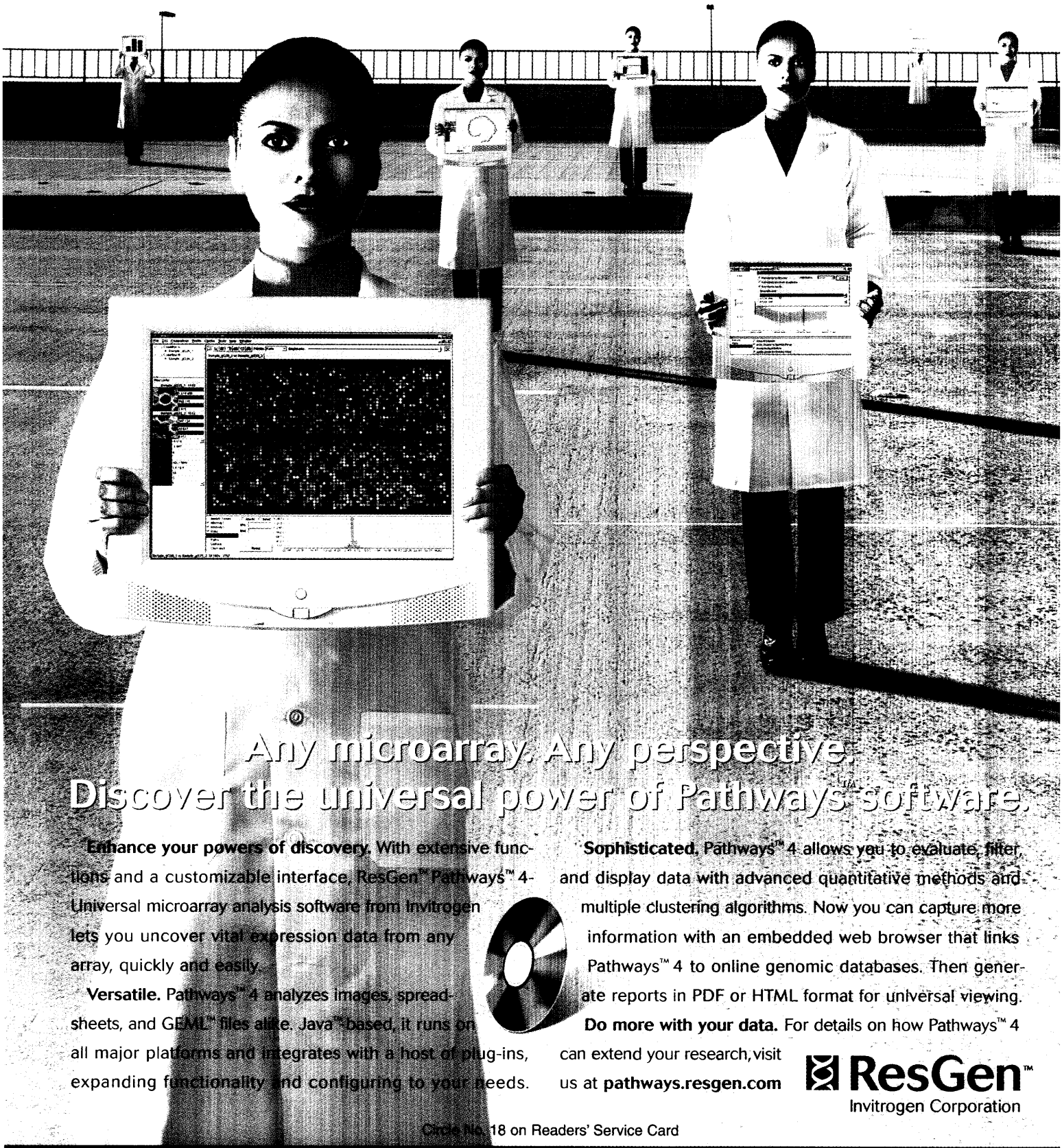
21 September 2001

Science

Vol. 293 No. 5538
Pages 2157–2336 $9

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Any microarray. Any perspective.
Discover the universal power of Pathways™ software.

Enhance your powers of discovery. With extensive functions and a customizable interface, ResGen™ Pathways™ 4-Universal microarray analysis software from Invitrogen lets you uncover vital expression data from any array, quickly and easily.

Versatile. Pathways™ 4 analyzes images, spreadsheets, and GEML™ files alike. Java™-based, it runs on all major platforms and integrates with a host of plug-ins, expanding functionality and configuring to your needs.

Sophisticated. Pathways™ 4 allows you to evaluate, filter, and display data with advanced quantitative methods and multiple clustering algorithms. Now you can capture more information with an embedded web browser that links Pathways™ 4 to online genomic databases. Then generate reports in PDF or HTML format for universal viewing.

Do more with your data. For details on how Pathways™ 4 can extend your research, visit us at **pathways.resgen.com**

ResGen™
Invitrogen Corporation

Circle No. 18 on Readers' Service Card

United States:
ResGen,™ Invitrogen Corporation
2130 Memorial Parkway, SW
Huntsville, AL 35801
Tel (Toll Free): 800 533 4363
Fax: 256 536 9016
Email: info@resgen.com

Europe:
Invitrogen Ltd
3 Fountain Drive
Inchinnan Business Park
Paisley PA4 9RF, UK
Tel (Free Phone Orders): 0800 269 210
Tel (General Enquiries): 0800 5345 5345
Fax: +44 (0) 141 814 6287
Email: eurotech@invitrogen.com

International Offices:
Argentina 5411 4556 0844
Australia 1 800 331 627
Austria 0800 20 1087
Belgium 0800 14894
Brazil 0800 11 0575
Canada 800 263 6236
China 10 6849 2578
Denmark 80 30 17 40
France 0800 23 20 79
Germany 0800 083 0902
Hong Kong 2407 8450
India 11 577 3282
Italy 02 98 22 201
Japan 03 3663 7974
The Netherlands 0800 099 3310
New Zealand 0800 600 200
Norway 00800 5456 5456
Spain & Portugal 900 181 461
Sweden 020 26 34 52
Switzerland 0800 848 800
Taiwan 2 2651 6156
UK 0800 838 380
Other countries see our website

www.resgen.com

PCR Cloning?

The Enzyme with the Best Accuracy is the Fastest Road to Success

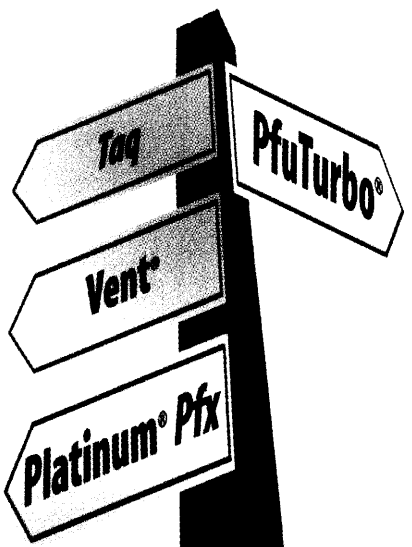
Hot-start Version Available!

PfuTurbo®

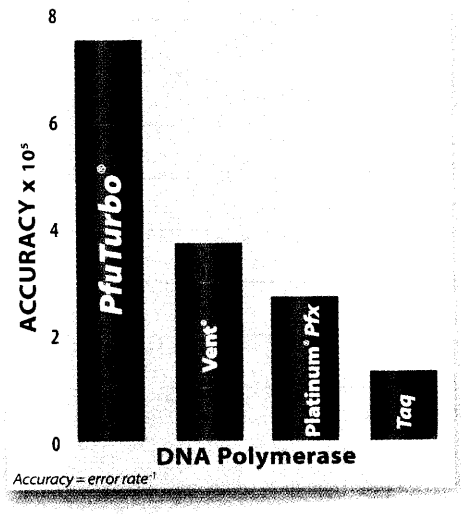
DNA POLYMERASE

Why risk getting the wrong PCR clone? Even with a 1 kb target, *Taq* introduces significantly more errors than *PfuTurbo*® DNA polymerase*,†, often resulting in the wrong clone. Using *PfuTurbo* DNA polymerase means getting the results you want faster and with confidence.

We started with *Pfu***,† the highest-fidelity enzyme available, and added a novel PCR enhancing factor*** that boosts PCR performance. *PfuTurbo* DNA polymerase gives precise accuracy plus robust yields for targets up to 19kb. *PfuTurbo* Hotstart DNA polymerase adds hot-start capability!



- ***Ideal for cloning***
- ***Robust product yields***
- ***Best accuracy available***
- ***Available in hot-start version***
- ***Amplifies up to 19kb genomic targets***
- ***Minimizes the chance of unwanted errors***



Turn to *PfuTurbo*® DNA polymerase for all your PCR cloning!

***PfuTurbo*® DNA polymerase 100U #600250**
***PfuTurbo*® Hotstart DNA polymerase 100U #600320**

STRATAGENE USA and CANADA
ORDER: (800) 424-5444 x3
TECHNICAL SERVICES: 800-894-1304

STRATAGENE EUROPE
Belgium, Germany, The Netherlands, Switzerland, United Kingdom
European Toll-Free Numbers
ORDER: 00800 7000 7000
TECHNICAL SERVICES: 00800 7400 7400
Austria
0800 312 526
France
00800 7000 7000 or 0800-100391

INTERNET
email: techservices@stratagene.com
website: www.stratagene.com

* U.S. Patent No. 5,545,552 and 5,866,395 and 5,948,663 and 6,183,997 and patents pending

** U.S. Patent No. 5,545,552 and 5,866,395 and 5,948,663 and patents pending

*** U.S. Patent No. 6,183,997 and patents pending

† 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 and PE Biosystems.

STRATAGENE®

Science

Volume 293 21 September 2001 Number 5538

2163 *SCIENCE* ONLINE
2165 THIS WEEK IN *SCIENCE*
2169 EDITORIAL
Suzanne Cory
Australia: Investing in Innovation
2171 EDITORS' CHOICE
2175 NETWATCH
2178 CONTACT *SCIENCE*
2277 TECH.SIGHT/NEW PRODUCTS
Molecular Modeling

2182
Taking stock of antiterrorism programs

NEWS

NEWS OF THE WEEK

2182 ANTITERRORISM PROGRAMS: **The Unthinkable Becomes Real for a Horrified World**
Intense Fire Doomed Trade Center Towers
2185 SCIENCESCOPE
2186 LASKER AWARDS: **Geneticists Knock Out Lasker Competition**
2186 ANIMAL CARE: **Report Castigates Indian Lab Practices**
2187 SCIENTIFIC PUBLISHING: **Peer Review and Quality: A Dubious Connection?**
2188 ASTROPHYSICS: **New Model Shows Sun Was a Hot Young Star**
2189 CANADA: **Inuit Claims Hinder NASA Mars Project**
2189 ENVIRONMENTAL HEALTH: **Second Look at Arsenic Finds Higher Risk**
▼2191 2248 PHYSIOLOGY: **All Fired Up: A Universal Metabolic Rate**

NEWS FOCUS

2192 NEUROSCIENCE: **New Leads on the 'How' of Alzheimer's**
2195 U.S. RESEARCH CAPACITY: **A Controversial IDeA to Shrink the Biomedical Gap**
2196 CONSERVATION BIOLOGY: **Bold Corridor Project Confronts Political Reality**
▼ Building a Case for Biological Corridors 2246
2201 RANDOM SAMPLES

To Our Colleagues

In the aftermath of the dreadful events of 11 September, *Science* and our publisher, AAAS, extend heartfelt condolences to those among its readers, members, and business partners who have suffered personal losses. We hope that the international community of scientists we serve can help reshape the world into one in which such things will never happen again.

SCIENCE'S COMPASS

2203 LETTERS

Elephant Hunting and Conservation N. Leader-Williams, R. J. Smith, M. J. Walpole. ***Response*** K. McComb, C. Moss, S. Durant. **The Fourth Dimension in Cellular Signaling** J. W. Karpen, T. C. Rich. ***Response*** D. D. Hall, J. W. Hell. **Corrections and Clarifications**

POLICY FORUM

2207 ENVIRONMENT: **Can We Defy Nature's End?**
S. L. Pimm, M. Ayres, A. Balmford, G. Branch, K. Brandon, T. Brooks, R. Bustamante, R. Costanza, R. Cowling, L. M. Curran, A. Dobson, S. Farber, G. A. B. da Fonseca, C. Gascon, R. Kitching, J. McNeely, T. Lovejoy, R. A. Mittermeier, N. Myers, J. A. Patz, B. Raffle, D. Rapport, P. Raven, C. Roberts, J. P. Rodríguez, A. B. Rylands, C. Tucker, C. Safina, C. Samper, M. L. J. Stiassny, J. Supriatna, D. H. Wall, D. Wilcove

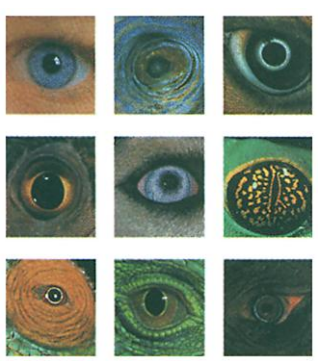
BOOKS *ET AL.*

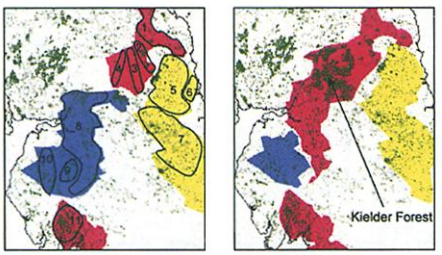
2209 EVOLUTION: ***Evolution*** WGBH Educational Foundation, and Clear Blue Sky Productions and ***Evolution The Triumph of an Idea*** C. Zimmer, reviewed by T. H. Goldsmith
2210 NEUROSCIENCE: ***Synapses*** W. M. Cowan, T. C. Südhof, C. F. Stevens, Eds., reviewed by M. B. Kennedy
2211 PUBLIC HEALTH: ***Mosquito*** *A Natural History of Man's Most Persistent and Deadly Foe* A. Spielman and M. D'Antonio, reviewed by J. Farley

PERSPECTIVES

▼2213 2256 GENETICS: **The Land Between Mendelian and Multifactorial Inheritance**
A. H. M. Burghes, H. E. F. Vaessin, A. de la Chapelle
▼2214 2242 ECOLOGY AND EVOLUTION: **The *Inga*—Newcomer or Museum Antiquity?**
E. Bermingham and C. Dick
▼2216 2239 EVOLUTION: **The Ancestry of Whales**
K. D. Rose
▼2217 2224 APPLIED PHYSICS: **Optics in the Nano-World**
S. W. Koch and A. Knorr
2218 ATMOSPHERIC SCIENCE: **Bridging the Atmospheric Divide** M. J. Jarvis

2209
Focus on the power of natural selection





2246

Genetic history in shifting habitats

COVER 2239

Rodhocetus, a whale that lived 47 million years ago, visualized on the basis of new Eocene fossils from Pakistan. The ankle bones indicate a close relationship of early whales to hooved land mammals such as hippopotami and pigs. Forefeet retain hooves on the central digits, but hind feet with slender webbed toes indicate that *Rodhocetus* was predominantly aquatic. [Painting by John Klausmeyer, University of Michigan Exhibit Museum]

RESEARCH

REPORTS

2221 **The Kondo Effect in an Artificial Quantum Dot Molecule** H. Jeong, A. M. Chang, M. R. Melloch

▼2224 2217 **Near-Field Coherent Spectroscopy and Microscopy of a Quantum Dot System** J. R. Guest, T. H. Stievater, G. Chen, E. A. Tabak, B. G. Orr, D. G. Steel, D. Gammon, D. S. Katzer

2227 **Hydrogen Sensors and Switches from Electrodeposited Palladium Mesowire Arrays** F. Favier, E. C. Walter, M. P. Zach, T. Benter, R. M. Penner

2231 **Changes in Seismic Anisotropy After Volcanic Eruptions: Evidence from Mount Ruapehu** V. Miller and M. Savage

2234 **The Tagish Lake Meteorite: A Possible Sample from a D-Type Asteroid** T. Hiroi, M. E. Zolensky, C. M. Pieters

2236 **The Organic Content of the Tagish Lake Meteorite** S. Pizzarello, Y. Huang, L. Becker, R. J. Poreda, R. A. Nieman, G. Cooper, M. Williams

▼2239 2216 **Origin of Whales from Early Artiodactyls: Hands and Feet of Eocene Protocetidae from Pakistan** P. D. Gingerich, M. ul Haq, I. S. Zalmout, I. H. Khan, M. Sadiq Malkani

▼2242 2214 **Rapid Diversification of a Species-Rich Genus of Neotropical Rain Forest Trees** J. E. Richardson, R. T. Pennington, T. D. Pennington, P. M. Hollingsworth

▼2246 2199 **Impact of Landscape Management on the Genetic Structure of Red Squirrel Populations** M. L. Hale, P. W. W. Lurz, M. D. F. Shirley, S. Rushton, R. M. Fuller, K. Wolff

▼2248 2191 **Effects of Size and Temperature on Metabolic Rate** J. F. Gillooly, J. H. Brown, G. B. West, V. M. Savage, E. L. Charnov

2251 **A Circadian Output in *Drosophila* Mediated by *Neurofibromatosis-1* and Ras/MAPK** J. A. Williams, H. S. Su, A. Bernards, J. Field, A. Sehgal

▼2256 2213 **Triallelic Inheritance in Bardet-Biedl Syndrome, a Mendelian Recessive Disorder** N. Katsanis, S. J. Ansley, J. L. Badano, E. R. Eichers, R. A. Lewis, B. E. Hoskins, P. J. Scambler, W. S. Davidson, P. L. Beales, J. R. Lupski

2260 **Positive Regulation of T Cell Activation and Integrin Adhesion by the Adapter Fyb/Slap** E. K. Griffiths, C. Krawczyk, Y.-Y. Kong, M. Raab, S. J. Hyduk, D. Bouchard, V. S. Chan, I. Kozieradzki, A. J. Oliveira-dos-Santos, A. Wakeham, P. S. Ohashi, M. I. Cybulsky, C. E. Rudd, J. M. Penninger

2263 **Coupling of the TCR to Integrin Activation by SLAP-130/Fyb** E. J. Peterson, M. L. Woods, S. A. Dmowski, G. Derimanov, M. S. Jordan, J. N. Wu, P. S. Myung, Q.-H. Liu, J. T. Pribila, B. D. Freedman, Y. Shimizu, G. A. Koretzky

2266 **Identification of Critical Staphylococcal Genes Using Conditional Phenotypes Generated by Antisense RNA** Y. Ji, B. Zhang, S. F. Van Horn, P. Warren, G. Woodnutt, M. K. R. Burnham, M. Rosenberg

2269 **A Role for the RNase III Enzyme DCR-1 in RNA Interference and Germ Line Development in *Caenorhabditis elegans*** S. W. Knight and B. L. Bass

2272 **Compartmentalized and Binary Behavior of Terminal Dendrites in Hippocampal Pyramidal Neurons** D.-S. Wei, Y.-A. Mei, A. Bagal, J. P. Y. Kao, S. M. Thompson, C.-M. Tang

2227

Sensing hydrogen by fixing breaks

New on *Science* Express — Duplicating barrel fields

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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.

Domestic individual membership and subscription (51 issues): $115 ($64 allocated to subscription). Domestic institutional subscription (51 issues): $370; Foreign postage extra: Mexico, Caribbean (surface mail) $55; other countries (air assist delivery) $87. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. Printed in the U.S.A.

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:** $9.00 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 $8.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for *Science* is 0036-8075/83 $8.00. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

A N Y T H I N G I S P O S S I B L E

NOW ANYONE CAN BE A MASS SPEC SPECIALIST.

It's ESI.

Now anyone can obtain fast, accurate results in protein analysis – results that you previously had to obtain from others – thanks to Ettan™ LC-MS. This exceptional system solution combines the Ettan ESI-ToF mass spectrometer with microbore to capillary chromatography designed for protein work.

Ettan ESI-ToF

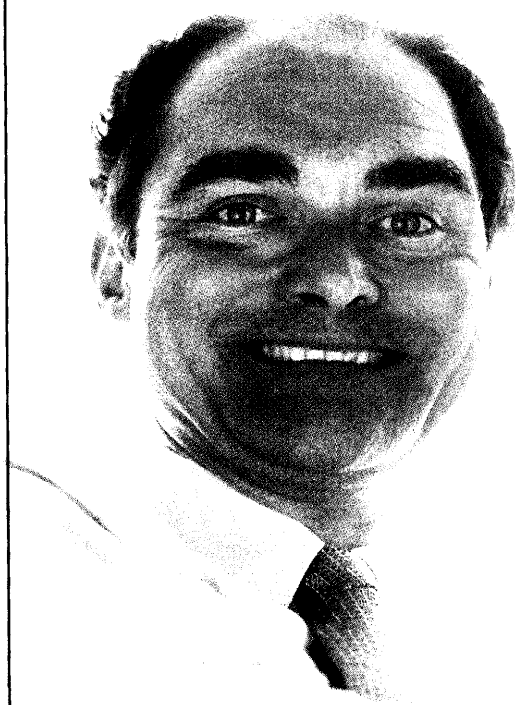
The new LC-MS couldn't be easier to use. This fully automated, turnkey system is simple to learn and operate. The complete system is controlled by a single software based on the Unicorn™ program that you're familiar with from the ÄKTAdesign™ LC systems.

Ettan ESI-ToF also provides outstanding performance for obtaining accurate results in protein purification, proteomics, high molecular weight determination and fast LC-MS analysis.

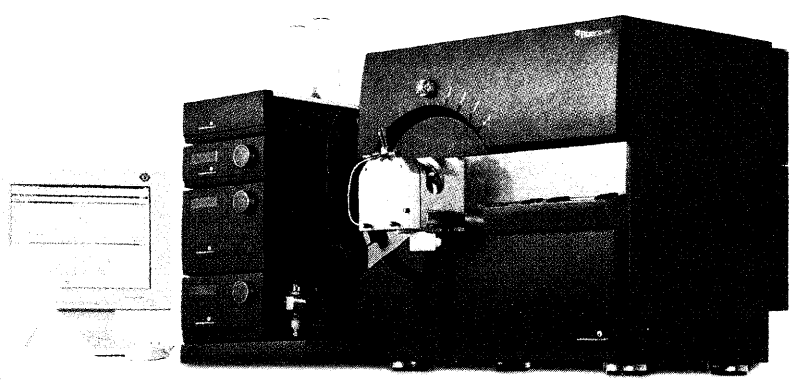
High sensitivity and accuracy ensure reliable detection of low sample amounts. And with a very fast spectra acquisition rate, it enables peptide mapping in just one minute.

Now, anyone can be a specialist when it comes to Mass Spec.

It's just part of the complete solution that Amersham Pharmacia Biotech offers for proteomics and biomolecule characterization. For more information, visit our website: **http://proteomics.apbiotech.com/lc-ms**.



Craig Whitehouse, President of Analytica of Branford, is the developer of the ESI interface and is the originator of the Ettan ESI-ToF concept.



Amersham Pharmacia Biotech UK Limited,
Amersham Place, Little Chalfont,
Buckinghamshire, England HP7 9NA.

Circle No. 53 on Readers' Service Card

amersham pharmacia biotech

Science online

www.scienceonline.org

CONTENT HIGHLIGHTS AS OF 28 SEPTEMBER 2001

Daily coverage of science and science policy by *Science*'s news team

sciencenow www.sciencenow.org

NOW!

science magazine www.sciencemag.org

SCIENCE EXPRESS www.sciencexpress.org

Patterning of the Neocortex by the Secreted Signaling Molecule FGF8 T. Fukuchi-Shimogori and E. A. Grove

Patterns of cortical structures in the developing mammalian brain form in response to signals of FGF8 from the anterior cortical primordium.

Regulation of Cutaneous Malignancy by γδ T Cells M. Girardi *et al.*

PERSPECTIVE: **Stress, NK Receptors and Immune Surveillance of Cancer** D. M. Pardoll

Studies in genetically deficient mice suggest a significant role for γδ T cells in monitoring and preventing cutaneous tumorigenesis, in part through the recognition of a novel ligand, Rae-1.

TECHNICAL COMMENTS

Roots of Clinical Resistance to STI-571 Cancer Therapy

Studying 11 patients with chronic myeloid leukemia who had relapsed after initially successful treatment with the kinase inhibitor STI-571, Gorre *et al.* (Reports, 3 August 2001) tied drug resistance to "progressive *BCR-ABL* gene amplification" in three patients and to a point mutation in the BCR-ABL kinase domain in six patients. In separate comments, Barthe *et al.* and Hochhaus *et al.* report the results of two studies that were unable to find the point mutation cited by Gorre *et al.* in any of a total of 44 relapsed patients. Gambacorti-Passerini *et al.*, in a third comment, argue that the Gorre *et al.* focus on "cellular" mechanisms gave insufficient weight to "organismic" explanations of STI-571 resistance, such as the binding and inactivation of the drug by α1 acid glycoprotein. Gorre *et al.*, in their response, raise questions about the alternative model suggested by Gambacorti-Passerini *et al.*, and suggest that the alternative results reported by Barthe *et al.* and Hochhaus *et al.* may trace to "differences in the patient population studied or the methods used to detect the mutation."

The full text of these comments can be seen at www.sciencemag.org/cgi/content/full/293/5538/2163a

science's stke www.stke.org

Perspective: Wnts, Signaling and Sulfates S. S. Blair

A candidate sulfatase for regulating sulfation of proteoglycans that influence Wnt signaling.

science's next wave www.nextwave.org

UK: Shotgun Thesis Composition P. H. Dee

Next Wave's "Yours Transferably" columnist describes his unorthodox approach to the dreaded thesis write-up: Touch everything—every result, every paper—only once.

US: Small Mistakes with Big Consequences D. Jensen

In "Tooling Up," some common snafus that might impede your search for an industry job.

US: Images of Athena L. Pray

Athena, the first mentor and counselor, serves as a model for two faculty members who recently became leaders of offices of postdoctoral education.

Canada: Photon Opportunities L. Lilge

Biophotonic technologies, being applied in many areas of medicine and basic research, are generating new job opportunities for biologists, biotechnologists, and bioengineers.

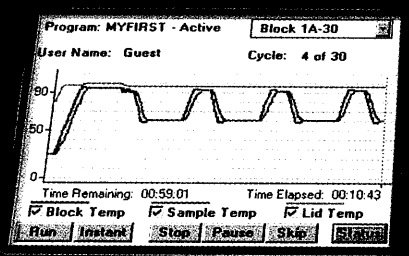
GrantsNet
www.grantsnet.org
RESEARCH FUNDING DATABASE

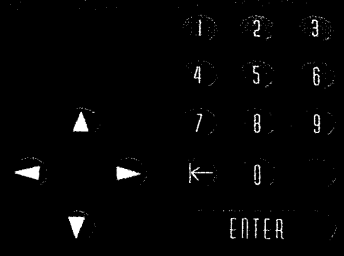
NEW! AIDScience
www.aidscience.com
HIV PREVENTION AND VACCINE RESEARCH

NeuroAIDS
www.sciencemag.org/NAIDS
EXPERIMENTAL WEB SITE

DNA Engine DYAD™

Peltier Thermal Cycler





DYAD™

MJ Research

Twice the Cycler—The dual chassis of the Dyad Thermal Cycler allows you to create over fifty unique instrument configurations in a space-saving footprint. You'll have the versatility to thermally cycle slides, arrays, 384-well/96-well plates, and 0.2 ml/0.5 ml tubes. Furthermore, MJ's pioneering dual blocks will let you run up to four different protocols at once.

A color display and choice of input devices establish the Dyad Cycler as a landmark instrument. Point-and-click navigation helps you design and run protocols intuitively. Real-time graphs of actual sample temperatures let you monitor instrument performance with confidence. The Dyad Cycler software also includes familiar features of the DNA Engine line–such as NIST-traceable temperature gradients with dynamic ramping for optimizing denaturation and annealing.

The Dyad Cycler exceeds the stringent performance standards that have made MJ the number one manufacturer of Peltier thermal cyclers. Experience the Dyad Cycler for yourself–an embodiment of our tradition of innovation.

MJ Research

(888) 729-2164 ◆ info@mjr.com ◆ www.mjr.com

South San Francisco CA • Waltham MA

Circle No. 64 on Readers' Service Card

THIS WEEK IN Science

edited by Phil Szuromi

Mesowires for Hydrogen Detection

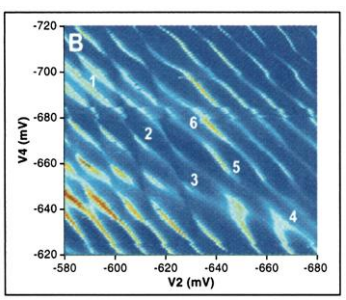
Submicrometer wires of palladium embedded in a polymer matrix are shown to decrease their resistance at room temperature in the presence of hydrogen, unlike bulk palladium, which becomes more resistive as the hydride forms. Favier *et al.* (p. 2224) find that hydrogen adsorption lowers the resistance by expanding microcrystallites in the wires, which then heals tiny "break junctions" in the wire. These effects are seen even when gases that normally poison hydrogen sensing were present, including O_2, CO, and CH_4. The rapid response and low power requirements suggest their use as sensors and switches.

2224 All-in-One Dot Characterization

The nanoscopic size and discrete energy levels of quantum dots make them attractive candidates for very high density optical components. However, obtaining information simultaneously on both the spatial location of excitations in a quantum dot and their spectral properties can be challenging. Guest *et al.* (p 2224; see the Perspective by Koch and Knorr) have overcome this limitation by combining the spatial sensitivity of scanning near-field optical microscopy with the spectral sensitivity of a nonlinear optical pump-probe technique. They can access and excite individual energy levels of the quantum dot and monitor the dynamics of such excitation processes.

Coupled Kondo Systems

Quantum dots provide an ideal system for investigating the many-body Kondo effect, in which the interaction of a magnetic impurity with a surrounding sea of electrons enhances conduction through the dot that would otherwise be suppressed by Coulomb blockade. However, when quantum dots are coupled, the Kondo effect must compete with spin-spin interactions. Jeong *et al.* (p. 2221) present an experimental study of a coupled pair of quantum dots which shows that the transport through the system can be explained through a simple model involving the spin configuration on each dot. They also observed a splitting of the Kondo resonance peak at zero bias which suggests that many-body bonding-antibonding Kondo states form in this artificial molecule.



CREDIT: JEONG *ET AL.*

A Primitive Messenger

The Tagish Lake meteorite is an unusual carbonaceous chondrite that was recovered from a frozen lake in Canada soon after its fall and before significant terrestrial alteration could occur. Two reports now provide important information about the origin of the meteorite and its well-preserved carbonaceous material. Hiroi *et al.* (p. 2234) compared reflectance spectra of the Tagish Lake meteorite with those of different types of asteroids. The D-type asteroids provided the best spectral fit; these asteroids are located near the Kirkwood gaps in the main asteroid belt. Some of these asteroids may be driven into the gaps as a consequence of gravitational interactions with Jupiter. As a result, their orbits would become chaotic, leading to collisions that could transfer material to the inner solar system and eventually to Earth. Pizzarello *et al.* (p. 2236) analyzed the organic matter in the Tagish Lake meteorite and found it to be dominated by water-soluble carboxyl and dicarboxyl compounds, to be relatively low in amino acids, and to contain insoluble carbon with aromatic character. This composition is distinct from those of other carbonaceous chondrites and implies an origin on a primitive parent body that had accreted solar nebular and interstellar material. Thus, the organic matter may represent the least altered material from the early solar nebula currently accessible to terrestrial scientists.

Whale Ankles

Whales, the largest marine mammals, are thought to have evolved from the land to the sea about 40 to 50 million years ago. Gingerich *et al.* (p. 2239; see the cover and the Perspective by Rose) have found two new species of early whales, *Artiocetus clavis* and *Rodhocetus balochistanensis*, in marine deposits from the Tethys Sea in Pakistan. The ankle bones of these species are similar to those found in artiodactyls, suggesting that the whales belong to Artiodactyla rather than Mesonychia. In addition, the fore and hind limbs of *Rodhocetus* indicate that it was a paddler in the shallow seas of the Tethys.

Climate and Tropical Speciation

Early models suggested that the high species richness of the tropics was the result of a gradual accumulation of species in a stable climate. Evidence that tropical climates have not remained stable, especially during the last 2 million years of the Pleistocene, led to the idea that tropical diversity might have originated recently and that speciation has been driven by environmental instability. Richardson *et al.* (p. 2242; see the Perspective by Bermingham and Dick) show that the model of recent speciation is far more accurate for *Inga*, a species-rich genus of neotropical rain forest trees. Nuclear and plastid DNA sequences and a molecular clock approach suggest recent, rapid diversification in *Inga* that resemble recent radiations of plant species on oceanic islands.

One Out of Many

Can many small patches of suitable habitat really act as a large patches if they are connected by corridors and "stepping stone" patches? Hale *et al.* (p. 2246; see the news story by Kaiser) analyzed DNA microsatellite variation to show the use of stepping stone patches of habitat by the red squirrel in northern Britain and dispersal through a patchy habitat during a 50-year period by a species that evolved in an unfragmented landscape. Samples of red squirrels were obtained before and after patches of a new forest were planted to connect isolated populations from northern England and

Published online in *Science* Express

CONTINUED ON PAGE 2167

STATISTICA™

High Performance Single-user and Enterprise-wide Software

- data analysis
- data mining
- quality control

New in Version 6

- ✓ Simplified user interface options for novices
- ✓ Complete Visual Basic scripting
- ✓ Full Web-enablement
- ✓ Countless new features...

www.statsoft.com

STATISTICA has received the highest rating in EVERY comparative review of statistics software since its first release in 1993.

StatSoft®

2300 E. 14th St. • Tulsa, OK 74104 • USA • (918) 749-1119 • Fax: (918) 749-2217 • info@statsoft.com • www.statsoft.com

Australia: StatSoft Pacific Pty Ltd.
Brazil: StatSoft Brazil Ltda.
Czech Republic: StatSoft Czech Rep. s.r.o.
France: StatSoft France
Germany: StatSoft GmbH
Hungary: StatSoft Hungary Ltd.
Israel: StatSoft Israel Ltd.
Italy: StatSoft Italia srl
Japan: StatSoft Japan Inc.
Korea: StatSoft Korea
Netherlands: StatSoft Benelux BV
Poland: StatSoft Polska Sp. z o. o.
Portugal: StatSoft Iberica Ltda.
Russia: StatSoft Russia
Singapore: StatSoft S.E. Asia
S. Africa: StatSoft S. Africa (Pty) Ltd.
Spain: StatSoft Espana
Sweden: StatSoft Scandinavia AB
Taiwan: StatSoft Taiwan
UK: StatSoft Ltd.

Circle No. 29 on Readers' Service Card

southern Scotland. The squirrels used the patches of new forest as stepping stones for dispersal from the southeast of Scotland to the northwest of England.

Burning Evenly

From sloths to squirrels, from weed to hibernating polar bears, the world of bioorganisms seems to present a wide diversity of metabolic rates. Gillooly *et al.* (p. 2248; see the news story by Brown) have analyzed measurements of metabolism among plants, animals, and microbes to derive a general model that describes the factors determining metabolic rate. Within a range of biologically relevant temperatures, metabolic rates are predominantly determined by temperature and body mass. Even unusual states, such as hibernation, thus need not invoke additional mechanisms for adjustment of metabolic rates.

Phantom Mendelian Inheritance

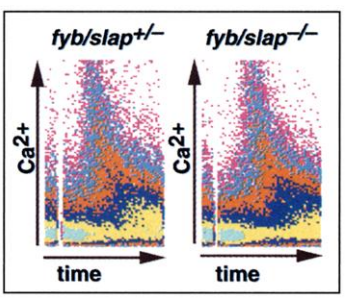
Bardet-Biedl syndrome (BBS) is an inherited disorder characterized by a variable phenotype that can include defects in vision, polydactyly, obesity, and learning disabilities. Historically, BBS has been viewed as a classical Mendelian recessive trait in which mutations at a single genetic locus suffice to cause disease. Katsanis *et al.* (p. 2256; see the Perspective by Burghes *et al.*) now show that in at least 40% of BBS patients, manifestation of the syndrome requires mutation of three alleles at two different genetic loci. This work blurs the well-defined boundary between Mendelian traits and complex traits such as diabetes, which are caused by the interaction of multiple genes, and will likely stimulate a re-examination of theoretical models of inheritance.

Analyzing the Staph

Staphylococcus aureus is a common cause of infection for which there are diminishing therapeutic options. By combining two existing technologies in a new way, Ji *et al.* (p. 2266) developed a library of antisense RNAs that are inducible with tetracycline, which means the respective genes can be turned on and off not just in vitro but also in infected mice. The roles played by specific genes in bacterial growth and behavior can be examined in complex ecologies, such as at the site of infection, and thereby clinically relevant drug or vaccine targets can be identified.

Making Signals Stick

In T cells, adapter proteins couple the T cell receptor (TCR) to multiple cellular signaling pathways. T cells also depend on cellular adhesion through integrins to perform many of their tasks, and Peterson *et al.* (p. 2263) and Griffiths *et al.* (p. 2260) show that the adapter SLAP-130/Fyb is directly involved this process. Using mice genetically deficient SLAP-130/Fyb, both groups observed that this protein was not required for inducing TCR-mediated calcium flux and protein tyrosine kinase activation, but was needed for clustering and activation of the integrin, LFA-1, which led to cellular adhesion. This process occurred in the presence of normal TCR-induced actin polymerization, which suggests that SLAP-130/Fyb couples TCR-dependent motility of the cytoskeleton with integrin activation.



CREDIT: GRIFFITHS *ET AL.*

The Independent Dendrite

The extensive dendritic trees of neurons are by no means passive receivers but are actively involved in processing and transforming synaptic inputs. Wei *et al.* (p. 2272) examined the passive and active transformations that an individual dendritic terminal segment performs on its excitatory inputs. By combining electrophysiological recordings at the cell bodies of hippocampal pyramidal neurons in organotypic cultures and visually guided local application of caged glutamate over dendritic arbors, they showed that distal arbors may generate an all-or-none regenerative response that spreads in a restricted dendritic region. These results now demonstrate directly that dendritic trees can be partitioned into independent functional subunits and that voltage-dependent calcium channels play a crucial role in this compartmentalization.

We develop innovative pharmaceuticals for the treatment of cancer.

So that cancer doesn't stand in the way of your dreams.

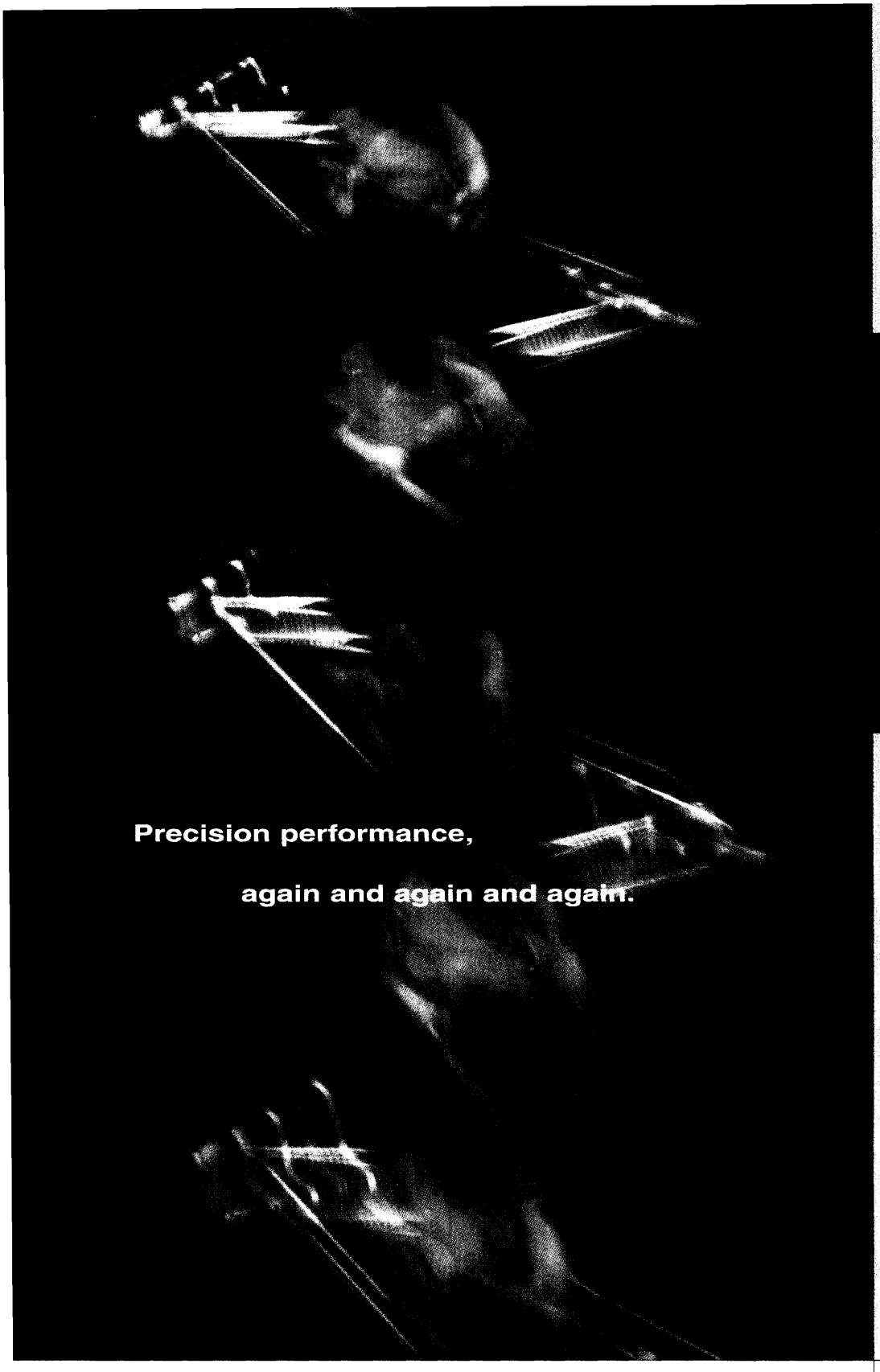
Aventis

Millions of people are diagnosed with cancer every year. This disease hampers the prospects of many for a long and full life. At Aventis, one of the world's leading pharmaceutical companies, we offer innovative drugs for the treatment of common cancers, such as breast, lung and colorectal cancer. Our scientists are utilizing new technologies, including gene therapy and immunology to develop new agents for the treatment of head and neck, lung and gastric cancer. Our goal is to develop more effective treatments for cancer; ones that give people a better chance to make their dreams come true.

002680N

Aventis Pharma AG, Frankfurt am Main (Germany) www.aventis.com

Circle No. 12 on Readers' Service Card



Precision requires discipline—the discipline to keep working until your performance is consistent and reliable. Consider the GeneAmp® PCR System 9700, the most advanced instrument for routine, high-performance PCR. We introduced the System 9700 in 1997 and continuously release innovations to the system.

The GeneAmp® PCR System 9700 is available with a gold-plated silver 96-well sample block or with an AutoLid-enabled dual 384-well sample block.

For example, today's PCR applications require precision thermal performance; even heat pumps that conform to manufacturer's specifications can vary enough to skew results. So we combined a proprietary Peltier heat pump with specially-engineered sample blocks to deliver fast thermal response and exceptional uniformity for all your PCR protocols.

Reliable results, again and again and again: it's what you've come to expect from Applied Biosystems.

www.appliedbiosystems.com
650.638.5800

GeneAmp® PCR System 9700

Applied Biosystems

PE Corporation is committed to providing the world's leading technology and information for life scientists.
PE Corporation consists of the Applied Biosystems and Celera Genomics businesses.

ORDER ON-LINE
store.appliedbiosystems.com

Circle No. 14 on Readers' Service Card

From Whole Blood to PCR in Under 8 Minutes

Extract-N-Amp™ for Blood

- Increased Throughput
- Increased Specificity

The **Extract-N-Amp Blood PCR Kits** contain reagents to rapidly extract genomic DNA from whole blood and amplify targets of interest by Hot Start PCR. This novel extraction system eliminates the need for organic extraction, centrifugation, column purification, heating, filtration or alcohol precipitation. The kit also includes a Hot Start PCR reaction mix, especially formulated for amplification directly from the extract.

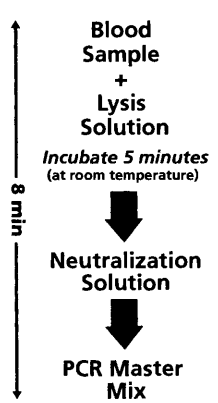
Features & Benefits:

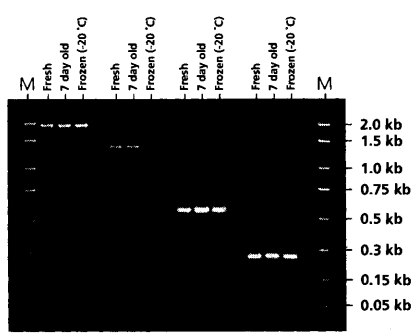
- **Fast: 8 minute prep allows greater speed and throughput**
- **Scalable: fits any format (single tube, 96-well, etc.)**
- **Convenient: Simple procedure with no special equipment required**
- **Specific: Hot Start antibody for highly specific PCR amplification of genomic DNA**

ORDERING INFORMATION

Product #	Description	Size
XNAB2	Extract-N-Amp Blood PCR Kit	100 extractions/100 amplifications
XNAB	REDExtract-N-Amp Blood PCR Kit (contains REDTaq)	100 extractions/100 amplifications *(Other kits sizes available)*

Inquire for bulk and high-throughput custom needs.





Extract-N-Amp Blood PCR Kit with fresh, 7 day old and frozen blood. *DNA was extracted and neutralized from 10 µl of whole blood in 5 min at room temperature using the REDExtract-N-Amp Blood PCR kit. The PCR products were then generated using the specially formulated Hot Start PCR mix included in the kit. The PCR products are 1.8 kb for carnitine palmitoyltransferase II, 1.3 kb for a mitochondrial DNA control region, 547 bp for human surfactant protein B, and 320 bp for the 5′ untranslated region of human major histocompatibility complex class II.*

Contact Sigma for more information on Extract-N-Amp and our entire line of GenElute™ Nucleic Acid Purification Products at 1-800-325-3010.

Circle No. 22 on Readers' Service Card

availability, ordering & tracking
sigma-aldrich.com
scientific tools, products & information

LEADERSHIP IN LIFE SCIENCE, HIGH TECHNOLOGY AND SERVICE
SIGMA-ALDRICH CORPORATION • BOX 14508 • ST. LOUIS • MISSOURI 63178 • USA

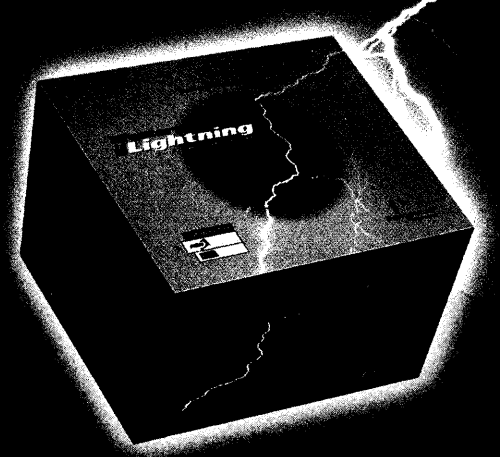
SIGMA®

Drug Discovery | Research | Clinical Screening

Chemiluminescence Imaging

Lightning

Chemiluminescence Reagent Plus



KODAK Image Station 440CF

A versatile, compact benchtop imaging system with superior sensitivity and accuracy for all your imaging needs.

See the difference in western blot imaging.

A start-to-finish system from a single trusted source. Western Lightning—a reliable NEN-brand product from PerkinElmer Life Sciences—taps the full power of chemiluminescence detection with sensitivity as much as 4 times greater than other brands.

PerkinElmer has everything you need for western blot imaging—including reagents, instrumentation and applications expertise! PerkinElmer is the single trusted source for western blotting.

Also try our new DNA Thunder Chemiluminescence Reagent for Nucleic Acid Detection.

Products You Trust

NEN

WALLAC

PerkinElmer life sciences.

Western Lightning.

World Headquarters: 549 Albany Street, Boston, MA 02118-2512 USA (800) 551-2121 **European Headquarters:** Imperiastraat 8 B-1930 Zaventem Belgium +32 2 717 7944

Circle No. 30 on Readers' Service Card

www.perkinelmer.com/lifesciences

Dean Hashimoto,
A.B., M.S., M.D., J.D., M.O.H., and now, finally, IRA.

As a man who's devoted his life to the pursuit of knowledge, Dean Hashimoto wasn't going to pick a retirement plan without first doing his homework. That's why he chose an IRA from us, the people with over 80 years' experience managing portfolios for the world's sharpest minds. After discovering that our IRAs offer a variety of investment choices and low expenses, he decided to add one to his resume. A wise choice, by a very wise man.

Log on for ideas, advice, and results. TIAA-CREF.org or call 1.800.842.2776

TIAA CREF

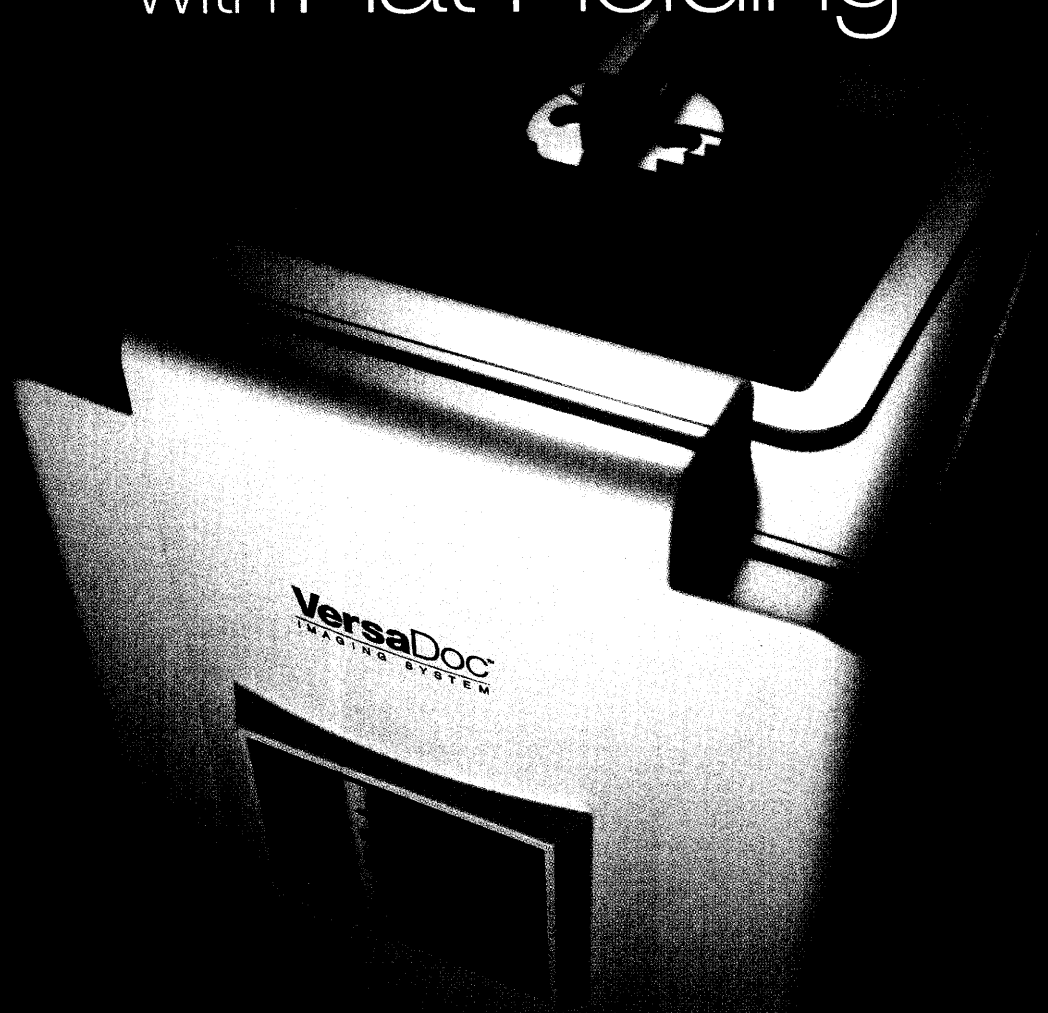
Managing money for people with other things to think about.

RETIREMENT | INSURANCE | MUTUAL FUNDS | COLLEGE SAVINGS | TRUSTS | INVESTMENT MANAGEMENT

Dean Hashimoto became a participant in 1989. TIAA-CREF Individual and Institutional Services, Inc., and Teachers Personal Investors Services, Inc., distribute securities products. ©2001 Teachers Insurance and Annuity Association–College Retirement Equities Fund (TIAA-CREF), New York, NY.
Dean Hashimoto was compensated.

Circle No. 26 on Readers' Service Card

Clean and Beautiful Images, with Flat Fielding



The VersaDoc™ Imaging System Eliminates Nonuniformities with Patented Flat Fielding Technology.

VersaDoc is clearly state-of-the-art. It's easily upgradable and very versatile, able to do multiple applications like fluorescence, chemiluminescence, colorimetric, and multimode imaging. You can perform these applications with UV or white-light illumination. VersaDoc is also the only product on the market with patented technology for background correction, for superior resolution and quantitation.

What Will You Discover Next?

Visit us on the Web at discover.bio-rad.com. Call toll free at 1-800-4BIORAD (1-800-424-6723); outside the US, contact your local sales office.

BIO-RAD

Circle No. 16 on Readers' Service Card

www.sciencemag.org

Science

1200 New York Avenue, NW
Washington, DC 20005
Editorial: 202-326-6550, FAX 202-289-7562
News: 202-326-6500, FAX 202-371-9227
Permissions: 202-326-7074, FAX 202-682-0816
Subscriptions: 800-731-4939 or 202-326-6417, FAX 202-842-1065

Bateman House, 82-88 Hills Road
Cambridge, UK CB2 1LQ
(44) 1223-326500, FAX (44) 1223-326501

EDITOR-IN-CHIEF **Donald Kennedy**
EDITOR **Ellis Rubinstein**
MANAGING EDITOR **Monica M. Bradford**

DEPUTY MANAGING EDITORS: R. Brooks Hanson, Katrina L. Kelner
NEWS EDITOR: Colin Norman

EDITORIAL/COMPASS SUPERVISORY SENIOR EDITORS Barbara Jasny, Guy Riddihough, Phillip D. Szuromi; SENIOR EDITOR/PERSPECTIVES Orla Smith; SENIOR EDITORS Gilbert J. Chin, Pamela J. Hines, Paula A. Kiberstis (Boston), L. Bryan Ray, Linda R. Rowan; ASSOCIATE EDITORS Lisa D. Chong, Marc S. Lavine, Beverly A. Purnell, H. Jesse Smith, Valda Vinson; EDITOR, *SCIENCE* ONLINE Stewart Wills; ASSOCIATE ONLINE EDITOR Chris Gunter; ASSOCIATE BOOK REVIEW EDITOR Sherman J. Suter; ASSOCIATE LETTERS EDITOR Christine M. Pearce; INFORMATION SPECIALIST Janet Kegg; CONTRIBUTING EDITOR Kevin Ahern; EDITORIAL MANAGER Cara Tate; SENIOR COPY EDITORS Jeffrey E. Cook, Harry Jach, Etta Kavanagh, Barbara P. Ordway; COPY EDITORS Joshua Marcy, Monique Martineau; EDITORIAL COORDINATORS Carolyn Kyle, Ellen E. Murphy, Beverly Shields; PUBLICATIONS ASSISTANTS Chris Filiatreau, Joi S. Granger, Jeffrey Hearn, Charlene King, Elise Laffman, Gail Murphy, Anita Wynn; EDITORIAL ASSISTANT Patricia M. Moore; EDITORIAL SUPPORT ASSISTANTS Osa Atoe, Yolanda Matthews, Brian White; EXECUTIVE ASSISTANT Sylvia S. Kihara; ADMINISTRATIVE SUPPORT Patricia F. Fisher

science_editors@aaas.org (for general editorial queries)
science_letters@aaas.org (for letters to the editor)
science_reviews@aaas.org (for returning manuscript reviews)
science_ bookrevs@aaas.org (for book review queries)

NEWS SENIOR CORRESPONDENTS Eliot Marshall, Jean Marx; DEPUTY NEWS EDITORS Robert Coontz, Jeffrey Mervis, Leslie Roberts; CONTRIBUTING EDITORS Elizabeth Culotta, Polly Shulman; NEWS WRITERS Martin Enserink, Laura Helmuth, Constance Holden, Jocelyn Kaiser, Richard A. Kerr, Andrew Lawler (Boston), David Malakoff, Elizabeth Pennisi, Charles Seife, Robert F. Service (Pacific NW), Gretchen Vogel, Joshua Gewolb (intern); CONTRIBUTING CORRESPONDENTS Marcia Barinaga (Berkeley, CA), Kathryn Brown, Barry A. Cipra, Jon Cohen (San Diego, CA), Daniel Ferber, Ann Gibbons, Robert Irion, Mitch Leslie (NetWatch), Charles C. Mann, Virginia Morell, Evelyn Strauss, Gary Taubes, David Voss, Ingrid Wickelgren; COPY EDITORS Linda B. Felaco, Daniel T. Helgerman; ADMINISTRATIVE SUPPORT Scherraine Mack, Fannie Groom; BUREAUS: Berkeley, CA: 510-652-0302, FAX 510-652-1867, Boston, MA: 617-542-5098, San Diego, CA: 760-942-3252, FAX 760-942-4979, Pacific Northwest: 503-963-1940

PRODUCTION DIRECTOR James Landry; MANAGER Wendy K. Shank; ASSISTANT PRODUCTION MANAGER Rebecca Doshi; ASSOCIATES Vicki J. Jorgensen, Tara L. Kelly, Jessica K. Moshell, Amanda K. Skelton

PREFLIGHT OPERATIONS DIRECTOR David M. Tompkins

ART DESIGN DIRECTOR C. Faber Smith; ART DIRECTOR Alan T. Stonebraker; ASSOCIATE ART DIRECTOR Joshua Moglia; ILLUSTRATORS Cameron Slayden, Katharine Sutliff; ASSOCIATES Holly Bishop, Debra J. Morgenegg, Preston Morrighan; Julie White PHOTO RESEARCHER Leslie Blizard

***SCIENCE* INTERNATIONAL**

EUROPE (science@science-int.co.uk) EDITORIAL: SUPERVISORY SENIOR EDITOR Andrew M. Sugden; SENIOR EDITOR/PERSPECTIVES Julia Uppenbrink; SENIOR EDITORS Caroline Ash, Stella M. Hurtley; ASSOCIATE EDITORS Ian S. Osborne, Stephen J. Simpson, Peter Stern; EDITORIAL SUPPORT Jenny Parker, Sarah Parker; ADMINISTRATIVE SUPPORT Janet Mumford, Liz Ellis, Viv Hogarth; NEWS: EUROPEAN NEWS EDITOR Richard Stone, CORRESPONDENT Michael Balter (Paris: (33) 1-49-29-09-01, FAX (33) 1-49-29-09-00); CONTRIBUTING CORRESPONDENT Robert Koenig (Bern); Ben Shouse (intern)

ASIA Japan Office: Asca Corporation, Eiko Ishioka, Fusako Tamura, 1-8-13, Hirano-cho, Chuo-ku, Osaka-shi, Osaka, 541-0046 Japan; (81) 6-6202-6272, FAX (81) 6-6202-6271; asca@os.gulf.or.jp JAPAN NEWS BUREAU: Dennis Normile (contributing correspondent, (81) 3-3335-9925, FAX (81) 3-3335-4898; dnormile@twics.com); CHINA REPRESENTATIVE Hao Xin, (86) 10-6307-4439 or 6307-3676, FAX (86) 10-6307-4358; science@public3.bta.net.cn; INDIA Pallava Bagla (contributing correspondent (91) 11-271-2896; pbagla@ndb.vsnl.net.in)

PUBLISHER **Richard S. Nicholson**
ASSOCIATE PUBLISHER **Beth Rosner**
MEMBERSHIP/CIRCULATION DIR. **Michael Spinella**

MEMBERSHIP/CIRCULATION (membership@aaas.org) DEPUTY DIRECTOR Marlene Zendell; MEMBER SERVICES: MANAGER Michael Lung; SENIOR SPECIALIST Mary Curry; COORDINATOR Jantell Stone; SPECIALISTS Laurie Baker, Pat Butler, Elizabeth Early, Katrina Smith; MARKETING: MANAGER Gregory Urquhart; PRODUCTION MANAGER Lauri Sirois; ASSOCIATE Deborah Stromberg; INTERNATIONAL MARKETING MANAGER Ruth Jackson; EXECUTIVE Martin Paine; RESEARCH: MANAGER Renuka Chander; BUSINESS AND FINANCE: MANAGER Teressa Ellis; ADMINISTRATIVE SUPPORT Zadia McKinnon; COMPUTER SPECIALIST John Williams

SUBSCRIPTION SERVICES For change of address, missing issues, new orders and renewals, and payment questions: 800-731-4939 or 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

REPRINTS Ordering/Billing/Status 800-407-9190; Corrections 202-326-6501

MEMBER BENEFITS For Credit Card: MBNA 1-800-847-7378; Car Rentals: Hertz 1-800-654-2200 CDP#343457, Dollar 1-800-800-4000 #AA1115; AAAS Travels: Betchart Expeditions 1-800-252-4910; Life Insurance: Seabury & Smith 1-800-424-9883; Other Benefits: AAAS Member Services 1-202-326-6417.

FINANCE AND ADVERTISING BUSINESS MANAGER Deborah Rivera-Wienhold; SENIOR ANALYST Randy Yi; FINANCIAL ANALYSTS Lisa Donovan, Jessica Tierney-Rubin; RIGHTS AND PERMISSIONS: ASSOCIATE Emilie David; ASSISTANT Karen Lentz; MARKETING: DIRECTOR John Meyers; RECRUITMENT MARKETING MANAGER Allison Pritchard; ASSOCIATES Mary Ellen Crowley, Amanda Donathen; ELECTRONIC MEDIA: MANAGER Don Hemenway; INTERNET PRODUCTION MANAGER Lizabeth Harman; ASSISTANT PRODUCTION MANAGER Wendy Stengel; SENIOR PRODUCTION ASSOCIATE Lisa Stanford; PRODUCTION ASSOCIATES Carla Cathey, Steve Kusek, Louis Williams; LEAD APPLICATIONS DEVELOPER Carl Saffell; ADMINISTRATIVE SUPPORT Joyce Scott

PRODUCT ADVERTISING (science_ advertising@aaas.org) NATIONAL SALES MANAGER Richard Teeling: 973-694-9173, FAX 973-694-9193 • NORTHEAST AND E. CANADA Elizabeth Pointek: 978-969-1542, FAX 413-480-0008• MIDWEST Rick Bongiovanni: 330-405-7080, FAX 330-405-7081 • WEST COAST/W. CANADA Neil Boylan: 415-458-1630, FAX 415-458-1631 • MID-ATLANTIC AND SOUTHEAST SALES Christopher Breslin: 443-512-0330, FAX 443-512-0331 • UK/SCANDINAVIA/FRANCE/ITALY/BELGIUM/NETHERLANDS Andrew Davies: 44 (0)1-782-750-111, FAX 44 (0)1-782-751-999 • GERMANY/SWITZERLAND/AUSTRIA Tracey Peers: (44) 1-782-752-530, FAX (44) 1-782-752-531 JAPAN Mashy Yoshikawa: (81) 3-3235-5961, FAX (81) 3-3235-5852 • TRAFFIC MANAGER Carol Maddox; TRAFFIC ASSOCIATE Halimah S. Whitby; SENIOR SALES ASSOCIATE Sheila Myers

RECRUITMENT ADVERTISING (science_classifieds@aaas.org); PRODUCTION MANAGER Jennifer Rankin; ASSISTANT PRODUCTION MANAGER Deborah Tompkins; U.S.: SALES MANAGER Gabrielle Boguslawski: 718-491-1607, FAX 202-289-6742; WEST COAST SALES MANAGER Kristine von Zedlitz; EAST COAST SALES MANAGER Jill Steinberg; INTERNET SALES MANAGER Beth Dwyer; ASSISTANT SALES MANAGER Daryl Anderson; SENIOR SALES COORDINATOR Erika Bryant; SALES COORDINATORS Rohan Edmonson, Caroline Gallina, Shirley Young; SALES REPRESENTATIVES Kathleen Clark, Jody Fenty, Christina Geiger, Bren Peters-Minnis; ASSISTANTS Sussy Castilla, Emnet Tesfaye; ASSOCIATES Christine Hall, Dina Freeman; PUBLICATIONS ASSISTANTS Robert Buck, Jane Vaughn; U.K./EUROPE: SALES MANAGER Debbie Cummings; PROMOTIONS COORDINATOR Richard Walters; INTERNET SALES EXECUTIVE Tracy Holmes; AUSTRALIA/NEW ZEALAND: Keith Sandell: (61) 02-9922-2977, FAX (61) 02-9922-1100 JAPAN: Mashy Yoshikawa: (81) 3-3235-5961, FAX (81) 3-3235-5852

AAAS BOARD OF DIRECTORS RETIRING PRESIDENT, CHAIR Mary L. Good; PRESIDENT Peter H. Raven; PRESIDENT-ELECT Floyd E. Bloom; TREASURER David E. Shaw; EXECUTIVE OFFICER Richard S. Nicholson; BOARD Lewis M. Branscomb; Nina V. Fedoroff; Karen A. Holbrook; Sally Gregory Kohlstedt; Richard A. Meserve; Robert C. Richardson; Neena B. Schwartz; Lydia Villa-Komaroff

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.

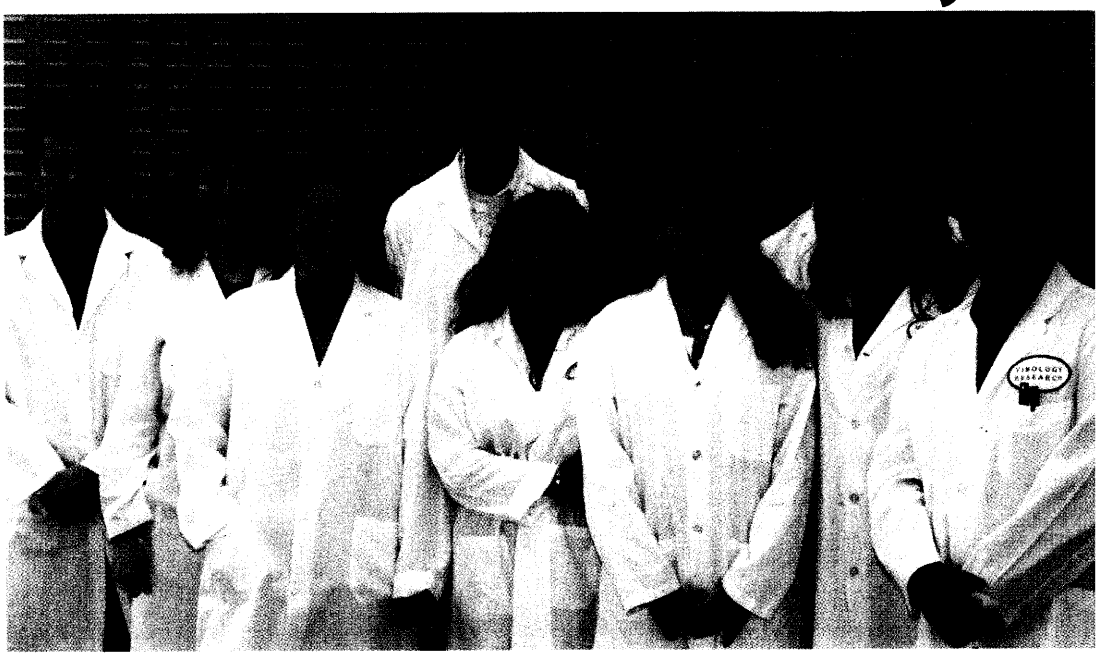
The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of 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 FOR CONTRIBUTORS
See pages 145 and 146 of the 5 January 2001 issue or access www.sciencemag.org/misc/con-info.shtml

Finally! Efficient and Functional Protein Delivery.

We have successfully used the BioPORTER reagent to study the molecular mechanism of apoptosis and we are using it to investigate host/pathogen relationships. BioPORTER reagent is a revolutionary tool in the functional genomics arsenal.

Genomics Core Lab
Univ. of California at
San Diego



BioPORTER® Protein Delivery Reagent

- Direct delivery of proteins and peptides into living cells
- Fast and efficient
- Easy to use and stable

BioPORTER protein delivery reagent is the first and only lipid-based delivery system that effectively translocates proteins into living cells.[1] * BioPORTER makes proteins or peptides directly available to cellular processes without the need for transcription and translation. BioPORTER reagent interacts non-covalently with the protein or peptide of choice and forms a protective vehicle for immediate delivery into cells.

Now your protein or peptide can be directly available for a variety of studies like intercellular signaling pathways, cell cycle regulation, control of apoptosis, study of oncogenesis and transcription regulation. Call GTS today to speed up your functional protein studies with the BioPORTER protein delivery reagent.

1. Zelphati, O *et al* (2001) Paper in press: *J. Biol Chem.* published on July 10, 2001 as manuscript M104920200

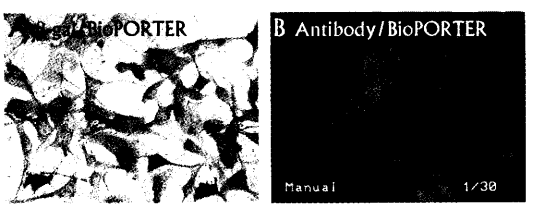


Fig. A/B FITC-Antibody or β-gal Delivery Into Mouse Fibroblasts

BioPORTER® QuikEase Kit	
Quantity	Catalog no.
24 pre-coated single-use vials	BP502424
96 pre-coated single-use vials	BP509696
BioPORTER® Protein Delivery Reagent	
Quantity	Catalog no.
24 reactions	BP502401
96 reactions	BP509604

* US and worldwide patents pending

BioPORTER is a registered trademark of Gene Therapy Systems, Inc.

To Order: 888-428-0558 or 858-457-1919
Fax: 858-623-9494
www.genetherapysystems.com

Circle No. 51 on Readers' Service Card

SORVALL®

6 liters. 9 minutes. 0 kidding.

Introducing the SORVALL® Evolution™ RC Superspeed.

One instrument now does it all – from large-volume cell pelleting to isolation of sub-cellular particles. And it does it all faster, with:

- Unequaled accel/decel across the board
- Simple, intelligent operation
- Industry's widest choice of rotors
- Vacuum-free DuraFlex™ drive system

Superspeed centrifugation will never be the same again. It's going to be a whole lot better. Contact Kendro today.

Kendro
Quality Products - Lifetime Care

Offices worldwide. In the U.S., call 1-800-522-7746, Fax 203-270-2166.
In Europe, 49 (1805) 536 376, Fax 49 (1805) 112 114.
In Asia Pacific, (852) 2711-3910, Fax (852) 2711-3858.
Or contact your local Kendro Representative.

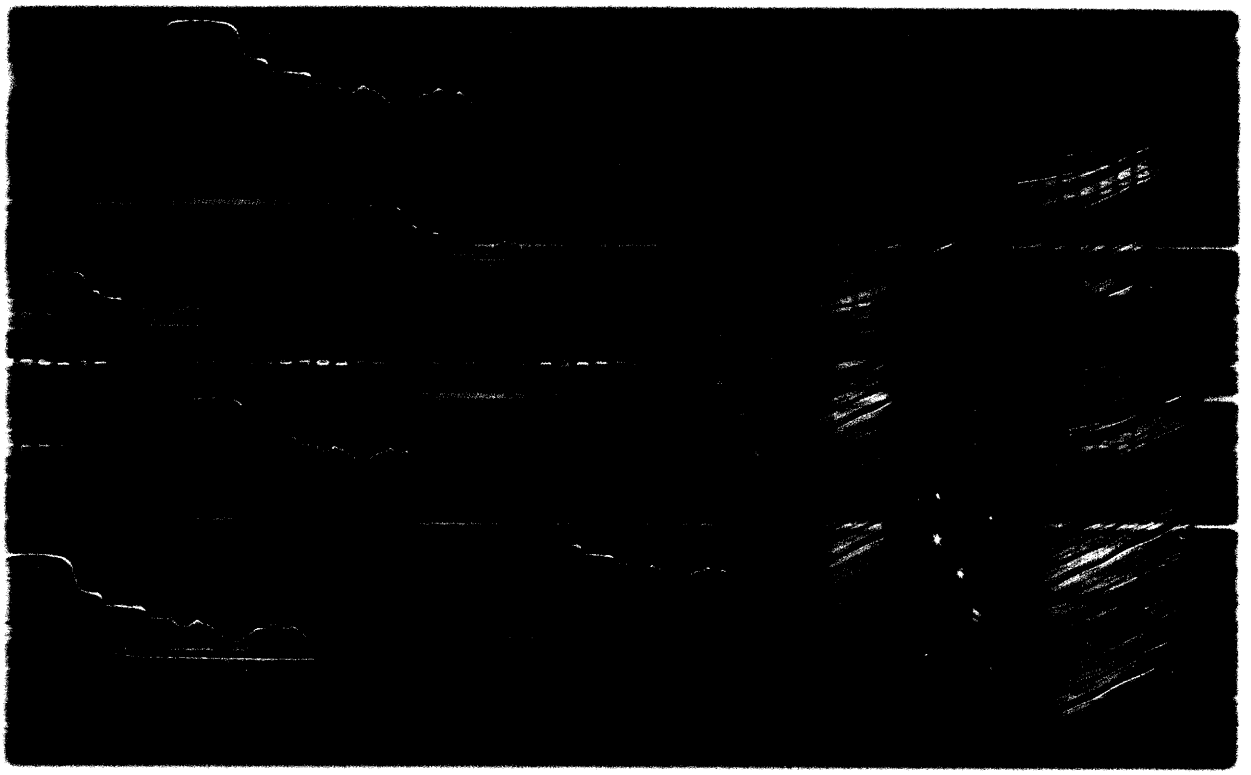
info@kendro.com

Visit our website
www.kendro.com

Circle No. 23 on Readers' Service Card

Instant Access

Your key to scholarly literature



Reference Manager® is the feature-rich writer's tool that saves you time organizing and preparing references for publication of your research. Now *Reference Manager* 9.5 gives you the key for two-way access between bibliographic management and the valuable literature search tools found in ISI® *eSource*™ and ISI *Web of Science*®. Just use the new "Search ISI" tool to link, search and export references into *Reference Manager* with a single click. That way you'll spend more time researching and writing—and less time locating and importing references.

In addition to using the new "Search ISI" feature, you can search PubMed and Internet libraries worldwide to create databases instantly.

You will find citing and formatting manuscripts is a simple matter of point-and-click. Furthermore, the *Reference Manager* network edition is ideal for supporting research teams.

FREE Trial

Open the door to two-way access between scholarly literature and reference management. Download a Free Trial of *Reference Manager* 9.5 today at **www.refman.com.**

"It is highly recommended for anyone needing a powerful reference tool."
—*Science*, June 16, 2000

ISI RESEARCHSOFT™

THOMSON SCIENTIFIC

Phone: 800-554-3049 • 510-559-8592 • Fax: 510-559-8683 • E-mail: info@refman.com • Web: www.refman.com

Circle No. 7 on Readers' Service Card

SYBR® Green JumpStart™ Taq ReadyMix™

Sigma Lights Your Way To Real Time Quantitative PCR

SYBR Green JumpStart Taq ReadyMix for Quantitative PCR combines the performance enhancements of antibody inactivation for hot start PCR with SYBR Green I in an easy-to-use 2x concentrate.

*Sensitive – **SYBR Green I detects down to 10 copies of template on the ABI Prism® 7700 Sequencing Detection System.***

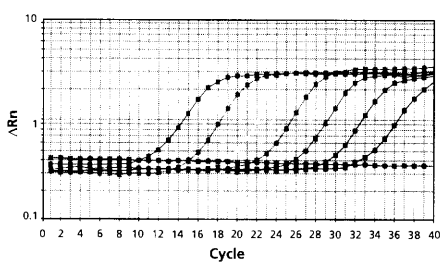
*Specific – **The hot start mechanism using Sigma's JumpStart Taq antibody prevents non-specific product formation.***

*Convenient – **SYBR Green JumpStart Taq ReadyMix is designed for high-throughput, quantitative PCR applications, providing consistent batch-to-batch and reaction-to-reaction performance.***

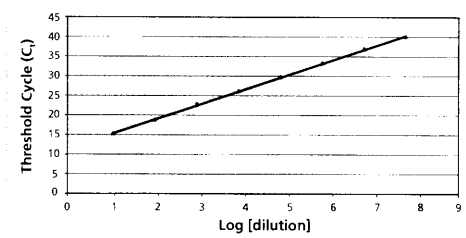
Product Code	Description	Package Size
S 4438	SYBR Green JumpStart Taq ReadyMix	100 reactions
		500 reactions

Threshold cycle (C_t) values for the lambda amplicon using SYBR Green JumpStart Taq ReadyMix

Quantitative PCR (qPCR) performed on pBac-2cp. Initial template copy number was 10^6, diluted 10-fold in subsequent wells. Threshold cycles (Cts) determined using the ABI PRISM 7700 Sequence Detection software.



Linearity of pBac-2cp ten-fold dilutions with SYBR Green JumpStart Taq ReadyMix



For more information and to evaluate Sigma's Quantitative PCR products, contact us at:
sigma-aldrich.com or call 1-800-325-3010

availability, ordering & tracking
sigma-aldrich.com
scientific tools, products & information

Circle No. 31 on Readers' Service Card

LEADERSHIP IN LIFE SCIENCE, HIGH TECHNOLOGY AND SERVICE

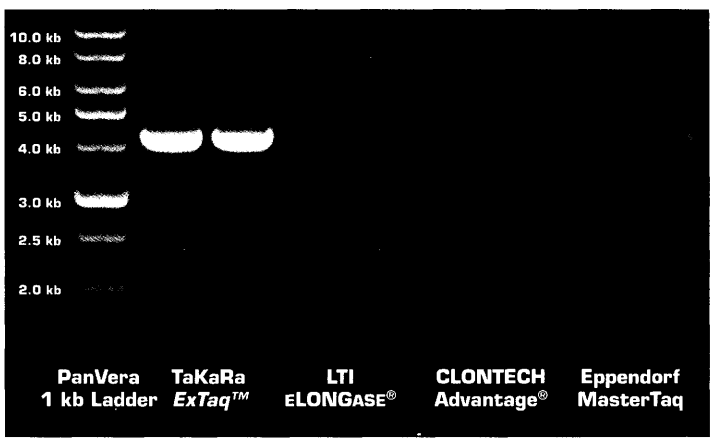
SIGMA-ALDRICH CORPORATION • BOX 14508 • ST. LOUIS • MISSOURI 63178 • USA

SIGMA®

Hot Start Version Now Available

PCR That Works!

Takara *Ex Taq*™
DNA Polymerase



- **Excellent Sensitivity**
- **Robust Signal Intensity**
- **High Fidelity**
- **Longer Amplifications**
- **Reliable Results**

PROVE IT TO YOURSELF

Call us or visit our website for your free sample of *Ex Taq* or **Hot Start** *Ex Taq* today!

PANVERA

The Protein Company™

Circle No. 54 on Readers' Service Card

Takara PCR-related products are sold under licensing arrangements with Roche Molecular Systems and F. Hoffmann-LaRoche Ltd. and The Perkin-Elmer Corporation. Purchase of these products is accompanied by a license to use them in the Polymerase Chain Reaction (PCR) process for research in conjunction with a thermal cycler whose use in the automated performance of the PCR process is covered by the up-front license fee, either by payment to Perkin-Elmer or as purchase, i.e., an authorized thermal cycler.

Ex Taq is a trademark of Takara Shuzo Co., Ltd.
"The Protein Company" is a trademark of PanVera Corporation.

PanVera Corporation • Madison WI 53711
Phone: 608.233.9450 • Fax: 608.233.3007
E-Mail: info@panvera.com

800.791.1400
In the USA and Canada

www.panvera.com

Lit.#L05265 Rev. 6/01

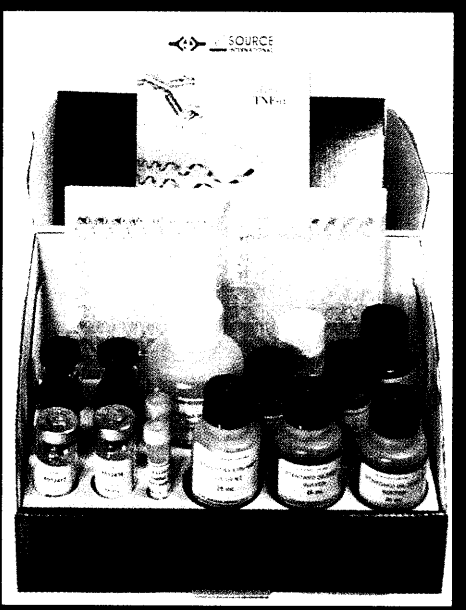
Cytokines Signal Transduction Immunology Custom

Things you can depend on...

Your dog.

Your friends.

BioSource ELISAs.



BioSource ELISAs. Solid performance. Every time.

BioSource International offers over 70 species-specific ELISA kits for
Cytokines • Chemokines • Growth Factors
Hormones • Signal Transduction and Neurobiology markers

BioSource Advantages

- Sample size efficient, ≤ 100 µL per sample
- Convenient single standard curve for quantitation of all sample types
- Consistent lot-to-lot performance ensures minimal variation in results
- Species-specific kits- Human, Mouse, Rat, Monkey, Swine and Bovine
- Referenced in peer-reviewed publications
- Standards calibrated to NIBSC (when available)
- Experienced manufacturing for nearly 20 years

BioSource ELISA kits are validated for measuring species-specific serum, plasma, culture supernatant and other buffered solutions found in scientific research.

Sample Human ELISA Specifications

Parameter	Catalog #	Sensitivity	Sample Size	Lot CVs
Hu IFN-γ	KHC4022	<4 pg/mL	50 µL	3.1%
Hu TNF-α	KHC3012	1.7 pg/mL	100 µL	6.2%
Hu IL-8	KHC0082	<5 pg/mL	50 µL	6.5%
Hu IL-6	KHC0062	<2 pg/mL	100 µL	10.4%
Hu IL-1β	KHC0012	1 pg/mL	50 µL	9.4%
Hu IL-4	KHC0042	<2 pg/mL	100 µL	1.8%
Hu IL-10	KHC0102	<1 pg/mL	50 µL	4.6%

Catalog # for 2-plate kits

Visit biosource.com for a list of ELISA products

For research use only.

BIOSOURCE INTERNATIONAL

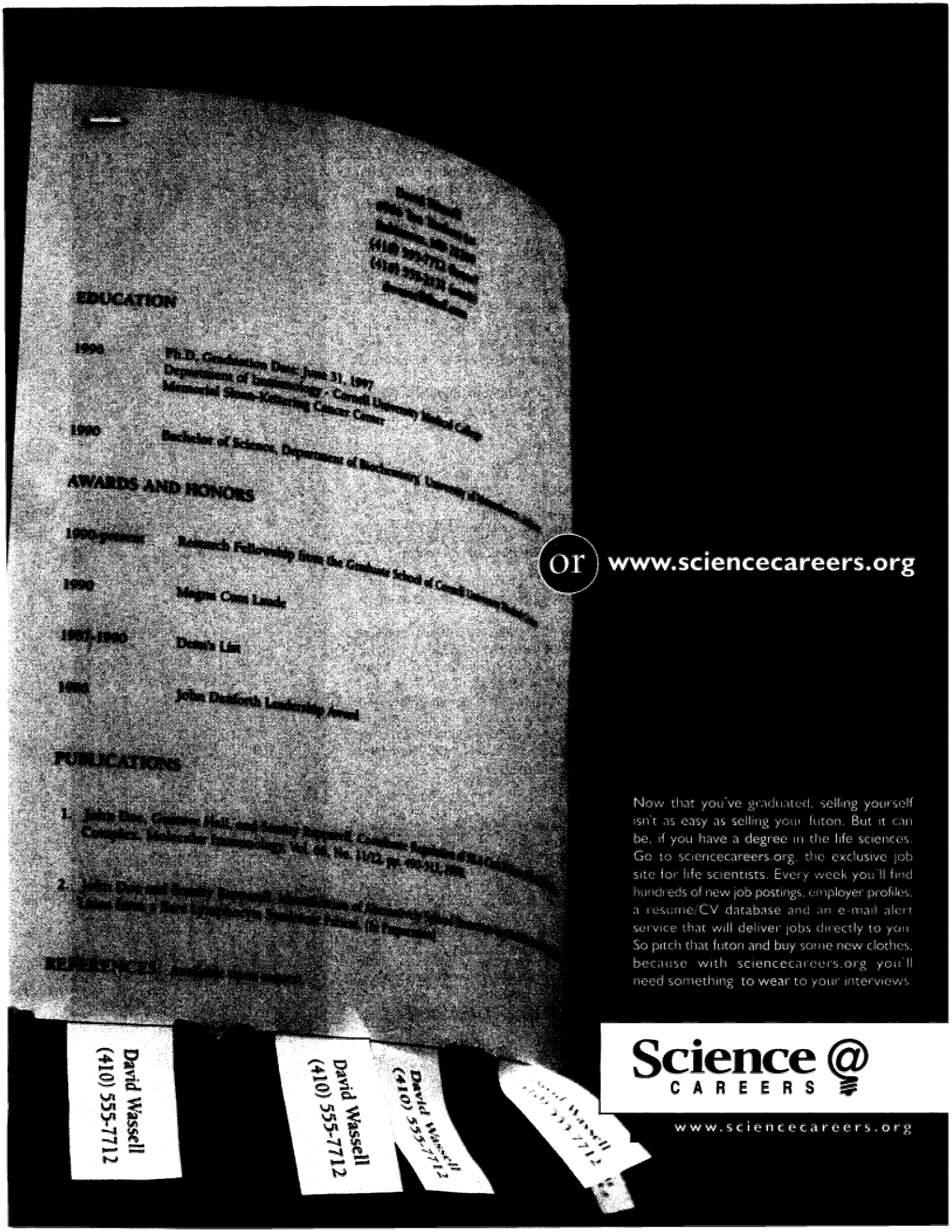
AI6/01

Circle No. 13 on Readers' Service Card

biosource.com

BioSource USA
800.242.0607

BioSource Europe
+32.67.88.99.99


EDUCATION
AWARDS AND HONORS
PUBLICATIONS
or www.sciencecareers.org
Now that you've graduated, selling yourself isn't as easy as selling your futon. But it can be, if you have a degree in the life sciences. Go to sciencecareers.org, the exclusive job site for life scientists. Every week you'll find hundreds of new job postings, employer profiles, a resume/CV database and an e-mail alert service that will deliver jobs directly to you. So pitch that futon and buy some new clothes, because with sciencecareers.org you'll need something to wear to your interviews.
David Wassell
(410) 555-7712
Science @
CAREERS
www.sciencecareers.org

Becoming Human and Beyond

A Conference
November 1-3, 2001

Speakers include:

Human Origins, Thursday, November 1

- **Bruce Knauft**, Anthropology, Emory University
- **Russ Tuttle**, Anthropology, University of Chicago
- **Robert Martin**, Primatology/Anthropology, Field Museum
- **Wendy Doniger**, Comparative Religion, University of Chicago
- **Joe Watkins**, Anthropology, Anadarko Agency, Bureau of Indian Affairs

Genomics and Behavioral Genetics Friday, November 2

- **Robert H. Waterston**, Genetics, University of Washington, St. Louis
- **Eric Juengst**, Philosophy, Case Western Reserve University
- **Laurie Zoloth**, Ethics, San Francisco State Univ.
- **Matthew McGue**, Behavioral Genetics, University of Minnesota
- **John Edward Terrell**, Anthropology, The Field Museum
- **Karen Lebacqz**, Ethics, Pacific School of Religion

Neuroscience, Robotics and the Future Saturday, November 3

- **Todd E. Feinberg**, Psychiatry, Beth Israel Medical Center
- **Merlin Donald**, Psychology, Queens University at Kingston, Ontario
- **Rodney Brooks**, Robotics, MIT Artificial Intelligence Laboratory
- **Nancy Kress**, Science Fiction Writer

What is the human genealogy? What is the sequencing of the human genome telling us about the natural history of humanity, about our biological constitution, about our capacity to shape the biology of future generations? Do our genes make us do things? What are the relationships between genes, culture and human behavior? How are brain, mind and person related? How can we understand the evolution of the human self? What is the likelihood of our generating non-biological, Lintelligent humanoid offspring? What is the human prospect?

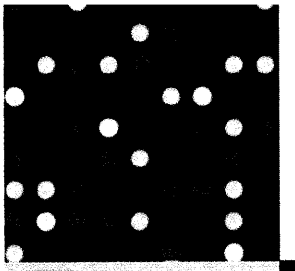
These are some of the questions that will be explored in a multidisciplinary, multi-religious conference on human nature being organized by the Program of Dialogue on Science, Ethics and Religion, of the American Association for the Advancement of Science (AAAS) and the Field Museum of Natural History. Scientists, philosophers, religious scholars and speculative writers will engage one another in an exploration of the evolutionary development of humankind, its biological and neurological constitution and the human future.

For more information about the conference or registration contact: www.aaas.org/spp/dser

Early Registration (before October 15):
Regular - $210
AAAS/Field Museum Members - $180
Students - $150

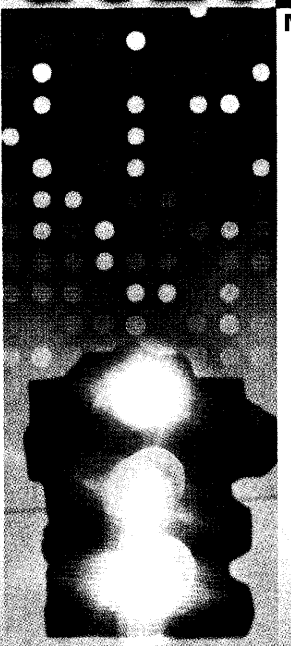
AAAS   The Field Museum   CHICAGO

Microarray Data Analysis Simplified.

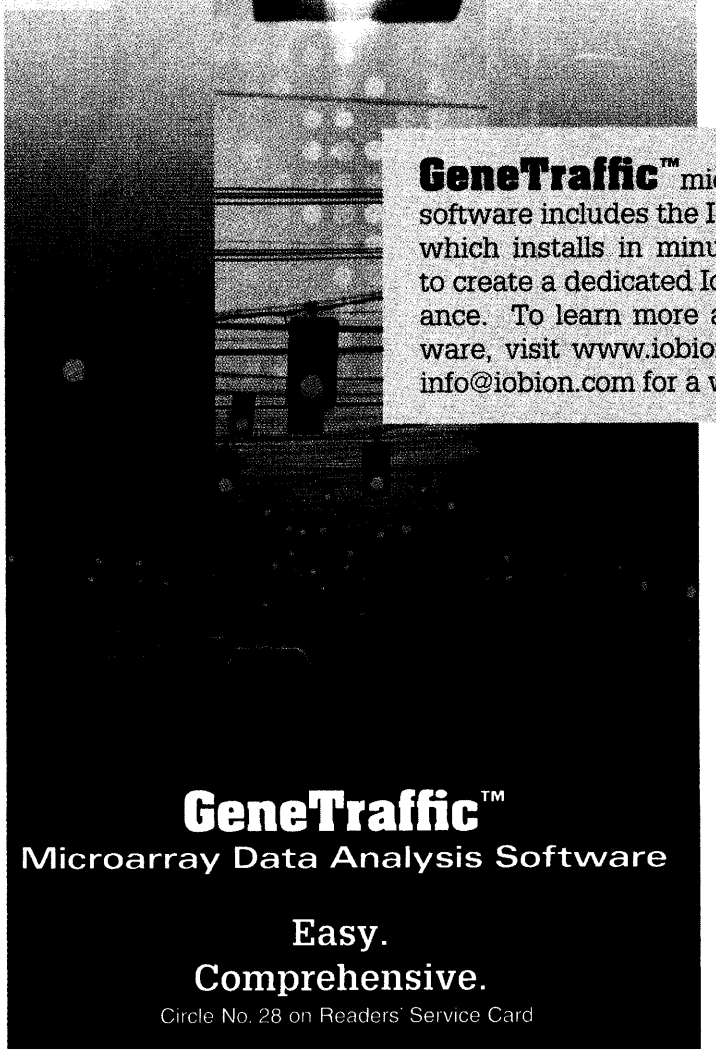


GeneTraffic™

Microarray Data Analysis Software



- Easy-to-use microarray data analysis software
- Intuitive intranet web interface
- Analyzes most two-color spotted microarray data
- Integrated relational database and graphical user interface
- Flexible, built-in filter and normalization methods
- Developed by biologists



GeneTraffic™ microarray data analysis software includes the Iobion system software, which installs in minutes on a Linux server to create a dedicated Iobion informatics appliance. To learn more about GeneTraffic software, visit www.iobion.com or contact us at info@iobion.com for a web demonstration.

GeneTraffic™

Microarray Data Analysis Software

Easy.
Comprehensive.

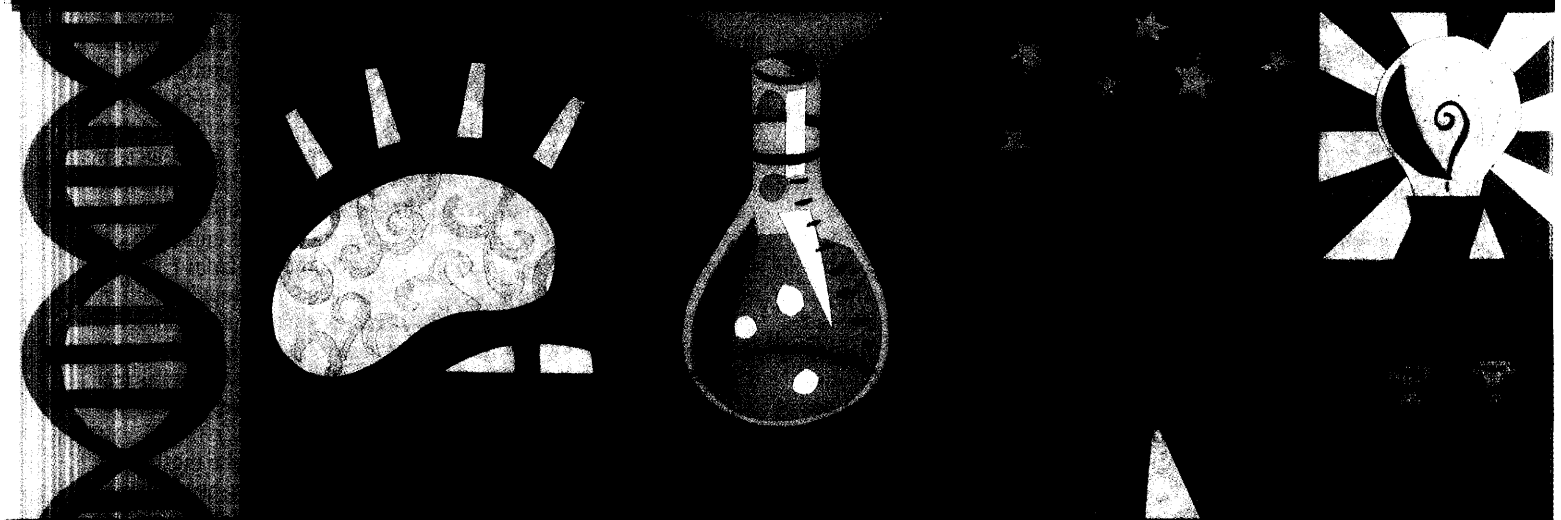
Circle No. 28 on Readers' Service Card

iobioninformatics

Iobion Informatics LLC
info@iobion.com
www.iobion.com

Call for Posters

Submission Deadline:
8 November 2001



AAAS Annual Meeting and Science Innovation Exposition

Science in a Connected World — 14-19 February 2002 · Boston MA

The AAAS Poster Session

- Provides the opportunity to present your research and update meeting attendees on new scientific developments
- Offers an excellent venue for extended informal discussion with meeting attendees
- Abstracts of accepted posters will appear in the 2002 AAAS Annual Meeting Program Book

All abstracts will be peer reviewed.

2002 Poster Categories

- Education
- Life Sciences
  - -- Ecology & Environment
  - -- Molecular & Cellular Biology
  - -- Organismic Biology
- Physical Science
- Social Science
- Technology and Engineering

Special Student Award Competition

This event recognizes the individual research efforts of students actively working towards a college-level degree.

For complete details and poster submission, visit:

www.aaasmeeting.org

Or contact:

AAAS Meetings
Department
1200 New York Ave., NW
Washington, DC 20005

E-mail
aaasmeeting@aaas.org

Phone
202-326-6450

Submission Deadline:
8 November 2001

►►► For more details: www.aaasmeeting.org

AAAS