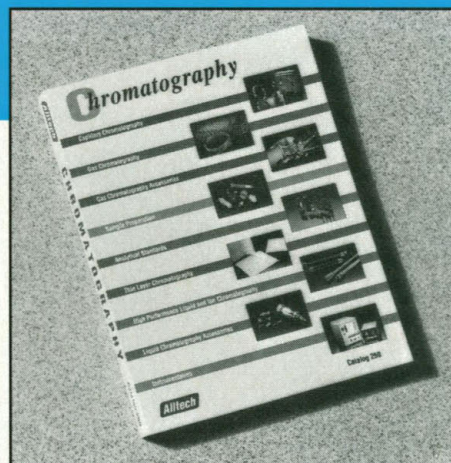
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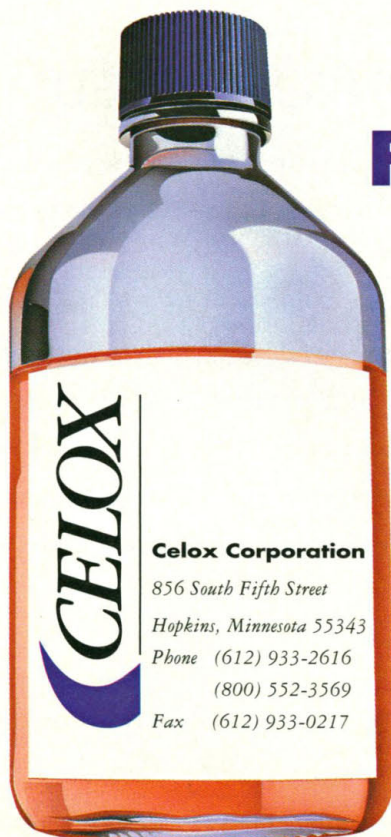
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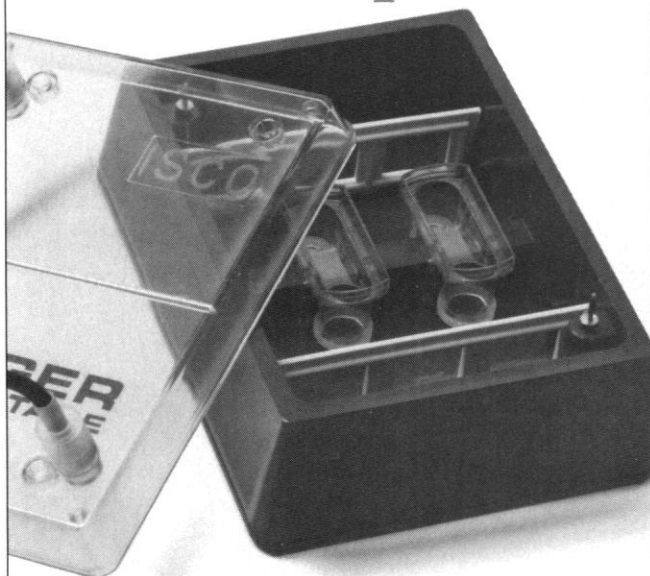
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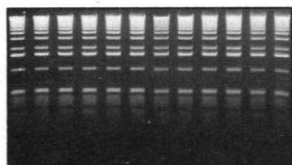


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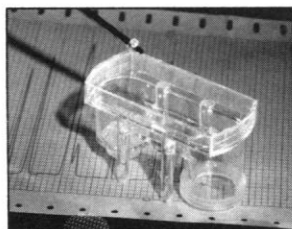
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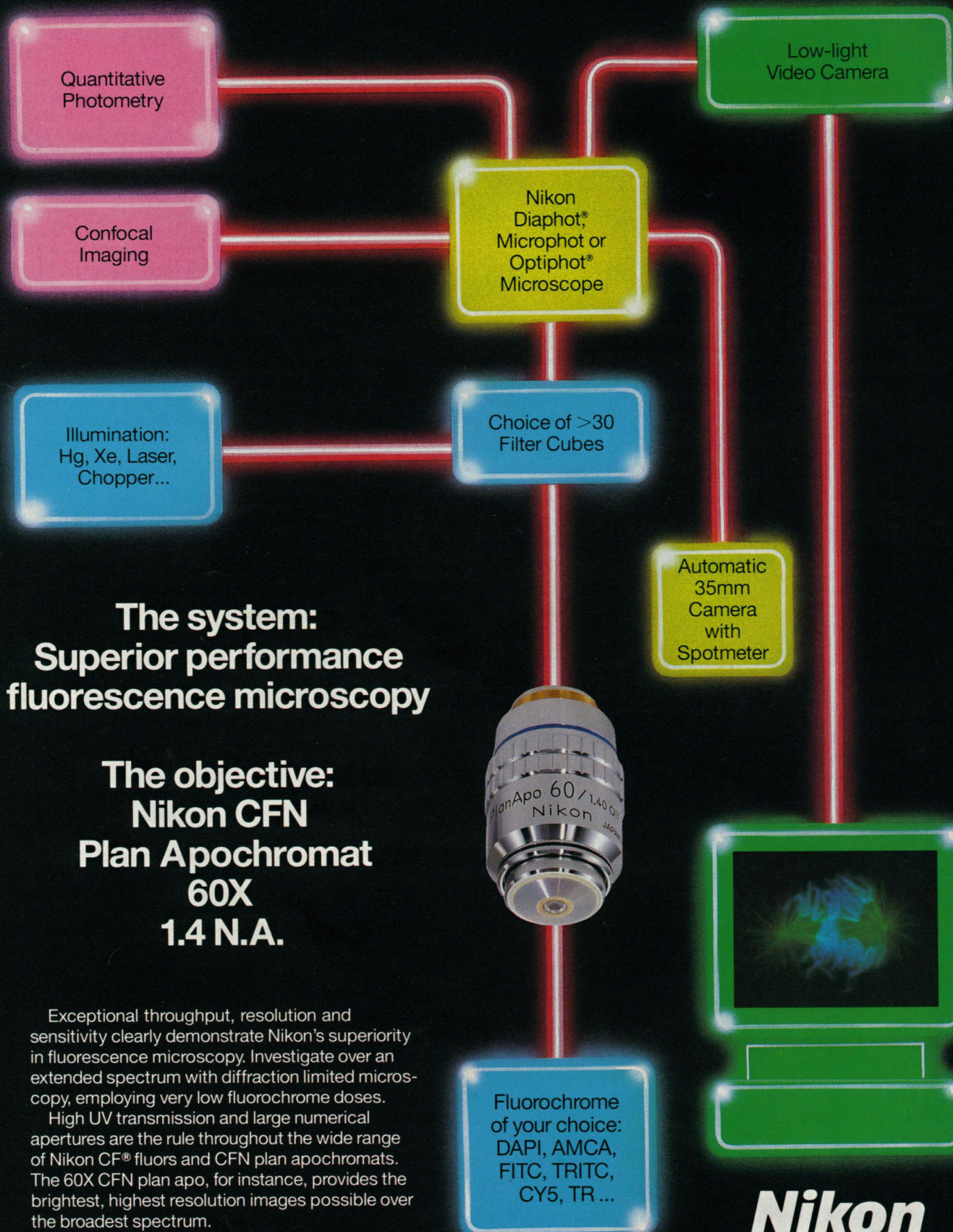
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- Bacterial Adherence & Colonization
- Metabolism & Processing of CFTR
- Pseudomonas Vaccines & Prospects for Immunotherapy
- Structure/Function of Secretory Cells
- Transplantation: How to Manage Patients
- Current & Future Topics in Nutrition
- Living with CF: Individual & Family Perspectives
- Clinical Questions in GI Management

### ▲ SHORT COURSES

- Human Subjects Research: Design & Grantsmanship
- Modern-Day Molecular Genetics for the Clinician
- Research Nurse/Study Coordinators' Training
- Technological Advances in CF Home Care

### ▲ PROGRAM COMMITTEE

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### ▲ CONTRIBUTED PAPERS AND CONFERENCE PUBLICATION

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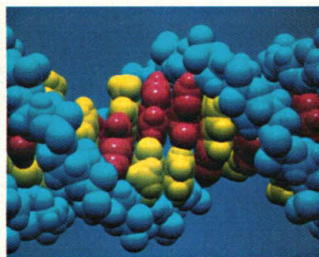
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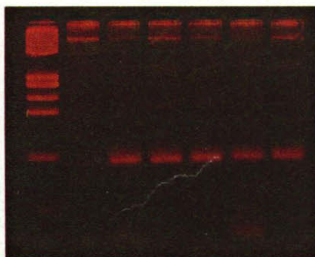
**For more information, please contact the CFF.**



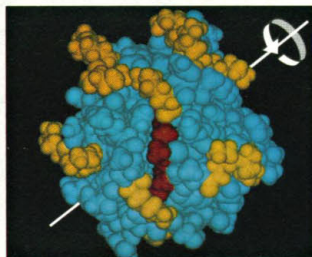
# One Fluorimeter Fits All.



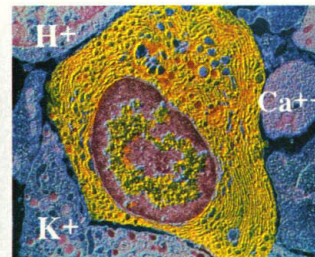
*DNA Quantitation*



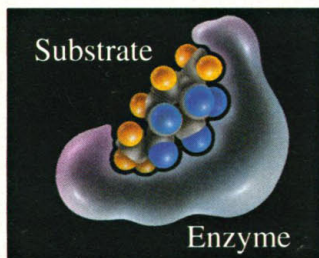
*Gel Scanning*



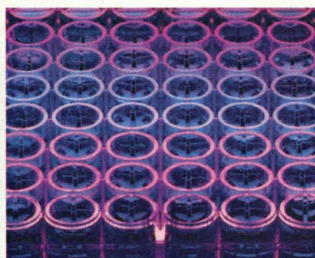
*Macromolecular Anisotropy Measurements*



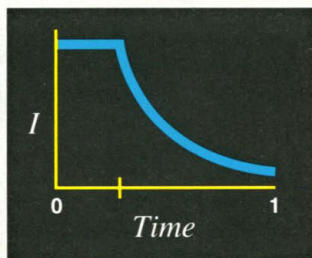
*Intracellular Ion Determinations*



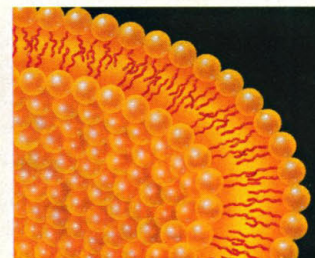
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If your abstract is accepted, you will be assigned to a poster session and provided with a 4' × 8' bulletin board on which to display graphics and text for two hours, during which you can discuss your work with interested colleagues. Accepted abstracts will also be published and distributed to all AAAS★93 registrants.

Below you will find complete instructions on how to submit an abstract for a poster presentation. (Note: Poster presenters are required to register for AAAS★93.)

**Student Research Awards:** To encourage the development of young scientists and to recognize their achievements in all fields of scientific research, AAAS will feature exceptional research by undergraduate and graduate students in a special poster session at AAAS★93. A panel of distinguished scientists will evaluate the

student posters and award cash prizes for the top three presentations in each of three broad categories: physical sciences, life sciences, and social sciences. (Awards for each category are: 1st prize—\$500; 2nd prize—\$250; 3rd prize—\$100.) Students who wish to be considered for this distinction should include the words “Student Award Entry” above their abstracts (see instructions below).

**Suggested Topics for Posters:** AIDS ♦ Anthropology ♦ Causing and Coping with Environmental Change ♦ Climate Change ♦ Eastern and Central Europe ♦ Economics ♦ Future Chemistry ♦ Global Cooperation and Survival ♦ The Human Genome ♦ Human Obesity ♦ Information Technology and the Changing Face of Science ♦ Life, the Universe, and Physics ♦ Mapping the Human Brain ♦ Marine Biology and Invertebrates ♦ Math and Statistics ♦ Medicine and Health Care ♦ Nanoengineering ♦ Phosphatases and Kinases ♦ Plant Biotechnology ♦ Psychology ♦ Science and Corporate Enterprise ♦ Science and the Media ♦ Science and Religion ♦ Science Education Reform in America ♦ Science, Technology, Ethics, and the Law

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**Endorsement:** An abstract for a poster presentation will be considered only if it is submitted or endorsed by a AAAS member or fellow; however, that member or fellow need not be the person who actually presents the paper. AAAS members are encouraged to solicit abstracts from their students and to endorse those that they consider worthy of presentation.

**Registration:** The person presenting the paper must be registered for AAAS★93.

**Format of Abstracts:** Type the text of the abstract to fit within a 5" square in the center of an 8.5" × 11" sheet of white paper. Use only a typewriter or letter-quality (not dot matrix) printer. Use black ink for all hand lettering. Indent, space, underline, and capitalize as in the example on the right. Justify text, if possible. Do not double-space the body of the text. Do not draw a box around the abstract, nor cut out the abstract. **Above the 5" square**, type the name of the topic to which the abstract most closely relates (see list of suggested topics above). If the poster will be presented by an undergraduate or graduate student and you wish it to be considered for the student awards, type the words “Student Award Entry” under the track or seminar name. **Below and to the left of the square**, type the name, address, phone number, and fax number of the poster presenter to be contacted regarding status and scheduling. **Below and to the right of the square**, type the name, affiliation, and complete membership number (from *Science* mailing label) of the member or fellow endorsing the abstract and provide his/her signature.

**Mailing Instructions:** Mail the abstract *flat* (do not fold or bend). Send original plus two photocopies to: AAAS '93 Contributed Papers, AAAS Meetings Office, 1333 H Street, NW, Washington, DC 20005, USA.

**Deadline for Abstracts:** 6 November 1992

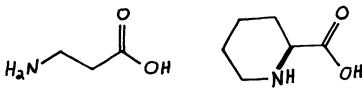
Topic to which abstract relates

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Indent Seven Spaces and Type Title in Upper and Lower Case Letters and Underline. AUTHOR'S NAME IN UPPER CASE (Institution Name in Upper and Lower Case Within Parentheses), SECOND AUTHOR (Institution), etc.

Skip one line and type abstract. The full width of the column of typed material should be 5 inches (12.7 cm) and must not extend beyond that. The total length of the material, from top of title to bottom of footnotes, must not exceed 5 inches (12.7 cm). Abstracts that exceed these parameters will be returned. Any special symbols or signs that must be hand lettered should be rendered in reproducible black ink as clearly and carefully as possible. The entire submission should be of camera-ready quality so that it can be photographed and printed. The printed abstract will be about 2/3 the size of the typed version. Justify, if possible. Avoid paragraphing, as this wastes space. However, you may use your allotted space to neatly letter equations and diagrams as you deem necessary, as in this example:



You may also use your allotted space for footnotes.\*

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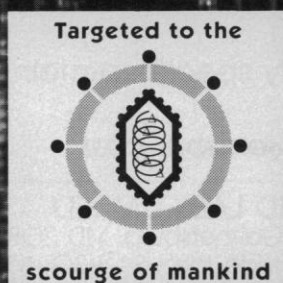


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CLONE	BINDS TO AMINO ACID RESIDUES NO.	NEUTRALIZING
<i>Anti-gp41 anti-gp160 monoclonal antibodies</i>		
IAM 41-3D6	env 604-617	No
IAM 41-4D4	env 590-600	No
IAM 41-4B3	env 580-604	No
IAM 41-25C2	(a)	No
IAM 41-2F5	known (patent pending)	Yes
IAM 41-3H12	env 693-856	No
IAM 41-5F3	(a)	No
<i>Anti-gp120 anti-gp160 monoclonal antibodies</i>		
IAM 120-2G12	(b)	Yes
IAM 120-3D12	(b)	Yes
IAM 120-1B1	(b) (blocks CD4 binding)	Yes
IAM 120-2G6	(b)	No
<i>Anti-p24 monoclonal antibodies</i>		
IAM 24-37G12	structural epitope	No
IAM 24-3A6	p 24 122-149	No
IAM 24-ID7	unknown	No
<small>(a) Binding site at residues 532-542, 556-566, or 683-693 of gp160; or structural epitope.  (b) Binds to carbohydrate moieties anchored between residues 001-201, 216-254, 285-302, 328-414, or 434-475 of gp160.  All IAM anti-gp41 and anti-gp120 antibodies also bind to gp160.</small>		

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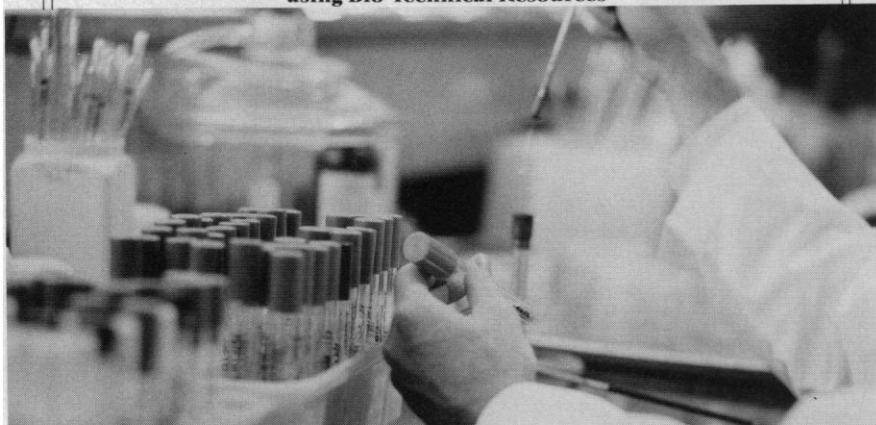
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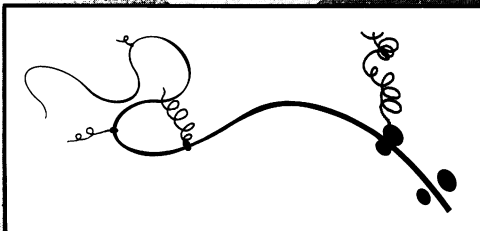
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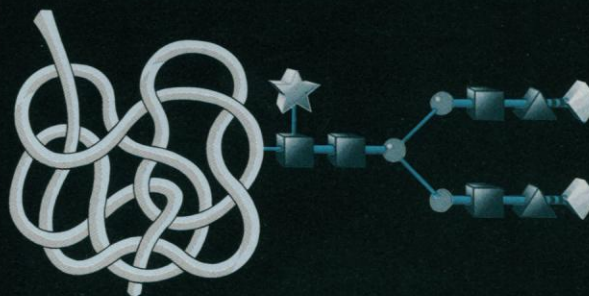
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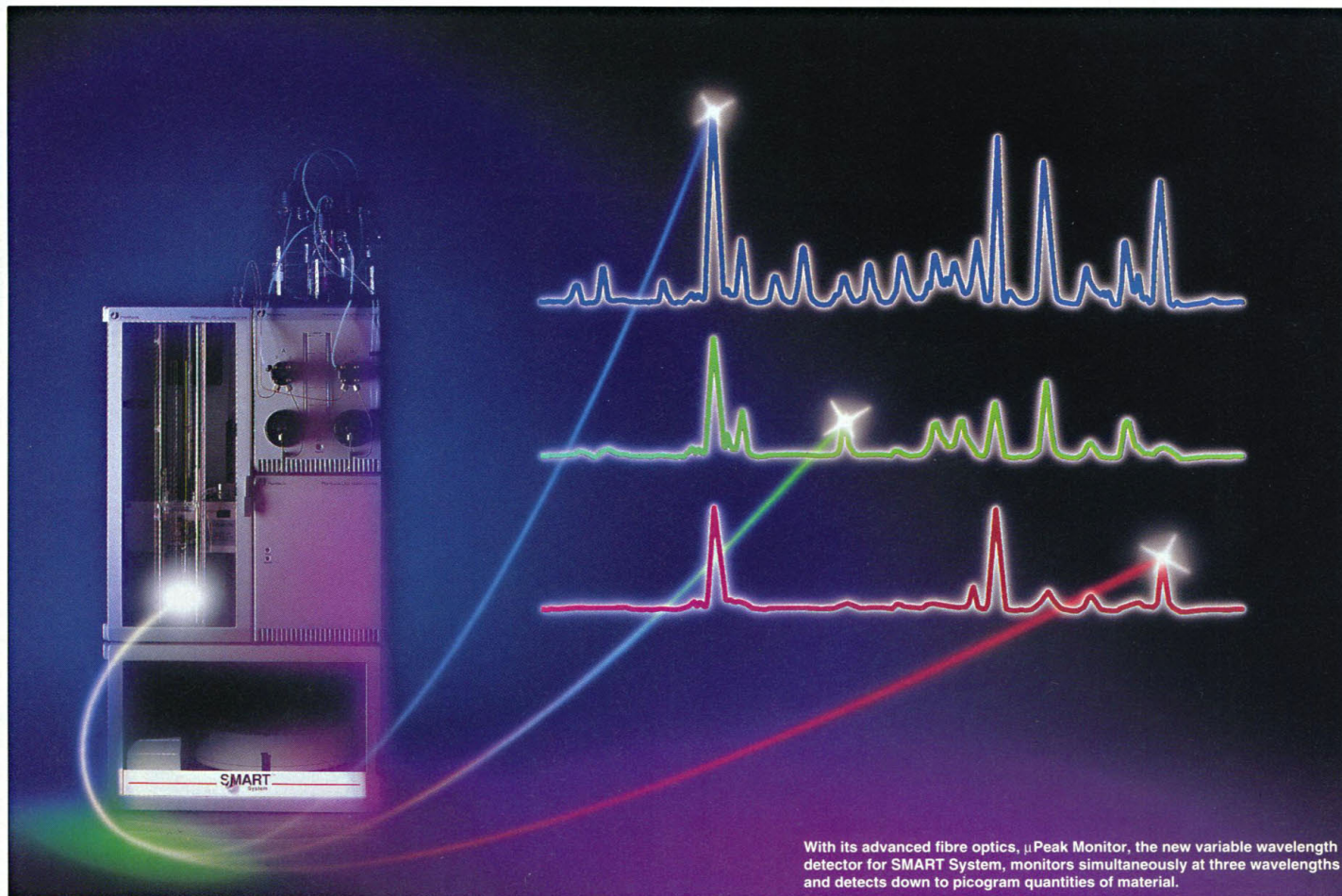
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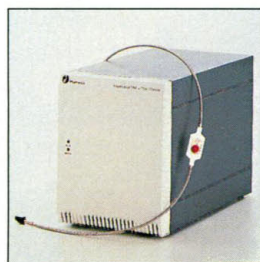




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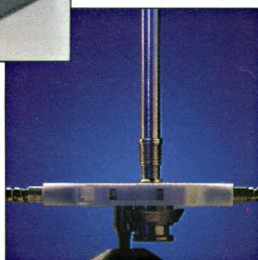
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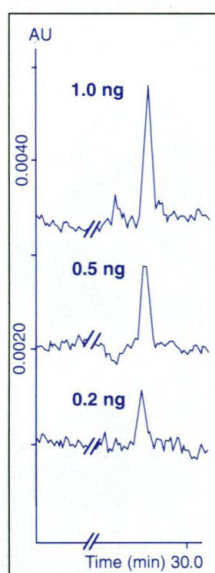
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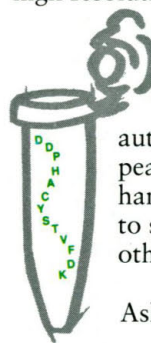
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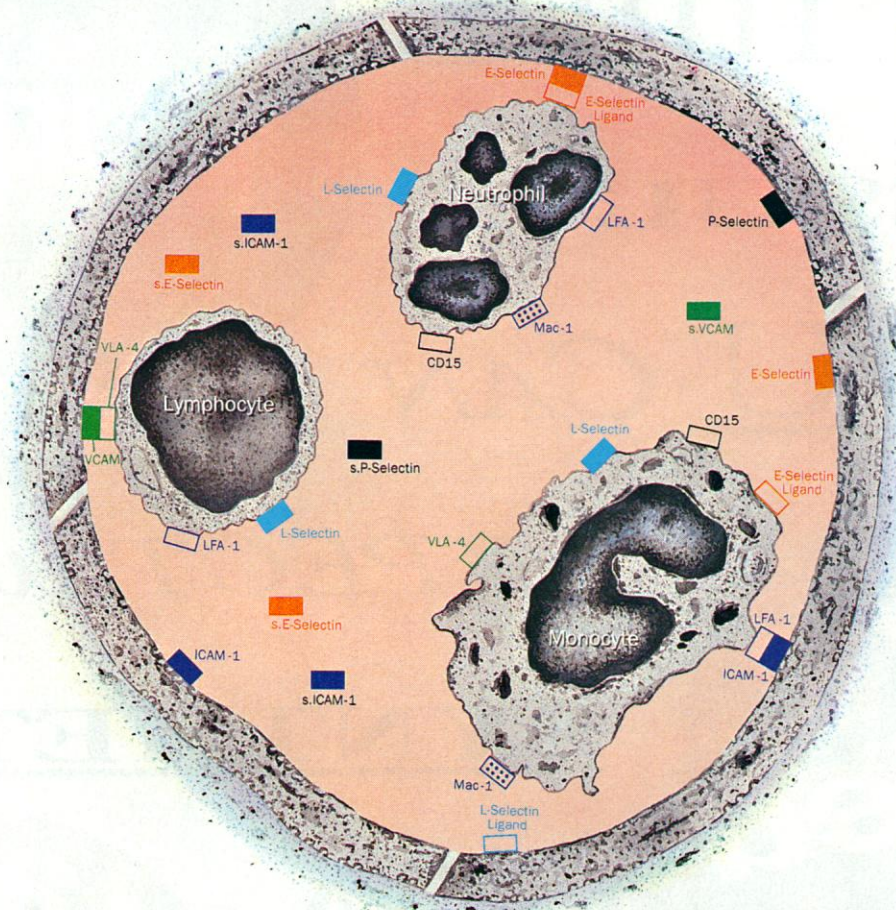
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Gearing, A.J.H. et al, In Press, Annals N. Y. Acad. Sci.

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**Cancer researchers report a growing interest in endothelial adhesins....**

- ▶ Current reports have suggested a role for intracellular adhesion molecule 1 (ICAM-1) in the progression of human malignant melanoma and other cancers. Stage I, II and III patients with histologically diagnosed malignant melanoma had significantly increased serum levels of circulating ICAM-1, (ciCAM-1). We suggest that elevated levels of serum ciCAM-1 may be of diagnostic and prognostic importance in patients with malignant cutaneous melanoma. ◀◀

Harning, R. et al, Cancer Research (1991) 51, 5003-5005.

**On-going studies into inflammatory diseases cite soluble adhesins as an area of potential importance....**

- ▶ Studies have shown differences in intensity related to age and to particular inflammatory conditions (Such as rheumatoid arthritis, systemic lupus erythematosus, metastatic cancer, and acute urolithiasis) of both ICAM-1 and VLA (unpublished). ◀◀

Seth, R. et al, The Lancet (1991) 338, 83-84.

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Giavazzi, R. et al, Cancer Research (1992)

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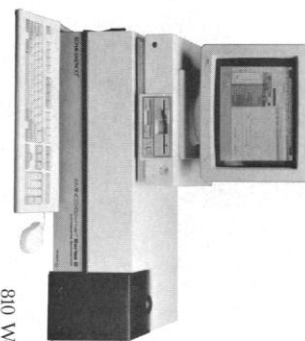
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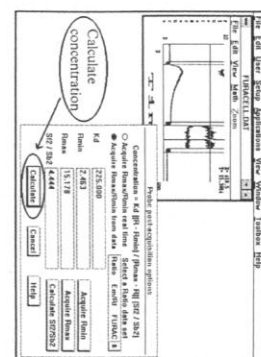
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  - "Automated LC/MS/MS Sequence Analysis of Peptide Digests" — Terry Lee, City of Hope Medical Centre.
  - "New Matrices Extending the Biological Applications of Laser Desorption Time of Flight Mass Spectrometry" — John Yates, California Inst. of Technology.
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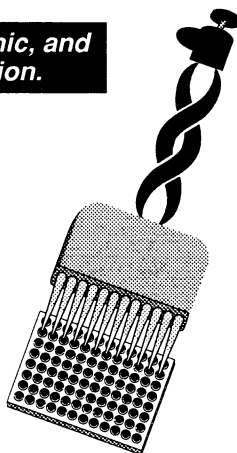


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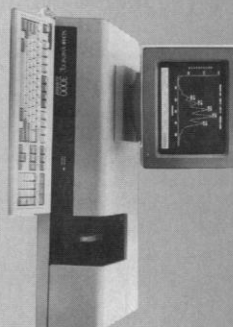
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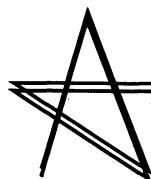
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# Ion Channels in the Cardiovascular System

✧ 12–15 September 1992 ✧

Westfields International Conference Center, Chantilly, VA

*Sponsored by National Heart, Lung, and Blood Institute, NIH and American Association for the Advancement of Science*

Take part in an intensive conference that will synthesize the recent explosion of information on the function and dysfunction of ion channels in the cardiovascular system.

The conference will bring together leaders from three groups: basic scientists researching molecular aspects of cardiovascular channel structure and function, academic clinicians concerned with disease processes resulting from channel dysfunction, and pharmaceutical scientists involved in the design and testing of channel active drugs.

Discussion will focus on such issues as subunit function, modulation and control, mutagenesis and amino acid replacement studies, de- and repolarizing sodium and potassium

channels, and channel involvement in disease processes (e.g., arrhythmias and sudden death). Participants will explore the ways in which this information could be used in the development of new pharmaceuticals to treat ion channel mediated diseases.

Westfields, a state-of-the-art conference center, will provide an atmosphere conducive to a high level of interaction among the participants and make you feel like a guest at one of Virginia's magnificent colonial estates. Yet, it's just minutes from Washington's Dulles International Airport.

Space is limited, so use the registration form on page 273 today!

---

**Program Committee:** Arthur M. Brown (*co-chair*), William A. Catterall (*co-chair*), Gregory J. Kaczorowski, Arnold M. Katz, Thomas W. Smith, Peter M. Spooner, Harold C. Strauss, August Watanabe, Robin Yeaton Woo

## Saturday, 12 September

Noon – 3:00pm **Registration**

3:00pm – 3:05pm **Welcome**

**Peter M. Spooner**, *National Heart, Lung and Blood Institute* **Robin Yeaton Woo**, *American Association for the Advancement of Science*

3:05pm – 3:30pm **Opening Remarks**

**Arnold M. Katz**, *Univ. of Connecticut Health Ctr.*  
Ion channels and cardiology: Need for bridges across a widening boundary

3:30pm – 5:30pm **Ion Channels and Cardiac Disease: Dimensions of the Problem — Clinical Tutorial**

**Harold C. Strauss**, *Duke Univ. Med. Ctr.*  
Conformational-dependent drug binding to cardiac potassium channels

**Robert J. Meyerburg**, *Univ. of Miami Sch. of Med.*  
Epidemiology of sudden cardiac death (SCD)

**Peter J. Schwartz**, *Univ. of Pavia*  
Autonomic markers of SCD

**Douglas P. Zipes**, *Indiana Univ. Sch. of Med.*  
Autonomic mechanisms underlying arrhythmogenesis and SCD

**A. John Camm**, *St. George's Hosp. Med. Sch.*  
Current pharmacologic and nonpharmacologic approaches to SCD

5:30pm – 6:00pm **Break**

6:00pm – 8:00pm **Ion Channels and Cardiac Disease: Fundamentals of the Problem — Basic Science Tutorial**

**William A. Catterall**, *Univ. of Washington*  
Introduction to molecular analysis of ion channel structure

**Arthur M. Brown**, *Baylor Coll. of Med.*  
Introduction to biophysical analysis of ion channel function

8:00pm **Dinner**

## Sunday, 13 September

7:00am – 9:00am **Breakfast**

9:00am – 12:30pm **Ion Channels and Cardiovascular Function**

Chair: **Harold C. Strauss**, *Duke Univ. Med. Ctr.*

**Harry A. Fozzard**, *Univ. of Chicago*  
Sodium channels and cardiac excitability

**Eduardo Marban**, *Johns Hopkins Univ.*  
Sodium and calcium channels in the heart



**Michael C. Sanguinetti**, *Merck Research Labs*  
Delayed rectifier K<sup>+</sup> channels of cardiac muscle

**Joseph R. Hume**, *Univ. of Nevada Sch. of Med.*  
Chloride channels

**David C. Spray**, *Albert Einstein Coll. of Med.*  
Cardiovascular gap junctions: Gating properties, function, and dysfunction

Discussion

12:30pm – 2:00pm **Lunch and Poster Session**

2:00pm – 5:00pm **Channel Modulation and Autonomic Control**

Chair: **Arthur M. Brown**, *Baylor Coll. of Med.*

**Wayne R. Giles**, *Univ. of Calgary Sch. of Med.*  
Alpha-1 adrenoceptor effects in single cells and sarcolemmal membranes from rabbit atrial and ventricular myocytes

**Bruce Bean**, *Harvard Univ.*  
Beta-adrenergic modulation of cardiac calcium channels

**Martin Morad**, *Univ. of Pennsylvania*  
Regulation of cardiac sodium channels by cAMP receptors

**Arthur M. Brown**, *Baylor Coll. of Med.*  
Pore of a K<sup>+</sup> channel and its regulation by G proteins  
Discussion

6:00pm – 8:00pm **Cocktails and Dinner**

8:00pm – 10:00pm **Poster Session**

## Monday, 14 September

7:00am – 9:00am **Breakfast**

9:00am – 12:30pm **Structure-Function of Ion Channels I**

Chair: **Arthur M. Brown**, *Baylor Coll. of Med.*

**Rod MacKinnon**, *Harvard Med. Sch.*  
Molecular physiology of potassium channels

**Richard Aldrich**, *Stanford Univ.*  
Mechanisms of voltage-dependent channel gating

**Peter Hess**, *Harvard Med. Sch.*  
Mechanisms of potassium channel gating probed by site-directed mutagenesis

**Michael M. Tamkun**, *Vanderbilt Med. Sch.*  
Molecular physiology of cardiac potassium and sodium channels

Discussion

12:30pm – 2:00pm **Lunch and Poster Session**

2:00pm – 5:00pm **Structure-Function of Ion Channels II**

Chair: **William A. Catterall**, *Univ. of Washington*

**William A. Catterall**, *Univ. of Washington*  
Structure and modulation of sodium channels

**Walter Stühmer**, *Max Planck Inst.*  
Extracellular potassium modulates a transient potassium current in rat atrial cells

**Kurt Beam**, *Colorado State Univ.*  
Structural basis of calcium channel function in skeletal muscle

**Franz Hofmann**, *Tech. Univ. of Munich*  
Regulation of the L-type calcium channel by its subunits

Discussion

6:00pm – 8:00pm **Cocktails and Dinner**

8:00pm – 10:00pm **Poster Session**

## Tuesday, 15 September

7:00am – 9:00am **Breakfast**

9:00am – Noon **Molecular Pharmacology**

Chair: **William A. Catterall**, *Univ. of Washington*

**Harold C. Strauss**, *Duke Univ. Med. Ctr.*  
Conformation-dependent drug binding to cardiac potassium channels

**Thomas Colatsky**, *Wyeth-Ayerst Research*  
Block of myocardial potassium channels by anti-arrhythmic drugs: Dependence on channel gating

**Robert S. Kass**, *Univ. of Rochester Med. Ctr.*  
Dihydropyridines and the molecular properties of heart calcium channels

**Jörg Striessnig**, *Inst. for Biochemical Pharmacology*  
Calcium antagonist binding domains of L-type calcium channels

Discussion

Noon – 2:00pm **Lunch**

2:00pm – 4:30pm **Drug Discovery**

Chairs: **August Watanabe**, *Eli Lilly & Co.*; **Gregory J. Kaczorowski**, *Merck Research Labs*

**Gregory J. Kaczorowski**, *Merck Research Labs*  
Strategies to discover novel ion channel modulators

**Benedict R. Lucchesi**, *Univ. of Michigan Med. Sch.*  
Potassium channels, repolarization, and antifibrillatory drugs

**S. David Kimball**, *Bristol-Meyers Squibb*  
The design of new calcium antagonists

**William C. Lumma, Jr.**, *Merck Research Labs*  
Inhibitors of cardiac delayed rectifying potassium currents as potential novel anti-arrhythmic agents  
Discussion

4:30pm – 5:00pm **Concluding Observations**

**Arnold M. Katz**, *Univ. of Connecticut Health Ctr.*  
Ion channels: Building the bridge

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[1] Includes conference registration, facilities, three nights lodging, snack breaks, all daily meals, tax, and gratuities from 3pm on 12 Sept. to 5pm on 15 Sept. Prices quoted are per person. Regular registrants will be housed at Westfields International Conference Center; graduate student registrants will be housed at a nearby hotel with shuttle service provided. All room requests are subject to availability.

	Advance	On site
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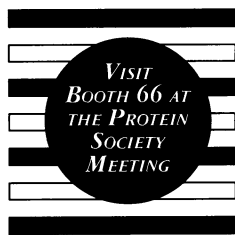
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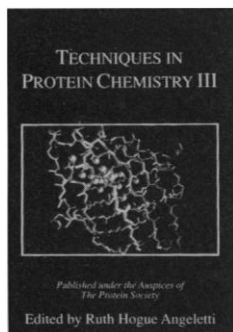
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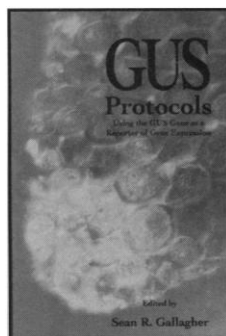
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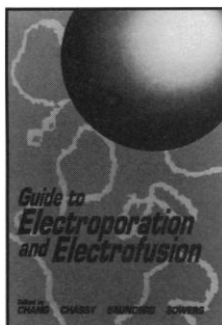
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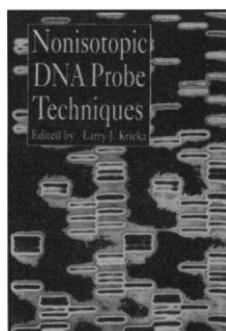


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