

AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

Science

20 DECEMBER 1996
VOL. 274 • PAGES 1977-2172

\$7.00

**NEW
WEAPONS
AGAINST**

HIV

**Breakthrough
of the Year**



NEW ENGLAND BIOLABS

Molecular Biology and PCR

Summer Workshops

WHEN:

Session 1: June 1-June 14, 1997
Session 2: June 22-July 5, 1997
Session 3: July 13-July 26, 1997

WHERE:

Clark Science Center
Smith College
Northampton, MA

FACULTY:

Dr. Steven A. Williams
Dept. of Biological Sciences, Smith College,
and Molecular and Cellular Biology,
University of Massachusetts

Dr. John R. McCarrey
Dept. of Genetics, Southwest
Foundation for Biomedical Research

Dr. Kathleen Fearon
College of Veterinary Medicine
Auburn University

Dr. Barton Slatko
New England Biolabs, Inc.
DNA Sequencing Group

Dr. Alan L. Scott
Dept. of Molecular Microbiology
and Immunology
Johns Hopkins University

TO APPLY:

Please submit a recent C.V. or resume and a one page statement explaining your interest to:

Dr. Steven A. Williams
Clark Science Center
Smith College
Northampton, MA 01063

We are pleased to announce the twelfth annual New England Biolabs Molecular Biology Summer Workshops held at Clark Science Center, Smith College, Northampton, MA, USA. Over 1,000 research scientists have attended this intensive program in the past eleven years.

INTENSIVE BENCH EXPERIENCE: This intensive, two-week course emphasizes hands-on molecular biology laboratory work. About eight hours each day will be spent working at the bench. All of the work is hands-on; there are no demonstrations.

EXPERIMENTS WILL INCLUDE: Construction and screening of genomic and cDNA libraries, PCR, RT-PCR, PCR subcloning, purification of DNA and RNA, restriction enzyme digestion, gel electrophoresis, construction of recombinant DNA molecules, cloning in plasmid and phage vectors, cloning strategies, bacterial transformation, Southern and Northern transfer and hybridization, methods for labeling DNA, DNA sequencing, etc. All of these techniques are woven into a cohesive research project carried out by each participant during the two-week session. Lectures and discussion sessions (at least three hours each day) will deal with all of the above topics and the application of these methods in molecular biology research.

INTENDED FOR BEGINNERS IN MOLECULAR BIOLOGY: No previous experience in molecular biology is required or expected. Forty-eight participants per session will be selected from a variety of disciplines and academic backgrounds. Last year's participants included principal investigators, directors of programs, postdoctoral fellows, graduate students, and research assistants. Their fields of research included medicine, biochemistry, ecology, immunology, microbiology, pharmacology, plant biology, genetics, physiology and others. They came from large universities, small colleges, medical schools, hospitals, industry, and private foundations; 75% came from the USA, and 25% from overseas. With eight instructors, the student to teacher ratio is 6 to 1.

FEE: \$3200 per participant includes lab manual, use of all equipment and supplies, and room and board (all rooms are singles). Fee includes the use of the libraries, computers, and all campus athletic facilities.



APPLICATIONS MUST BE RECEIVED BY March 10, 1997. Notification of acceptance status will be mailed by March 12, 1997. Late applications will be accepted for our wait list. Payment in full will be due by April 10, 1997. Your application should include a brief C.V. and a one page statement explaining your reasons for taking the course. Please specify the session to which you are applying (1, 2, 3) and indicate one of the other sessions as a second choice. Women and minorities are especially encouraged to apply. **For additional information, please visit our web site (<http://math.smith.edu/~sawlab/neb.html>) or contact us at (413) 247-3004.**

Check the facts on pCR-Script™ Cloning Vectors



pCR-Script SK(+) Cloning Vectors

1. Rapid and effective cloning of PCR products
2. Derived from pBluescript II SK(+)® vector
3. No additional bases required for PCR primers
4. Includes reagents for optimal cloning of Tag-generated PCR products

pCR-Script™ Cloning Vectors

- ✓ ≥ 80% efficiency with 1.1-kb insert
 - ✓ ≥ 90% true positives
 - ✓ Works great with any PCR enzyme
 - ✓ One-hour ligation
- The best way to clone PCR products!*

pCR-Script...
the smart way
to PCR clone!

Another creative cloning
solution from Stratagene!

UNITED STATES:
Stratagene Headquarters
800-424-5444
INTERNET MAIL:
techservices@stratagene.com
AUSTRALIA: 1800-252-204
AUSTRIA: 1 5332666
BRAZIL: 11 530 7833
CANADA: 905 713 1201
DENMARK: 8 6101055

FRANCE: 1 34 60 2424
GERMANY: 0130-840911
HONG KONG: 5785839
ISRAEL: 3 7521687
ITALY: 258013409
JAPAN:
(Funakoshi) 3 5684 1622
(Toyobo) 3 3660 4819
KOREA: 2 5580311
MALAYSIA: 37031888

THE NETHERLANDS: 33 4850094
NEW ZEALAND: 9 443 5867
NORWAY: 22715090
PORTUGAL: 1-4581641
ROC: 2 694 0066 or 2 720 2215
SINGAPORE: 2730898
SPAIN: 1 729 03 33
SWEDEN: 8 680 0845
SWITZERLAND: 3641106
THAILAND: 23080611

UNITED KINGDOM: 0800 585370

*Patents Pending
†Purchase of this PCR-related product does not convey any rights under the PCR patents owned by Hoffmann-La Roche. A license to use the PCR process accompanies the purchase of certain reagents from Stratagene when used in conjunction with an Authorized Thermal Cycler.

pCR-SCRIPT SK(+) CLONING KITS
pCR-Script Amp 25 rxn #211190
pCR-Script Amp 50 rxn #211189
pCR-Script Cam 25 rxn #211192



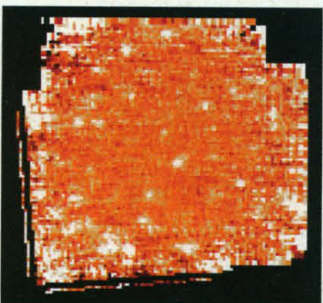
STRATAGENE

Circle No. 53 on Readers' Service Card



2000

Reflecting on NSF



2006

Hubble's early light

NEWS & COMMENT

- Smiles and Status Quo at NSF 2000
- New Ideas Go With the Flow 2001
- Travel Grants to Boost Sagging Labs 2002
- Origins Researchers Win Gore's Ear, Not Pocketbook 2003
- Fraud and Ethics Charges Hit Stroke Drug Trial 2004
- Baltimore to Head New Vaccine Panel 2005

RESEARCH NEWS

- Mining the Deep Field 2006
- Repeated Bursts Puzzle Astronomers 2007
- Genes, Junctions, and Disease at Cell Biology Meeting 2008
- Tumor-Killer Made; How Does It Work? 2009
- Ironing Out the Wrinkles in the Prion Strain Problem 2010
- Fly Gene Discovery Gets at Root of Branching Structures 2011
- On Ice's Surface, a Dance of Molecules 2012
- Rock Chemistry Traces Ancient Traders 2012
- Supercritical Solvent Comes Into Its Own 2013
- Prime Formula Weds Number Theory and Quantum Physics 2014
- Does Europa's Ice Hide an Ocean? 2015

PERSPECTIVES

- Capturing the Dynamic Behavior of Adsorbed Polymers 2036
A. C. Balazs
- Complexities in the Treatment of Autoimmune Disease 2037
H. F. McFarland
- A Ligand-Receptor Mechanism in Plant-Pathogen Recognition 2038
C. Lamb
- Biologists Put on Mathematical Glasses 2039
T. Fagerström, P. Jagers, P. Schuster, E. Szathmari

REPORTS

- Probing Collective Motions of Terminally Anchored Polymers 2041
G. Fytas, S. H. Anastasiadis, R. Seghrouchni, D. Vlassopoulos, J. Li, B. J. Factor, W. Theobald, C. Toprakcioglu
- Copper-Catalyzed Oxidation of Alcohols to Aldehydes and Ketones: An Efficient, Aerobic Alternative 2044
I. E. Markó, P. R. Giles, M. Tsukazaki, S. M. Brown, C. J. Urch
- Formation of Chiral Interdigitated Multilayers at the Air-Liquid Interface Through Acid-Base Interactions 2046
I. Kuzmenko, R. Buller, W. G. Bouwman, K. Kjær, J. Als-Nielsen, M. Lahav, L. Leiserowitz
- Design of Nonionic Surfactants for Supercritical Carbon Dioxide 2049
J. B. McClain, D. E. Betts, D. A. Canelas, E. T. Samulski, J. M. DeSimone, J. D. Londono, H. D. Cochran, G. D. Wignall, D. Chillura-Martino, R. Triolo

DEPARTMENTS

- | | |
|---|--|
| <p>THIS WEEK IN SCIENCE 1983</p> <p>EDITORIAL 1987</p> <p>Breakthroughs of the Year, 1996</p> <p>BREAKTHROUGH OF THE YEAR 1988</p> <p>New Hope in HIV Disease</p> <p>LETTERS 1993</p> <p>SCIENTESCOPE 1999</p> <p>RANDOM SAMPLES 2017</p> | <p>ASSOCIATION AFFAIRS 2025</p> <p>Global Climate and Infectious Disease: The Cholera Paradigm
R. R. Colwell</p> <p>BOOK REVIEWS 2032</p> <p>AAAS NEWS & NOTES 2127</p> <p>PRODUCTS & MATERIALS 2128</p> <p>QUARTERLY INDEX 2130</p> |
|---|--|

AAAS Board of Directors

Rita R. Colwell
Retiring President, Chairman
Jane Lubchenco
President
Mildred S. Dresselhaus
President-elect

Sheila Jasanoff
William A. Lester Jr.
Simon A. Levin
Marcia C. Linn
Michael J. Novacek
Anna C. Roosevelt
Jean E. Taylor
Nancy S. Wexler

William T. Golden
Treasurer
Richard S. Nicholson
Executive Officer

■ **SCIENCE** (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 1996 by the American Association for the Advancement of Science. The title **SCIENCE** is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$102 (\$55 allocated to subscription). Domestic institutional subscription (51 issues): \$250. Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$90. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. **Printed in the U.S.A.**

COVER

The 1996 Breakthrough of the Year is a set of new weapons against human immunodeficiency virus (HIV), which are shown approaching their viral target. Although past weapons based on the CD4 receptors (gold) failed, an array of new drugs (shown as pills) offer hope to

those infected, while basic research on the chemokines and their receptors (in blue) may one day be used to help block HIV infection. See the editorial on page 1987 and the Breakthrough of the Year section, beginning on page 1988. [Illustration: Steve Keller]



Grain Growth Rates of MgSiO₃ Perovskite and Periclase Under Lower Mantle Conditions 2052
D. Yamazaki, T. Kato, E. Ohtani, M. Toriumi

Late Complications of Immune Deviation Therapy in a Nonhuman Primate 2054
C. P. Genain, K. Abel, N. Belmar, F. Villinger, D. P. Rosenberg, C. Linington, C. S. Raine, S. L. Hauser

Loss of Heterozygosity in Normal Tissue Adjacent to Breast Carcinomas 2057
G. Deng, Y. Lu, G. Zlotnikov, A. D. Thor, H. S. Smith

Initiation of Plant Disease Resistance by Physical Interaction of AvrPto and Pto Kinase 2060
X. Tang, R. D. Frederick, J. Zhou, D. A. Halterman, Y. Jia, G. B. Martin

Molecular Basis of Gene-for-Gene Specificity in Bacterial Speck Disease of Tomato 2063
S. R. Scofield, C. M. Tobias, J. P. Rathjen, J. H. Chang, D. T. Lavelle, R. W. Michelmore, B. J. Staskawicz

Capturing the Structure of a Catalytic RNA Intermediate: The Hammerhead Ribozyme 2065
W. G. Scott, J. B. Murray, J. R. P. Arnold, B. L. Stoddard, A. Klug

Functional Analysis of the Genes of Yeast Chromosome V by Genetic Footprinting 2069
V. Smith, K. N. Chou, D. Lashkari, D. Botstein, P. O. Brown

Requirement for a Noncoding RNA in *Drosophila* Polar Granules for Germ Cell Establishment 2075
A. Nakamura, R. Amikura, M. Mukai, S. Kobayashi, P. F. Lasko

Evidence for the Conformation of the Pathologic Isoform of the Prion Protein Enciphering and Propagating Prion Diversity 2079
G. C. Telling, P. Parchi, S. J. DeArmond, P. Cortelli, P. Montagna, R. Gabizon, J. Mastrianni, E. Lugaresi, P. Gambetti, S. B. Prusiner

Intestinal Secretory Defects and Dwarfism in Mice Lacking cGMP-Dependent Protein Kinase II 2082
A. Pfeifer, A. Aszódi, U. Seidler, P. Ruth, F. Hofmann, R. Fässler

Control of EGF Receptor Signaling by Clathrin-Mediated Endocytosis 2086
A. V. Vieira, C. Lamaze, S. L. Schmid

Association of Src Tyrosine Kinase with a Human Potassium Channel Mediated by SH3 Domain 2089
T. C. Holmes, D. A. Fadool, R. Ren, I. B. Levitan

Reexpression of RAG-1 and RAG-2 Genes in Activated Mature Mouse B Cells 2092
M. Hikida, M. Mori, T. Takai, K.-i. Tomochika, K. Hamatani, H. Ohmori

Neoteny in Lymphocytes: *Rag1* and *Rag2* Expression in Germinal Center B Cells 2094
S. Han, B. Zheng, D. G. Schatz, E. Spanopoulou, G. Kelsoe

Enhancement of Class II-Restricted T Cell Responses by Costimulatory NK Receptors for Class I MHC Proteins 2097
O. Mandelboim, D. M. Davis, H. T. Reyburn, M. Valés-Gómez, E. G. Sheu, L. Pazmany, J. L. Strominger

Inhibition of Adipogenesis Through MAP Kinase-Mediated Phosphorylation of PPAR γ 2100
E. Hu, J. B. Kim, P. Sarraf, B. M. Spiegelman

Associative Learning Disrupted by Impaired G_s Signaling in *Drosophila* Mushroom Bodies 2104
J. B. Connolly, I. J. H. Roberts, J. D. Armstrong, K. Kaiser, M. Forte, T. Tully, C. J. O'Kane

A Mechanism of Drug Action Revealed by Structural Studies of Enoyl Reductase 2107
C. Baldock, J. B. Rafferty, S. E. Sedelnikova, P. J. Baker, A. R. Stuitje, A. R. Slabas, T. R. Hawkes, D. W. Rice

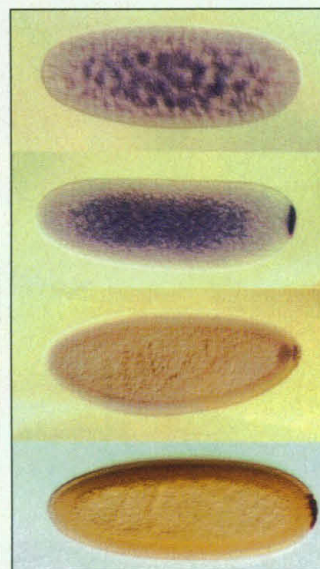
Orientation Maps of Subjective Contours in Visual Cortex 2110
B. R. Sheth, J. Sharma, S. C. Rao, M. Sur

Requirement of CDC42 for *Salmonella*-Induced Cytoskeletal and Nuclear Responses 2115
L.-M. Chen, S. Hobbie, J. E. Galán

TECHNICAL COMMENTS

Consequences of Retinal Color Coding for Cortical Color Decoding * 2118
V. A. Billock; *Response*: D. M. Dacey; R. H. Masland

Evaluating the Evidence for Past Life on Mars 2119
E. Anders; C. K. Shearer and J. J. Papike; J. F. Bell; *Response*: S. J. Clemett and R. N. Zare; D. S. McKay, K. L. Thomas-Keptra, C. S. Romanek, E. K. Gibson Jr., H. Vali; E. K. Gibson Jr., D. S. McKay, K. Thomas-Keptra, C. S. Romanek



2075

Life at the pole

■ Indicates accompanying feature

Change of address: allow 4 weeks, giving old and new addresses and 8-digit account number.
Postmaster: Send change of address to *Science*, P.O. Box 1811, Danbury, CT 06813-1811.
Single copy sales: \$7.00 per issue prepaid includes surface postage; bulk rates on request.
Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$4.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for *Science* is 0036-8075/93 \$4.00. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

On the Web

Breakthrough of the Year: A Guide with Links to Top Discoveries

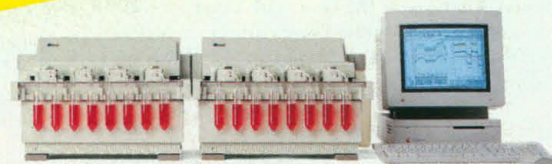
<http://www.sciencemag.org/science/content/vol274/issue5295/#special>

Access to
Science Online
is changing soon

CYTOSENSOR™
MICROPHYSIOMETER

The Only Comprehensive Assay System for Receptor Signaling.

Scientific Breakthrough!!
Novel CC-CKR5 Chemokine Receptor (Implicated in HIV-1 Infection)
First Characterized using the Cytosensor® Microphysiometer!!
Michael Samson, et al, *Biochemistry* 35: 3362-3367 (1996)



The **Cytosensor Microphysiometer System** is the latest tool used for drug discovery and signal transduction research.¹ Using a patented biosensor, the system can monitor the receptor-mediated responses from living cells in minutes, producing functional dose responses in just a few hours. Because of the unique biosensor, receptor activation can be studied even without previous knowledge of the signal transduction pathway. Thus, a single assay system can be used to evaluate a variety of receptor families. Previously time-consuming experiments can be performed quickly and easily, making it possible to obtain EC₅₀ and IC₅₀ values in just 4-7 hours,² without radioactivity. And novel receptor responses, not seen with other methods, have been observed.

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

Call us for an evaluation of your cells and effector agents or for a detailed list of scientific references.



G PROTEIN-LINKED RECEPTORS



TYROSINE KINASE RECEPTORS



LIGAND-GATED ION CHANNELS



HEMATOPOIETIC RECEPTORS

Circle No. 46 on Readers' Service Card



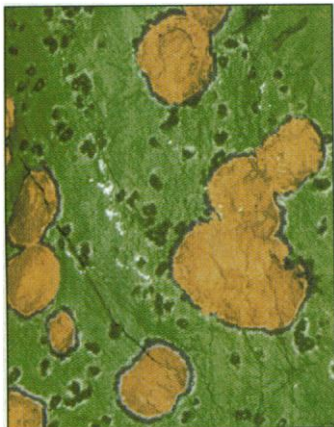
U.S.A. 1-800-400-9060 (FAX USA: 408-747-3602)
Germany: 49-898-54-5050 (FAX: 49-898-54-2238)
United Kingdom: 44-293-619579 (FAX: 44-293-619586)

THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Martian update

In an earlier article, McKay *et al.* suggested that the occurrence of PAHs (polyaromatic hydrocarbons) and textural and mineralogical features in the martian meteorite ALH84001



were consistent with the presence of past primitive life on mars. A series of technical comments and responses starting on p. 2118 address whether abiotic processes could have instead produced these features.

Greener chemistry

Two reports focus on ways to minimize the use of environmentally burdensome solvents and reaction by-products (see the news story by Kaiser, p. 2012). Markó *et al.* (p. 2044) have synthesized a copper-based catalyst for the oxidation of a wide variety of alcohols by oxygen or even air, thus avoiding the use of metal oxides or hydrogen peroxides as the oxidant. McClain *et al.* (p. 2049) have developed nonionic surfactants that allow supercritical CO₂ to be used as a solvent for organic polymers which will allow this replacement solvent to be used in processing applications that use waxes, heavy oils, and other high molecular weight organic molecules.

Premalignant cells in disguise?

Like other cancers, breast cancer is thought to develop through a series of morphologically distinguishable stages beginning with a benign overgrowth of cells and eventually progressing to invasive cancer. Deng *et al.* (p. 2057) postulated that breast cancers might also arise from cells that appear morphologically normal. They examined normal breast tissue adjacent to invasive tumors and found that in a subset of cases, the normal tissue contained genetic aberrations (loss of heterozygosity) previously detected only in obviously premalignant or malignant tissues. Whether the presence of these genetic changes in normal tissue is predictive of tumor recurrence remains to be investigated.

Caught in films

Lipids and other molecules with polar head groups and long tails can form monolayer (Langmuir) films on a water surface, but making multilayers requires transfer to a solid substrate. Kuzmenko *et al.* (p. 2046) have made multilayers at an air-water interface by incorporating a small basic molecule to stabilize the interaction between long-chain molecules with acidic head groups. Structural studies showed that the type of multilayers formed under compression depended on the relative handedness of the two molecules—if both were right handed, trilayers with a crystalline segment were formed, but if the molecules had different handedness, amorphous bilayers with poor chain packing were formed.

Prion templates

Prion proteins, the suspected causative agent of several inherited and infectious forms of spongiform encephalopathy in animals and humans, are abnormal conformers of host proteins. The normal host form (PrP^C) has a high α -helical content, whereas the prion form (PrP^{Sc}) is composed mainly of β sheets and can assume differ-

ent isoforms that have protease-resistant fragments of different sizes. Telling *et al.* (p. 2079; see the news story by Grady, p. 2010) show that extracts from brains of human patients with prion-associated diseases could induce neurodegeneration in transgenic mice that express the human form of PrP. Moreover, the protease-resistant fragments were of the size characteristic for the human disease. These results indicate that the presence of the PrP^{Sc} form redirects folding of the PrP protein and may help to explain how different strains of these proteins could arise and propagate.

Kinase meets potassium channel

Potassium channel activity affects processes, such as muscle contraction and neuronal integration, and electrophysiological and biochemical studies suggest that their activity can be modulated by serine-threonine kinases. Holmes *et al.* (p. 2089) noted that the human Kv1.5 potassium channel contains two repeats of the Src homology 3 (SH3) domain. They show that the native and cloned forms of this channel are associated directly with Src tyrosine kinase in human myocardium. Activa-

tion of the kinase with v-Src resulted in tyrosine phosphorylation of the channel and suppression of its current.

Fat cell fates

Differentiation of fat cells is inhibited by cell growth factors such as epidermal or fibroblast growth factors. Hu *et al.* (p. 2100) show that one of the key components in the transcription control of adipogenesis, peroxisome proliferator-activated receptor γ (PPAR γ), is phosphorylated by mitogen-activated protein (MAP) kinase in cells that were stimulated by different growth factors. Cells expressing a PPAR γ mutant that could not be phosphorylated were more sensitive to induction of adipogenesis by signals such as insulin.

Class crossover

T cell receptors (TCRs) “see” foreign peptides complexed with either class I or class II major histocompatibility complex (MHC) proteins. Natural killer (NK) cells do not express TCRs but have activating and inhibitory receptors that bind to class I MHC molecules. Mandelboim *et al.* (p. 2097) studied such T cell clones that express the NK cell activating receptor (NKAR1). These T cells were isolated during NK cell cloning and were restricted to MHC class II responses. Proliferation of these T cells in response to superantigens increased by 300 to 900% in situations where the NKAR1 receptor could bind class I. This costimulation by class I proteins could help T cells initiate immune responses in the presence of limiting amounts of antigen.

1step Bibliographies in Microsoft® Word with the new EndNote® Add-in

Create a bibliography in one step:

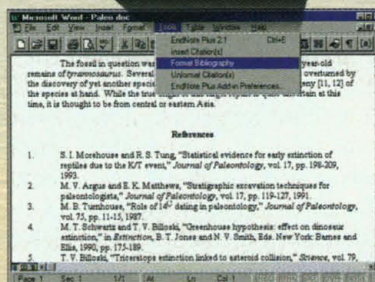
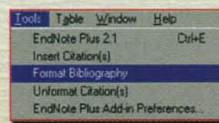
With the new **EndNote Add-in** (included in **EndNote Plus 2.1** or higher), you simply choose *Format Bibliography* from Word's *Tools* menu and **EndNote** will create your bibliography instantly! You don't have to close the document, scan it, or save a formatted copy under a different name.

Keep track of only one document:

When formatting bibliographies, there's no need to keep track of two separate versions of the same document (i.e., your working copy and the formatted copy).

Revise the same document as many times as you need:

The **EndNote Add-in** has no problem with last-minute revisions that you've made to your document. Each time you choose *Format Bibliography*, the **EndNote Add-in** will automatically update your citations and bibliography in your document.



To create a bibliography, simply select *Format Bibliography* from Word's *Tools* menu.

Available for Macintosh and now for Windows!

- Speedy 32-bit processing ■ Works under Windows 3.1, Windows 95, Windows NT and Macintosh ■ Works with Microsoft Word 6 and 7 (Windows); 5 and 6 (Macintosh) ■ **EndNote** is compatible with WordPerfect and other word processors (no Add-in) ■ Includes bibliographic styles for more than 300 journals ■ **EndLink** (sold separately) imports from more than 100 online databases and CD-ROMs

"If you use Word and you do scholarly publishing, you need EndNote Plus. Recommended."

— Jerry Pournelle, *Byte*, September 1996

"... the most powerful citation manager you can find, short of a personal librarian."

— *PC Magazine*, December 1995

"Despite its power, EndNote Plus remains surprisingly easy to learn and use."

— *Macworld*, April 1995

more than
100,000
SOLD



MICROSOFT
WINDOWS
COMPATIBLE



Compatible with
Windows 3.1,
Windows NT, Windows 95
and the Mac OS.

All trademarks are property of their respective companies. Mac and the Mac OS logo are trademarks of Apple Computer, Inc. Microsoft Windows and the Windows logo are registered trademarks of Microsoft Corporation.

© Copyright 1996, Niles & Associates, Inc.



Niles & Associates, Inc.

800 Jones Street Berkeley California 94710 USA
Phone 800.554.3049 or 510.559.8592 Fax 510.559.8683
E-mail: info@niles.com World Wide Web: <http://www.niles.com>
Australia (+61) 66.58.3674 Germany (+49) (0) 69.970841.11
Japan (+81) 3.3384.8861 Scandinavia (+46) 481.511.23 UK (+44) (0) 1865.784800

Reference Manager is a registered trademark of Institute for Scientific Information. EndNote is a registered trademark of Niles & Associates, Inc.

Reference Manager® Users Can Now Switch to EndNote® In One Step

Users of Reference Manager have asked us for a simple way to convert their data into EndNote. We've done it! Simply click a button and EndNote will automatically convert your Reference Manager database into an EndNote database. It's that easy! And your Reference Manager files are not affected by this conversion.

And that's not all! If you use Microsoft Word, you can enjoy the benefits of the EndNote Add-in right away! You can convert your Microsoft Word documents containing Reference Manager citations into papers with EndNote citations. Now you're ready to format your bibliographies in just one step!

As a user of Reference Manager you qualify for a competitive upgrade. Call us for details. All of our products are backed by a simple 30-Day Money-Back guarantee.

If you would like to see how EndNote converts your Reference Manager files, you can download a free demo from our web site at <http://www.niles.com>. Questions? Call Niles & Associates at 510.559.8592 or email us at info@niles.com.

Circle No. 34 on Readers' Service Card

MEMBERSHIP/CIRCULATION

Director: Michael Spinella
Deputy Director: Marlene Zendell
Member Services: Donald Crowl, *Manager*; Mary Curry, *Supervisor*; Pat Butler, Laurie Baker, Yvette Carter *Representatives*
Marketing: Dee Valencia, *Manager*; Jane Pennington, *Europe Manager*; Hilary Baar, *Assistant Manager*; Lauri Sirois, *Coordinator*
Research: Renuka Chander, *Manager*
Business and Finance: Robert Smariga, *Manager*; Nina Araujo de Kobes, Kimberly Parker, *Coordinators*
Computer Specialist: Charles Munson

ADVERTISING AND FINANCE

Associate Publisher: Beth Rosner
Advertising Sales Manager: Susan A. Meredith
Recruitment Advertising Manager: Janis Crowley
Business Manager: Deborah Rivera-Wienhold
Finance: Randy Yi, *Senior Analyst*; Connie Dang, *Financial Analyst*
Marketing: John Meyers, *Manager*; Allison Pritchard, *Associate*
Electronic Media: David Gillikin, *Manager*; Mark Croatti, *Crystal Young, Production Associates*
Product Advertising: Carol Maddox, *Traffic Manager*; Natalie Britt, *Sales Associate*
Product Advertising Sales: East Coast/E. Canada: Richard Teeling, 201-904-9774, FAX 201-904-9701 • **Midwest/Southeast:** Elizabeth Mosko, 773-665-1150, FAX 773-665-2129 • **West Coast/W. Canada:** Neil Boylan, 415-673-9265, FAX 415-673-9267 • **UK, Scandinavia, France, Italy, Belgium, Netherlands:** Andrew Davies, (44) 1-457-838-519, FAX (44) 1-457-838-898 • **Germany/Switzerland/Austria:** Tracey Peers, (44) 1-260-297-530, FAX (44) 1-260-271-022 • **Japan:** Maschy Yoshikawa, (81) 3-3235-5961, FAX (81) 3-3235-5852
Recruitment Advertising: Terri Seiter Azie, *Sales and Production Operations Manager*; Celeste Miller, *Sales Supervisor*; Eric Banks, Troy Benitez, Bren Peters-Minnis, Bethany Ritchey, *Sales*; Debbie Cummings, *European Sales Manager*; Wendy Green, *Production Associate*; Nicole Robinson, *Advertising Assistant*
Recruitment Advertising Sales: US: Janis Crowley, 202-326-6532, FAX 202-289-6742 • **Europe:** Debbie Cummings, (44) 1223-302067, FAX (44) 1223-576208 • **Australia/New Zealand:** Keith Sandell, (61) 02-922-2977, FAX (61) 02-922-1100 • **Japan:** Maschy Yoshikawa, (81) 3-3235-5961, FAX (81) 3-3235-5852
Assistant to Associate Publisher: Nancy Hicks
Permissions: Lincoln Richman
Exhibits Coordinator: Arlene Ennis
Send materials to *Science* Advertising, 1200 New York Avenue, NW, Washington, DC 20005.

SCIENCE EDITORIAL BOARD

Charles J. Arntzen
David Baltimore
J. Michael Bishop
William F. Brinkman
E. Margaret Burbidge
Pierre-Gilles de Gennes
Joseph L. Goldstein
Mary L. Good
Harry B. Gray

John J. Hopfield
F. Clark Howell
Paul A. Marks
Yasutomi Nishizuka
Helen M. Ranney
Bengt Samuelsson
Robert M. Solow
Edward C. Stone
James D. Watson
Richard N. Zare

■ Published by the American Association for the Advancement of Science (AAAS), *Science* serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

INFORMATION RESOURCES

SUBSCRIPTION SERVICES

For change of address, missing issues, new orders and renewals, and payment questions, please contact AAAS at Danbury, CT: 800-731-4939 or Washington, DC: 202-326-6417, FAX 202-842-1065. Mailing addresses: AAAS, P.O. Box 1811, Danbury, CT 06813 or AAAS Member Services, 1200 New York Avenue, NW, Washington, DC 20005 • **Other AAAS Programs:** 202-326-6400

REPRINTS & PERMISSION

Reprints: Ordering/Billing, 800-407-9191; Corrections, 202-326-6501 • **Permissions:** 202-326-7074, FAX 202-682-0816

INTERNET ADDRESSES

science_editors@aaas.org (for general editorial queries); science_news@aaas.org (for news queries); science_letters@aaas.org (for letters to the editor); science_reviews@aaas.org (for returning manuscript reviews); science@science-int.co.uk (for the Europe Office); membership@aaas.org (for member services); science_classifieds@aaas.org (for submitting classified advertisements); science_advertising@aaas.org (for product advertising)

INFORMATION FOR CONTRIBUTORS

See pages 93–94 of the 5 January 1996 issue or

access <http://www.sciencemag.org/science/home/con-info.shtml>.

EDITORIAL & NEWS CONTACTS

North America

Address: 1200 New York Avenue, NW, Washington, DC 20005
Editorial: 202-326-6501, FAX 202-289-7562
News: 202-326-6500, FAX 202-371-9227 • **Bureaus:** Berkeley, CA: 510-841-1154, FAX 510-841-6339, San Diego, CA: 619-942-3252, FAX 619-942-4979, Chicago, IL: 312-360-1227, FAX 312-360-0537, Boston, MA: 617-566-7137, FAX 617-734-8088

Europe

Headquarters: 14 George IV Street, Cambridge, UK CB2 1HH; (44) 1223-302067, FAX (44) 1223-302068
Paris Correspondent: (33) 1-49-29-09-01, FAX (33) 1-49-29-09-00

Asia

Japan Office: Carl Kay, Esaka-cho 5-chome 11-10, Suita-shi, Osaka 564 Japan; (81) 6-368-1925, FAX (81) 6-368-6905; science@magical.egg.or.jp
• **News Bureau:** (81) 3-3335-9925, FAX (81) 3-3335-4898 • **China Office:** Hao Xin, (86)10-6255-9478; science@public3.bta.net.cn

BOARD OF REVIEWING EDITORS

Frederick W. Alt
Children's Hospital, Boston
Don L. Anderson
California Institute of Technology
Michael Ashburner
Univ. of Cambridge
Stephen J. Benkovic
Pennsylvania State Univ.
Alan Bernstein
Mount Sinai Hospital, Toronto
Seth Blair
Univ. of Wisconsin, Madison
David E. Bloom
Harvard Institute for International Development
Piet Borst
The Netherlands Cancer Institute
Henry R. Bourne
Univ. of California, San Francisco
Michael S. Brown
Univ. of Texas Southwestern Medical Center
James J. Bull
Univ. of Texas at Austin
Kathryn Calame
Columbia Univ. College of Physicians & Surgeons
Dennis W. Choi
Washington Univ. School of Medicine, St. Louis
David Clapham
Mayo Foundation
Adrienne E. Clarke
Univ. of Melbourne, Parkville
John M. Coffin
Tufts Univ. School of Medicine
F. Fleming Crim
Univ. of Wisconsin, Madison
Paul J. Crutzen
Max-Planck-Institut für Chemie
James E. Dahlberg
Univ. of Wisconsin Medical School, Madison
Robert Desimone
National Institute of Mental Health, NIH

Paul T. Englund
Johns Hopkins Univ. School of Medicine
G. Ertl
Max-Planck-Gesellschaft
Richard G. Fairbanks
Lamont-Doherty Earth Observatory
Robert E. Fay
U.S. Bureau of the Census
Douglas T. Fearon
Univ. of Cambridge
Harry A. Fozzard
The Univ. of Chicago
Roger I. M. Glass
Centers for Disease Control
Stephen P. Goff
Columbia Univ. College of Physicians & Surgeons
Peter N. Goodfellow
SmithKline Beecham, UK
Peter Gruss
Max Planck Institute of Biophysical Chemistry
Philip C. Hanawalt
Stanford Univ.
Paul Harvey
Univ. of Oxford
M. P. Hassell
Imperial College at Silwood Park
Nobutaka Hirokawa
Univ. of Tokyo
Tomas Hökfelt
Karolinska Institutet
Tasuku Honjo
Kyoto Univ.
Susan D. Iversen
Univ. of Oxford
Eric F. Johnson
The Scripps Research Institute
Elliott Kieff
Harvard Univ.
Judith Kimble
Univ. of Wisconsin, Madison
Stephen M. Kosslyn
Harvard Univ.
Michael LaBarbera
The Univ. of Chicago
Nicole Le Douarin
Université Bayreuth
Erkki Ruoslahti
The Burnham Institute, CA

Harvey F. Lodish
Whitehead Institute for Biomedical Research
Richard Losick
Harvard Univ.
Reinhard Lührmann
Institut für Molekularbiologie und Tumorforschung der Philipps-Universität
Ruth Lynden-Bell
Queen's Univ., Belfast
Seth Marder
California Institute of Technology
Diane Mathis
Institut de Chimie Biologique, Strasbourg
Susan K. McConnell
Stanford Univ.
Anthony R. Means
Duke Univ. Medical Center
Stanley Meisel
Univ. of California, Davis
Shigetada Nakanishi
Kyoto Univ.
Kim Nasmyth
Research Institute of Molecular Pathology, Vienna
Roger A. Nicoll
Univ. of California, San Francisco
Staffan Normark
Swedish Institute for Infectious Disease Control
Bert W. O'Malley
Baylor College of Medicine
Stuart L. Pimm
The Univ. of Tennessee, Knoxville
Yeshayau Pocker
Univ. of Washington, Seattle
Ralph S. Quatrano
Univ. of North Carolina, Chapel Hill
Martin Raff
Univ. College London
Douglas C. Rees
California Institute of Technology
T. M. Rice
ETH-Hönggerberg, Zürich
David C. Rubie
Universität Bayreuth
Erkki Ruoslahti
The Burnham Institute, CA

Gottfried Schatz
Biozentrum, Basel
Jozef Schell
Max-Planck-Institut für Züchtungsforschung
Ronald H. Schwartz
National Institute of Allergy and Infectious Diseases, NIH
Terrence J. Sejnowski
Salk Institute
Christopher R. Somerville
Washington
Thomas A. Steitz
Yale Univ.
Michael P. Stryker
Univ. of California, San Francisco
Cliff Tabin
Harvard Medical School
John Jen Tai
Academia Sinica, Taiwan
Tomoyuki Takahashi
Univ. of Tokyo
Masatoshi Takeichi
Kyoto Univ.
Keiji Tanaka
RIKEN Institute
David Tilman
Univ. of Minnesota, St. Paul
Robert T. N. Tjian
Univ. of California, Berkeley
Yoshinori Tokura
Univ. of Tokyo
Emil R. Unanue
Washington Univ. School of Medicine, St. Louis
Derek van der Kooy
Univ. of Toronto
Geerat J. Vermeij
Univ. of California, Davis
Bert Vogelstein
Johns Hopkins Oncology Center
Arthur Weiss
Univ. of California, San Francisco
Zena Werb
Univ. of California, San Francisco
George M. Whitesides
Harvard Univ.
Owen N. Witte
Univ. of California, Los Angeles

UNO™

you have
no idea
how **big** it is!

{ Chromatography will never be the same. }

BIO-RAD

**Bio-Rad
Laboratories**

Circle No. 36 on Readers' Service Card

Life Science Group

U.S. (800) 4BIORAD California (510) 741-1000 Australia 02-9914-2800 Austria (1)-877 89 01 Belgium 09-385 55 11 Canada (905) 712-2771 China (86-10) 2048622 Denmark 39 17 9947
Finland 90 804 2200 France Ph. (1) 43 90 46 90 Germany 089 31884-0 Hong Kong 7893300 India 91-11-461-0103 Italy 02-21609 1 Japan 03-5811-6270 The Netherlands 031318-540666
New Zealand 09-443 3099 Singapore (65) 272-9877 Spain (91) 661 70 85 Sweden 46 (0) 8 627 50 00 Switzerland 01-809 55 55 United Kingdom 0800 181134

One. Better.



Sigma Gives You One Better - Precast Gels in Convenient Single Packs.

Are you tired of half the precast gels in a package expiring before you need them? Are you annoyed by minimum order requirements? Then you'll welcome Sigma's smart answer to short shelf life: our convenient new single packs.

Sigma's precast mini-polyacrylamide gels offer many advantages. They're available in a variety of concentrations and gradients, in 8 x 10 cm or 10 x 10 cm cassette sizes. They're reliable and reproducible. They're faster, easier and safer than hand-casting.

And they're a bargain, because you can buy just one at a time.

Now when you really only need one gel, you can get exactly what you need. Never more, and certainly never less. That's just what you expect from Sigma, your single source for precast gels.

Call toll free: 800-325-3010 / collect: 314-771-5750 or contact your local Sigma office. Visit our web site at: <http://www.sigald.sial.com>

SIGMA[®] 
CHEMICAL COMPANY

Circle No. 2 on Readers' Service Card

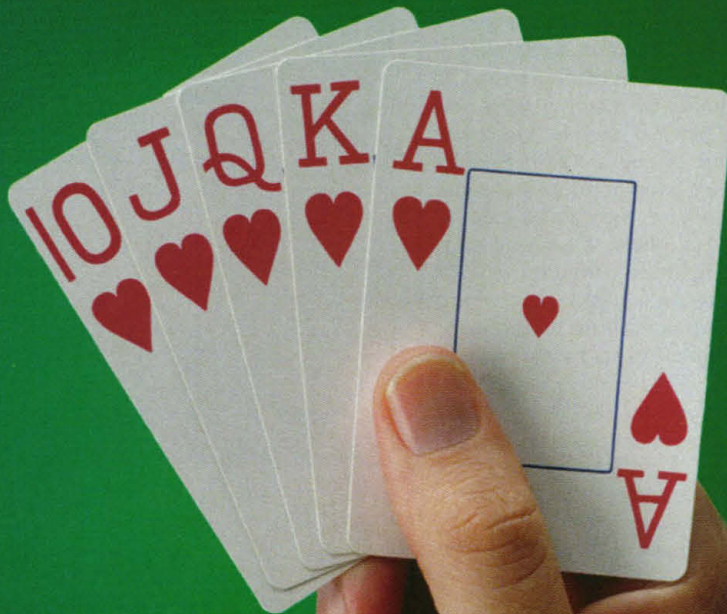
AUSTRALIA AUSTRIA BELGIUM BRAZIL CZECH REPUBLIC FRANCE GERMANY HUNGARY INDIA ISRAEL ITALY JAPAN
 KOREA MEXICO THE NETHERLANDS POLAND SPAIN SWEDEN SWITZERLAND UNITED KINGDOM UNITED STATES

A Sigma-Aldrich Company

Sigma Chemical Company
 P.O. Box 14508
 St. Louis, MO 63178 USA

Here's the Deal...

- **PGD₂-MOX
EIA Kit**
- **11 β -PGF_{2 α}
EIA Kit**



The News

There is renewed interest in the measurement of Prostaglandin D₂ in CSF and urine due to its causal role in the induction of sleep and its overproduction in asthmatics, respectively. So, what assay method should one use?

The Problem

Prostaglandin D₂ is unstable to the conditions used in generating hapten:carrier conjugates for the production of antisera. The consequence: immunoassays for PGD₂ show unwanted crossreactivity and poor correlation with more precise methods.

The Solution

PGD₂ readily forms a stable methoxime derivative, and our EIA kit for this PGD₂-methoxime (PGD₂-MOX) is highly sensitive and specific. For samples containing PGD₂, this is the answer.

11 β -PGF_{2 α} is a major plasma and urinary metabolite of PGD₂. Our 11 β -PGF_{2 α} EIA has been recently validated for the measurement of this metabolite in the urine of asthmatic patients.

Simply mention code
20094 when ordering to receive
a PGD₂-MOX or 11 β -PGF_{2 α}
EIA kit for only

\$60!*



www.CaymanChem.com
e-mail: cayman @ caymanchem.com

690 KMS Place
Ann Arbor, MI 48108 USA
(800) 364-9897

Limit one kit per customer. Shipping charges additional. This offer expires January 31, 1997.

Circle No. 52 on Readers' Service Card

Do It Yourself Library Screening

Get 85-100 kb or 120+ kb P1 or PAC/BAC clones by performing your own library screening with "Down-to-the-Well"™ PCR'able DNA pools or by using High Density Colony Filters from Genome Systems, Inc.

PAC/BAC PCR'able DNA Pools

Genome Systems provides its PAC/BAC libraries in convenient DNA pools for screening by PCR¹. Depending upon your choice of kits, enough DNA is provided for 25 or 50 screens.

Our High Density Filters Can Be Hybridized with Your Choice of Probes

Genome Systems double-spots up to 150,000 colonies on 22 by 22 cm filters, (36,864 spots per filter). Double-spotting makes it easy to identify true positive colonies over the background noise generated by hybridization probes.

In addition, the clone address can be easily determined by the position of the two hybridization signals created by double spotting.

From a single copy gene, a multi-gene family, or an entire YAC clone, you can identify the cognate clones. Or let Genome Systems convert even the largest YAC into overlapping sets of P1 or PAC/BAC™ clones in a matter of days.

Our services include;

- P1 (85kb) genomic library screening service (human, ES mouse for knockouts, rat and drosophila).
- Human PAC; or Human, Mouse ES 129/SvJ, Mouse C57BL/6, Mosquito or Zebrafish BAC (120kb+ insert) genomic library screening services.
- IMAGE human, and mouse cDNA clones.
- Custom gene knockout services.
- Matched 129/SvJ mouse BAC library and 129/SvJ ES cells.

Other P1 or PAC/BAC™ services include:

- DNA Preparation
- DNA Insert End Sequencing
- DNA Insert Orientation
- DNA Subcloning

1. The PCR process is covered by patents owned by Hoffman-La Roche.

GenomeSystemsInc™

8620 Pennell Drive

St. Louis, Missouri 63114, USA

(800) 430-0030 or, (314) 692-0033

Facsimile: (314) 692-0044

France: Appel gratuit, 0590-2104

Germany: Rufen sie uns an zum ortstarif, 0130-81-9081

UK: Call us free on, 0800-89-3733

email address: Genome@MO.net

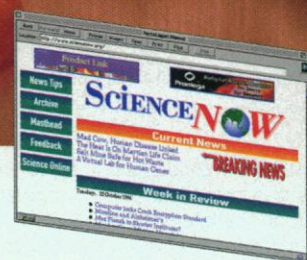
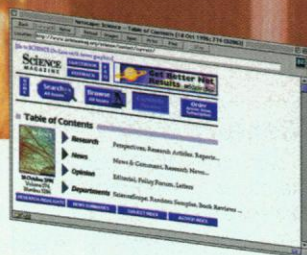
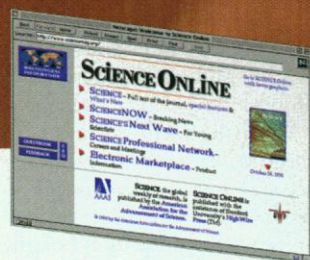
World Wide Web: <http://www.genomesystems.com>

Circle No. 23 on Readers' Service Card



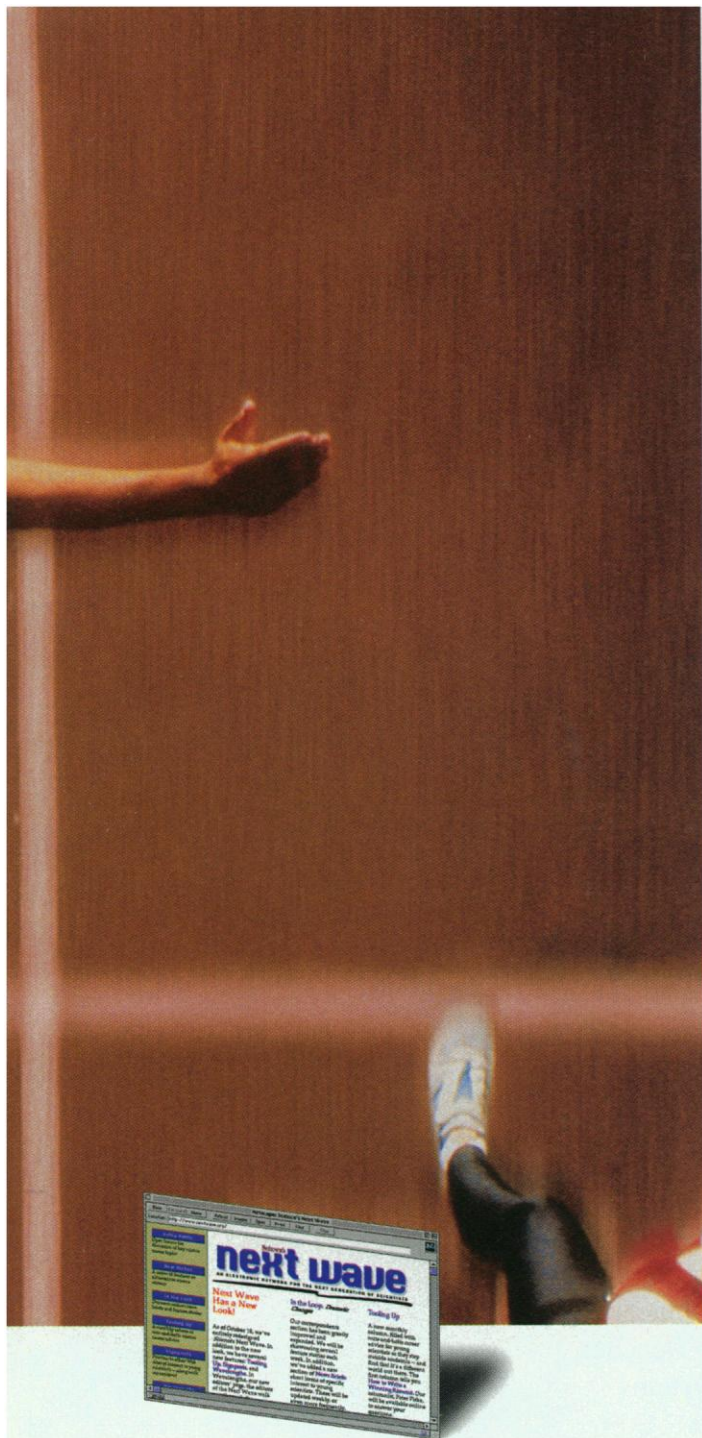
Go To
<http://www.sciencemag.org>

GET ON THE FAST TRACK... SCIENCE ONLINE



SCIENCE Online helps keep you out in front!

- **Full-text SCIENCE** — on the day of publication, research papers and news articles with hyperlinks from citations to related abstracts in Medline
- **ScienceNOW** — daily science news briefings
- **SCIENCE's Next Wave** — a new design, plus new career advice column, an Asian forum, and expanded news section written by young scientists worldwide
- **Perspectives** — enhanced with links to related research and background information
- **SCIENCE Professional Network** — career related services, including a powerful new engine to search jobs by discipline, position, organization, and region
- **SCIENCE Electronic Marketplace** — the latest product information from the world's leading science manufacturers and suppliers, plus hyperlinks to advertiser's web sites



*Join thousands of your AAAS colleagues
and turn to SCIENCE Online to research
your interest areas right at your desk.*

SCIENCE ONLINE

<http://www.sciencemag.org>

Starting in 1997, only AAAS members will be able to gain access to SCIENCE Online. If you are already a member, upgrade now for just \$12. If you are not yet a member, you can still join AAAS and get SCIENCE Online for \$12.

Access our online form through the AAAS WWW site:

<http://www.aaas.org/membership/meminfo.htm>...

Or fill out and mail the coupon below...

Or fax your coupon to us at (202) 842-1065...

Or call (202) 326-6417 to order today.

MEMBERSHIP UPGRADE

- ☐ YES, I want instant access to SCIENCE Online. Please upgrade my membership to include the full-text SCIENCE Online at the special introductory rate of only \$12. (Offer good through 12/31/96. Access to SCIENCE Online is for one full year.)

NEW MEMBERSHIP WITH SCIENCE ONLINE

- ☐ Please sign me up for AAAS membership and the special introductory rate for the full-text of SCIENCE Online. Membership includes 51 weekly issues of SCIENCE and one-year access to SCIENCE Online:

	U.S.	Europe, Asia, Pacific & Other	Canada	Mexico/ Caribbean
Regular Member	☐ \$114	☐ \$204	☐ \$179.99	☐ \$169
Postdoctoral/Resident	☐ \$ 89	☐ \$179	☐ \$153.24	☐ \$144
Full-Time Student	☐ \$ 67	☐ \$157	☐ \$129.70	☐ \$122

NEW MEMBERSHIP WITHOUT SCIENCE ONLINE

- ☐ Please sign me up for AAAS membership. Membership includes 51 weekly issues of SCIENCE.

Regular Member	☐ \$102	☐ \$192	☐ \$167.99	☐ \$157
Postdoctoral/Resident	☐ \$ 77	☐ \$167	☐ \$141.24	☐ \$132
Full-Time Student	☐ \$ 55	☐ \$145	☐ \$117.70	☐ \$110

Rates are valid until 12/31/96. \$55 allocated to SCIENCE. Canadian rate includes GST# 125488122. Please allow six weeks for receipt of first issue of Science. International exchange rates for credit card transactions are set by your credit card company, not by AAAS.

- ☐ Check enclosed (payable to "AAAS") for: \$ _____

- ☐ Charge \$ _____ to my: ☐ Visa ☐ MasterCard ☐ American Express

CARD # _____ EXP. DATE _____

SIGNATURE _____

NAME _____

MEMBERSHIP ID # (IF CURRENT MEMBER) _____

INSTITUTION _____

STREET ADDRESS _____

CITY _____ STATE/COUNTRY _____ ZIP/POSTAL CODE _____

MAIL TO:
AAAS—Membership Services
1200 New York Avenue, NW
Washington, DC 20005

OR FAX TO:
(202) 842-1065

Circle No. 33 on Readers' Service Card

S6AF1

Forma



Serving the World Market with Environmentally Controlled
Laboratory Equipment ... Forma Scientific

Cell Culture Incubators
Non-CFC Ultra-Low Temperature Freezers
Biological Safety Cabinets
Laminar Airflow Clean Benches
Cryopreservation Systems
Orbital Shakers
Blood Bank Equipment
Laboratory/Pharmaceutical Refrigerators and Freezers
Glassware Washers/Dryer
Monitor/Alarm Systems
Controlled Humidity Chambers
Centrifuges
Custom Designed Products

 **LIFE SCIENCES
INTERNATIONAL**
Laboratory Products Group



Forma Scientific, Inc.

Circle No. 39 on Readers' Service Card

Box 649 • Marietta, OH 45750 • 614-373-4763 • Fax: 614-373-6770
USA and Canada 800-848-3080 • <http://www.forma.com> • An ISO 9001 Company
International Distributors Worldwide

We're proving that positive thinking can cure disease.

The first step in accomplishing anything is the belief that it can be done. We believe there are cures for today's "incurable" diseases and we're working fast to find them. At Pharmacia & Upjohn we share this belief with more than 30,000 colleagues worldwide.

Along the way, we're finding better treatments for diseases like cancer, AIDS, diabetes, Parkinson's, growth disorders and arthritis.

Believing there is a cure is the first step in finding it. By sharing that belief you too can join in the fight. That's the power of positive thinking. That's the power of Pharmacia & Upjohn.



**Pharmacia
& Upjohn**

One simple move puts the future in sharper focus.

The company that pioneered BIA technology has just taken a long, hard look at itself. And decided on a simple change: our name.

Pharmacia Biosensor has become Biacore AB. By refocusing our identity, we've more closely associated ourselves with the instruments that we're famous for: the BIACORE® range. Just as importantly, in a competitive marketplace, we've distinguished ourselves from other manufacturers of biosensor technology.

Some things won't change though. Our commitment to helping researchers all over the world realize their scientific visions stays the same. As does our devotion to developing new and exciting products.

Products which
save time. Give faster,
more accurate information.
And ease pressure on research
budgets.

At Biacore, we're opening
people's eyes.



BIACORE
You have the vision. Use it.



Biosensor

Biacore AB: <http://www.pnu.com/biosensor/> fax: +46 18 150110

Circle No. 30 on Readers' Service Card

Start Your Day with inScight

Science and **Academic Press** invite you to start your day with **inScight**, the online information service devoted specifically to late-breaking science news.

Located at **www.apnet.com/inscight**, the site is a free service featuring daily topical news items of interest to researchers, practitioners, students, and anyone with an interest in current science issues. The experienced and preeminent

news team of the weekly **Science** compiles and provides **inScight** with the day's primary science news stories which are then formatted and maintained online through the Academic Press electronic production services department.

In addition to providing daily science news, **inScight** features a daily-updated network of links to related newsmakers, associations, and appropriate science subjects.

Stories are archived for easy searchable reference.

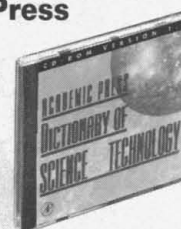
For key word descriptions, the service incorporates the **Academic Press Dictionary of Science and Technology**, a comprehensive reference of more than 130,000 entries.

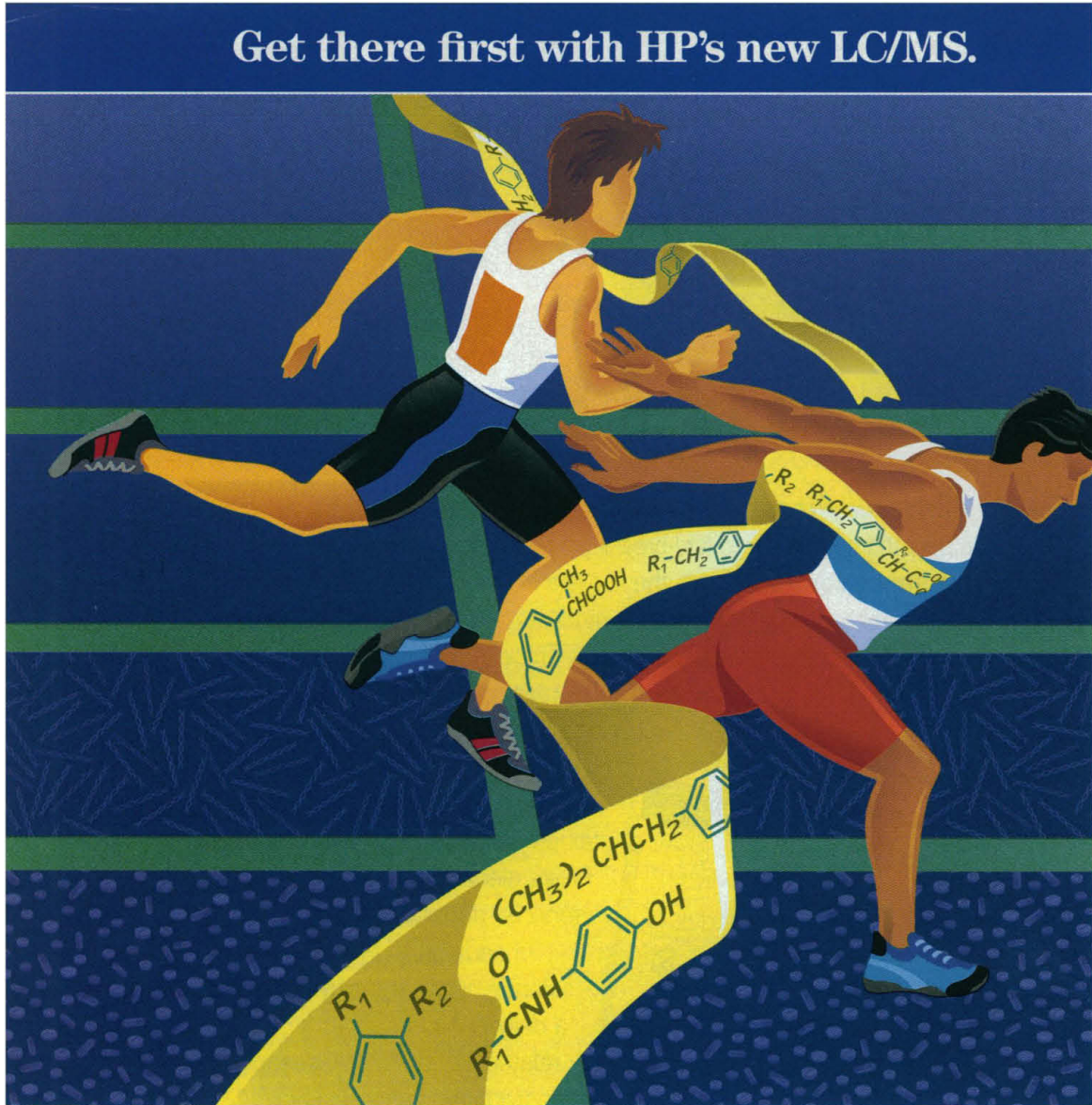
Start your day off right, with inScight!

**inScight—
www.apnet.com/inscight**

Science—
www.sciencemag.org

Academic Press—
www.apnet.com/ or
www.europe.apnet.com/



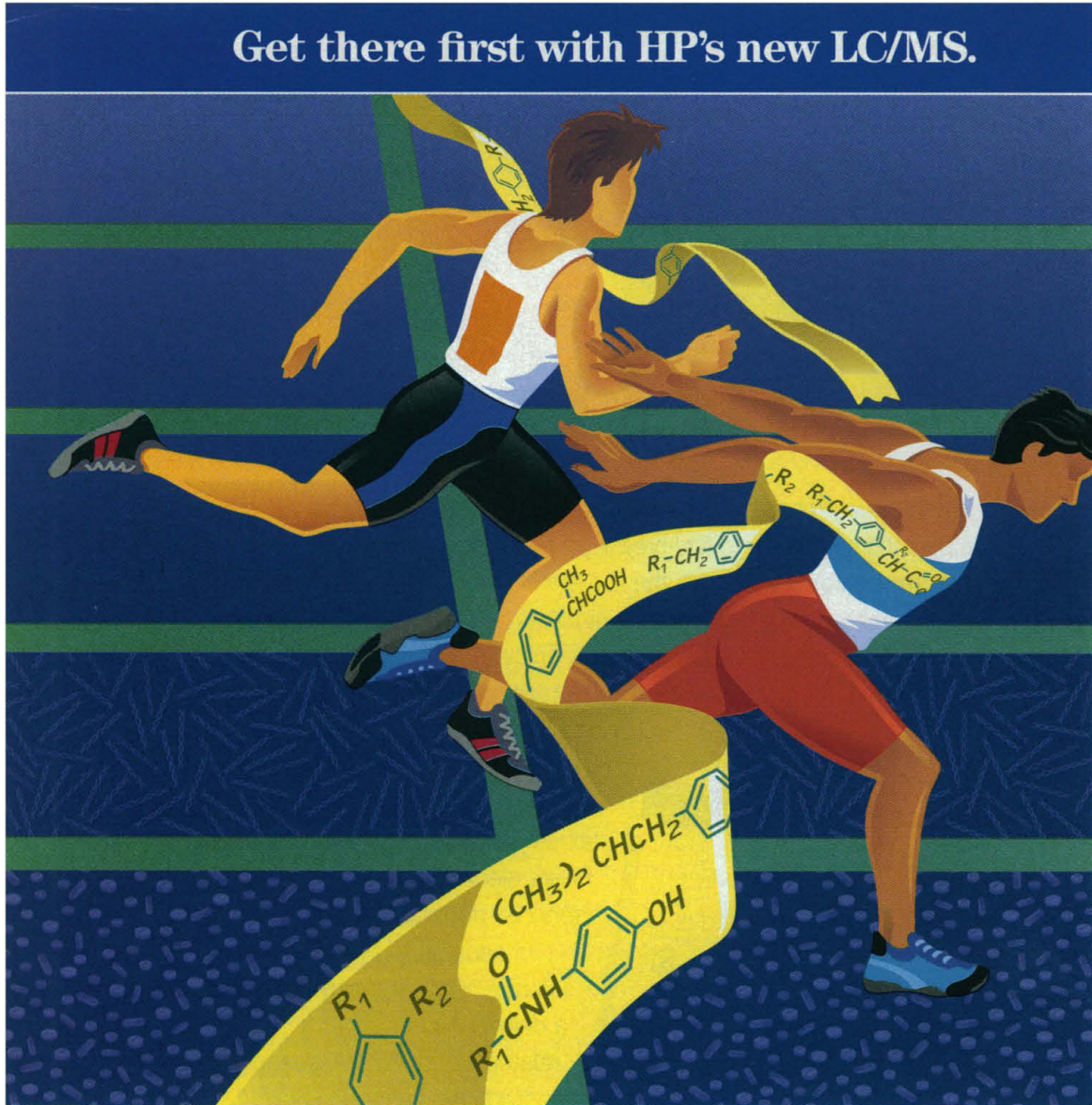
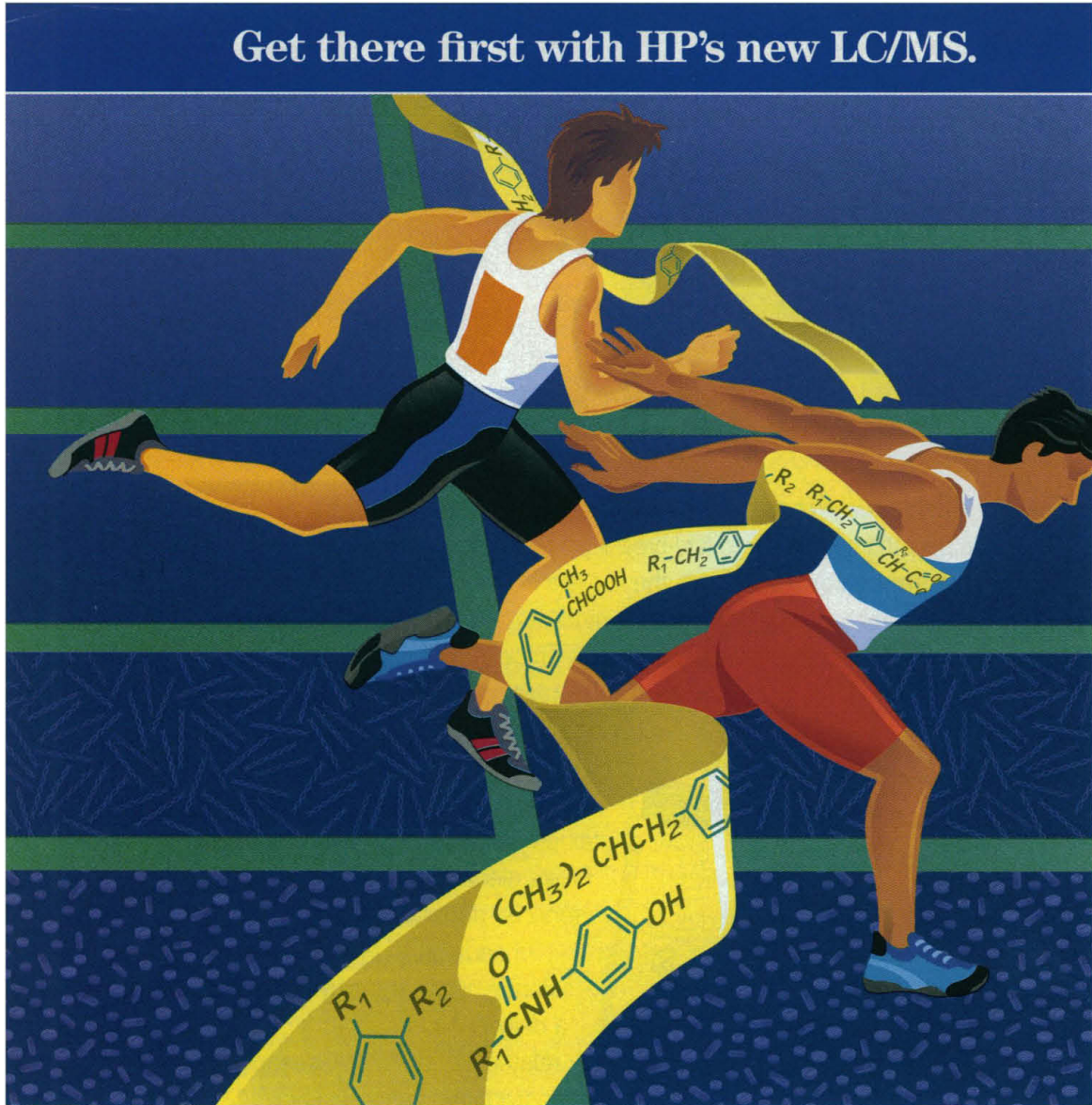
[illegible][illegible][illegible]

Get there first with HP's new LC/MS.

An illustration of two male runners competing on a green track with white lane markings. The runner in the foreground is wearing a white tank top with orange accents and black athletic pants; he is captured mid-stride, leaning forward. Behind him is another runner in a red tank top and blue athletic pants, also in motion. A long, flowing yellow banner trails behind the lead runner, featuring several chemical structures. These include a benzene ring with a methyl group (CH_3) and a carboxylic acid group (CHCOOH), a benzene ring attached to a chain with $\text{R}_1\text{-CH}_2$, a benzene ring with a hydroxyl group (OH) and an amide linkage ($\text{R}_1\text{-CNH-}$), and a complex structure involving $(\text{CH}_3)_2\text{CHCH}_2$ and a benzene ring. The background is a solid dark blue.[illegible][illegible]

- [illegible]

Get there first with HP's new LC/MS.

[illegible]

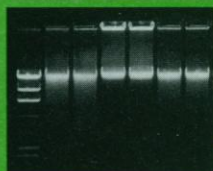
MRC Reagents For GENOMIC DNA ISOLATION

FAST
complete in
about 30 minutes

Setting a new standard of simplicity and effectiveness in the isolation of high quantity genomic DNA. No enzymatic treatments! No columns! No prolonged incubations! Non-toxic! (patent pending)

HIGH QUALITY DNA

rat human pepper
liver blood leaves



DNAzol™

- for cells and tissues
Isolates apoptotic DNA fragments.

DNAzol™ BD

- for whole blood

DNAzol™ ES

- for plants

MRC

MOLECULAR RESEARCH CENTER, INC
5645 Montgomery Rd.
Cincinnati, OH 45212
Phone: 513-841-0900
888-841-0900
Fax: 513-841-0080
E-mail: info@mrcgene.com

Isolated DNA is ready for:

- Southern blotting
- restriction analysis/RFLP
- PCR
- molecular cloning
- other molecular biology applications

ECONOMICAL

- Use 1ml of reagent with
- 10⁷ cells
 - 25–50mg animal tissue
 - 300mg plant
 - 300µl whole blood

Visit our website at:
<http://www.mrcgene.com>

Austria: 43-1-292-3527 Australia: 1-800-631-093 France: 33-3-88-180722 Germany: 49-6227-51308, 49-6172-22073
Hong Kong: 852-275-77569 India: 91-11-6425156 Israel: 972-8-947-2563 Italy: 39-2-2640274 Japan: 81-3-5632-9605
South Korea: 822-294-6411 Switzerland: 41-41-420-9636 Taiwan: 886-2-7418169 United Kingdom: 44-993-706736

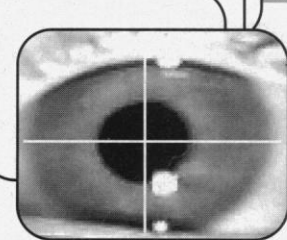
Circle No. 48 on Readers' Service Card

ISCAN®

EYE MOVEMENT MONITORING SYSTEMS

ISCAN eye tracking products set the pace for performance and affordability in the research marketplace. Applications include fixation monitoring, vision research, advertising research, psycho-visual experiments, reading studies, toxicology, human factors evaluation and drug or alcohol response.

Non-invasive, real-time video image processors automatically measure pupil position and size and compute subject's point of



gaze. Benchtop, head mounted and high speed versions as well as computer data analysis software are available. Complete Eye Movement Monitoring Laboratories or component systems can be provided to suit any research application.

ISCAN, Inc.

P.O. Box 382076

Cambridge, MA 02238-2076 USA

Tel: 617-273-4455 Fax: 617-273-0076

Circle No. 11 on Readers' Service Card



KINETIC
CITY
super crew™

The Coolest Kids' Show on Radio, Now on Tape!

The Kinetic City Super Crew is a group of curious kids that travel the world in their express train to solve brain-teasing science mysteries!

Order a copy of the Super Crew's latest adventure "Concrete Jungle or The Case of the City Safari" and discover the wild side of the city.

To order, call toll-free 1-888-GET-CREW
\$8.95 plus \$4 s&h (per order)

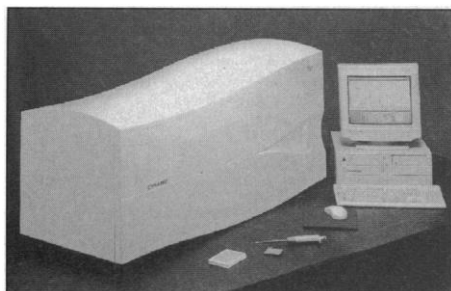
Check out our Website for your local KCSC station,
and for other cool Super Crew stuff.
<http://www.aaas.org/EHR/KCsuper.html>

Kinetic City Super Crew is a production of the American Association for the Advancement of Science.
Funding is provided by the National Science Foundation and support from other contributors.

PRODUCTS & MATERIALS

MALDI-TOF Mass Spectrometer

DYNAMO is a new matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF) mass analyzer that brings the power of dynamic extraction (DE) to MALDI-TOF.



DE achieves enhanced resolution, sensitivity, and mass accuracy by rapid switching of the high-voltage extraction field in the ion source shortly after the laser has been fired. Until the advent of DE, operation using fixed-

source voltages meant that ions were extracted through a plume of neutrals, resulting in collisions that caused fragmentation and energy spread. DE allows the neutrals to disperse before the source voltages are applied, so collisions are reduced to a negligible level. **Thermo BioAnalysis.** For information call +44 (0) 1442 233555 or circle 139 on the reader service card.

Nucleic Acids from a Variety of Templates

The High Pure PCR Template Preparation Kit is designed for the rapid isolation of nucleic acids from different template materials. Although optimized for whole blood, cultured cells, and tissue samples, with a simple pre-lysis treatment it can be used to treat bacteria and yeast samples. The spin-filter tube unit incorporates two layers of a spe-

cially treated glass fiber fleece that is highly specific for nucleic acids. A simple washing step removes bound impurities and the nucleic acid is rapidly eluted from the matrix using a low salt buffer or water. The nucleic acids isolated with the kit can be used for polymerase chain reaction amplification and are pure enough for Southern blotting applications. **Boehringer Mannheim UK.** For information call +44 (0) 1273 480444 or circle 140 on the reader service card.

DNA Clean-Up Kit

The *gene*CLEANUP kit uses new *pink*RESIN to remove salt, enzymes, unincorporated nucleotides, and primer-dimers from DNA preparations. The *pink*RESIN has an enhanced binding capacity and resuspends with ease, eliminating one of the main frustrations of using resins to clean DNA. The protocol involves mixing the DNA or polymerase chain reaction product with the resin, and then a quick washing step follows elution of DNA in a small volume of water or buffer. **Geno Technology.** For information call 314-534-0075 or circle 141 on the reader service card.

Mutation Detection Kit

The MutaPlax cII-Select Kit is designed to give accurate mutation frequency data at a substantially reduced cost for mutagenesis assays using rodents or cell lines transgenic for bacteriophage lambda. Mutations are detected by direct selection, avoiding the need to screen large numbers of plaques. False positives caused by host cell-derived mutations are much less likely. Expensive specialized media, reagents, and accessories for screening are not required since mutation selection is performed using only standard size petri dishes and standard growth agar. **Epicentre Technologies.** For information call 800-284-8474 or circle 142 on the reader service card.

Cell Assay Microplate

The Cytostar-T scintillating microplate enables the continuous, real-time analysis and quantitation of many cell-based events. This noninvasive technology could find applications in many aspects of cell-based drug research, from cell proliferation and receptor-ligand interactions to drug uptake and cell motility. The Cytostar-T plate incorporates scintillant into the base plastic of a standard format 96-well microplate. Thus, cellular events occurring at the cell surface or within the cells growing on the base of the wells can

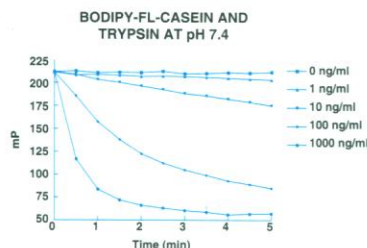
40,000 SAMPLES PER DAY

FLUORESCENCE POLARIZATION WILL REDEFINE PROTEASE AND PROTEASE INHIBITOR ASSAYS

FLUORESCENCE POLARIZATION

ALLOWS FOR SIMPLE, QUICK AND PRECISE ASSAYS OF PROTEASES AND THEIR INHIBITORS OF UP TO 40,000 SAMPLES/DAY. FP IS HOMOGENEOUS. YOU CAN MAKE UP YOUR OWN REAGENTS OR BUY THEM OFF THE SHELF.

AS DEMONSTRATED AT LEFT, THE FPM-1™ ANALYZER PRODUCES A KINETIC MAPPING OF PROTEASE ACTIVITY IN UNDER 5 MINUTES, DETECTING THE ACTIVITY AT A VARIETY OF CONCENTRATIONS AND PH VALUES. TO LEARN MORE ABOUT (FP) AND TRANSFORM THE WAY YOU DO ASSAYS—CALL AND REQUEST AN INTERACTIVE FP MULTIMEDIA DISK.



BODIPY-FL® IS A TRADEMARK OF MOLECULAR PROBES, EUGENE, OR.

IMAGINE
40,000 PROTEASE SAMPLES
PER DAY!



JOLLEY CONSULTING AND RESEARCH, INC.
USA AND CANADA: 1-800-685-0401 ■ 847-548-2330 ■ FAX: 847-548-2984
E-MAIL: info@jolley.com ■ ENGLAND: 44-01708-476-162

EUROPE GERMANY: 49-711-346-1078

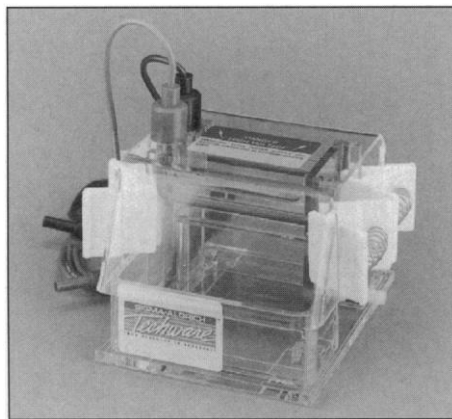
be monitored by the addition of radiolabeled molecules to the growth medium. When these molecules bind to, or are taken up by, growing cells, the label is sufficiently close to the scintillant in the baseplate for a signal to be produced. **Amersham International.** For information call 800-323-9750 or circle 143 on the reader service card.

Grant Accounting Software

GRANT TRACKER 5.2 is an upgrade of a software program for grant-expenditure accounting, with up-to-the-minute information on expenses and personnel. Many new accounting and report features have been added. GRANT TRACKER can be used by a principal investigator whose secretary has no bookkeeping experience or by a central administrator who handles grants for many principal investigators. Windows, DOS, and Macintosh versions are available. **KCS Software.** For information call 415-493-7210 or circle 144 on the reader service card.

Small Electrophoresis Units

Two new vertical mini-gel systems are available for the electrophoresis of small polyacrylamide or agarose gels. The units have gel plate dimensions of 11.3 cm wide by 10.0 cm high and can accommodate most standard



10.0 by 10.0 cm pre-cast gels. A dual unit model, capable of running two gels simultaneously under identical buffer conditions, and a single unit model are available. Both units are constructed of high quality acrylic with

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card and placing it in a mailbox. Postage is free.

platinum electrodes. The dual unit model is supplied with a cooling chamber with coolant recirculation ports. **Sigma Chemical.** For information call 800-325-3010 or circle 145 on the reader service card.

Literature

SPECTRAmax 340 Microplate Reader, Redefined describes a monochromator-based microplate reader that allows selection of any wavelength between 340 and 750 nm without changing filters. Tunable in 1-nm increments, the instrument's bandwidth is only 5 nm. It provides programmable mixing and three-stage temperature control that eliminates lid fogging from ambient 4°C to 45°C. **Molecular Devices.** For information call 408-747-3591 or circle 146 on the reader service card.

Phenomenex Chromatography 1996 is a 300-page catalog filled with new products, technical information, charts, and tables. **Phenomenex.** For information call 310-212-0555 or circle 147 on the reader service card.

CLONTECH 96/97 is a catalog featuring many innovative products including green fluorescent protein-related products, a complementary DNA subtraction kit for en-

richment of differentially expressed genes, **MATCHMAKER One-Hybrid** and **Mammalian Two-Hybrid** systems, polymerase chain reaction (PCR) kits and enzymes, a PCR library construction kit, and more. **CLONTECH Laboratories.** For information call 800-622-2566 or circle 148 on the reader service card.

High Throughput LC-MS Verification of Drug Candidates from 96-Well Plates is an application note on the use of combinatorial chemistry and liquid chromatography-mass spectrometry in screening compounds for biological activity. **Micromass.** For information call ++44 (0) 161 945 4170 or circle 149 on the reader service card.

ConfoCor: New Insights into Molecular Interactions using Fluorescence Correlation Spectroscopy is a brochure on a tool capable of characterizing the hybridization of nucleic acids in solution rapidly without the need for separation of the nonbound fraction, a novel method for studying receptor/ligand interactions in homogeneous assays rapidly without the need for radioactively labeled ligands, and a sensitive method for the quantification of protein-DNA interactions in a homogeneous solution. **Carl Zeiss Jena.** For information call 800-356-1090 or circle 150 on the reader service card.

High Speed Wavelength Switching

The **Lambda DG-4** is the ideal light source for your fluorescence ratio imaging experiments. The **DG-4** is the first wavelength switcher to achieve 1 millisecond switching using up to 4 standard interference filters. Easy to install, easy to use and highly integrated, the **DG-4** extends the capabilities of your imaging system.

One millisecond wavelength switching for real time video imaging

Accommodates up to 4 standard interference filters and neutral density filters

Integral 125 watt, pre-focused xenon lamp requires no alignment

No mechanical vibration transmitted to microscope

Fiber optic output adaptable to most microscopes

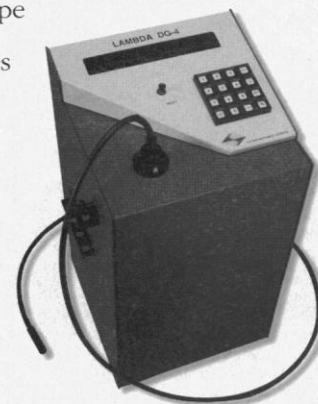
Sub-millisecond shuttering of excitation light

Arbitrary dwell time at any one wavelength

Can be triggered by video sync pulse

Parallel or serial computer interface

Programmable intensity



SUTTER INSTRUMENT COMPANY

40 LEVERONI COURT, NOVATO, CA 94949

PHONE: 415.883.0128 FAX: 415.883.0572 INFO@SUTTER.COM HTTP://WWW.SUTTER.COM

Circle No. 9 on Readers' Service Card