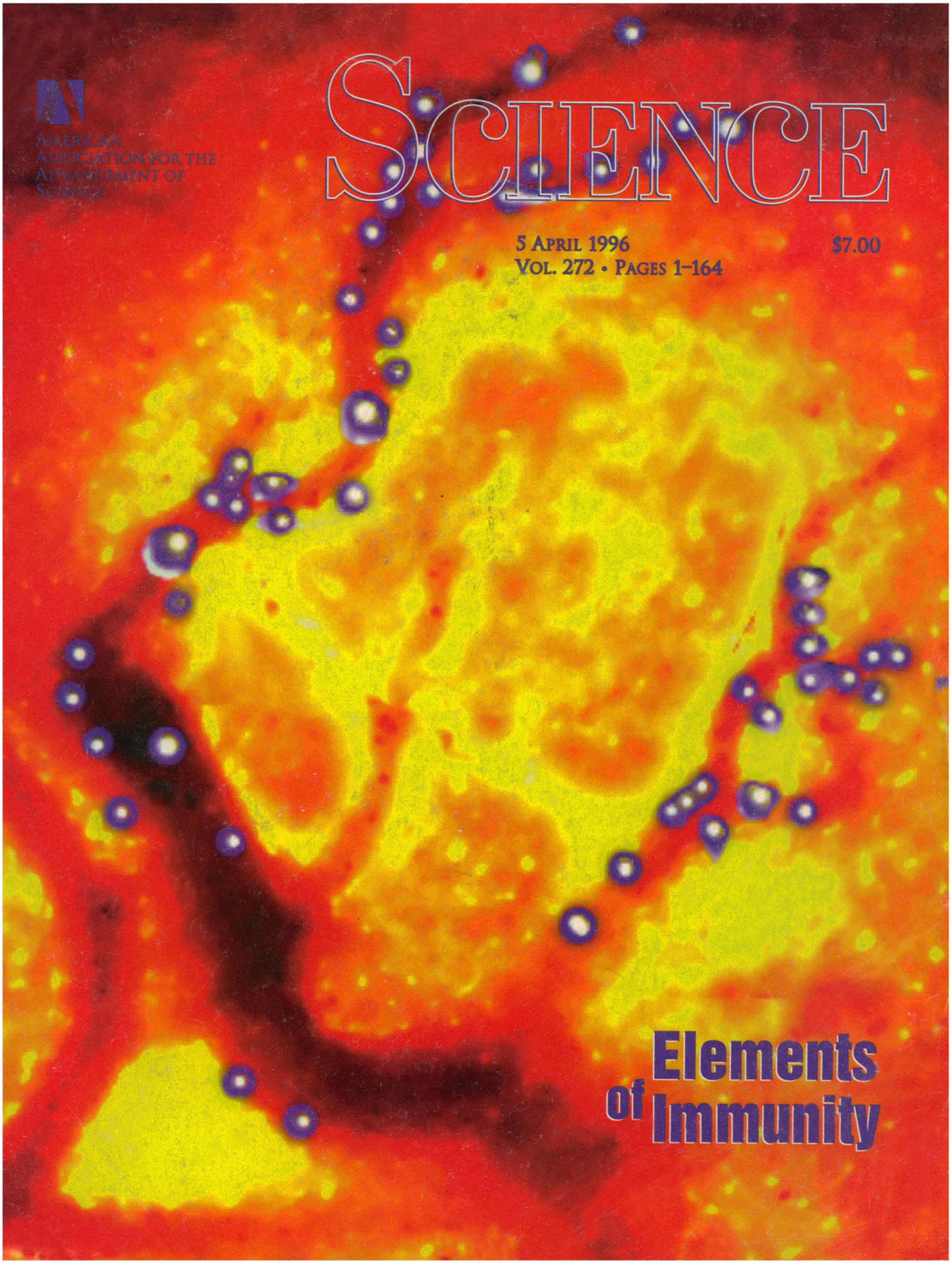
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Elements of Immunity

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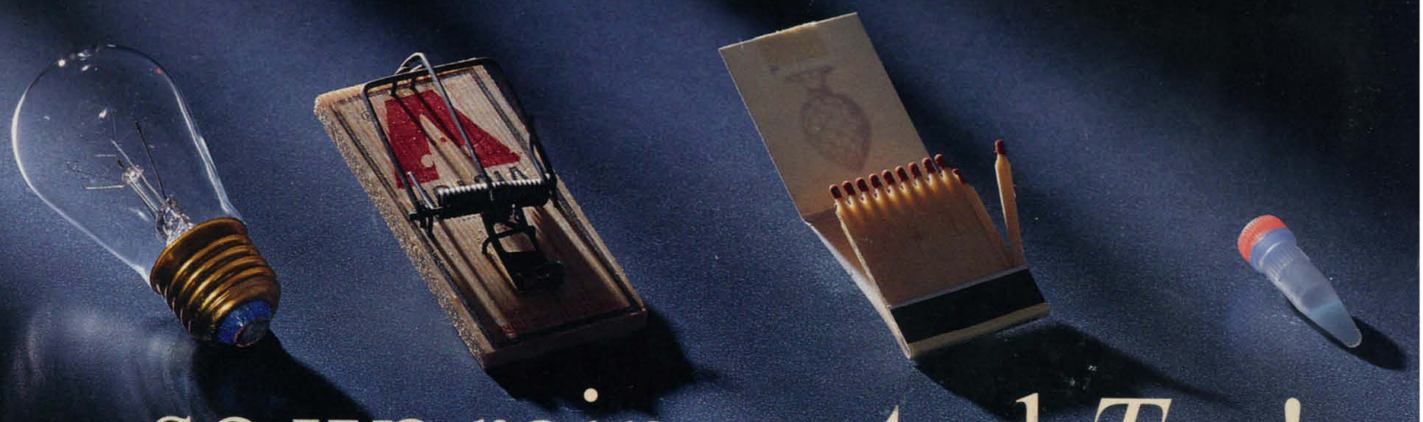

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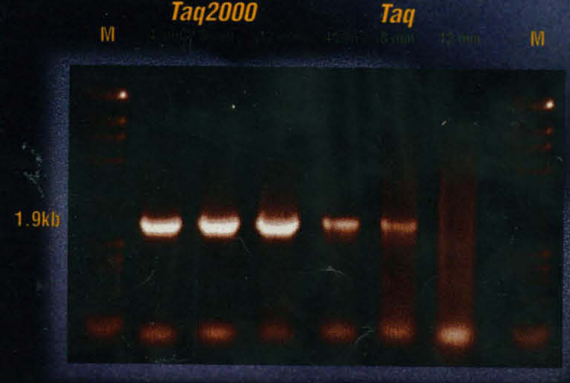

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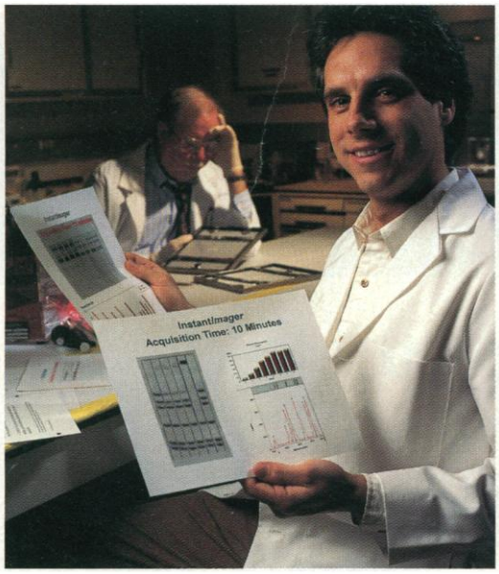

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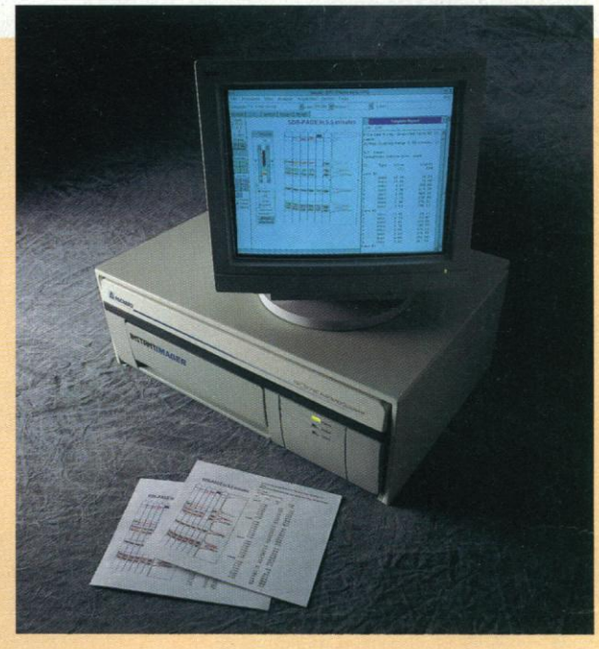

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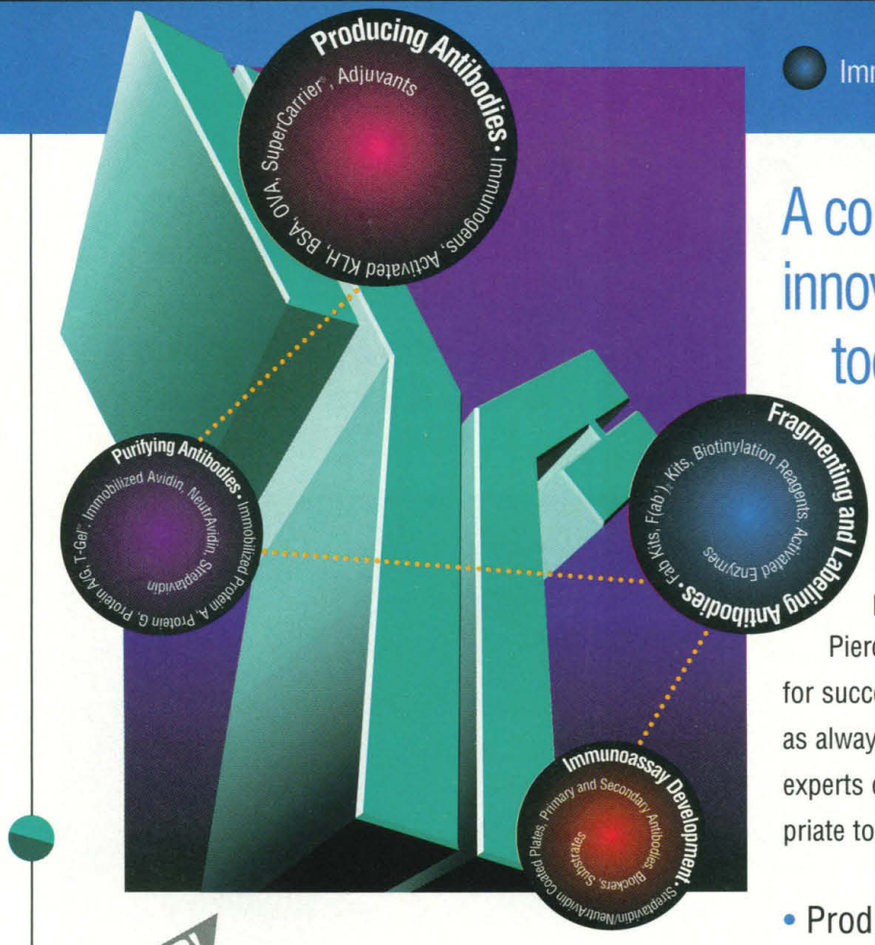

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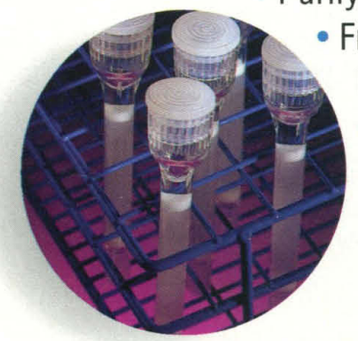

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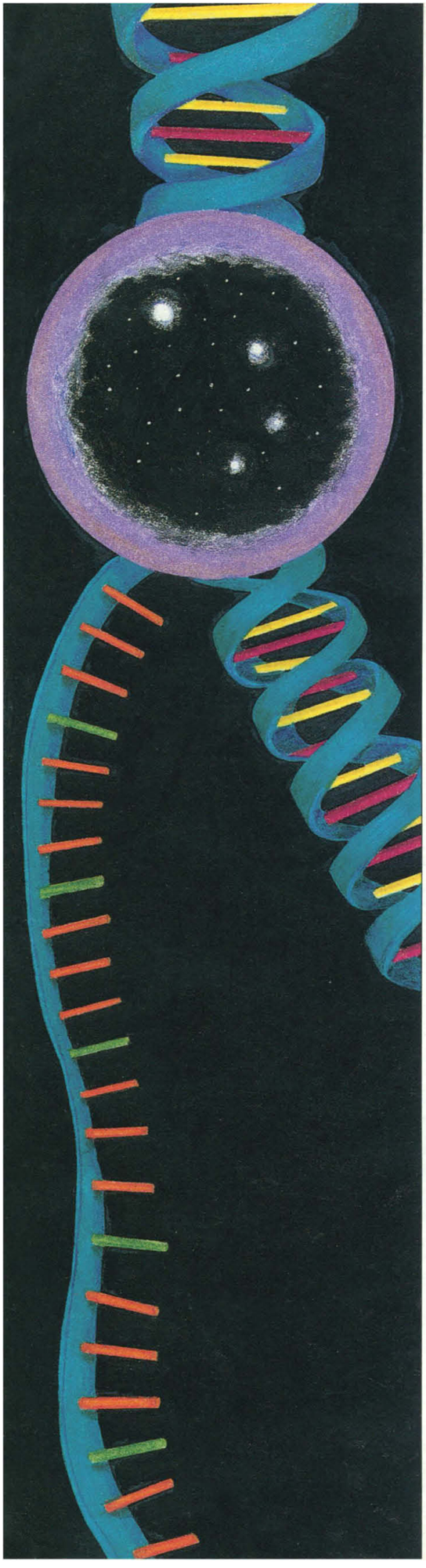

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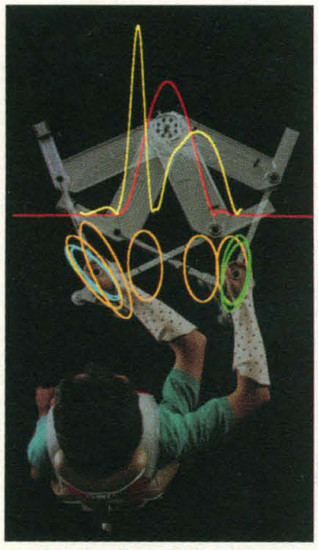

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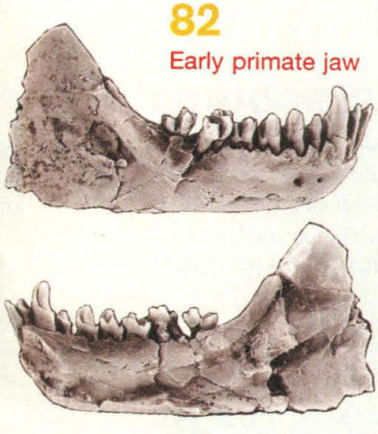

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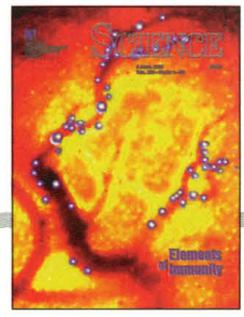
COVER

False-color image illustrating fluorescence-labeled lymphocytes (blue and white circles, ~10 micrometers in diameter) that home after intravenous injection to high endothelial venules (in shades of red) in the lymphoid tissue (yellow) of an intestinal Peyer's patch. The image was captured by video epifluorescence microscopy of exteriorized mouse small intestine. See page 54, the special section beginning on page 50, and the related News story on page 28. [Image: R. F. Bargatze, Montana Immunotech, Bozeman, MT]



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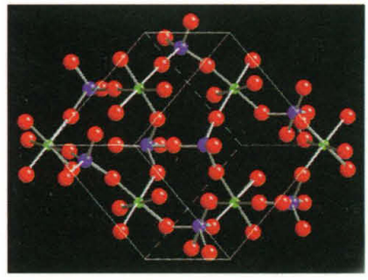

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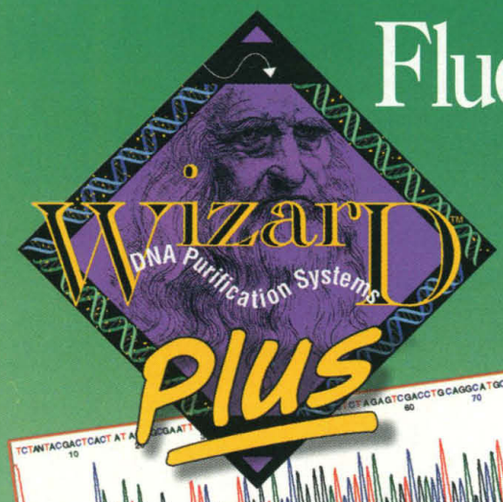

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Earliest origins

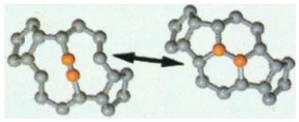
The Anthropoidea (the primate suborder that includes monkeys, apes, and humans) seems to have originated about 45 to 50 million years ago, although the early ancestor and whether the origin was in Africa or Asia has been debated. One concern was whether recently discovered isolated teeth from China truly represented an early anthropoid. Beard *et al.* (p. 82) now describe a complete lower jaw from a new genus of anthropoids in Eocene rocks of Shaxi Province, China. This fossil shows both primitive and derived characteristics that are unlike those of other primates.

Really fine print

Nanotechnology requires the routine fabrication of smaller and smaller units. For a technique to become useful in the manufacturing of commercially viable nanodevices, it has to prove low cost, high throughput and reproducibility. Chou *et al.* (p. 85) present a technique, based on compression molding of thermoplastic polymers, that allows the manufacture of well-defined 25-nanometer features. The technique does not require a sophisticated apparatus, and allows high throughput by imprinting a large area at once.

C_{60} catalyst

The soccer-ball pattern of carbon atoms in C_{60} satisfies the isolated pentagon rule (IPR), and other possible isomers would be thermodynamically unstable by comparison. Higher energy forms could rearrange their carbon bonds and satisfy the IPR, but these pathways often increase strain and have high energetic barriers. Eggen *et al.* (p. 87; see the Perspective by Mintmire, p. 45) explain how



attaching a carbon atom to the fullerene can lower the barriers to rearrangement substantially.

Infant diarrhea and rotavirus vaccines

Rotavirus infection causes almost 1 million infant deaths annually in developing countries through acute diarrhea. Although oral vaccines against rotavirus infection have been developed, some are not effective in all populations (modified live oral vaccines) or provide immunity only against the four major rotavirus serotypes (see the Perspective by Glass *et al.*, p. 46). Identification of viral gene products associated with virulence may lead to new vaccination strategies. Ball *et al.* (p. 101) show that a nonstructural rotavirus protein, NSP4, acts as an enterotoxin and induces diarrhea in young mice. Burns *et al.* (p. 104) studied the protective effect of antibodies that were secreted in mice from "backpack" tumors. Two immunoglobulin A antibodies to an inner viral capsid protein, VP6, were effective in preventing and resolving rotavirus infections, but antibodies to an outer viral capsid protein, VP4, were not effective.

Throwing a wrench

Moving one's arm as, for instance, in throwing a baseball, requires no conscious computation of trajectory and velocity. Is this because the brain is an effortless computer of movement or because the intrinsic mechanical properties of the arm are used to reduce the problem to a series of muscle equilibrium points? Gomi and Kawato (p. 117; see the news story by Pennisi, p. 32) describe a machine used to measure arm stiffness during multijoint movement. They find that the arm velocities produced by humans do not correspond to those calculated assuming that the equilibrium points are targeted sequentially and thus conclude that more complex motor commands are necessary.

Homogenized NMR

Higher magnetic fields can lead to sharper nuclear magnetic resonance (NMR) spectra. However, the field must be made homogeneous to about one part per billion, which is often done with additional fields from shimming coils. Very high field magnets are usually impractical for high-resolution NMR work. Vathyam *et al.* (p. 92) have devised a detection sequence that removes inhomogenity by referencing the spectrum of a solute molecule to nearby solvent molecules through zero-quantum coherences. Possible applications include NMR structures of proteins.

No special hydrogen bonds

Recently, it has been proposed that hydrogen bonds can contribute in a special way in enzymatic catalysis: a strong low-barrier H bond can form that stabilizes the transition state by matching the acidities (pK_a's) of the H bond donor and acceptor. Shan *et al.* (p. 97) tested this hypothesis by studying the equilibria of a series of substituted phthalate monoanions in nonaqueous solvents. The free energy of formation of the H bonds did not vary even when the pK_a's of the donor and acceptor were matched.

Shrinking ceramics

When minerals or ceramics are heated up, they usually expand. Mary *et al.* (p. 90) report on a material that shrinks when heated over a 1000-kelvin temperature interval and even through a solid-solid phase transition. The shrinking is attributed to coupled rotations of lattice units, leading to anisotropic thermal vibrations. This property could be used for devising materials with zero thermal expansion, either as composites or by tuning the lattice composition (see the news story by Service, p. 30).

Stranded mutations

Mutations of DNA in the wild provide the groundwork for evolution. Because DNA is replicated in a continuous manner on the leading strand, and discontinuously on the lagging strand by the synthesis and joining of Okazaki fragments, it has been suggested that mutations might more easily accumulate in the lagging strand. Francino *et al.* (p. 107) have examined the prevalence of mutations on the leading and lagging strands of multiple genes in natural strains of *Escherichia coli* and *Salmonella*. They find no difference in mutation rates on the leading and lagging strands; instead they find that the coding strand had more C to T substitutions than the noncoding strand. These differences may imply that transcription-coupled repair took care of DNA damage on the transcribed (noncoding) strand.

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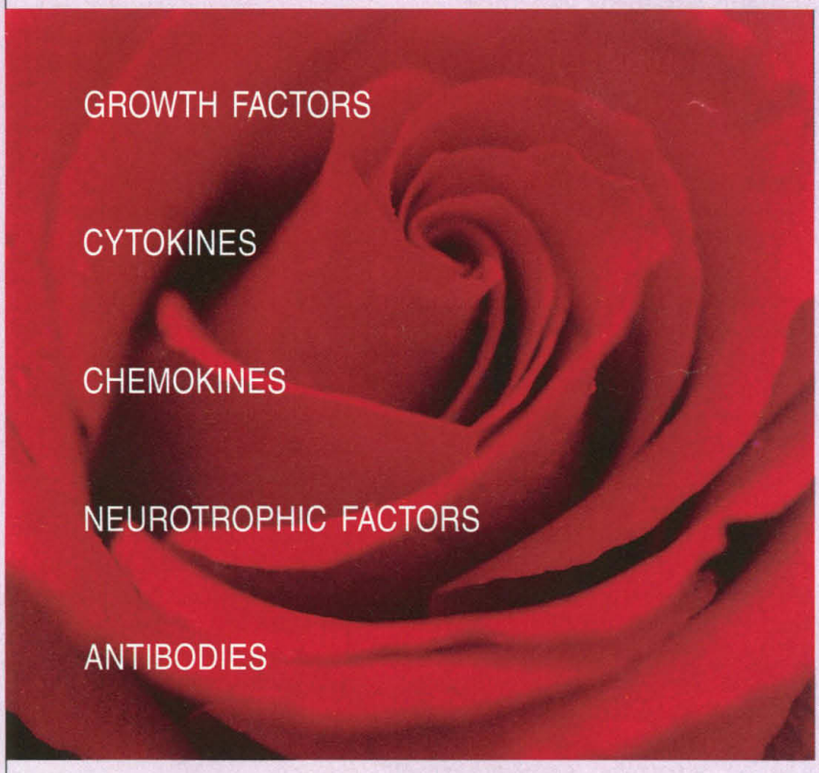

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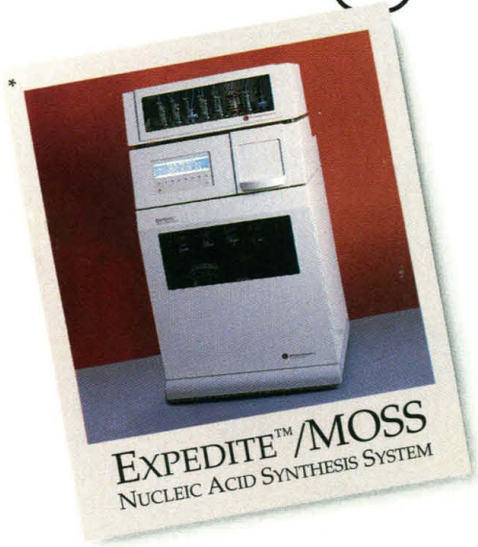

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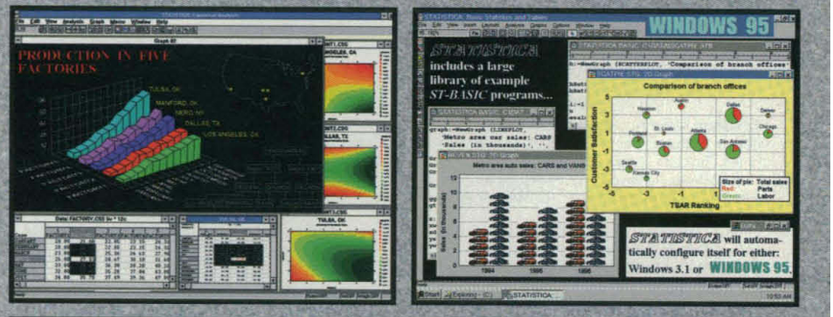

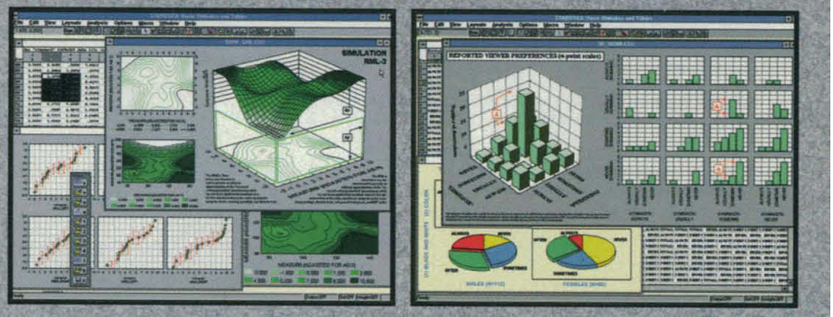

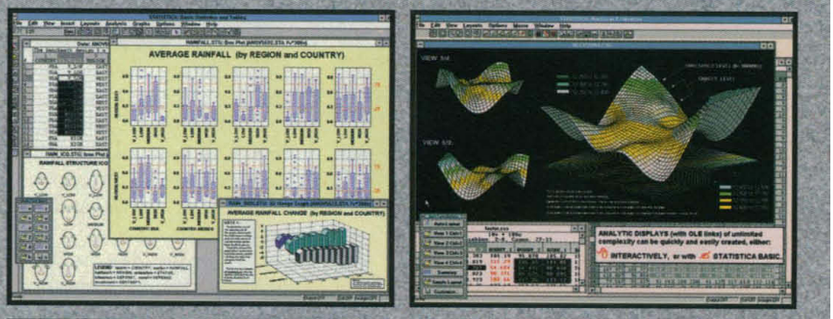

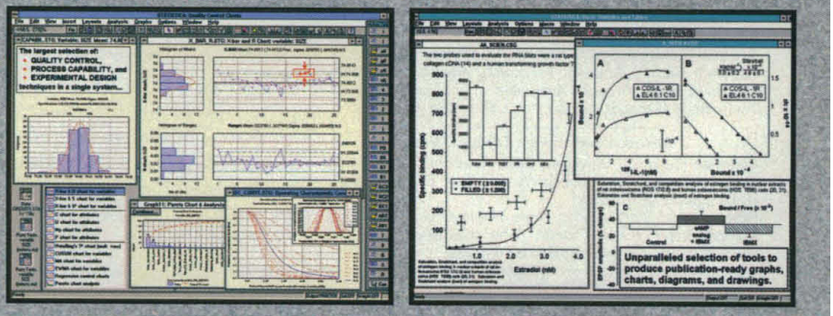

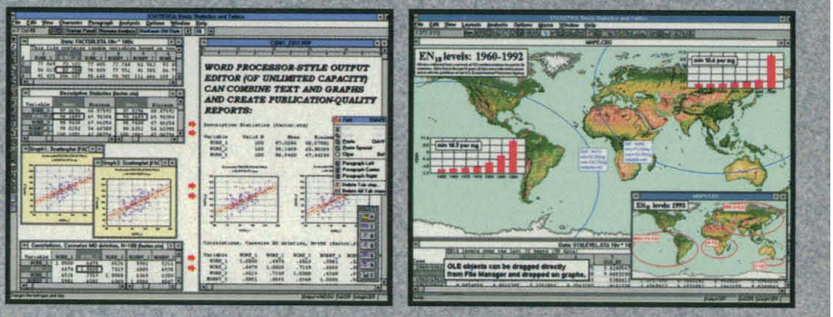

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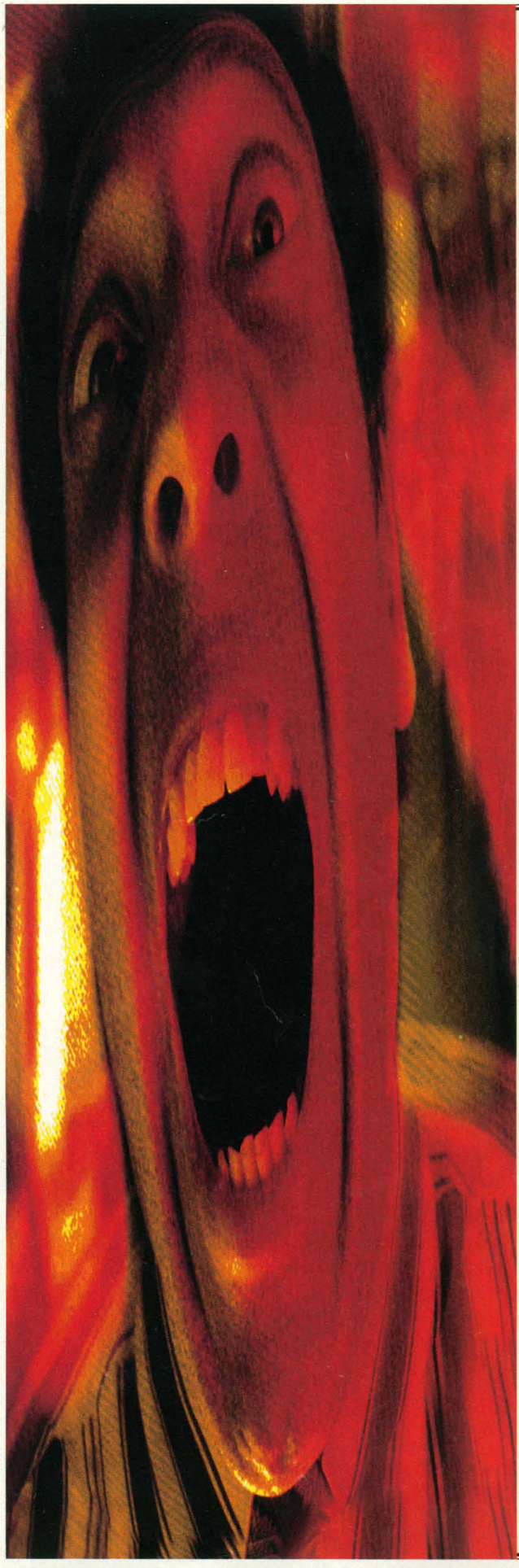

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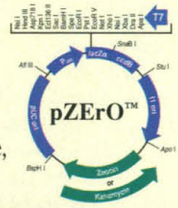

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1. Bernard, P. *et al.* (1994) *Gene* **148**: 71-74.

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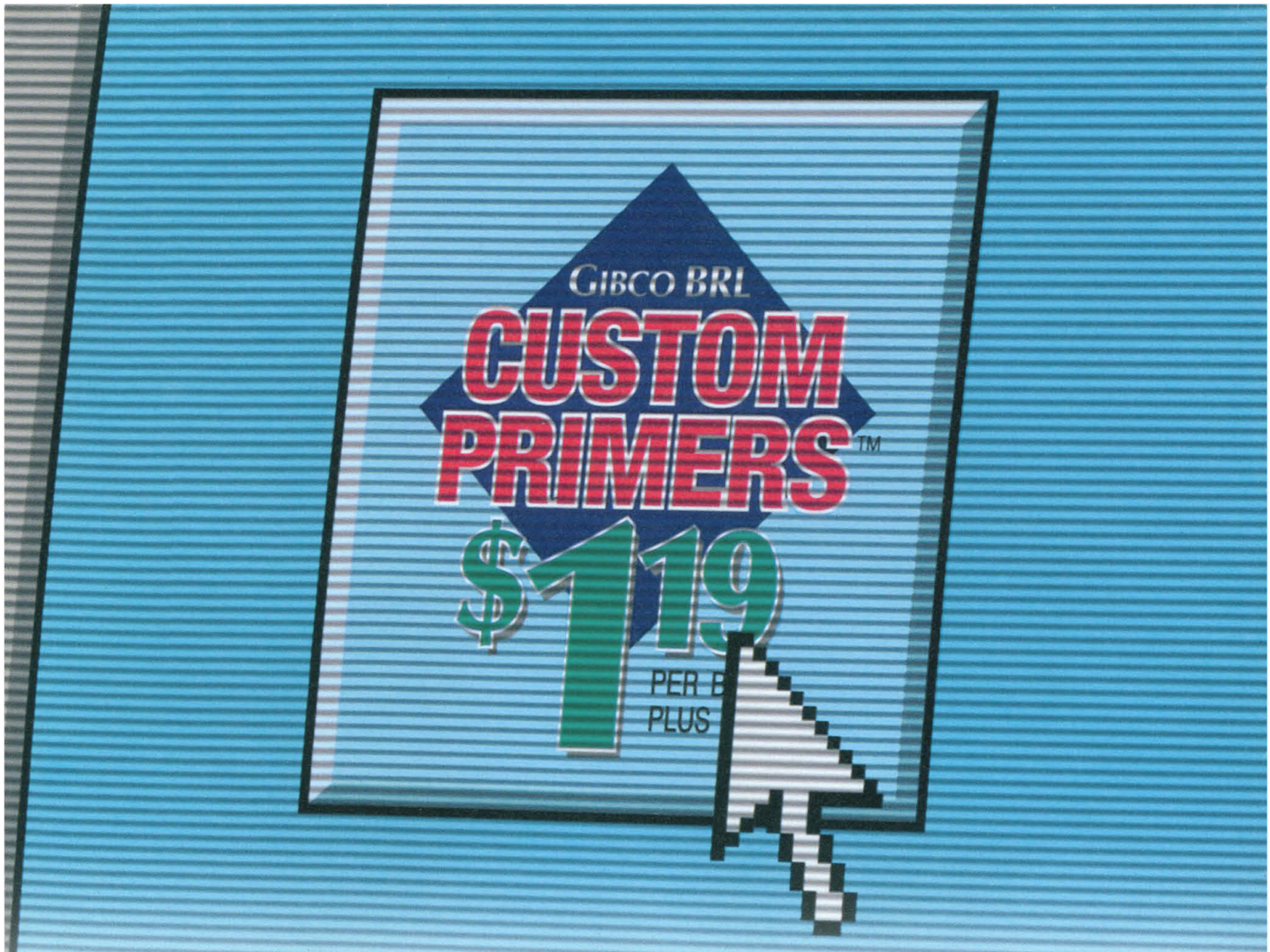

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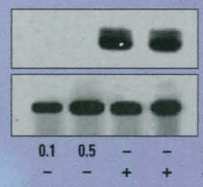
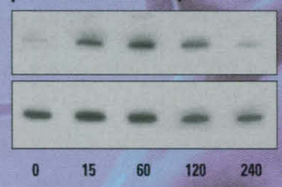


Western Blot of c-Jun expressed from *E. coli* or JEG cells using **A.** phospho-c-Jun or **B.** control c-Jun antibodies.

p38 MAPK (Tyr182)



Western Blot of cell extracts from SK-N-MC cells treated with Anisomycin using **A.** phospho-p38 MAPK or **B.** control-p38 MAPK antibodies.

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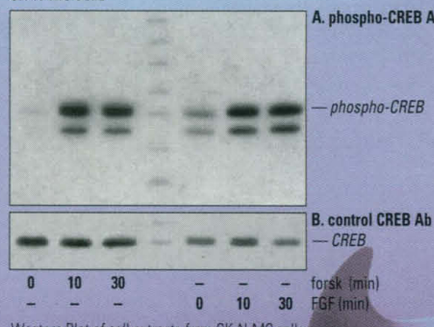
CREB (Ser133)

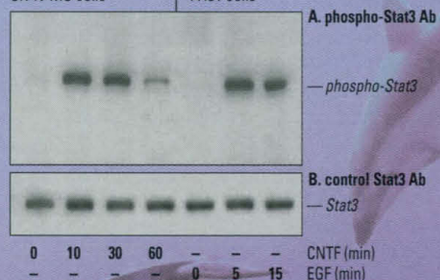
SK-N-MC cells



Western Blot of cell extracts from SK-N-MC cells treated with forskolin and FGF using **A.** phospho-CREB or **B.** control CREB antibodies.

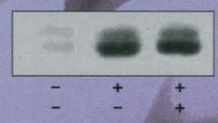
Stat3 (Tyr705)

SK-N-MC cells | A431 cells



Western Blot of cell extracts from CNTF treated SK-N-MC cells and EGF treated A431 cells using **A.** phospho-Stat3 or **B.** control Stat3 antibodies.

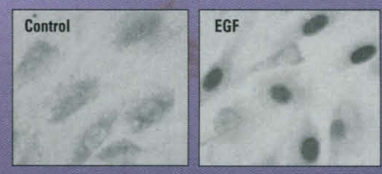
SEK1/MKK4 (Thr223)



Western Blot of cell extracts from 293 cells treated with NaCl and Sodium Vanadate using phospho-SEK1 antibody.

p44/p42 MAPK (Tyr204)

NIH 3T3 Cells



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Friday, May 3, 1996

5:00 PM - 6:30 PM
Write-a-Grant Symposium

7:00 PM - 9:00 PM
Poster Session I/Wine and Cheese Reception/Exhibits

Saturday, May 4, 1996

8:30 AM - 11:30 AM
Oral Abstract Presentations

11:00 AM - 3:00 PM
Scientific Exhibits

11:30 AM - 1:30 PM
Poster Session II/Light Luncheon

12:00 noon-1:30 pm
Meet the Investigator Luncheons

2:00 PM - 4:00 PM Theme Symposia
Human Immunodeficiency Virus Disease: Epidemiologic, Pathogenic and Therapeutic Considerations
Chair: Anthony S. Fauci
National Institute of Allergy and Infectious Diseases, NIH

Transgenic Models of Metabolic Disease
Co-Chairs: C. Ronald Kahn
Joslin Diabetes Center

Translational Research in Dermatology
Chair: Jouni Uitto
Jefferson Medical College

Regulation of Apoptosis: Cellular, Molecular and Genetic Factors
Chair: John D. Mountz
University of Alabama at Birmingham and Birmingham VAMC

4:00 PM - 6:00 PM
ASCI Plenary Session

Featured Speaker
Harold Varmus
Director, National Institutes of Health

Sunday, May 5, 1996

8:30 AM - 11:30 AM
Oral Abstract Presentations

11:00 AM - 3:00 PM
Scientific Exhibits

11:30 AM - 1:30 PM
Poster Session III/Refreshments

2:00 PM - 4:00 PM Theme Symposia
Intracellular Membrane Trafficking
Chair: Jennifer Lippincott-Schwartz
National Institute of Child Health and Human Development, NIH

Health Outcomes Research - The PORTS: Were They Worth It?
Chair: Allan S. Detsky
University of Toronto

The New Biology of Obesity
Chair: Jeffrey S. Flier
Harvard Medical School

Training in Subspecialty Internal Medicine: Current Status and Public Policy
Co-Chairs: Eric G. Neilson
University of Pennsylvania
Robert J. Mayer
Harvard Medical School

4:00 PM - 6:00 PM
AAP Plenary Session

Monday, May 6, 1996

8:00 AM - 10:00 AM
Oral Abstract Presentations

10:00 AM - 12:00 noon
AFCR Plenary Session

Featured Speaker
Aurthur Weiss
Molecular and Genetic Insights into T Cell Antigen Receptor Signal Transduction
University of California, San Francisco

1:00 PM - 3:00 PM -Theme Symposia
Electronic Communications in Support of Biomedical Research and Clinical Practice
Co-Chairs: Edward H. Shortliffe
Stanford University School of Medicine
David Lipman
National Library of Medicine

Developmental Biology: Organogenesis
Co-Chairs: Jeffrey A. Whitsett
University of Cincinnati
Jeffrey I. Gordon
Washington University School of Medicine

Emerging Infections
Co-Chairs: Ruth Berkelman
Centers for Disease Control and Prevention
Monica M. Farley
Emory University School of Medicine

Ion Transport and Disease
Co-Chairs: H. William Harris
Harvard Medical School
Mark T. Keating
University of Utah

Housing Instructions

- U.S. and Canada - call: 1-800-535-3336, Metro DC area: 202-842-2930
- International - fax: 202-289-8079 or write: Biomedicine '96 Housing Bureau • 1212 New York Avenue, NW, 6th Floor • Washington, DC 20005
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Please have the following information available when calling for reservations:

1. Name of Convention Attending: Biomedicine '96
2. 1st, 2nd, 3rd Choice of Hotel
3. Arrival/Departure Dates
4. Number of Rooms Required
5. Type of Room (single, double, etc.)
6. Number of Persons in Party
7. Arrival Time
8. Credit Card Name, Number and Expiration Date
9. Names of All Occupants of Room(s)
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Deposit

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3. Washington Courtyard by Marriott	$115.00	$125.00
4. Normandy Inn	$100.00	$100.00
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*Rates do not include 13% per room per night room tax and $1.50 per room per night occupancy tax.

Registration Form

Name _____
First Middle Initial Last Degree

Institution _____

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City _____ **State** _____ **Zip** _____

Telephone Numbers: _____
Office

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Home Fax

Registration fee includes all meetings, poster sessions, and exhibits.
Please check ap opriate selections:

- ❑ (A) Member AAP/ASCI/AFCR - $125.00
- ❑ (B) Molecular Medicine Society Member - $125.00
- ❑ (C) Nonmember - $160.00
- ❑ (D) Trainee (i.e., medical students, graduate students, house staff, and fellows) - $50.00
- ❑ (E) Meet the Investigator Luncheon - $15.00

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Biomedicine '96 Registration Manager, SLACK Incorporated,
PO Box 510, Thorofare, New Jersey 08086-0510.

Your name badge will be mailed prior to the meeting. Requests for refunds, accompanied by registration badge and receipt card, must be submitted in writing and be received by the Registration Manager by May 2, 1996. Refund requests will be processed after the meeting. **On-site registration fees will be increased by $10.00. There is a $25.00 processing charge for all cancellations.**

Registration for Meet the Investigator Lunches

A fee of $15.00 will be charged for each lunch. Luncheon charges are not refundable.

Check box of your choice if you wish to attend.
Saturday, May 4, 1996

- ❑ (F) Women in Academic Medicine
- ❑ (G) Biomedical Research - What Should Be the Relationship Between Academia and Industry
- ❑ (H) Designing Research Careers for Physicians

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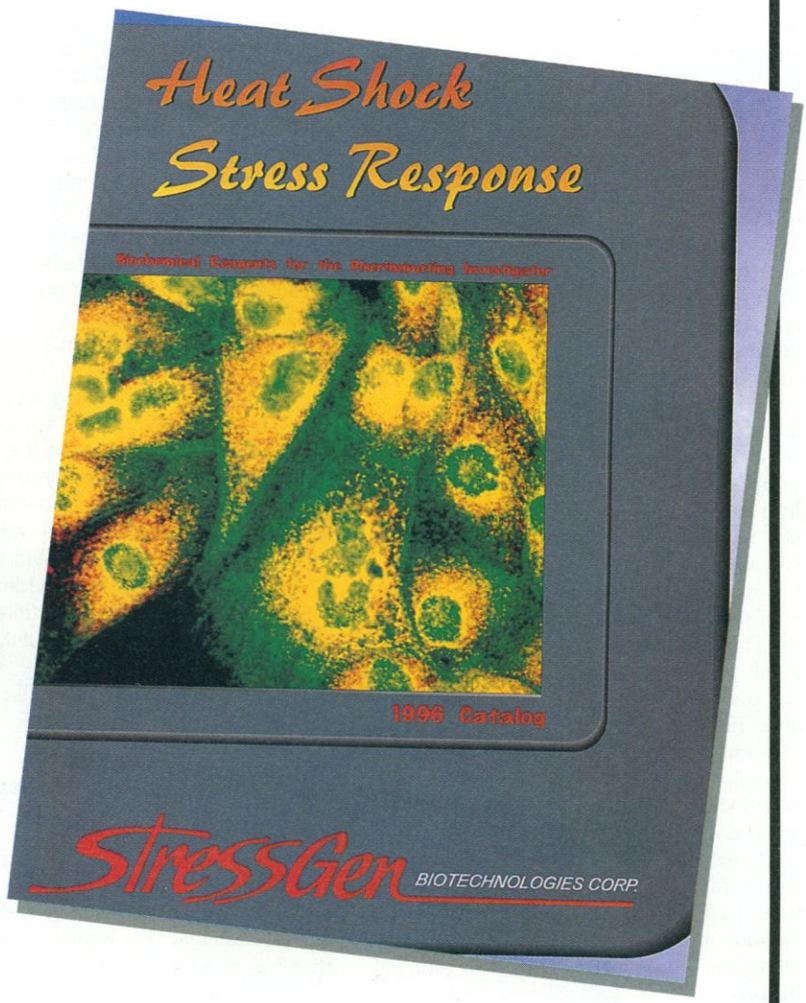

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