

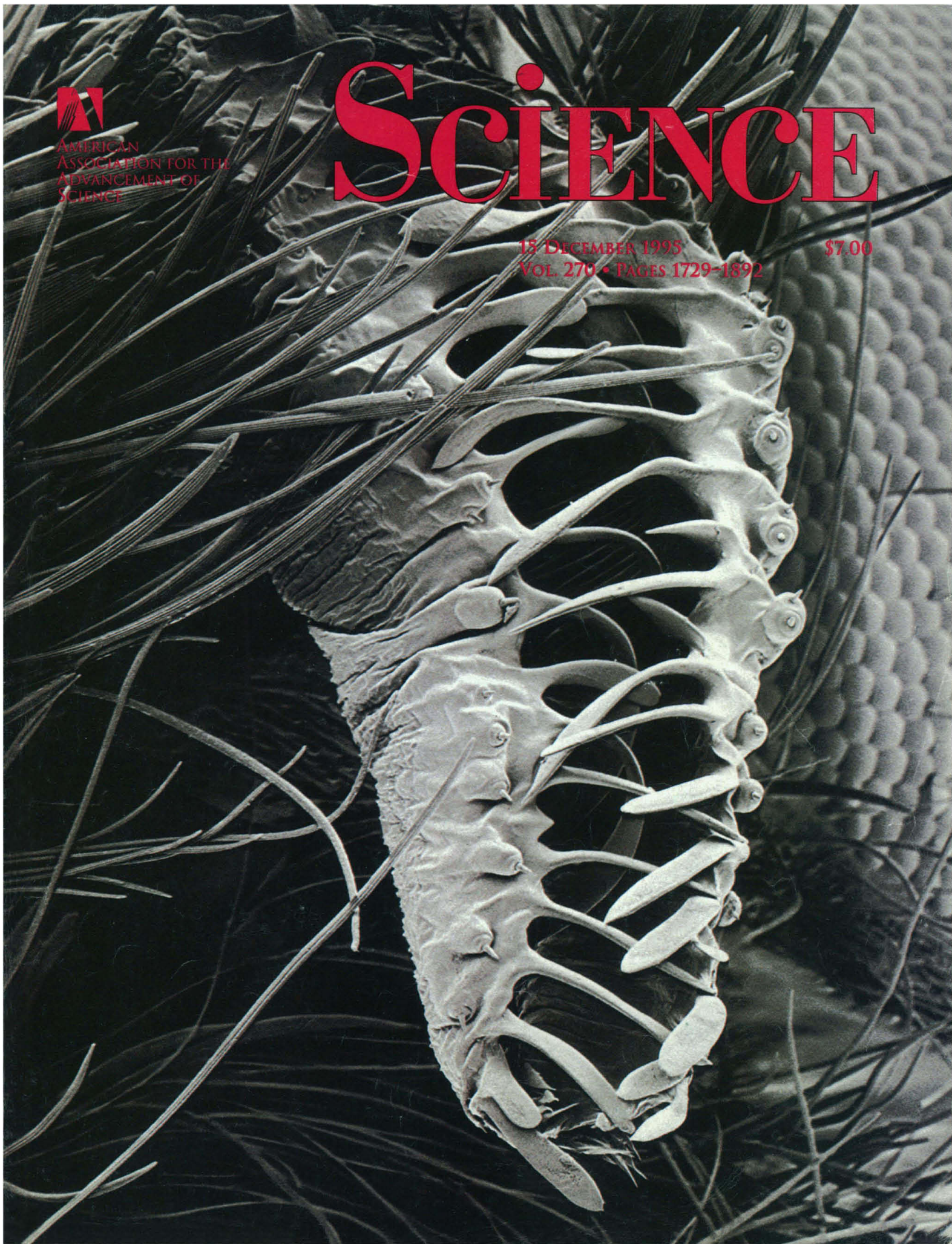


AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

SCIENCE

15 DECEMBER 1995
VOL. 270 • PAGES 1729-1892

\$7.00



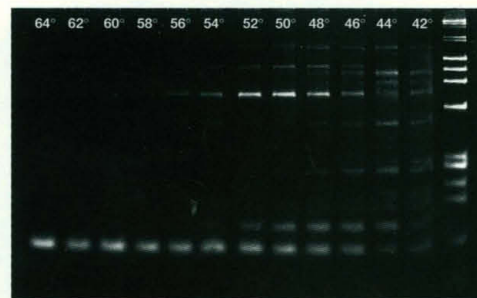
We're the Only Company that Gives

Stratagene's PCR enzymes[†] and thermal cyclers^{††} are authorized for PCR. Plus we offer products specifically designed to solve your PCR problems. So Stratagene truly has everything you need to make PCR quickly deliver the very best results. And when you use Stratagene's authorized PCR reagents with our RoboCycler[®] temperature cycler, you have a fully licensed system for performing PCR in your research.

Authorized RoboCycler[®] System

- ◆ Optimizes PCR primer annealing temperature in 1 run
- ◆ Up to 30% faster cycling
- ◆ Well-to-well uniformity of $\pm 0.1^{\circ}\text{C}$
- ◆ Unique robotic design and 4

No temperature ramping because robotic arm moves samples from one pre-equilibrated block to another.



Optimization of PCR primer annealing temperature with the RoboCycler[®] Gradient 96 system*

RoboCycler[®] Gradient 96 System

RoboCycler[®] Gradient 40 System



If you buy a RoboCycler[®] system in 1995, Stratagene will give you the PCR authorization at no charge!

INTERNET MAIL
techservices@stratagene.com

USA
Corporate Headquarters
(800) 424-5444
(619) 535-5400
Fax: (619) 535-0045

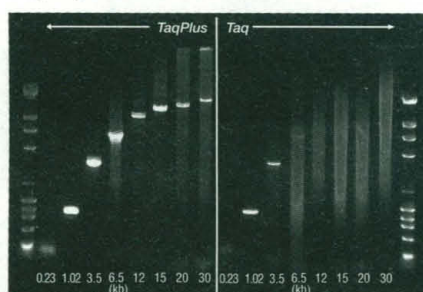
GERMANY
Stratagene GmbH
Telephone: (06221) 400634
Telefax: (06221) 400639

You Everything for Authorized PCR!

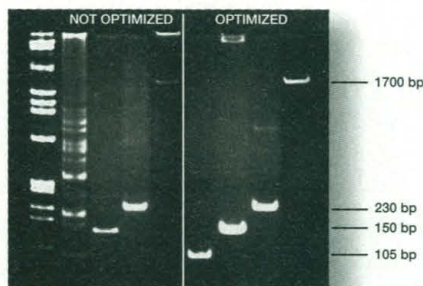
Stratagene's polymerases simply make better PCR products. Plus we have PCR-related products that solve problems, clone PCR fragments, reverse transcribe, screen and more.

Innovative PCR Enzymes

- ◆ *Pfu* DNA polymerase* for high-fidelity PCR and cloning
- ◆ *TaqPlus*™ DNA polymerase for robust PCR and long templates
- ◆ *Taq2000*™ cloned DNA polymerase for consistent PCR



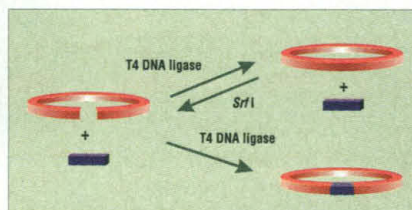
Increased PCR Amplification Success Using *TaqPlus*™ DNA Polymerase



Opti-Prime™ Kit Used to Optimize PCR Amplification of Primer-Template Sets

PCR Problem Solvers†††

- ◆ *Taq* Extender™ PCR additive to boost *Taq* performance
- ◆ Perfect Match® PCR enhancer* to erase background
- ◆ *Opti-Prime*™ kit for easy PCR buffer optimization
- ◆ PCR Polishing Kit for 30-minute end polishing



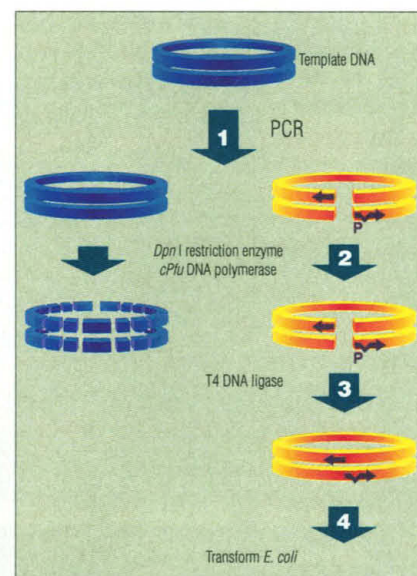
The pCR-Script SK(+) Cloning Method

Best PCR Cloning System

- ◆ pCR-Script™ Amp, Cam and Direct* vectors†††
- ◆ Derived from pBluescript® phagemid
- ◆ Highly efficient 1-hour, 1-tube cloning

And More PCR-Related Products†††

- ◆ ExSite™ PCR-based site-directed mutagenesis* in 3 hours
- ◆ RT-PCR Kit for high yields of full-length transcripts
- ◆ RAP-PCR Kit to identify selectively expressed genes*
- ◆ ScreenTest™ recombinant screening in 3 hours



ExSite™ PCR-Based Site-Directed Mutagenesis

With Stratagene, You're Authorized!

Stratagene Products for PCR...
Why on earth would you use anything else?



STRATAGENE®

Circle No. 41 on Readers' Service Card
Electronic Marketplace: <http://www.aaas.org>

UNITED KINGDOM
Stratagene Ltd.
Telephone: (01223) 420955
Telefax: (01223) 420234

SWITZERLAND
Stratagene GmbH
Telephone: (01) 3641106
Telefax: (01) 3657707

† Purchase of these enzymes is accompanied by a license to use them in the Polymerase Chain Reaction (PCR) process in conjunction with an Authorized Thermal Cycler.
Stratagene's PCR products are sold under licensing arrangements with Roche Molecular Systems, Inc., F. Hoffmann-La Roche Ltd. and The Perkin-Elmer Corporation.

†† Practice of the patented Polymerase Chain Reaction (PCR) process requires a license. Stratagene's thermal cycler is an Authorized Thermal Cycler. Its use with Authorized Reagents provides a limited PCR license in accordance with the label rights accompanying such reagents. It may also be used with PCR licenses available from The Perkin-Elmer Corporation.

††† These products are optimized for use in the Polymerase Chain Reaction (PCR) process covered by patents owned by Hoffmann-La Roche. Purchase of these PCR-related products 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.

* Patent(s) pending

Fluorescent PCR Analysis

Action.

Reaction.

ABI
PRISM



Now you can label PCR products for fluorescent analysis with just one action. Simply add ABI PRISM™ fluorescent dUTPs—[F]dUTPs—to your PCR amplification reaction.

That's all there is to it. During extension, [F]dUTPs are incorporated directly into your PCR product. You don't need a dye-labeled primer. No changes to reaction components or cycling conditions are required. And when the process is complete, your sample is ready for analysis.

You have a choice of three dyes—blue, green or yellow. So you can run products labeled with different colors in a single gel lane. Add in-lane size standards labeled with a fourth color for accurate fragment sizing.

In fact, with [F]dUTPs, you can convert almost any PCR application method to multicolor fluorescence, including microsatellite analysis, long PCR, quantitative PCR, and *in situ* hybridization.

What's more, the cost is surprisingly low. Because incorporation of [F]dUTPs is highly efficient, it takes very little material to produce a strong signal.

[F]dUTPs are part of an expanding line of multicolor labeling products optimized for use with GeneAmp® and

ABI PRISM systems. Other fluorescent products include dye primers, dye phosphoramidites, in-lane size standards, and optimized kits for DNA analysis and sequencing. Through Perkin-Elmer's Applied Biosystems Division, you have access to the most comprehensive range of reagents, systems, and support for automated genetic analysis.

So if you're looking for convenient, cost-effective fluorescent labeling, take direct action. To request information, call 1-800-345-5224. Outside the U.S. and Canada, contact your local Perkin-Elmer representative.

PERKIN ELMER

Europe Langen, Germany Tel: 49 6103 708 301 Fax: 49 6103 708 310

Japan Tokyo, Japan Tel: (0473) 80-8500 Fax: (0473) 80-8505

Latin America Mexico City, Mexico Tel: 52-5-651-7077 Fax: 52-5-593-6223

Australia Melbourne, Australia Tel: (03) 9212-8585 Fax: (03) 9212-8502

Perkin-Elmer PCR reagents are developed and manufactured by Roche Molecular Systems, Inc., Branchburg, New Jersey, U.S.A.



The GeneAmp PCR process is covered by the U.S. patents owned by Hoffmann-La Roche, Inc. and F. Hoffmann-La Roche Ltd. GeneAmp is a registered trademark of Roche Molecular Systems, Inc. Perkin-Elmer is a registered trademark and ABI PRISM is a trademark of The Perkin-Elmer Corporation.

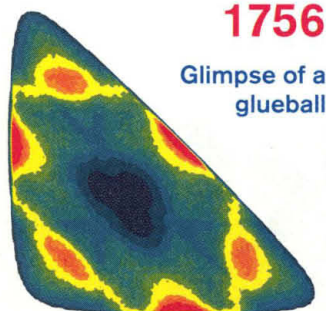
Circle No. 29 on Readers' Service Card

glass milk?

It ain't GENE CLEAN[®] without it.

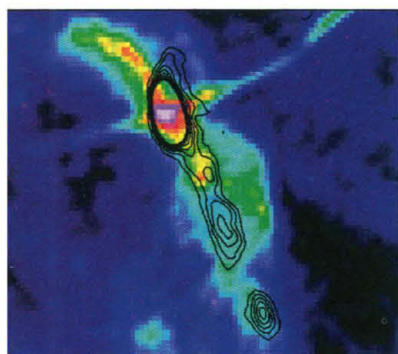


GLASSMILK[®] and **GENE CLEAN[®]** are trademarks of BIO 101, Inc. **GLASSMILK[®]** is a secret ingredient. All silica matrices are not the same. **GENE CLEAN[®]** is the original DNA purification kit. The one and only. Contact us for more information or just to talk shop. Phone: (800) 424-6101 e-mail: info@bio101.com Fax: (619)598-0116. International customers contact your local distributor.



1756

Glimpse of a
blueball



1771 & 1801

Mapping masers

NEWS & COMMENT

- R&D Impact: A Numbers Game? 1748
Tech Funding: If U.S. Bows Out,
States May Come Up Short 1749

- Less Hype, More Biology Needed for
Gene Therapy 1751

- Clinton Holds First AIDS Summit 1752

- Probe Takes a Fatal Plunge at Jupiter 1752

- Post-Cold War Science Thrives in the
Heart of Siberia 1753
Weapons Researchers Come in
From the Cold 1754

- Fusion Advocates Scramble for Scraps 1755

RESEARCH NEWS

- Mastering Nature's Strong Force 1756
Catching the Strong Force in a Coarser Net 1757

- Chernobyl's Thyroid Cancer Toll 1758

- Just Another Billion-Sun Black Hole 1759

- Materials Scientists Make Contact
in Boston 1760

- Can Nuclear Waste Keep Yucca Mountain
Dry—and Safe? 1761
Plutonium Under Glass 1762

PERSPECTIVES

- Supernova Maser Emission 1771
Y. Fukui

- The Molecular Biology of Rice 1772
K. Shimamoto

- Mechanisms of Gene Activation 1773
S. Buratowski

- Ethylene Sensors: How Perceptive! 1774
A. Theologis

RESEARCH ARTICLES

- Reactive Immunization 1775
P. Wirsching, J. A. Ashley, C.-H. L. Lo, K. D.
Janda, R. A. Lerner

- Multiple TAF_{II}s Directing Synergistic
Activation of Transcription 1783
F. Sauer, S. K. Hansen, R. Tjian

REPORTS

- Polymer Photovoltaic Cells: Enhanced
Efficiencies via a Network of Internal
Donor-Acceptor Heterojunctions 1789
G. Yu, J. Gao, J. C. Hummelen, F. Wudl, A. J. Heeger

- Solution-Liquid-Solid Growth of
Crystalline III-V Semiconductors: An Analogy
to Vapor-Liquid-Solid Growth 1791
T. J. Trentler, K. M. Hickman, S. C. Goel, A. M.
Viano, P. C. Gibbons, W. E. Buhro

DEPARTMENTS

- THIS WEEK IN SCIENCE 1737

- EDITORIAL 1739
K-12 Education and Support for Science
R. L. Hinman

- LETTERS 1741
Collaboration and Data Sharing: A. R. Stevens • On-
Line Instruction: L. Arvan • Polymer Publishing: R. J.
Farris • Smoke and Rainforests: F. M. Mims III • Lo-
cal Chinooks: T. L. Johnson • Hydrolytic Destruction
of Nerve Agents: J. F. Bunnett • Depicting Epidemiol-
ogy: A. H. Smith • Science Professionals in Spain:

- C. Gotor and L. C. Romero • Heso-no-O: A Gift:
K. Moriawaki, S. Iida, M. Kinoshita; C. Bharucha; J. J.
Gormley

- SCIENCESCOPE 1747

- RANDOM SAMPLES 1763

- BOOK REVIEWS 1857

- Impact Jupiter* and *The Great Comet Crash*, reviewed by
P. R. Weissman • *Stream Ecology*, S. G. Fisher • Books
Received • Vignettes • Publishers' Addresses

- PRODUCTS & MATERIALS 1862

Board of Reviewing Editors

Frederick W. Alt
Don L. Anderson
Michael Ashburner
Stephen J. Benkovic
Alan Bernstein
David E. Bloom
Piet Borst
Henry R. Bourne
Michael S. Brown
James J. Bull
Kathryn Calame
C. Thomas Caskey

Dennis W. Choi
David Clapham
Adrienne E. Clarke
John M. Coffin
F. Fleming Crim
Paul J. Crutzen
James E. Dahlberg
Robert Desimone
Paul T. Englund
G. Ertl
Richard G. Fairbanks
Douglas T. Fearon

Harry A. Fozzard
Klaus Friedrich
Roger I. M. Glass
Stephen P. Goff
Peter N. Goodfellow
Corey S. Goodman
Peter Gruss
Philip C. Hanawalt
Ira Herskowitz
Nobutaka Hirokawa
Tomas Hökfelt
Tasuku Honjo

Susan D. Iversen
Eric F. Johnson
Stephen M. Kosslyn
Michael LaBarbera
Nicole Le Douarin
Charles S. Levings III
Alexander Levitzki
Harvey F. Lodish
Richard Losick
Reinhard Lührmann
Ruth Lynden-Bell
Seth Marder

Diane Mathis
Anthony R. Means
Shigetada Nakanishi
Kim Nasmyth
Roger A. Nicoll
Staffan Normark
Stuart L. Pimm
Yeshayau Pocker
Dennis A. Powers
Ralph S. Quatrano
Martin Raff
V. Ramanathan

Douglas C. Rees
T. M. Rice
David C. Rubie
Erkki Ruoslahti
Gottfried Schatz
Jozef Schell
Ronald H. Schwartz
Terrence J. Sejnowski
Ellen Solomon
Thomas A. Steitz
Michael P. Stryker
Tomoyuki Takahashi

Masatoshi Takeichi
Keiji Tanaka
Robert T. N. Tjian
Yoshinori Tokura
Emil R. Unanue
Geerat J. Vermeij
Bert Vogelstein
Arthur Weiss
Zena Werb
George M. Whitesides
Owen N. Witte
William A. Wulf

Specialized mouth of a male moth (*Gluphisia septentrionis*). The gaping orifice serves for the intake of massive amounts of fluid at puddles of water from which the moth extracts sodium. The ion is transmitted

to the female at mating and eventually to the eggs. The grid is presumed to guard against silt intake. Magnification $\sim 420\times$. See page 1816. [Electron micrograph: Maria Eisner]



High Photorefractive Gain in Nematic Liquid Crystals Doped with Electron Donor and Acceptor Molecules

G. P. Wiederrecht, B. A. Yoon, M. R. Wasielewski

1794

Efficient Aldolase Catalytic Antibodies That Use the Enamine Mechanism of Natural Enzymes

J. Wagner, R. A. Lerner, C. F. Barbas III

1797

Shock-Excited OH Maser Emission Outlining the Galactic Center Supernova Remnant G359.1-0.05

F. Yusef-Zadeh, K. I. Uchida, D. Roberts

1801

A Receptor Kinase-Like Protein Encoded by the Rice Disease Resistance Gene, *Xa21*

W.-Y. Song, G.-L. Wang, L.-L. Chen, H.-S. Kim, L.Y. Pi, T. Holsten, J. Gardner, B. Wang, W.-X. Zhai, L.-H. Zhu, C. Fauquet, P. Ronald

1804

An Ethylene-Inducible Component of Signal Transduction Encoded by *Never-ripe*

J. Q. Wilkinson, M. B. Lanahan, H.-C. Yen, J. J. Giovannoni, H. J. Klee

1807

Ethylene-Binding Sites Generated in Yeast Expressing the *Arabidopsis ETR1* Gene

G. E. Schaller and A. B. Blecker

1809

Identification of RANTES, MIP-1 α , and MIP-1 β as the Major HIV-Suppressive Factors Produced by CD8 $^{+}$ T Cells

F. Cocchi, A. L. DeVico, A. Garzino-Demo, S. K. Arya, R. C. Gallo, P. Lusso

1811

Sodium Uptake by Puddling in a Moth

S. R. Smedley and T. Eisner

1816

Evidence for Developmentally Programmed Transdifferentiation in Mouse Esophageal Muscle

A. Patapoutian, B. J. Wold, R. A. Wagner

1818

Crystal Structure of the V_{α} Domain of a T Cell Antigen Receptor

B. A. Fields, B. Ober, E. L. Malchiodi, M. I. Lebedeva, B. C. Braden, X. Yern, J.-K. Kim, X. Shao, E. S. Ward, R. A. Mariuzza

1821

DNA Template and Activator-Coactivator Requirements for Transcriptional Synergism by *Drosophila Bicoid*

F. Sauer, S. K. Hansen, R. Tjian

1825

Control of Cell Fate by a Deubiquitinating Enzyme Encoded by the *fat facets* Gene

Y. Huang, R. T. Baker, J. A. Fischer-Vize

1828

Precise Spatial Positioning of Chromosomes During Prometaphase: Evidence for Chromosomal Order

R. Nagele, T. Freeman, L. McMorrow, H.-y. Lee

1831

Diffusion Across the Nuclear Envelope Inhibited by Depletion of the Nuclear Ca^{2+} Store

L. Stehno-Bittel, C. Perez-Terzic, D. E. Clapham

1835

A Nucleic Acid Triple Helix Formed by a Peptide Nucleic Acid-DNA Complex

L. Betts, J. A. Josey, J. M. Veal, S. R. Jordan

1838

Solution Structure of a Cisplatin-Induced DNA Interstrand Cross-Link

H. Huang, L. Zhu, B. R. Reid, G. P. Drobny, P. B. Hopkins

1842

Role of NK1.1 $^{+}$ T Cells in a T_H2 Response and in Immunoglobulin E Production

T. Yoshimoto, A. Bendelac, C. Watson, J. Hu-Li, W. E. Paul

1845

TECHNICAL COMMENTS

Use of NMR to Detect Water Within Nonpolar Protein Cavities

B. W. Matthews, A. G. Morton, F. W. Dahlquist, J. A. Ernst, R. T. Clubb, H.-X. Zhou, A. M. Gronenborn, G. M. Clore

1847

STM on Wet Insulators: Electrochemistry or Tunneling?

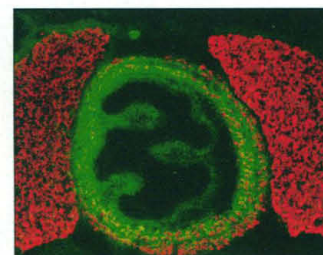
F.-R. F. Fan and A. J. Bard; R. Guckenberger and M. Heim

1849

18S rDNA from Lophophorates

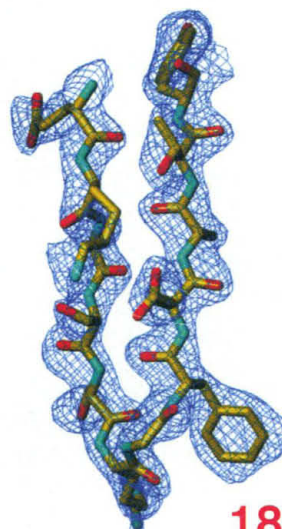
W. C. Banta and B. T. Backus; K. M. Halanych, J. D. Bacheller, A. M. A. Aguinaldo, S. M. Liva, D. M. Hillis, J. A. Lake

1852



1818

Transdifferentiation in development



1821

T cell receptor V_{α} structure

AAAS Board of Directors

Francisco J. Ayala
Retiring President,
Chairman
Rita R. Colwell
President
Jane Lubchenco
President-elect

William A. Lester Jr.
Simon A. Levin
Michael J. Novacek

Anna C. Roosevelt
Alan Schriesheim
Jean E. Taylor
Chang-Lin Tien
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, 1333 H Street, NW, Washington, DC 20005. Second-class postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 1995 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): \$97 (\$50 allocated to subscription). Domestic institutional subscription (51 issues): \$228. Foreign postage extra: Mexico, Caribbean (surface mail) \$53; other countries (air assist delivery) \$93. 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.

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 \$3.00 per article is paid directly to CCC, 27 Congress Street, Salem, MA 01970. The identification code for *Science* is 0036-8075/93 \$3.00. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

Brinkmann introduces two new Eppendorf® Pipettes.

Single button for pipetting, volume adjustment, and tip ejection.

Volume-locking button.

Separate tip ejector.

Volume setting visible during use.

Easy-to-turn, unrestricted volume adjustment. Will not snag gloves.

For those who prefer one-button pipetting and tip ejection...

The New Series 2000

- Eight adjustable models, from 0.1µL to 2.5mL; 28 fixed-volume models, from 1µL to 2.5mL
- Shielded piston design on Ultra Micro models
- Easy user-calibration and user-servicing
- Fully autoclavable
- Two-year warranty

For those who prefer a separate tip ejector...

The New Series 2100

- Seven adjustable models, from 0.1µL to 5mL; 11 fixed-volume models, from 5µL to 1mL
- Shielded piston design on Ultra Micro models
- Easy user-calibration and user-servicing
- Autoclavable lower section
- Two-year warranty

Make your choice. Either way you get the high quality, high performance, and reliability you always get from Eppendorf. For more information about the new Eppendorf Pipettes, call **1-800-645-3050**; fax 1-516-334-7506. In Canada, call 800-263-8715; fax 905-826-5424.

The pipettes are Eppendorf. The choice is yours.

eppendorf

BRINKMANN Quality products for research and control.

Brinkmann Instruments, Inc., One Cantiague Road, Westbury, NY 11590-0207

Brinkmann Instruments (Canada) Ltd., 6670 Campobello Road, Mississauga, Ont. L5N 2L8

5101-323

Circle No. 45 on Readers' Service Card
Electronic Marketplace: <http://www.aaas.org>



Semiconductor solution

Most semiconductors are highly covalent, nonmolecular solids, and crystals of these materials are usually grown under high-temperature conditions, either from the melt or the vapor phase. Trentler *et al.* (p. 1791) report a lower temperature route (at or below about 200°C) for growing crystals of III-V materials, such as gallium arsenide, from reagents in organic solvents. These crystals form as thin whiskers up to several micrometers in length.

■

Aldolase antibody

The aldol condensation couples a ketone to an aldehyde and is one of the most basic carbon-carbon bond-forming reactions in organic chemistry. Many methods exist to facilitate this reaction, but they often require stoichiometric reagents and the use of protective groups. Wagner *et al.* (p. 1797) have generated catalytic antibodies based on class I aldolases that can couple a wide variety of aldehydes and ketones through this reaction. These antibodies were generated by immunization with a reactive compound, a method detailed in a Research Article by Wirsching *et al.* (p. 1775).

■

Supernova shock

The OH maser line emission is thought to trace shock activity associated with supernovas. Yusef-Zadeh *et al.* (p. 1801; see the Perspective by Fukui, p. 1771) report the detection of this emission along the interface between the remnant of a supernova in the Milky Way (G359.1-0.5) and the surrounding ring of molecular gas. Comparison of the velocities of the

Photorefractive liquid crystals

The index of refraction of photorefractive materials can be changed by irradiating them with laser beams in an appropriate geometry; this effect is useful in holography and optical signal processing. Twin laser beams generate electrical charges that are usually moved with an applied electric field. The charges form a refractive index grating pattern that can transfer light intensity between the beams. Weiderrecht *et al.* (p. 1794) doped a nematic liquid crystal mixture with both an electron acceptor and an electron donor to create a strongly photorefractive material that can operate at low applied fields and low light intensities.

molecular gas and the OH maser lines implies that the shock emissions are associated with CO material at the limb of the supernova remnant.

■

Disease resistance in rice

Cultivation of rice may be made easier as our understanding of the molecular basis of disease in rice improves. Song *et al.* (p. 1804; see the Perspective by Shimamoto, p. 1772) cloned a gene from rice, a monocot, that is responsible for resistance to a subtype of *Xanthomonas oryzae*. Virtually all food crop species are infected by some member of this genus of bacterial pathogens. The predicted protein product sequence is suggestive of a receptor kinase. The gene is one in a family of genes and bears a certain resemblance to the disease resistance genes recently identified in dicots.

■

Cell fate in the eye

In the developing compound eye of *Drosophila*, the protein encoded by the *fat facets* gene plays a role in preventing the formation of more than the required eight photoreceptor cells per eye part—mutants contain extra, ectopic photoreceptor cells. Huang *et al.* (p. 1842) show that

the *Fat* facets protein is a ubiquitin-dependent protease. The protease may control the levels of a specific regulator of cell number in the eye cells during development. This result shows that a deubiquitinating enzyme can control the levels of a specific protein and that protein stability as defined by its ubiquitination state has implications in development.

■

HIV suppressors

Activated CD8⁺ lymphocytes from individuals infected with the human immunodeficiency virus secrete soluble factors that can suppress HIV infection. Cocchi *et al.* (p. 1811) developed a cellular assay system and have identified three chemokines, RANTES, MIP-1 α , and MIP-1 β , as the major components of the suppressive factor. Replication of HIV in infected cells could be suppressed with recombinant forms of these chemokines.

■

Variable structure

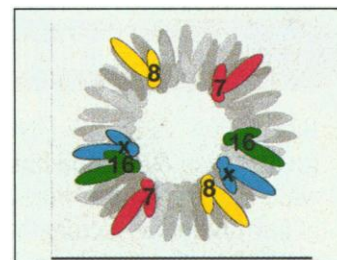
Antigens are recognized by T cells as peptide fragments that are bound to the T cell receptor (TCR). Fields *et al.* (p. 1821) have determined the structure of the variable (V) region of the TCR α chain, which shows an

unusual connectivity of the β sheets. They used this result and the previously determined structure of the variable β domain to construct a model for $V_{\alpha}V_{\beta}$ association.

■

Chromosome order

During prometaphase, chromosomes are briefly found in a wheel-shaped ring or rosette. Nagele *et al.* (p. 1831) investigated the order of the chromosomes during prometaphase



and found that homologs are located across the rosette from each other. Their data also suggest that the chromosomes are grouped in two haploid sets in an antiparallel arrangement.

■

A biased response

The nature of an immune response is governed by T helper (T_H) cells. If T_H1 cells dominate, cell-mediated immunity results, whereas a T_H2 response can cause immunoglobulin E production, as occurs in allergic diseases. Much effort is currently focused on early events that can bias the response toward either the T_H1 or T_H2 type. Yoshimoto *et al.* (p. 1845) identified one such event. A small population of T cells, discriminated by the expression of the NK1.1 marker, produces interleukin-4 soon after antigen challenge. This cytokine helps establish conditions that favor development of a T_H2 response.

NEW

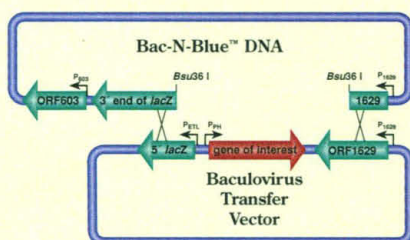
Faster, Easier Baculovirus Expression.

To make the baculovirus expression system faster and easier to use than ever before, Invitrogen, the leader in gene expression, has added several new and improved tools to our already extensive product line. With these new products you can now obtain pure recombinant baculovirus in just 14 days!

Efficient Transfection

Bac-N-Blue™ AcMNPV DNA produces greater than 80% recombinant virus while allowing you to take advantage of our pBlueBac vectors for simple screening of recombinant plaques. This means you save time by eliminating multiple rounds of plaque assay. You can now pick a pure recombinant plaque in the first round of plating! Don't spend your valuable time on multiple plaque assays. Start using Bac-N-Blue™ DNA today!

Catalog No. K855-01

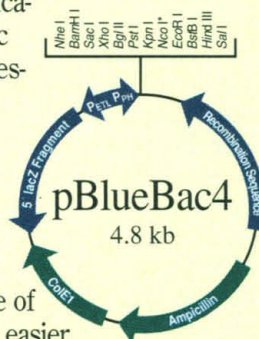


Easy Subcloning

Three new baculovirus transfer vectors are now available; pBlueBac4 for intracellular expression, pBlueBacHis2 for one-step purification, and pMelBac for secreted expression. At less than 5.0 kb these vectors are half the size of the most commonly used vectors making cloning your gene of interest faster and easier.

What's more, each vector carries a fragment of the *lacZ* gene for production of easy-to-screen blue recombinant plaques following recombination with Bac-N-Blue™ DNA.

pBlueBac4 Catalog No. V1995-20
pBlueBacHis2 Catalog No. V375-20
pMelBac Catalog No. V1950-20



Highest Expression

For the highest expression of recombinant proteins in the baculovirus system try High Five™ cells. In a direct comparison, High Five™ cells produced up to 20-fold higher expression of a secreted protein than either Sf9 or Sf21 cells (1). High Five™ cells grow well in serum-free medium, simplifying protein purification. And the cells are easily adapted to suspension culture for higher cell densities and increased expression. If you want the highest expression, contact Invitrogen today!

Log phase Catalog No. B855-01
Frozen Catalog No. B855-02

Reference:
1. Davis, T. R. et al. (1993) *In Vitro Cell. Dev. Biol.* **29A**: 388-390.

Invitrogen®

The Gene Expression Folks.
1-800-955-6288
Telephone (619) 597-6200
Fax (619) 597-6210
<http://www.invitrogen.com>

EUROPEAN HEADQUARTERS:
Invitrogen BV
De Schelp 12, 9351 NV Leek
The Netherlands
Tel: +31 (0) 594 515175
Fax: +31 (0) 594 515312
E-Mail: tech_service@invitrogen.nest.nl

TOLL FREE TELEPHONE NUMBERS:
Austria 0660 8127
Belgium 0800 111 73
Denmark 800 188 67
Finland 990 31 800 5345
France 19 31 800 5345
Germany 0130 8100 43
The Netherlands 06 022 8848
Norway 800 113 70
Sweden 020 795 369
Switzerland 155 1966
UK 0800 96 61 93

Distributors:
Australia 03 562 6888
Hong Kong 886 2 381 0844
Israel 02 524 447
Italy 02 38 10 31 71
Japan 03 5684 1616
Korea 822 569 6902
Singapore 65 779 1919
or 29 29 783
Spain 03 450 2601
Taiwan 886 2 381 0844
From all other countries, please contact our European headquarters at +31 (0) 5945 15175.

Five New
Products
Every Day.



Sigma scientists work every day on requests for new products from researchers like you.

Over 50 years ago, Sigma produced the first stable crystalline ATP for just one reason...researchers needed a reliable source. This tradition of "listening to our customers" is deeply ingrained in the Sigma philosophy. Our R&D scientists constantly review literature to keep abreast of refinements and revolutions in research.



But without input from our customers, we would never be able to offer such an extensive list of new products year after year.

We added nearly 2,000 new products to the 1996 Sigma Catalog. *That's more than five products every day!*

In addition, our scientists have already begun to manufacture and stock many new items that will not appear in the catalog until 1997. So if you don't

find what you need, give us a call. You may be surprised; a colleague may already have suggested the product you are looking for!



Where Science and Service Come Together.

Call collect: 314-771-5750,
Toll Free: 800-325-3010,
or contact your local Sigma office.
World Wide Web: <http://www.sigma.sial.com>

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

Circle No. 9 on Readers' Service Card

We asked 1000's of
scientists what they want
from our new catalog.

"A nice bright cover
so I can see it on the shelf."

"500 pages of Swedish
models in full color."

"How I can find you when
I'm surfing the Net."

"The contents on the outside."



Informative, authoritative, definitive: the new BioDirectory. Just goes to show what can happen when you ask scientists what they require from a catalog. So what does all this research give you? Everything you want to know about Pharmacia Biotech molecular biology and separation products.

BioDirectory has lots of useful product specifications, ordering and contact information plus an easy access index system. And you can't miss the cover when it's on your shelf – or anywhere else. In typical Swedish democratic fashion, we went along with most suggestions (there are no Swedish models), so here it is...almost what you asked for. Watch the mail for your copy.



Uppsala, Sweden. (And the rest of the world)
Circle No. 49 on Readers' Service Card



TECHNICAL
PRODUCTS
INTERNATIONAL, INC.

The Vibratome® People

I F IMITATION IS THE SINCEREST FORM OF FLATTERY, BOY, ARE WE FLATTERED!

Sure, we've been flattered before. But the latest is the greatest yet.

As you know so well, the **Vibratome®** fresh tissue sectioning system gives you the ability to section fresh or fixed tissue without freezing or embedding. The principle is a vibrating blade passing through the tissue below the surface of a fluid bath, which lubricates the cut. We and our predecessors Oxford & Lancer/Sherwood invented, developed and perfected the **Vibratome** system.

Over the years we have been flattered by imitations from uninventive but nevertheless bright friends in Japan, the UK and even the US. Now comes new flattery from our enterprising if not original friends in Germany/Austria/Switzerland.

Is it the **Vibratome** system's beauty that attracts such flattery? Not really. What our friends try, unsuccessfully, to imitate is the **Vibratome**

system's functional, versatile, sturdy, dependable, serviceable and economical qualities. (Flatterers are of course notorious for overlooking many equally important qualities. They fail to take into account that part of the **Vibratome** system's popularity is attributable to our helpful, friendly, courteous, kind, cheerful, loyal, thrifty, brave, clean and reverent nature!)



To those of you who are using or have used the **Vibratome** system, have we earned your trust? To those of you who are

or may be considering fresh/fresh fixed tissue sectioning without freezing or embedding, ask your colleagues. There is no reason to grab at an imitation when you can own the original. Proven over time, it is still the best.

A special note to authors: When citing the **Vibratome** system in "Materials and Methods" please use a capital "V". We would be sincerely appreciative.

And a cautionary note to our friendly competitors: Call yours whatever you want, but don't call it a **Vibratome**. Don't even imply or suggest that yours is a **Vibratome**. Our lawyers are adamant about protecting our **Vibratome** system's name and excellent reputation.



TECHNICAL
PRODUCTS
INTERNATIONAL, INC.

5918 EVERGREEN / ST. LOUIS, MISSOURI 63134 U.S.A.
(314) 522-8671 (800) 729-4421 FAX (314) 522-6360

Get It

BLOOMERSM



**Screen Over
150,000 P1 or
PAC/BACTM
Clones With Our
Double Spotted
High Density Filters**

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/BACTM clones in a matter of days.

Our services also include; P1 (85kb) genomic library screening service (human, ES mouse for knockouts, rat and drosophila).

- New!** Human PAC/BACTM (120kb+ insert) genomic library screening service.
- New!** Fluorescent in-situ hybridization (FISH).
- New!** YAC library screening service (human, mouse).
- New!** Go Germlinesm ES and MEF cells for making mouse knockouts.
- New!** Custom robotic colony picking and spotting services.
- New!** "Down To The Well"TM PCR¹able DNA pools.

GenomeSystemsIncTM

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

Other P1 or PAC/BACTM 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.



<http://www.aaas.org>

The world of SCIENCE... On-line every week!

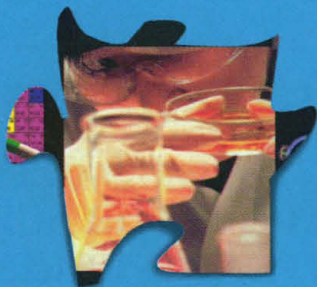
.....



- *SCIENCE Table of Contents*
- *The SCIENCE Editorial*
- *This Week in SCIENCE*
- *Beyond the Printed Page:
On-line interactive projects & articles*
- *Abstracts of research articles*
- *Synopsis of news stories*
- *SCIENCE Global Career Network:
On-line classified advertising*
- *The SCIENCE Electronic Marketplace:
On-line product information*

SCIENCE
COVERS THE WORLD

Puzzled?



Problem Solved.



Your knowledge and experimental intuition...Our products and services.
It's the powerful combination that puts together
all the pieces of your research puzzle.



Moving Ahead Together

TEL: (619) 597-9755 • FAX: (619) 597-9777 • E-MAIL: solutions@biosym.com
INTERNET: <http://www.biosym.com/> or <http://www.msi.com>

Puzzled by your research problem?

You need some answers.

Your R&D staff has deadlines to meet.

You have obstacles to overcome.

You need to adhere to your budget.

You know what you need:

- The appropriate blend of theory, experiment, and simulation
- The ability to share chemical information quickly and easily
- The best software and hardware technology
- Access to the right skills and scientific expertise
- A more efficient R&D process

BIOSYM/Molecular Simulations – we're ready to help

BIOSYM and Molecular Simulations, the leaders in computer aided molecular science, have merged to create a new company focused on helping you to solve your research problems and improve your R&D process. We have the resources and expertise to help you fit the pieces of the puzzle together.

The best chemical computing technology

Our scientific software provides invaluable insight and reduces lead times for research projects in life sciences and materials technology. Applications range from protein structure determination to predicting organic crystal growth.

Make the most of your programs

Our new Software Developer's Kit allows you to plug your programs into our software environment. Use your programs, our applications, and other academic or commercial codes in a single user interface. Now it's easier to distribute your work and share information with colleagues.

Use multiprocessing technology

Our software products are optimized and parallelized to take advantage of the symmetric multiprocessing architecture and MIPS® microprocessor technology used in Silicon Graphics computer systems.

Now, supercomputer-class power is available without a supercomputer, increasing performance for new modeling, chemical information analysis, and data mining and process capabilities.

Utilize our expertise

Through consortia programs, contract research, worldwide support, and consultancy, you work with our experts to solve your research problems.

Silicon Graphics, Inc. is the leading manufacturer of high-performance visual computing systems.



In partnership with

SiliconGraphics
Computer Systems

Circle No. 59 on Readers' Service Card

You Can Help Us Open Our Doors

JOIN THE PARTNERSHIP

By Making A Gift To The CENTER FOR SCIENCE AND ENGINEERING

Yes, I/We would like to support the **Center for Science and Engineering** with

☐ a gift of \$ _____ or

☐ a pledge of \$ _____

Enclosed is the first installment of \$ _____, with balance to be contributed:

☐ annually ☐ semi-annually ☐ quarterly beginning _____

I make this gift

☐ in my name

☐ in honor/memory of: _____

☐ and I will determine if my employer or my spouse's employer will match this contribution to AAAS.

Signature

Printed Name

Address

City, State, ZIP

Phone

"Supporting the Center for Science and Engineering fosters the continued vitality of the scientific enterprise. I urge you to join me in ensuring that the programs of AAAS will continue to flourish in response to the current and future needs of the scientific and engineering community and our country."

Dr. Philip Abelson



AMERICAN ASSOCIATION FOR THE
ADVANCEMENT OF SCIENCE



SC&A'S "READERS CHOICE" AWARD WINNER 4 YEARS RUNNING!

WINDOWS 95
COMPATIBLE
32 BIT VERSION

New SigmaPlot® 3.0!

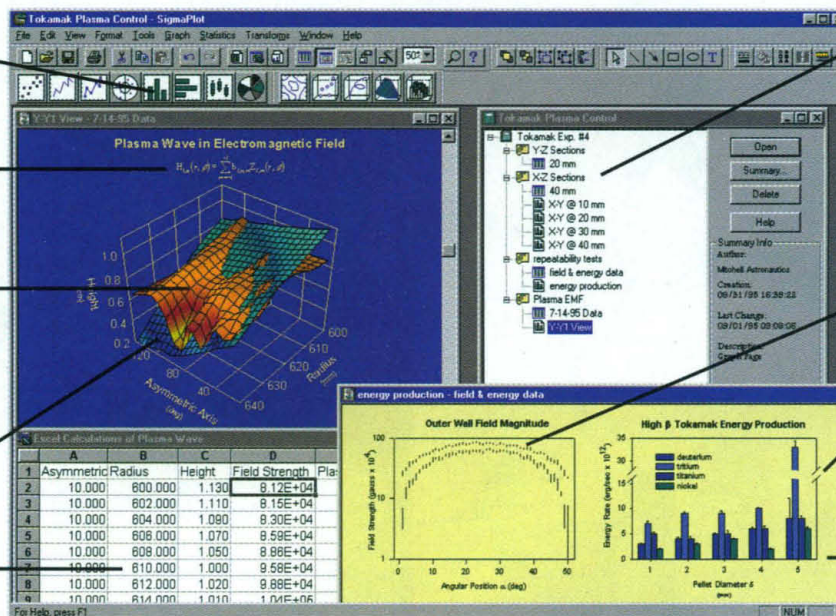
NEW! Create graphs easily
"Point and click" toolbar graph
creation • Step-by-step, interactive
graph wizard • Easier to use
templates

NEW! Graph anywhere!
Embed images into SigmaPlot
or embed SigmaPlot graphs into
your documents with OLE 2
container and server

NEW! Visualize 3D
Multiple, intersecting 3D graphs
with hidden line removal,
discrete and continuous shading,
and light source • Scatter, trajec-
tory, mesh, and 3D bar charts

**Robust multidimensional
nonlinear curve fitting**
10 independent variables,
25 parameter • Piecewise
continuous, multifunctional,
weighted, and boolean functions

NEW! Excel® inside
SigmaPlot
Use Excel as your spreadsheet
and pick data from it to create
SigmaPlot graphs



NEW! Jandel Notebook
Organize multiple data
worksheets and multiple
graph pages effectively

NEW! Time-saving
transforms
Create quick and powerful
mathematical analysis rou-
tines to use again and again,
including FFT functions

NEW! Visual Display
Graph Library
Edward Tufte's templates
and style guidelines •
The Visual Display of
Quantitative Information
book • Data density meter

NEW! Control axes
completely
Linear, semi-log, log, logit,
probit, probability, polar,
and category and custom axes
• Offset axes • Axis breaks

NEW! Flexibility
of multiples
Multiple pages per worksheet
Multiple graphs per page •
Multiple curves per graph •
Multiple axes per graph

Create and customize *the exact* scientific graph you want

You've spent months collecting and analyzing data. Don't spoil your work now! Maximize the impact of your research with *new* SigmaPlot. When you want to document, present, and publish your work, financial spreadsheets and business graphing software can't do what SigmaPlot *already does* for tens of thousands of researchers worldwide.

AWARD-WINNING SIGMAPLOT

Since 1985, scientists and engineers have chosen award-winning SigmaPlot for the technical analyses and graphing they *want* – and for the total flexibility they *need*. Clear, precise technical graphs provide new insights into your data and allow you to present your results better.



POWERFUL DATA ANALYSIS

The *best scientific graphs* begin with powerful data analysis. SigmaPlot has what you need – huge data worksheets, FFTs, mathematical transform language, automatic regressions, nonlinear curve fitter, and much more.

To get started with SigmaPlot's graphing flexibility and to create the graphs you want,

CALL 1-800-4-JANDEL (1-800-452-6335)

CREATE GRAPHS EASILY

Click on a graph toolbar icon, pick your data with the new Graph Wizard, and you have your graph! Double click on any graph element and customize it with the new Graph Properties Dialog – everything's in one easy-to-use dialog.

CUSTOMIZE GRAPHS YOUR WAY

Create multiple technical axes per graph, control error bars, and choose from a variety of new 3D graphs. Don't settle for "canned graphs" software. Make the graphs you want.

EASY EXCEL AND OLE 2 INTEGRATION

Annotate your SigmaPlot graph with Word®'s Equation Editor. Embed your graph in PowerPoint® or Word. Analyze your data with an Excel worksheet *right inside of SigmaPlot* – Excel's menus actually merge with SigmaPlot's!

ANNOUNCING THE VISUAL DISPLAY GRAPH LIBRARY

Dr. Edward Tufte designed The Visual Display Graph Library using the unique flexibility of SigmaPlot. This graph library includes: the book *The Visual Display of Quantitative Information*, style guidelines, data density meter, fonts, and templates.

OTHER JANDEL PRODUCTS

SigmaPlot®: DOS Macintosh
SigmaStat®: Advisory statistical software
SigmaScan®: Image measurement software
SigmaScan® Pro: Automated image analysis software
SigmaSuite®: Integrated graphing, statistics & image measurement software
SigmaGel®: Gel analysis software
TableCurve® 2D: Equation generator & curve fitting software
TableCurve® 3D: Equation generator & surface fitting software
PeakFit®: Automated peak analysis software

FOR MORE INFORMATION PLEASE CALL, FAX OR E-MAIL:

Jandel Scientific: 2591 Kerner Blvd., San Rafael, CA 94901
415-453-6700 Fax 415-453-7769 Internet: sales@jandel.com
In Europe: Jandel Scientific, Schimmelbuschstrasse 25, 40699
Erkrath, Germany 02104/9540 02104/95410 (FAX).

International Dealers: Australia 2 958 2688, Brazil 11 453 5588,
Canada 519 767 1061, Chile 56 2 635 2422, Denmark 45 4615 4464, France
05 90 37 55, Hong Kong 852 739 2001, India 40 31 3368, Israel 972 349
0823, Japan 3 3590 2311, 3 5689 8000, Korea 822 886 3983, Kuwait 965
242 1851, Malaysia 603 777 2597, South Africa 12 660 2884, Switzerland
41 617 12 16 16, Taiwan 2 788 6777, 2 705 1590, UK 0800 89 49 82

All company and/or product names are trademarks of their respective companies. ©1995 Jandel Corporation.



Jandel
SCIENTIFIC SOFTWARE

Circle No. 60 on Readers' Service Card

Goodbye to manual minipreps...



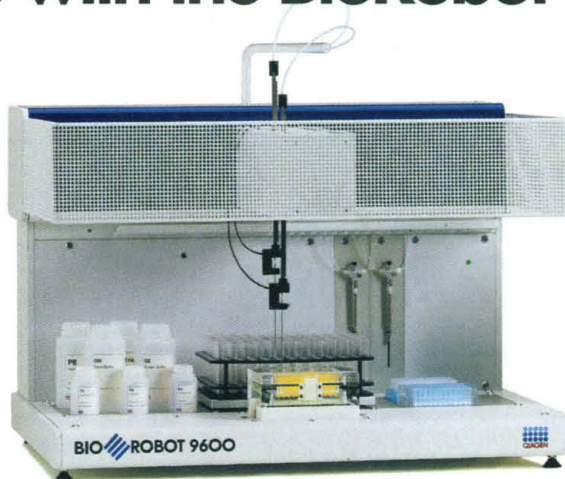
...automate with the BioRobot 9600

Whatever your reasons for considering automation — saving time and money, increasing productivity, improving consistency and quality, or just escaping endless minipreps — the QIAGEN BioRobot™ 9600 is just what you need.

The BioRobot 9600 means:

- state-of-the-art robotics
- renowned QIAGEN purification technologies
- 96 preps every 2 hours, with just 5 minutes of hands-on time
- user-friendly, Windows®-based software

The BioRobot 9600 is ideal for automated preparation of ultrapure DNA for sensitive applications such as sequencing, transfection, or microinjection, yet versatile enough to handle a multitude of other general laboratory procedures. Simple point-and-click software



makes adapting the BioRobot 9600 to other applications fast and easy.

For more information or to set up a demonstration in your lab, call QIAGEN today — and see how the BioRobot 9600 will save you time, money, and days full of minipreps.

Germany: QIAGEN GmbH Tel. (0)2103-892-0, Fax (0)2103-892-222
UK: QIAGEN Ltd. Tel. (01306) 740 444, Fax (01306) 875 885

USA & Canada: QIAGEN Inc. Tel. 800-426-8157, Fax 800-718-2056
Switzerland: QIAGEN AG Tel. (0)61 3179420, Fax (0)61 3179422

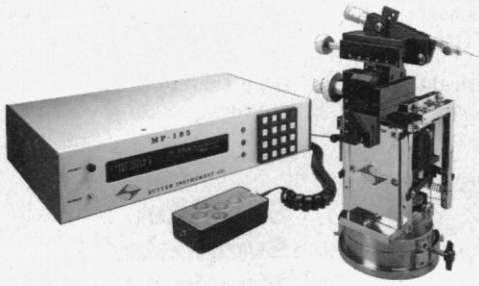
DISTRIBUTORS: AUSTRALIA/NEW ZEALAND: Tel. 1 800 882 555 AUSTRIA/HUNGARY/SLOVENIA: Tel. (1)-889 18 19 BELGIUM/LUXEMBOURG: Tel. 0800-1-9815 CHINA/HONG KONG: Tel. (021) 5242386 or Tel. (852) 2896-6283 CZECH REPUBLIC: Tel. (02) 49 53 77 DENMARK: Tel. (43)-86 87 88 FINLAND: Tel. (0)-804 551 FRANCE: Tel. (1)-45-32-35-17 GREECE: Tel. (01)-643 6138 INDIA: Tel. (011)-542 1714 ISRAEL: Tel. (02)-65244 47 ITALY: Tel. (055) 500 1871 JAPAN: Tel. (03)-5684-1620 KOREA: Tel. (02) 924-8697 MALAYSIA: Tel. (03)-731 2099 MEXICO, CENTRAL & SOUTH AMERICA: Tel. 800-426-8157 THE NETHERLANDS: Tel. (033)-495 00 94 NORWAY: Tel. 022 90 00 00 PORTUGAL: Tel. (1)-758 07 40 SINGAPORE: Tel. (65) 445 7927 SOUTH AFRICA: Tel. (021) 981 1560 SPAIN: Tel. (91)-663-05-00 SWEDEN: Tel. (08) 621 34 00 TAIWAN: Tel. (02) 880 2913 In other countries contact: QIAGEN GmbH Not available in some countries.



MICROMANIPULATORS

STABILITY


MP-185 MICROMANIPULATOR



MICROELECTRODE BEVELERS

MICROPETTE/NEEDLE PULLERS

ULTRASTABLE MOTORIZED MICROMANIPULATION
PRECISION MOVEMENT WITH 25NM STEP SIZE
LOCAL HAND-HELD OR COMPUTER CONTROL
CONTINUOUS OR STEPPED MOTION
SERIAL INTERFACE FOR ROBOTIC APPLICATIONS



SUTTER INSTRUMENT COMPANY
40 LEVERONI COURT, NOVATO, CA 94949
PHONE: 415.883.0128 FAX: 415.883.0572
INFO@SUTTER.COM HTTP://WWW.SUTTER.COM
OPTICAL FILTERWHEELS

Circle No. 8 on Readers' Service Card

SCIENCE BOOKS&FILMS

The *Other* AAAS Journal

SCIENCE BOOKS & FILMS gives you the expert information you need to make the best decisions when choosing science materials for your library, school, or institution.

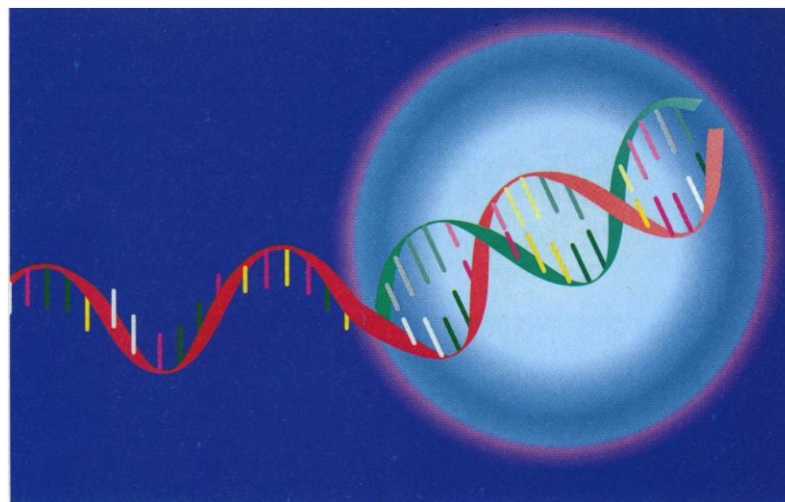
SCIENCE BOOKS & FILMS is the only critical review journal devoted exclusively to print and nonprint materials in all of the sciences and for all age groups.

Every issue contains some 100 evaluations of books, audiovisual materials, and software for general audiences, professionals, teachers, and students from kindergarten through college.

**AAAS Members—
Subscribe Now and Save 30%**

Call Now to Receive Nine Issues a Year for \$28.
(That's 30% off the regular subscription price of \$40!)

Contact Chickona Royster at (202) 326-6454
(E-mail) SB&F@AAAS.ORG



To have more time
for research
we take care of your
synthesis and reagents

The success of your research will be based on the high quality of our custom synthesis products.

We are now providing the full line of the following services.

Oligonucleotides

- unmodified oligonucleotides
- modified bases
- 5'- and 3'-end modifications
- non-radioactive labeling
- S-oligonucleotides
- different purifications (RP-cartridge, HPLC, PAGE) HPLC purification is included by oligo orders >30-mer

Peptides

- Immunological grade
- 70 - 80% purity
- >95% purity (mass spectrum included)
- specific amino acids
- N- and C-terminal modifications

For customers who synthesize their own oligonucleotides we offer: DNA-Synthesis-Reagents

- phosphoramidites
- synthesis columns
- synthesis reagents

Order more information:

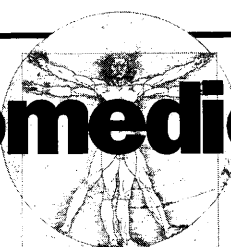
Eppendorf - Netheler - Hinz GmbH • Biotronik Division
D - 63463 Maintal • P.O. Box 1330
Tel.-No.: (+49) 6181/4203-21 • Fax-No.: (+49) 6181/4203-26



eppendorf
BIOTRONIK

Circle No. 47 on Readers' Service Card

Biomedicine '96



May 3-6, 1996
Washington, D.C.

Medical Research from Bench to Bedside

Association of American Physicians (AAP)

American Society for Clinical Investigation (ASCI)

American Federation for Clinical Research (AFCR)

and presented in conjunction with

SCIENCE

Join us in Washington, D.C. for a showcase of the latest in biomedical research with clinical applications. The Meeting reflects a unique collaboration between *SCIENCE* and the AAP, ASCI, and AFCR. The program will explore current topics in clinical and basic research emphasizing the multidisciplinary areas of interest to a wide range of investigators. Topics will be presented as Theme Symposia, State-of-the-Art Lectures, and abstract presentations in oral and poster formats.

Theme Symposia

Prominent physicians and scientists highlighting multidisciplinary areas of biomedical research and clinical investigation.

Human Immunodeficiency Virus Disease: Epidemiologic, Pathogenic, and Therapeutic Considerations

Anthony S. Fauci, National Institute for Allergy and Infectious Diseases

Transgenic Models of Metabolic Disease

C. Ronald Kahn, Joslin Diabetes Center
E.M. Rubin, University of California

Intracellular Membrane Trafficking

Jennifer Lippincott-Schwartz, National Institute of Child Health and Human Development

Ion Transport and Disease***

H. William Harris, Children's Hospital, Boston
Mark T. Keating, University of Utah

Health Outcomes Research

Allan S. Detsky, University of Toronto

Regulation of Apoptosis: Cellular, Molecular and Genetic Factors

John D. Mountz, University of Alabama at Birmingham

Translational Research in Dermatology*

Juoni Uitto, Thomas Jefferson Medical College

Delivering Information to Clinicians in the Era of National Networking***

Edward H. Shortliffe, Stanford University School of Medicine
David Lipman, National Library of Medicine

Developmental Biology: Organogenesis***

Jeffrey A. Whitsett, Children's Hospital Medical Center, Cincinnati
Jeffrey I. Gordon, Washington University School of Medicine

The New Biology of Obesity

Jeffrey S. Flier, Harvard Medical School

Emerging Infections***

Ruth Berkelman, National Center for Infectious Diseases
Monica M. Farley, Emory University School of Medicine

Training in Subspecialty Medicine: Current Status and Public Policy

Eric G. Neilson, University of Pennsylvania
Robert J. Mayer, Harvard Medical School

Abstract Presentations

Original abstracts will be presented either in oral session, chaired by teams of senior investigators, or in poster sessions.

Infectious Diseases/AIDS

James B. Dale, University of Tennessee School of Medicine

Cardiovascular

Christine Seidman, Harvard Medical School

Hematology

Dorothea Zucker-Franklin, New York University

Oncology

George Bosi, Memorial Sloan Kettering Cancer Center

Clinical Epidemiology/Health Care Research**

Pamela G. Williams-Russo, Cornell University Medical Center

Pulmonary/Critical Care

Jeffrey M. Drazen, Harvard Medical School

Gastroenterology/Hepatology/Nutrition

Tadataka Yamada, University of Michigan School of Medicine

Immunology/Allergy/Rheumatology

William J. Koopman, University of Alabama at Birmingham

Gerontology/Aging

Mark A. Supiano, University of Michigan School of Medicine

Endocrinology/Metabolism

Leslie DeGroot, University of Chicago Medical Center

Renal/Hypertension

Barry M. Brenner, Harvard Medical School

Inflammation

William M. Nauseef, University of Iowa

Regulation of Gene Expression

Herbert H. Samuels, New York University

Physiology

J. Chris Gillin, University of California, San Diego

Cytokines/Growth Factors

Derek LeRoith, National Institute of Diabetes and Digestive and Kidney Diseases

Dermatology*

Juoni Uitto, Thomas Jefferson Medical College

Gene Therapy

Elizabeth G. Nabel, University of Michigan

Satellite Symposia/Meetings

Molecular Medicine Society

May 3, 1996

Association of Subspecialty Professors

May 4-5, 1996

GCRC Program Award for Excellence

May 4, 1996

Basic Aspects of Immunology

Sponsored by the Walter Reed Army Institute of Research
May 1-3, 1996

NIH Conference on Ischemic Acute Renal Failure

May 6-8, 1996

Joint Sessions with:

* Society for Investigative Dermatology

** Society of General Internal Medicine

*** Pediatric Academic Societies (APS/SPR/APA)

Send Me Biomedicine '96 Information Today!

I'm interested in: ☐ Conference ☐ Exhibiting

Name _____

Title _____

Organization _____

Address _____

City _____

State _____ Zip _____

Phone _____

Fax _____

Mail or fax to: Biomedicine '96, 6900 Grove Road, Thorofare, NJ 08086-9447.

Phone: 609-848-1000. Fax: 609-848-5274. E-mail: biomedicine96@slackinc.com

**Whatever the source:
Proteinase K will get you
to the DNA!**

Amber inclusion from Bitterfeld/Germany
photographed by Dr. A. Gabert, Leipzig

Since more than
20 years we
are the world's
largest producer
of Proteinase K.

For further information,
please call us:

USA:

EM Science
Phone: 1-800-222-0342
Fax: (609) 423-4389

Rest of the World:

Merck KGaA, Darmstadt/Germany
Phone (+49) 6151-72 75 93
Fax: (+49) 6151-72 68 59

Circle No. 24 on Readers' Service Card

efis

IMMUNOLOGY LETTERS

4th EFIS Best Paper Award

\$10,000 prize

The European Federation of Immunological Societies (EFIS) announces that following the success of the 3rd award, a further \$10,000 prize will be presented in 1997. This will be given to the first author of the best paper published in **IMMUNOLOGY LETTERS**, the Official Journal of EFIS, in the period 1st July 1995 - 1st May 1997. The prize will be presented at the EFIS Immunology Meeting in Amsterdam in July 1997.

Previous winners:

1995:	Richard Loh, Vol. 45. pp 99-106
1994:	Stefan Martin, Vol. 37. pp 97-102
1992:	Rustom Antia, Vol. 32. pp 153-158

For Sample copies and Notes to Authors of Immunology Letters, please either consult your library, see the Elsevier Science WWW home page (<http://www.elsevier.nl/>) or contact Elsevier Science, Customer Service Dept., P.O. Box 211, 1000 AE Amsterdam, The Netherlands; fax +31 (20) 485 3432; e-mail: ninfo-f@elsevier.nl or usinfo-f@elsevier.com


POF 13-2081A

Circle No. 33 on Readers' Service Card
Electronic Marketplace: <http://www.aaas.org>

It's easy to do the right thing.

CCC makes it simple, efficient, and cost-effective to comply with U.S. copyright law. Through our collective licensing systems, you have lawful access to more than 1.7 million titles from over 9,000 publishers. Whether it's photocopying, electronic use, or the emerging information technologies of tomorrow—CCC makes it easy.

Call 1-800-982-3887 ext. 700 to find out how CCC can help you to Copy Right.SM

 **Copyright Clearance Center®**
Creating Copyright Solutions

222 Rosewood Drive
Danvers, MA 01923

Copyright Clearance Center and the CCC logo are registered trademarks of Copyright Clearance Center, Inc. within the United States

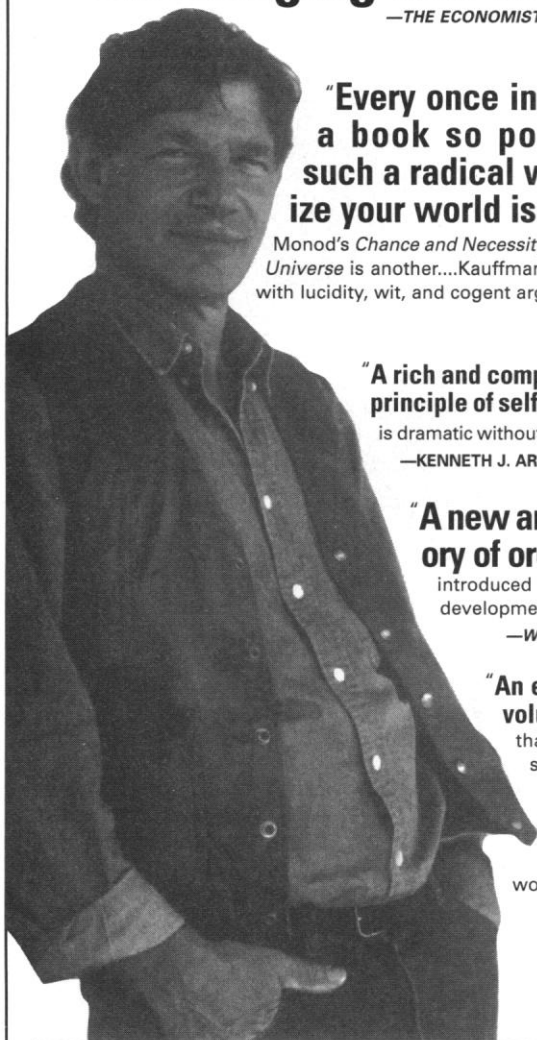
At Home in the Universe

The Search for the Laws of Self-Organization
and Complexity

STUART KAUFFMAN

"Challenging and audacious."

—THE ECONOMIST



"Every once in a while, you read a book so powerful and with such a radical view, that you realize your world is changed forever."

Monod's *Chance and Necessity* was one such; *At Home in the Universe* is another....Kauffman shares his discovery with us, with lucidity, wit, and cogent argument, and we see his vision."

—ROGER LEWIN

"A rich and compelling picture of the new principle of self-organization....The analysis is dramatic without sacrificing scientific accuracy."

—KENNETH J. ARROW, Nobel Laureate in Economics

"A new and far-reaching theory of order in the universe, introduced by a pioneer in that theory's development."

—WASHINGTON POST BOOK WORLD

"An exciting and well-written volume....Kauffman lucidly argues that, in addition to Darwinian selection, another force, the emergence of self-organized order from apparent chaos, determines the beautiful systems that make up the world and cosmos."

—BARRY BLUMBERG,
Nobel Laureate in Physiology or
Medicine

AND FOR A DEEPER LOOK AT THE SCIENCE BEHIND
AT HOME IN THE UNIVERSE

The Origins of Order

Self-Organization and Selection in Evolution

"A landmark and a classic." —STEPHEN JAY GOULD

"There are few people in this world who ever ask the right questions of science, and they are the ones who affect its future most profoundly. Stuart Kauffman is one of these. Read this book."

—PHILIP W. ANDERSON, Nobel Laureate in Physics

At bookstores everywhere. 1-800-451-7556
Visit our new website: <http://www.oup-usa.org>
OXFORD UNIVERSITY PRESS

Circle No. 61 on Readers' Service Card

TiterMax®

Worldwide Adjuvant of Choice

- High, long-lasting titers
- Reliable alternative to Freund's
- Animal safe
- Antibody specific



In response to our customers' requests, TiterMax is now packaged in 1.0 and 5.0 ml vials, in addition to our 0.5 and 10 ml vials currently sold.

CytRx®
CORPORATION

154 Technology Parkway
Norcross, GA 30092
1-800-345-2987 • 1-770-368-9500
Fax: 1-770-447-8875
<http://www.cytrx.com/titermax/>

For more information or to purchase TiterMax contact one of the following TiterMax Distributors:

- **Canada:** CedarLane Laboratories Ltd.,
Tel: 800-268-5058, Fax: 905-878-7800
- **Germany:** Serva Feinbiochemica GmbH & Co. KG,
Tel: 6221-502-134, Fax: 6221-502-143
- **Italy:** Charles River Italia S.p.A., Tel: 039-509-915,
Fax: 039-508-219
- **Japan:** Funakoshi Co., Ltd., Tel: 3-5684-1627,
Fax: 3-5684-1775
- **United Kingdom:** Stratech Scientific Ltd.,
Tel: 0582-481884, Fax: 0582-481895
- **United States:** CytRx Corporation,
Tel: 1-800-345-2987, 770-368-9500,
Fax: 770-447-8875
Sigma Immunochemicals, Tel: 800-262-9141,
Fax: 314-664-3143

Circle No. 36 on Readers' Service Card