



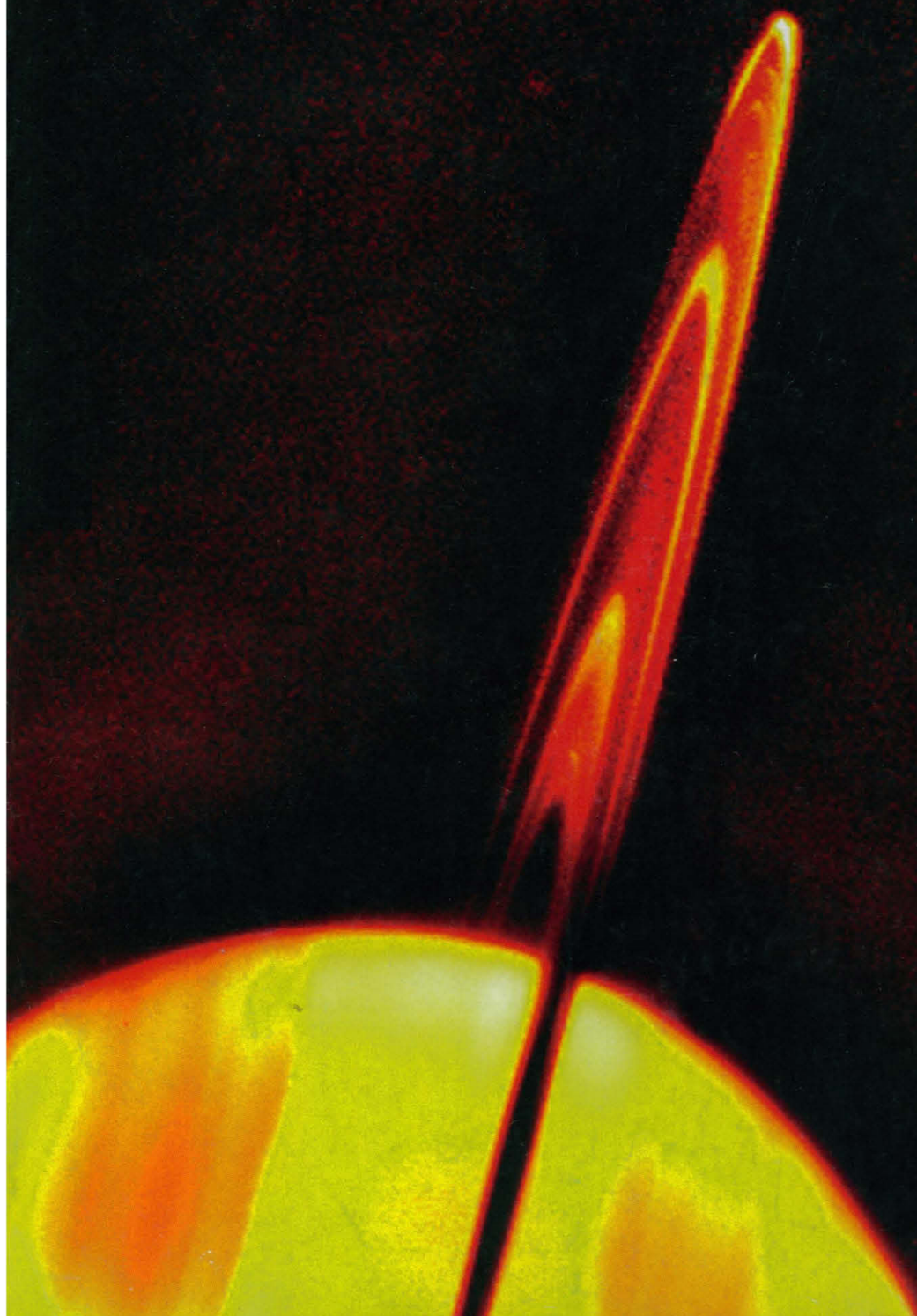
AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

SCIENCE

26 APRIL 1996

\$7.00

VOL. 272 • PAGES 453-616



The Future of Microplate Assays Is Here — 384-well Radioisotopic and Luminescence Counting!

TopCount HTS Revolutionizes Microplate Counting — Again

- Measure radioisotopic and luminescence assays in both 96- and 384-well microplates.
- Process 12 luminescence samples simultaneously for throughputs of 10,000 samples per hour, or more.
- Stack up to 40 plates or 15,000 samples for unattended counting.
- Interface with robotic systems for complete automation.

Meeting the Demands of Microplate Counting for Today and for the Future

Assays have been scaled down from test tubes to 24-well microplates and the 96-well format. Now, the next step in assay miniaturization is here with the TopCount HTS. Continue today's assays in 96-well plates while converting assays to the higher density 384-well plates — the screening format of the future. With the TopCount HTS you can do both without risk or compromise.

Less Reagents, Less Handling, More Samples

The Packard 384-well plate accommodates assay volumes of up to 80 μ L. This allows practical miniaturization of assays such as scintillation proximity, in-plate binding, liquid scintillation, Cerenkov and luminescence.

TopCount Harnesses the Power of Luminescence

Packard has pioneered the field of high throughput microplate luminescence. Now up to 12 wells can be measured simultaneously in 96- or 384-well plates for throughputs never before possible. Ultra-sensitive photon counting is combined with innovative reagents, such as LucLite with a five hour half-life, for measuring the luciferase reporter gene. Greater capacity, greater throughput.

To complement sample throughput, TopCount now has an extended 40 plate stacker. Load up to 40 plates with the TopCount ZipLoad stacker, carry them safely to the TopCount, load and count. It's that easy.



If your experiments demand accuracy, versatility or high

throughput, TopCount has the answer for your laboratory.

Contact Packard at 800-323-1891 (U.S. only) or 203-238-2351 for more details. Or, visit our Web Site at <http://www.packardinst.com>.



PACKARD

A Canberra Company

Packard Instrument Company, 800 Research Parkway, Meriden, CT 06450 U.S.A.

Tel: 203-238-2351 Toll Free: 1-800-323-1891 FAX: 203-639-2172

Web Site: <http://www.packardinst.com> Email: webmaster@packardinst.com



Packard International Offices:

Australia, Mt Waverley 61-3-9543-4266; **Austria**, Vienna 43-1-2702504; **Belgium**, Brussels 32-2-4668210; **Canada**, Ontario 1-800-387-9559; **Central Europe**, Vienna 43-2230-3263; **Denmark**, Greve 45-42909023; **France**, Rungis (33) 1 46.86.27.75; **Germany**, Dreieich 49 6103 385-0; **Italy**, Milano 39-2-33910796/7/8; **Japan**, Tokyo 81-3-3866-5850; **Netherlands**, Groningen 31-50-5413360; Tilburg (013) 5423900; **Russia**, Moscow, 7-095-238-7335; **Switzerland**, Zurich (01) 481 69 44; **United Kingdom**, Pangbourne, Berks (44) 01734 844981.

Circle No. 14 on Readers' Service Card

Cytometry Reagents

Apoptosis Detection Kit
Whole Blood Lyse Kit

Labeled Cytokine Kits

G-CSF
GM-CSF
IL-1 α
IL-1 β
IL-2
IL-4
IL-6
IL-10
LIF
MCP-1
MIP-1 α
SCF
TGF- β 1
TNF- α

Antibodies for Cytometry

BL-CAM (CD22)
CD15
CD44H
CD44v3
CD44v4/5
CD44v6
E-Selectin (CD62E)
ICAM-1 (CD54)
ICAM-3 (CD50)
IL-1 α membrane bound
L-Selectin (CD62L)
LFA-1 α chain (CD11a)
LFA-1/Mac-1/p150,
95 β chain (CD18)
Mac-1 α chain (CD11b)
NCAM (CD56)
p150, 95 α chain (CD11c)
Platelet GPIIb/IIIa (CD41a)
TNF- α membrane bound
VCAM-1 (CD106)

T cell Enrichment Columns

human CD3⁺
mouse CD3⁺
human CD4⁺
mouse CD4⁺
human CD8⁺
mouse CD8⁺
human CD4⁺/CD45RO⁺
mouse CD4⁺/CD45RA⁺

R&D
SYSTEMS
1-800-343-7475

Looking for the right angle on cell analysis?

The special twist of this puzzle is that each entry in the puzzle grid makes one 90-degree turn somewhere along its length. It's up to you to determine where each word or phrase makes this turn and in which direction. The starting direction of each answer (before it makes a turn) is indicated by a letter following the clue number – N for north, S for south, E for east and W for west.

- 1E** Cytokine
2E Apoptosis
3W Multiparameter
4S Stat
5S Receptor
6N Biotin
7N Avidin
8S Lyse
9S FITC
10S Specific
11E Epitope
12N Chain
13S Cell
14N Viable
15N Laser
16N FACS
17W Fluorochrome



Turn to R&D Systems' flow cytometry reagents

Labeled Cytokine Kits include:

- ☐ Labeled cytokine
- ☐ Negative control
- ☐ Blocking antibody
- ☐ Wash buffer

Apoptosis Detection Kit includes:

- ☐ Fluorescein-conjugated annexin V
- ☐ Propidium iodide
- ☐ Cell binding buffer

FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES.

U.S.A. and Canada
R&D Systems, Inc.
614 McKinley Place NE
Minneapolis, MN 55413, USA.
Tel: 612 379-2956
Fax: 612 379-6580

Europe
R&D Systems Europe Ltd.
4-10 The Quadrant, Barton Lane
Abingdon, OX14 3YS, UK.
Tel: +44 (0)1235 531074
Fax: +44 (0)1235 533420


Germany
R&D Systems GmbH
Borsigstrasse 7
65205 Wiesbaden, Germany
Tel: +49 06122 90980
Fax: +49 06122 909819

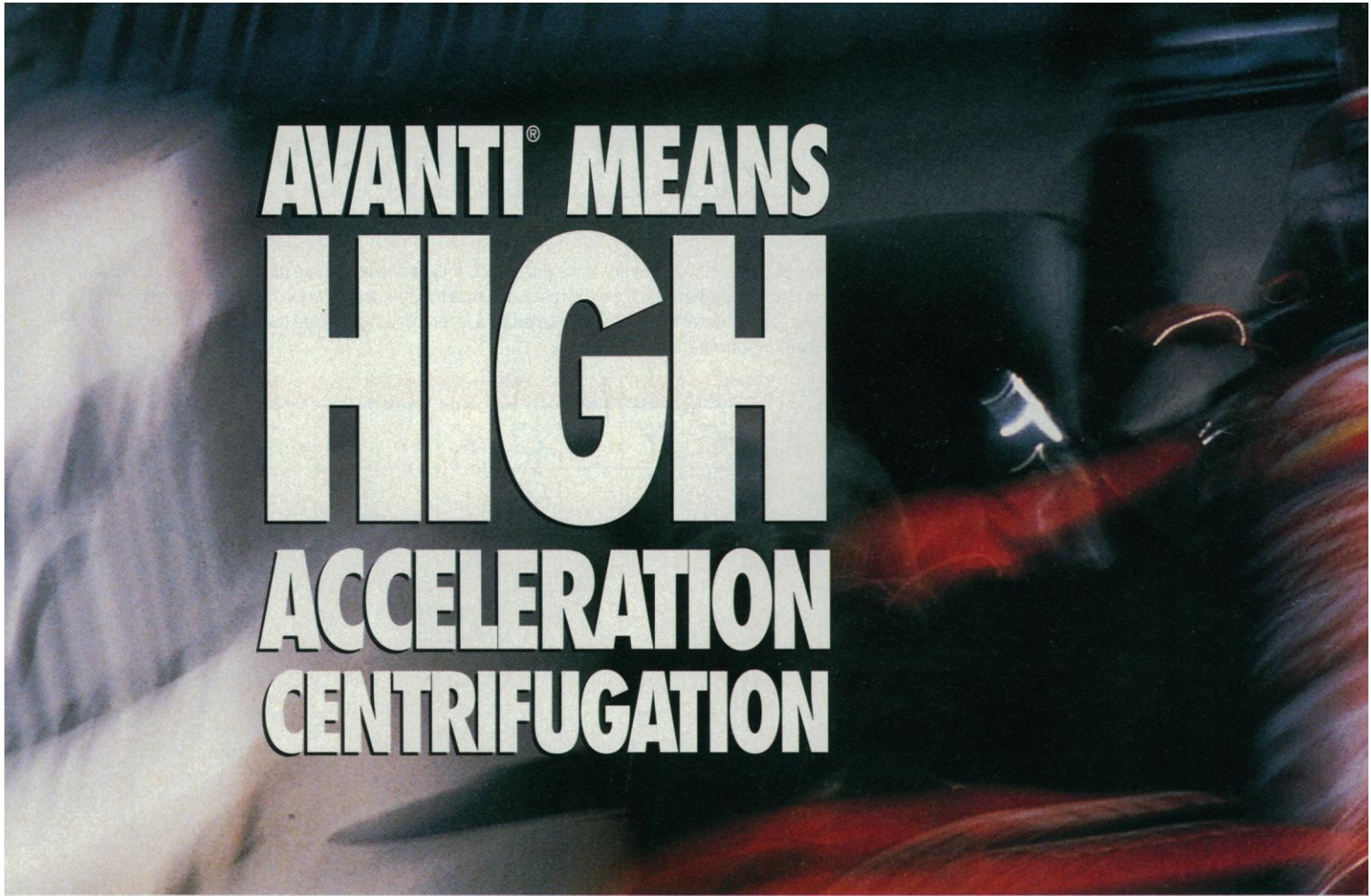
Japan
Funakoshi Co., Ltd.
9-7, Hongo 2-Chome
Bunkyo-ku, Tokyo 113, Japan
Tel: +81 (03) 56841622
Fax: +81 (03) 56841633

International Distributors – Australia: (62) 008-25-1437. **Austria:** (43) 02 292 35 27. **Chile:** (56) 2-671-9369.
Israel: (972) 02 9230048. **Italy:** (39) 02 25 75 377. **Korea:** (850) 82-2-569-0781. **Mexico:** (52) 5-612-0085.
Spain & Portugal: (34) 01 448 84 86 or 03 456 97 06. **Taiwan:** (866) 2-368-3600.

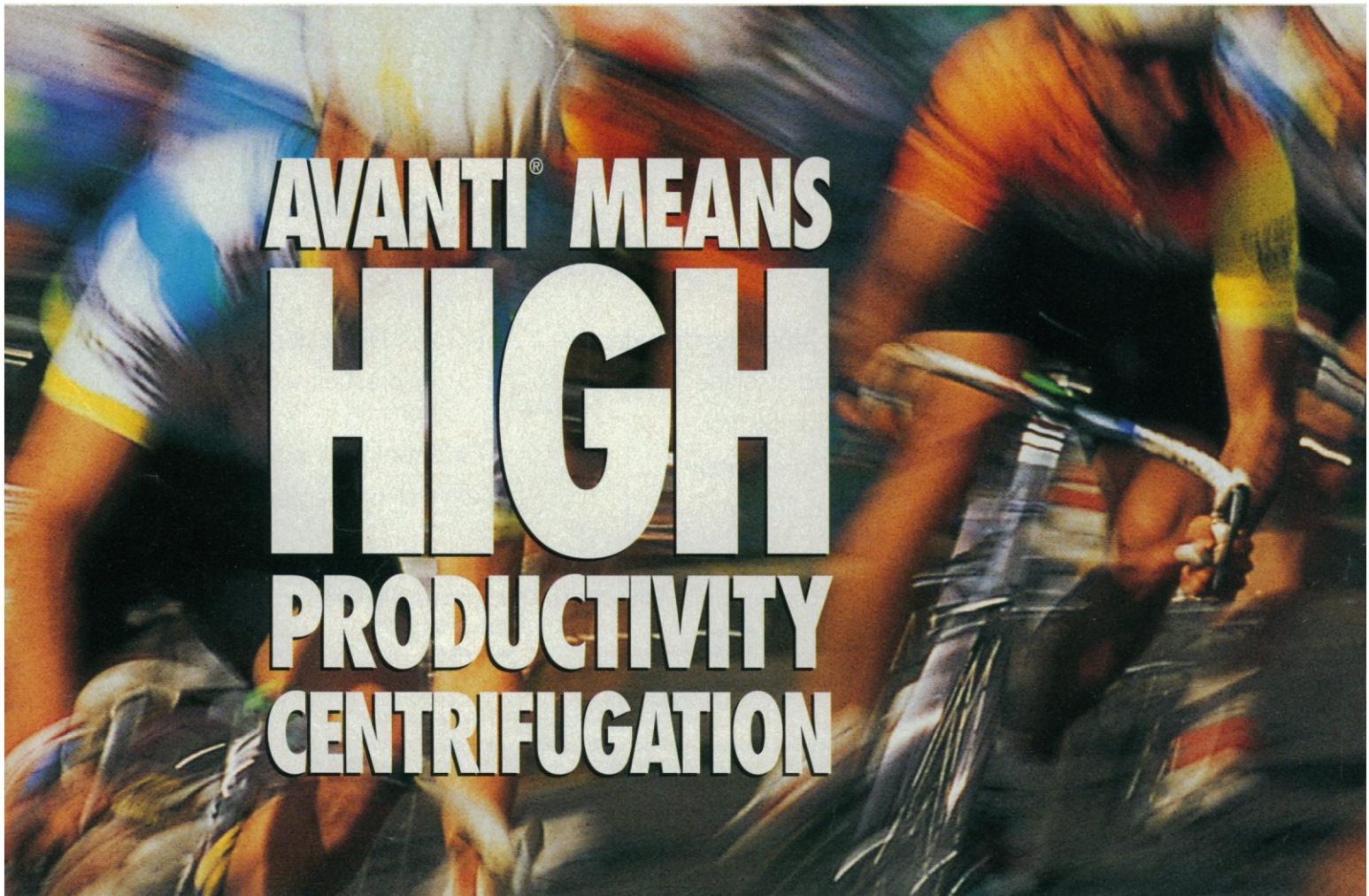
International Freefone Numbers – Belgique/België: 078 11 04 68. **Danmark:** 80 01 85 92. **Deutschland:** 013011 0169.
France: 05 90 72 49. **Nederland:** 060-225607. **Norge:** 800 1103. **Sverige:** 02079 31 49. **Switzerland:** 155 2482.

Circle No. 26 on Readers' Service Card
See Electronic Marketplace: www.aaas.org

 www.rndsistemas.com

A blurred photograph of a person wearing a white lab coat, possibly in a laboratory setting. The image is out of focus, emphasizing motion and speed.

**AVANTI[®] MEANS
HIGH
ACCELERATION
CENTRIFUGATION**

A blurred photograph of a person wearing a yellow and blue shirt, possibly in a laboratory setting. The image is out of focus, emphasizing motion and speed.

**AVANTI[®] MEANS
HIGH
PRODUCTIVITY
CENTRIFUGATION**



BETTER QUALITY, INCREASED OPERATOR SAFETY

Accelerate up to $110,000 \times g$ in half the time of conventional high speed drives. Designed and tested as a system, Avanti J systems meet the world's highest standards for quality and operator safety. Even at maximum g -force, high-speed centrifugation is a breeze, certified by CE marking, UL and CSA approval.

We have two High Performance Centrifuge systems to choose from — the Avanti J-25 Series and our fastest model, Avanti J-30I. Both are engineering breakthroughs, and both offer longer warranties, diagnostic notification of instrument performance, and are designed for easy servicing.

Whichever Avanti J system you choose, you can be assured of a safe, quality drive with unmatched accel/decel rates, in a high-performance system that's driven to productivity.

BECKMAN

Worldwide Offices: Africa, Middle East, Eastern Europe (Switzerland) (41) 22 994 07 07. Australia (61) 2 844 6000. Austria (43) 222 7292164. Canada (800) 387-6799. China (861) 5051241-2. France (33) 1 43 01 70 00. Germany (49) 89-358700. Hong Kong, PRC (852) 814 7431. Italy (39) 2-953921. Japan 3-5352-2825. Mexico (525) 559-1635. Netherlands 0297-230630. Poland (48) 22 408822, 408833. Singapore (65) 339 3633. South Africa (27) 11-805-2014/5. Spain (1) 358-0051. Sweden (8) 445 11 20. Switzerland (41) 22 994 07 07. Taiwan (886) 02 378-3456. U.K. (01494) 441181. U.S.A. 1-800-742-2345.

© 1996 Beckman Instruments, Inc.

Circle No. 41 on Readers' Service Card



EASIER SET-UPS, FASTER SEPARATIONS

Break away from the pack. At up to $110,000 \times g$, Avanti J systems offer a range of separations broader than that of conventional high speeds. Plus, Avanti J systems are as easy to use as they are powerful. Every system is optimized by analog or digital display of set parameters and one-touch functions that accelerate your throughput while cutting run time.

We have two High Performance Centrifuge systems to choose from — the Avanti J-25 Series and our fastest model, Avanti J-30I. Both are engineering breakthroughs, and both offer longer warranties, diagnostic notification of instrument performance, and are designed for easy servicing.

Whichever Avanti J system you choose, you can be assured of a fast, easy way to produce more separations in less time.

BECKMAN

Worldwide Offices: Africa, Middle East, Eastern Europe (Switzerland) (41) 22 994 07 07. Australia (61) 2 844 6000. Austria (43) 222 7292164. Canada (800) 387-6799. China (861) 5051241-2. France (33) 1 43 01 70 00. Germany (49) 89-358700. Hong Kong, PRC (852) 814 7431. Italy (39) 2-953921. Japan 3-5352-2825. Mexico (525) 559-1635. Netherlands 0297-230630. Poland (48) 22 408822, 408833. Singapore (65) 339 3633. South Africa (27) 11-805-2014/5. Spain (1) 358-0051. Sweden (8) 445 11 20. Switzerland (41) 22 994 07 07. Taiwan (886) 02 378-3456. U.K. (01494) 441181. U.S.A. 1-800-742-2345.

© 1996 Beckman Instruments, Inc.

Circle No. 42 on Readers' Service Card



488
A burning
debate



482 & 545

Sense and the cerebellum

NEWS

- Rare Sightings Beguile Physicists 474
- Scientific Misconduct: Panels Look for Common Ground 476
- Grim Budgets Spur Call to Action 477
- Genome Researchers Take the Pledge 477
- NASA Shuffle Seen as Harming Science 478
- Swiss Plan Next-Generation X-ray Source 479
- Chemicals Behind Gulf War Syndrome? 479
- Microbiology Careers: ASM Report Sees a Mixed Future 480
- Yeast Genome Sequence Ferments New Research 481
- The Cerebellum: Movement Coordinator or Much More? 482

- Materials Scientists View Hot Wires and Bends by the Bay 484

- Are Asteroids Flying Piles of Rubble? 485

SPECIAL NEWS REPORT

- Tobacco Money Lights Up a Debate 488
- Philip Morris Gives Institute a Head Start 489
- Institutes Find It Hard to Kick the Tobacco Funding Habit 490
- Lung Association Journals Spurn Tobacco-Funded Papers 492
- CTR's Special Projects Attract Special Scrutiny 494

PERSPECTIVES

- AIDS Pathogenesis: A Finite Immune Response to Blame? 505
F. Miedema and M. R. Klein
- p75^{NTR}: A Receptor After All 506
M. Bothwell
- Saturn's Rings: Life at the Edge 507
C. D. Murray

DEPARTMENTS

- THIS WEEK IN SCIENCE** 461
- EDITORIAL** 465
- Nuclear Power in East Asia
- LETTERS** 467
- Gene Therapy in New Zealand: M. During • Eye Evolution: W. J. Dickinson and J. Seger; W. J. Gehring • NIH Regional Primate Centers: W. R. Dukelow • Going to Sea: K. S. Johnson; R. F. Pittenger • Linac-Based Free Electron Lasers: M. Poole
- SCIENCESCOPE** 473
- RANDOM SAMPLES** 487
- Cold Fusion Gets Drubbing in Italian Court • Clotting Gene Tied to Heart Attacks • Fairchild Garden Rehabilitated • DNA Pioneers Honored
- BOOK REVIEWS** 495
- The Correspondence of John Flamsteed, the First Astronomer Royal*, reviewed by R. W. Smith • *Interplanetary Magnetohydrodynamics*, E. G. Zweibel • *The Tent Caterpillars*, L. F. Gall • Books Received • Vignettes
- AAAS NEWS & NOTES** 566
- PRODUCTS & MATERIALS** 570

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
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

Roger I. M. Glass
Stephen P. Goff
Peter N. Goodfellow
Corey S. Goodman
Peter Gruss
Philip C. Hanawalt
Nobutaka Hirokawa
Tomas Hökfelt
Tasuku Honjo
Susan D. Iversen
Eric F. Johnson
Stephen M. Kosslyn

Michael LaBarbera
Nicole Le Douarin
Charles S. Levings III
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
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
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

The dark side of Saturn's rings, imaged by the Hubble Space Telescope on 21 November 1995. The main rings are illuminated by reflected saturnshine and by sunlight diffusely transmitted through the translucent C ring and Cassini division. The outermost bright feature is the narrow,

multistranded F ring, seen here from Earth for the first time. Just inside the F ring, the Encke gap and the outer edge of the A ring are seen as a pair of faint bands. See page 509 and the related Reports (pages 516 and 518) and Perspective (page 507). [Image: P. D. Nicholson *et al.*]



RESEARCH ARTICLE

Observations of Saturn's Ring-Plane Crossings in August and November 1995

P. D. Nicholson, M. R. Showalter, L. Dones, R. G. French, S. M. Larson, J. J. Lissauer, C. A. McGhee, P. Seitzer, B. Sicardy, G. E. Danielson

REPORTS

Fluorescent Hydroxyl Emissions from Saturn's Ring Atmosphere

D. T. Hall, P. D. Feldman, J. B. Holberg, M. A. McGrath

Observations of Saturn's Inner Satellites During the May 1995 Ring-Plane Crossing

A. S. Bosh and A. S. Rivkin

Trapped Coronal Magnetogravity Modes

Y.-Q. Lou

Probing Electrical Transport in Nanomaterials: Conductivity of Individual Carbon Nanotubes

H. Dai, E. W. Wong, C. M. Lieber

Teleconnections Between the Subtropical Monsoons and High-Latitude Climates During the Last Deglaciation

F. Sirocko, D. Garbe-Schönberg, A. McIntyre, B. Molino

Textural Entrapment of Core-Forming Melts

W. G. Minarik, F. J. Ryerson, E. B. Watson

Role of Type I Myosins in Receptor-Mediated Endocytosis in Yeast

M. I. Geli and H. Riezman

Evaluating Electrostatic Contributions to Binding with the Use of Protein Charge Ladders

J. Gao, M. Mammen, G. M. Whitesides

Adaptive Evolution of Human Immunodeficiency Virus-Type 1 During the Natural Course of Infection

S. M. Wolinsky, B. T. M. Korber, A. U. Neumann, M. Daniels, K. J. Kunstman, A. J. Whetsell, M. R. Furtado, Y. Cao, D. D. Ho, J. T. Safrit, R. A. Koup

Selective Activation of NF- κ B by Nerve Growth Factor Through the Neurotrophin Receptor p75

B. D. Carter, C. Kaltschmidt, B. Kaltschmidt, N. Offenhäuser, R. Böhm-Matthaei, P. A. Baeuerle, Y.-A. Barde

Cerebellum Implicated in Sensory Acquisition and Discrimination Rather Than Motor Control

J.-H. Gao, L. M. Parsons, J. M. Bower, J. Xiong, J. Li, P. T. Fox

Altered Growth and Branching Patterns in Synpolydactyly Caused by Mutations in HOXD13

Y. Muragaki, S. Mundlos, J. Upton, B. R. Olsen

Interactions Between Electrical Activity and Cortical Microcirculation Revealed by Imaging Spectroscopy: Implications for Functional Brain Mapping

D. Malonek and A. Grinvald

Ocular Dominance Plasticity Under Metabotropic Glutamate Receptor Blockade

T. K. Hensch and M. P. Stryker

Transcription-Coupled Repair Deficiency and Mutations in Human Mismatch Repair Genes

I. Mellon, D. K. Rajpal, M. Koi, C. R. Boland, G. N. Champe

Linkage of Replication to Start by the Cdk Inhibitor Sic1

B. L. Schneider, Q.-H. Yang, A. B. Futcher



548

Human
HOXD13
mutant



AAAS Board of Directors

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

Sheila Jasanoff
William A. Lester Jr.
Simon A. Levin

Marcia C. Linn
Michael J. Novacek
Anna C. Roosevelt
Jean E. Taylor
Nancy S. Wexler

William T. Golden
Treasurer
Richard S. Nicholson
Executive Officer

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

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 18111, Danbury, CT 06813-1811. Single copy sales: \$7.00 per issue prepaid includes surface postage; bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$4.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for *Science* is 0036-8075/96 \$4.00. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

Why are these cells smiling?



It's ultrapure QIAGEN DNA!

 **QIAGEN Plasmid Kits** —
unsurpassed quality for more than a decade

Ultrapure QIAGEN DNA is ideal for all applications from cloning to transfection. QIAGEN® Plasmid Kits are based on ready-to-use gravity-flow QIAGEN-tips sized for purification of 20 µg to 10 mg plasmid DNA.

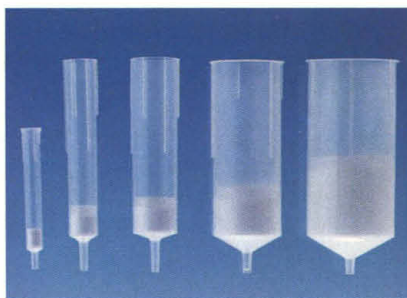
 **QIAfilter Plasmid Kits** —
the faster alternative

QIAfilter™ Plasmid Midi Kits and Maxi Kits combine QIAfilter Cartridges with QIAGEN-tips for the fastest, most convenient way to isolate ultrapure plasmid DNA. QIAfilter Cartridges rapidly clear bacterial lysates by filtration, saving up to one hour of purification time.

 **EndoFree Plasmid Kit** —
endotoxin-free for ultimate plasmid DNA purity

Endotoxin-free plasmid DNA improves transfection into sensitive or immunologically active cells, and is essential for gene therapy research.

The new EndoFree™ Plasmid Maxi Kit integrates endotoxin removal into the QIAGEN plasmid purification procedure. No additional extractions or affinity columns are required.



Choose from 3 QIAGEN systems to suit your needs.

See Electronic Marketplace www.aaas.org

QIAGEN Inc.
9600 De Soto Avenue
Chatsworth, CA 91311, USA
Orders 800-426-8157
Fax 800-718-2056
Technical 800-362-7737



Circle No. 39 on Readers' Service Card

Proper connections

Carbon nanotubes, like graphite, are electrically conducting, but accurately measuring their conductivity can be difficult—very small probes are necessary, and the resistance of the contacts to the tube itself can dominate the measurement. Dai *et al.* (p. 523) used lithographic methods to expose parts of nanotubes while holding the rest of the nanotube under a conducting layer of gold. A conducting probe tip was then used to contact the exposed nanotubes and also map out their structure. Conductivity measurements were made at several points, and thus contact resistance could be factored out. Kinks in the nanotubes greatly increase their resistivity.

Moving molten iron

Formation of iron cores in Earth and other planets would have involved early segregation of iron-rich melts from silicate-rich mantles. Minarik *et al.* (p. 530) provide experimental evidence suggesting that large degrees of melting of the planets would have been required for the iron melts to segregate. These authors found large wetting angles for iron-rich melts in olivine up to pressures of 11 gigapascals, which suggests that small volumes of melt could not form an interconnected network through solid olivine.

Homeobox connection

Homeobox-containing (*Hox*) genes regulate pattern formation during development. No human mutations, however, have been linked to a *Hox* gene to date. Muragaki *et al.* (p. 548) found that synpolydactyly, an inherited abnormality of the

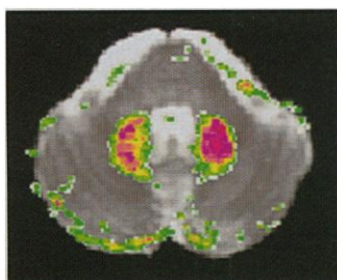
An edge-on view of Saturn's rings

About every 15 years, Earth, the sun, and Saturn are positioned such that Saturn's rings appear edge-on. The Hubble Space Telescope has been used to take advantage of this rare set of reference frames in 1995 (see cover and the Perspective by Murray, p. 507). Bosh and Rivkin (p. 518) identified the F ring inner satellite, Prometheus, lagging behind its predicted position by about 20 degrees and the A ring outer satellite, Atlas, ahead of its predicted orbit by about 25 degrees, during the first Earth ring-plane crossing in May. During the second Earth ring-plane crossing in August and the solar crossing in November, Nicholson *et al.* (p. 509) confirmed Prometheus' lag, which suggests that this satellite may not have collided with the F ring as predicted but may have encountered a co-orbital satellite instead. They also studied the structure of the fainter F, E, and G rings. Hall *et al.* (p. 516) used the faint object spectrograph on Hubble just before the August crossing to more clearly define a tenuous OH gas cloud enveloping the rings that may be derived from meteoritic impacts.

hands and feet, is caused by a mutation in *HOXD13*. The phenotype is the result of an insertion of a polyalanine stretch in the protein in a region outside of the homeodomain.

Sense in the cerebellum

Because the cerebellum is activated by body movements and damage to it causes a loss of motor control, it has been re-



garded as a motor organ. Gao *et al.* (p. 545; see the news story by Barinaga, p. 482) obtained magnetic resonance images of the lateral cerebellum (the dentate nucleus, which sends out signals) of human subjects as they performed motor tasks which did or did not require sensory input, as well as sensory

comparison tasks. Only the tasks that required sensory input activated the cerebellum. The cerebellum may not be specialized for motor control, as commonly thought, but only for certain motor tasks that are used to make sensory discriminations.

Visual cortex development

Covering one eye in a mammal's early life can permanently impair the response of the visual cortex in the brain to that eye—the brain will learn to respond only to the open eye (ocular dominance plasticity). How this phenomenon occurs has been debated, and a role for one of the neurotransmitter receptors—the metabotropic glutamate receptor—has been postulated. Hensch and Stryker (p. 554) show that in vivo activation of the receptor is not required for the ocular dominance plasticity. However, they also demonstrate that in vitro long-term depression, which had been thought to occur through a similar mechanism, does require receptor activation.

Damage control

DNA damage induced by ultraviolet light or exposure to carcinogens can be repaired by nucleotide excision. Transcription-coupled repair (TCR) couples nucleotide excision repair to transcription; in *Escherichia coli*, mutations in genes for mismatch repair also lead to defects in TCR. Mellon *et al.* (p. 557) have identified mutations in human homologs of genes required for mismatch repair in *E. coli* in cell lines from patients with hereditary non-polyposis colorectal cancer, a cancer predisposition syndrome. These cell lines are also defective for TCR, suggesting that in addition to mismatch defects, environmentally induced defects also avoid repair in these cells and may lead to increases in sporadic tumors.

Fashioning an image

Two brain imaging techniques, positron emission tomography and functional magnetic resonance imaging, rely on changes in blood flow and oxygenation that result from neuronal activity. The temporal and spatial connection between neuronal activity and these changes has been an unresolved issue. Maloney and Grinvald (p. 551) optically imaged the cat visual cortex during presentation of oriented gratings that are known to yield well-defined cortical responses. They suggest that aerobic metabolism in localized neurons first creates a highly localized increase in deoxyhemoglobin. This effect triggers an increase in the blood flow that maintains oxyhemoglobin in the immediate vicinity and is then followed by a large regional increase in blood flow that only slowly returns to prestimulus levels.

Is there anything really new in New Orleans? See for yourself.

What are you really hoping to see at the next scientific meeting? Old friends and colleagues? Or a vision of the future in life science research? Take a look at the Biosensor stand at ASBMB in New Orleans, Analytica in Munich, FAOBMB in Tokushima and at a number of other major exhibitions.

You'll see how BIA technology is turning visions into reality. And opening up a world of possibilities in biochemistry, molecular biology, drug screening, food analysis and environmental research.

Biosensor's range of analytical instruments monitors biomolecular interactions, in real time and without the use of labels, between molecules of almost any type. From proteins, peptides and nucleic acids to

carbohydrates, lipids and signalling substances.

No need to purify molecules, either. You can study crude extracts as well as lipid vesicles, viruses, bacteria and eucaryotic cells.

By allowing you to study interactions as they occur, BIA is cutting days, even months, from your research time. Just as importantly, it's saving costs, too.

BIA is already a world-proven technology that is being used in new applications every day. It's letting scientists see more of what's going on.

So look us up. We'll open your eyes.

Pharmacia Biosensor AB
<http://www.pharmacia.se/biosensor>



You have the vision. Use it.

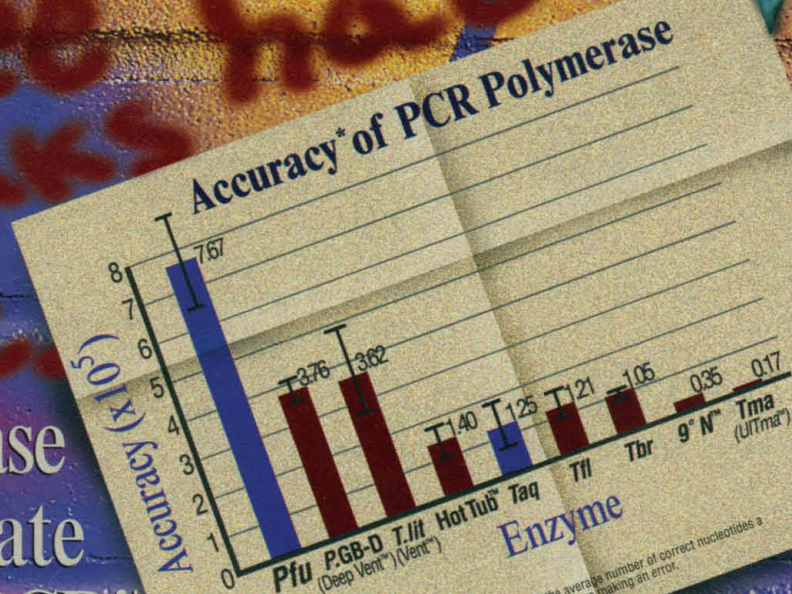
For High-Fidelity PCR *Pfu* Beats *Taq* Every Time!

If you're using
Tth or *Taq*
for PCR
your DNA
problems have
summers
win it.

UNITED STATES:
Stratagene Headquarters
800-424-5444
INTERNET MAIL:
rich@pcgs@stratagene.com
AUSTRALIA: 1800-252-204
AUSTRIA: 1 5332666
BRAZIL: 11 530 7833
CANADA: 905 713 1201
DENMARK: 8 6101055
FRANCE: 1 34 69 2424
GERMANY: 0130-840911
HONG KONG: 5785839
ISRAEL: 3 7521687
ITALY: 258013409
JAPAN: (Tokyo) 3 3660 4919
or 6 348 3785
(Fukuoka) 3 5684 1622
KOREA: 2 5560311
MALAYSIA: 37031888
THE NETHERLANDS: 33 4950294
NEW ZEALAND: 9 443 5867
NORWAY: 22715090
PORTUGAL: 1 4561641
ROC: 2 694 0066 or 2 720 2215
SINGAPORE: 2730898
SPAIN: 1 729 03 33
SWEDEN: 8 680 0845
SWITZERLAND: 3641106
THAILAND: 23080611
UNITED KINGDOM: 0800 585370

Pfu polymerase
for accurate
PCR!

Call Stratagene or your
Stratagene distributor for
the complete picture.



NATIVE *Pfu* DNA POLYMERASE
Catalog #600135 (100U), #600136 (500U)
RECOMBINANT *Pfu* DNA POLYMERASE
Catalog #600153 (100U), #600154 (500U), #600159 (1000U)



STRATAGENE®

* Patent 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., Hoffmann-La Roche Ltd. and The Perkin-Elmer Corporation.

Circle No. 45 on Readers' Service Card

Filtration Problems?



The Solution Is Clear — Millipore® Filters From Techware



When it comes to filtration problems, there's no clearer solution than Millipore® Filtration Products from Sigma-Aldrich Techware.

One phone call is all it takes to gain immediate access to Millipore's comprehensive family of ready-to-use, disposable filter devices...as well as over 10,000 other brand-name laboratory equipment and supply products.

In addition to this wide selection of top quality products, Sigma-Aldrich Techware backs each purchase with

unequaled service and support, including:

- Same day shipping
- Comprehensive technical support
- Competitive pricing

So for solutions that are perfectly clear, rely on Millipore filtration products from Sigma-Aldrich Techware — your single, most convenient source for brand name laboratory supplies and equipment.

Circle the number below for your free Filtration Product Guide.



Call collect: 314-771-5750, 800-325-3010, or contact your local Sigma office.

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

Millipore is a registered trademark of Millipore Corporation.

A Sigma-Aldrich Company

Circle No. 3 on Readers' Service Card

Commit to make a difference.

Our new catalog features vital information on coastal marine habitats and offers support to organizations dedicated to conserving the health and wealth of marine life in endangered coastal zones.

96-97 catalog

NEW ENGLAND BIOLOGICALS

Take advantage of the finest resource for Molecular and Cell Biology research featuring an exciting series of new products and an improved appendix section. New products include: more

unique enzymes for DNA and Protein Modification, extremely stable RNA Markers, "premixed" Protein

Molecular Weight Markers and new kits featuring Phototope™-Star Detection for Southern &

Westerns, Phospho-Specific Antibodies for Signal Transduction Research, and the new Ph.D.

Phage Display Peptide Library kit for identification of peptide ligands.

Discover the world's largest collection of recombi-

nant as well as native enzymes for DNA technology, all backed by unsurpassed scientific expertise.

To receive a catalog call 1-800-NEB-LABS or

via the internet: <info@neb.com>

NEB home page: <http://www.neb.com>

NEW ENGLAND BIOLOGICALS...

LEADING THE WAY FOR OVER 20 YEARS IN

THE MOLECULAR BIOLOGY INDUSTRY.



- New England Biolabs Inc. 32 Tozer Road, Beverly, MA 01915 USA 1-800-NEB-LABS Tel. (508) 927-5054 Fax (508) 921-1350 email: info@neb.com
- New England Biolabs Ltd., Canada Tel. (800) 387-1095 (905) 672-3370 Fax (905) 672-3414 email: info@caneb.com
- New England Biolabs GmbH, Federal Republic of Germany Tel. (0130) 83 30 31 (06196) 83639 email: info@caneb.com
- New England Biolabs (UK) Ltd. Tel. (0800) 31 84 86 (01462) 420616 Fax (01462) 421057 email: info@ukneb.com

DISTRIBUTORS: Australia (07) 5594-0299; Belgium (0800) 1 9815; Brazil (011) 66-3565; Denmark (31) 56 20 00; Finland (90) 584-121; France (1) 34 60 24 24; Greece (01) 5226547; Hong Kong 2649-9988; India (542) 311473; Israel (03) 5351205; Italy (02) 381951; Japan (03) 5820-9408; Korea (02) 556-0311; Mexico (5) 519-3463; Netherlands (033) 495 00 94; New Zealand (09) 418-3039; Norway 22 22 04 11; Singapore 4457927; Sweden (08) 30 60 10; Switzerland (061) 481 47 13; Taiwan (02) 8802913; Circle No. 44 on Readers' Service Card

Turn up the Heat... Turn off the UNG (Completely!)

HKTM-UNG

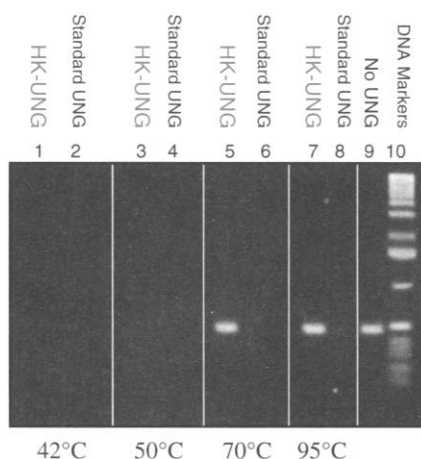
Thermolabile Uracil N-Glycosylase

Exclusively from Epicentre

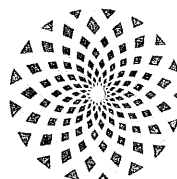
Epicentre's new HK-UNG is the only available Uracil N-Glycosylase that can be completely and irreversibly heat-inactivated.

HK-UNG is:

- ❖ Fully active to 50°C in digesting dU-containing DNA.
- ❖ Heat-Killed - by a 10 minute incubation at 65°C or higher.
- ❖ Irreversibly heat-inactivated - no activity was detected in reactions containing heat-inactivated HK-UNG that was incubated for 2 days at room temperature to promote renaturation.



Brief heat treatment of HK-UNG eliminates its ability to digest dU-containing DNA. One unit of HK-UNG or standard UNG from another supplier was incubated for 10 minutes at the indicated temperature. Following heat treatment, approximately 300 ng of a dU-containing, 450 bp DNA were added and the samples were incubated at 37°C for 30 minutes before analysis by gel electrophoresis. The presence of the 450 bp band in lanes 5 & 7 demonstrates that HK-UNG was inactivated at 70°C and above, unlike the standard UNG (lanes 6 & 8).



EPICENTRE® TECHNOLOGIES

1202 Ann Street Madison, WI 53713

800-284-8474

...when you need to be sure of the quality

Outside of the U.S. contact the distributor in your country, or call 608-258-3080 or fax 608-258-3088.

E-mail: techhelp@epicentre.com ♦ World Wide Web: <http://www.epicentre.com>

Argentina/Uruguay:

1-822-6164

Australia: 02-540-2055

Austria: 0222-74040-190

Benelux: 045-532-7755

Brazil: 021-592-6642

Canada: 800-268-5058

Finland: 17-6822-758

France: 1-34-84-62-52

Germany: 5152-2075

Greece: 1-6005977

Hong Kong/China:

852-2-896-6283

Israel: 02-335599

Italy: 02-891391

Japan: 03-3545-5720

06-441-5103

Korea: 82-2-924-8697

Mexico: 8-371-60-50

Norway, Denmark, Finland,

Iceland, Sweden: 22-200137

New Zealand: 9-443-1284

Portugal: 01-453-70-85

Singapore: 266-1884

South Africa: 011-792-3428

Spain: 93-450-2601 OR

93-490-7440

Sweden: 8-36-90-40

Switzerland: 56-624-0100

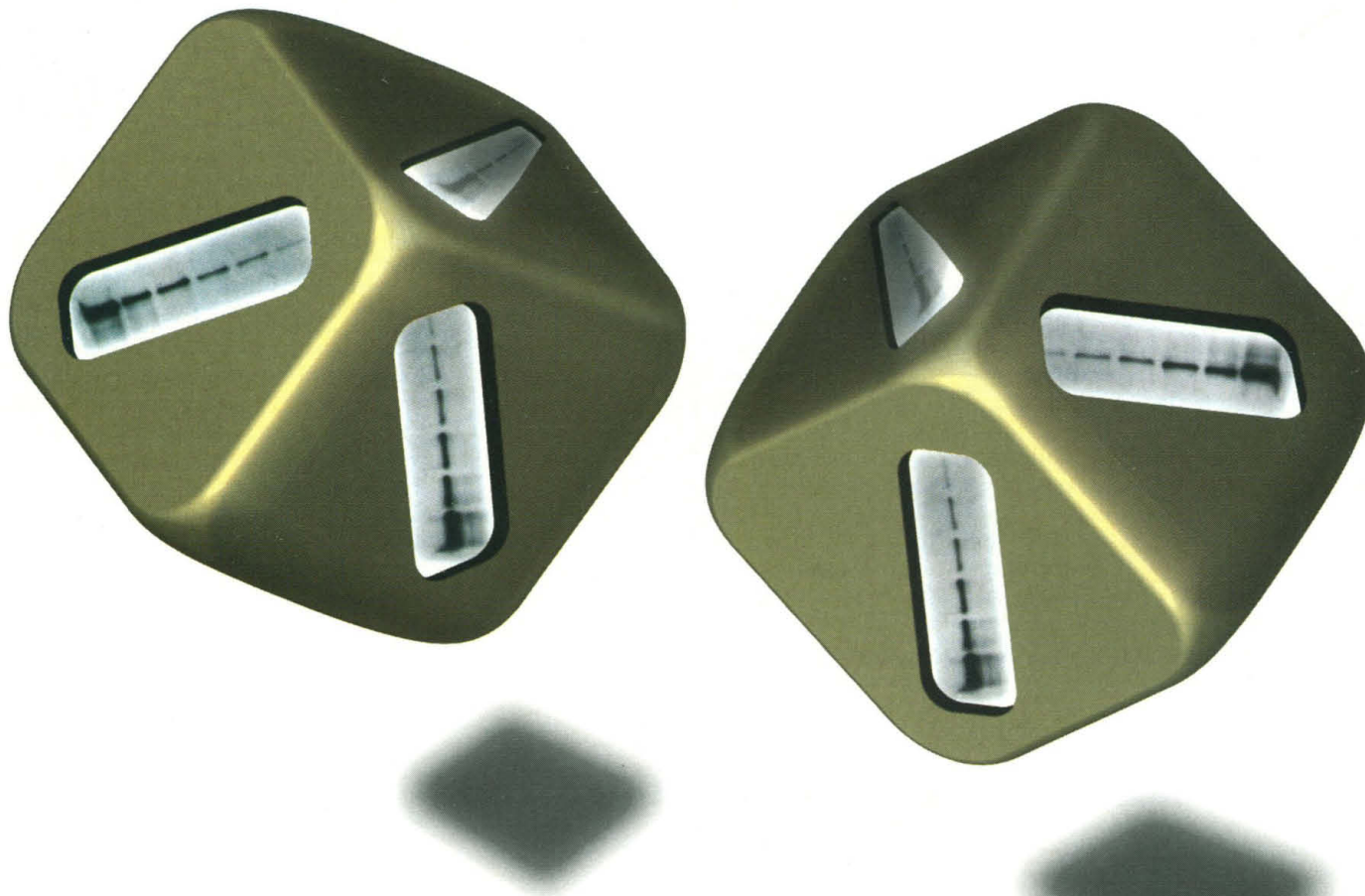
Taiwan: 2-381-0844

Turkey: 312-435-0775

United Kingdom:

1-223-366500

Circle No. 24 on Readers' Service Card



Why Gamble?

The right result, every time, with ECL Western blotting

Life is often a game of chance, but this need not apply to Western blotting, particularly if you use the ECL system from Amersham International plc.

ECL Western blotting offers performance when it matters, every time. As the above results show, sensitivity levels are at least 2.5pg with only a 30 second exposure (in fact, levels as low as 1pg can be detected). Furthermore, light output is maintained for 6 hours after initial incubation. Far greater sensitivity and versatility than equivalent ^{125}I and colorimetric methods.

Easy optimization and clear results at all protein concentrations has kept Amersham™ as the market leader for this application. ECL is the 'Gold Standard' for all purposes giving top quality results every time, and is supported by an unrivalled reference list including over 600 citations in scientific publications. Coupled to this are Amersham's films, membranes and molecular weight markers, and its technical and customer service.

Why take a risk? With ECL Western blotting, the dice are firmly loaded in your favour.

The faces of the dice show a typical result obtained using ECL Western blotting reagents. In this example, human transferrin dilutions were separated and transferred to Hybond™ PVDF. Following immunodetection, the blot was detected using ECL reagents and exposed to Hyperfilm™ ECL™ for 30 seconds. Protein loadings (in pg) are 500, 100, 50, 10, 5 and 2.5.

ECL

Amersham International plc
Amersham Place, Little Chalfont,
Buckinghamshire, HP7 9NA England.
Tel: +44 (0)1494 544000
Fax: +44 (0)1494 542929

USA Arlington Heights
Il: (800) 323 9750
Japan
Tokyo: (03) 38 16 1091

Location: <http://www.amersham.co.uk/life/>

See our worldwide web site
for news, information and
local office contact details.



Protein Studies

ECL Western
blotting performance

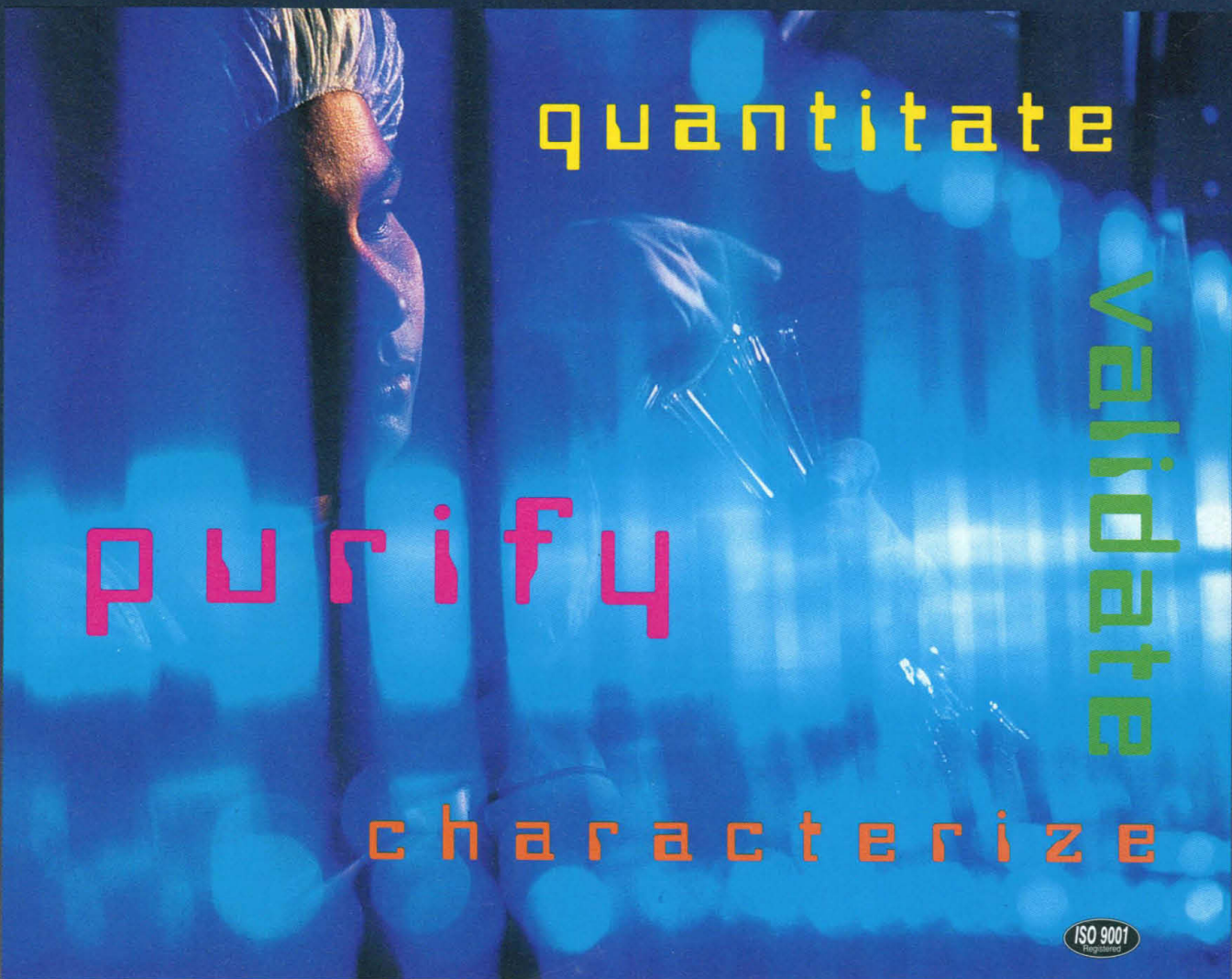
All goods and services are sold subject to the terms and conditions of sale of the company within the Amersham Group which supplies them. A copy of these terms and conditions is available on request. ECL, ECL device, Hybond, Hyperfilm and Amersham are trademarks of Amersham International plc. © Amersham International plc 1996. All rights reserved.

MECL

Circle No. 34 on Readers' Service Card

Amersham LIFE SCIENCE

SHIMADZU



ONE COMPANY...COMPREHENSIVE SOLUTIONS FOR PEPTIDE AND PROTEIN RESEARCH.

Turn to a world leader in instrumentation technology, support and service for your lab requirements in protein and peptide research!

- **Purify** peptides or separate protein digest with the Shimadzu LC-10Ai bio-inert LC system.
- **Characterize** samples by measuring molecular weight, library searching the Shimadzu Kompact MALDI sequence spectrum.
- **Quantitate** samples using absorbance rate measurements on the Shimadzu BioSpec®-1601.

- **Validate** all of your research and assure GLP with built-in tracking software found in every Shimadzu instrument.

When research is important, turn to a dependable, versatile, competent partner in your lab. Shimadzu. Comprehensive solutions.

 **SHIMADZU**
Solutions for Science
since 1875

7102 Riverwood Dr., Columbia, MD 21046 1-800-477-1227
<http://www.shimadzu.com>

SHIMADZU CORPORATION, International Marketing Div., Tokyo, Japan Phone: 81(3)3219-5641 Fax: 81(3)3219-5710 <http://www.shimadzu.co.jp>

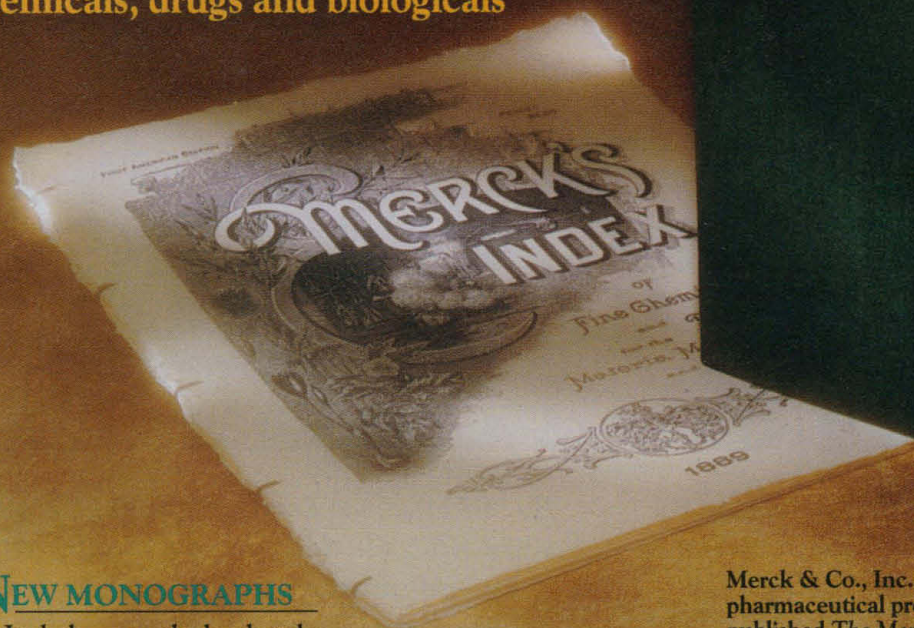
ENTERING ITS
SECOND CENTURY...

Still

THE ESSENTIAL REFERENCE

A one-volume encyclopedia of
chemicals, drugs and biologicals

Just Published...
Only \$45.00



NEW MONOGRAPHS

- Includes recently developed pharmaceuticals, agricultural chemicals, biological substances and natural products of current interest
- Over 50% of existing monographs revised

NEW COMPUTER- GENERATED GRAPHICS

- Completely redrawn and standardized structural depictions

NEW TABLES

- Glossary of selected biological and chemical terms; amino acid abbreviations; minerals and their properties; chemical terms in foreign languages

NOW INCLUDING ORGANIC NAME REACTIONS

- Covers over 400 of the most important name reactions in organic synthesis

Available from Chapman & Hall on CD-ROM
this summer. Call 1-800-634-9196.

Circle No. 30 on Readers' Service Card

Merck & Co., Inc., a worldwide, research-intensive pharmaceutical products and services company, has published *The Merck Index* as a non-profit service to the scientific and medical communities for over 100 years.



MERCK

Committed to Bringing Out the Best in Medicine

Order now. Call toll-free 1-800-659-6598, Ext. 753

VISA or MasterCard only or mail this coupon to:

Merck & Co., Inc., Merck Publishing Group, P.O. Box 2000, RY7-220,
Rahway, NJ 07065-0900

☐ Please send me ___ copy(ies) of *The Merck Index*, Twelfth Edition, \$45.00.

Enclosed is my payment. I will not be charged for shipping (U.S. only).

☐ Check enclosed. Make payable to Merck & Co., Inc.

Total \$ _____ ☐ VISA ☐ MasterCard

Card No. _____ Exp. Date _____

Signature _____

Name _____

Address _____ City _____

State _____ Zip _____ ☐ Residence ☐ Business

Please allow four to six weeks for delivery.

(Check one)

MS
MOLECULAR WEIGHT

MS/MS
COMPLEX
MIXTURE ANALYSIS
STRUCTURAL
ELUCIDATION
COMBINATORIAL
SCREENING
FAST
CHROMATOGRAPHY
PICOGRAM
QUANTITATION
PROTEIN
SEQUENCING
MOLECULAR WEIGHT

NO COMPARISON

When you consider the additional capabilities that MS/MS offers over single stage mass spectrometry, there's really no comparison.

And now they're available for the same price.

LC/MS provides molecular weight. That's all. LC/MS/MS, on the other hand, gives you complex mixture analysis, structural elucidation, combinatorial screening, fast chromatography, picogram quantitation, protein sequencing and molecular weight.

Not only that, but Finnigan's latest MS/MS systems are also as easy to use as MS-only instruments, thanks to a simple, automated Windows* data system.

Whether you choose our benchtop LCQ™ or our research-grade TSQ® for LC/MS/MS, you're putting unprecedented analytical power into your laboratory.

And we've managed to balance this breakthrough technology and Finnigan quality with very affordable prices.



A subsidiary of ThermoQuest Corporation

<http://www.finnigan.com>



Australia Tel. (02)646-2211 • France Tel. (1)69 41 98 00 • Germany Tel. (0421) 54 930 • Italy Tel. (02) 66011742 • Japan Tel. (03) 3372 3001 • Netherlands Tel. (08318)527266 • People's Republic of China Tel. (01)8362441 • Sweden Tel. (08)6800101 • United Kingdom Tel. (01442)233555 • U.S.A. Tel. (408)433-4800

Copyright 1996 by Finnigan Corporation, a subsidiary of ThermoQuest Corporation. All rights reserved. *Windows is a registered trademark of Microsoft Corporation.

Circle No. 18 on Readers' Service Card

Discovery.

It is driven. Inspired. And enlightened by an instrument as devoted to finding solutions as you are.

The Olympus **PROVIS** Research Microscope or **iX** Inverted Research Microscope. With easier access to vital

Provis
Research
Microscope

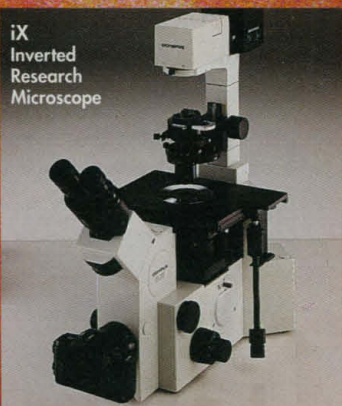


controls and a Y-shaped stand that offers up to 5 output ports, they **challenge the limits** of advanced microscopy. And take optical precision to its highest level.

In the PROVIS you'll find today's most advanced optical system

— including **U.I.S. Infinity-corrected Optics**, brilliant illumination and the power of fluorescence — all enhanced by computer-controlled automation for virtually limitless imaging and photomicrography options. And the iX simplifies the way you pursue your most dynamic applications, using a **powerfully efficient** single-reflection beam path and offering faster, direct access to pure primary images.

Just go where your research takes you, and so will we.



iX
Inverted
Research
Microscope

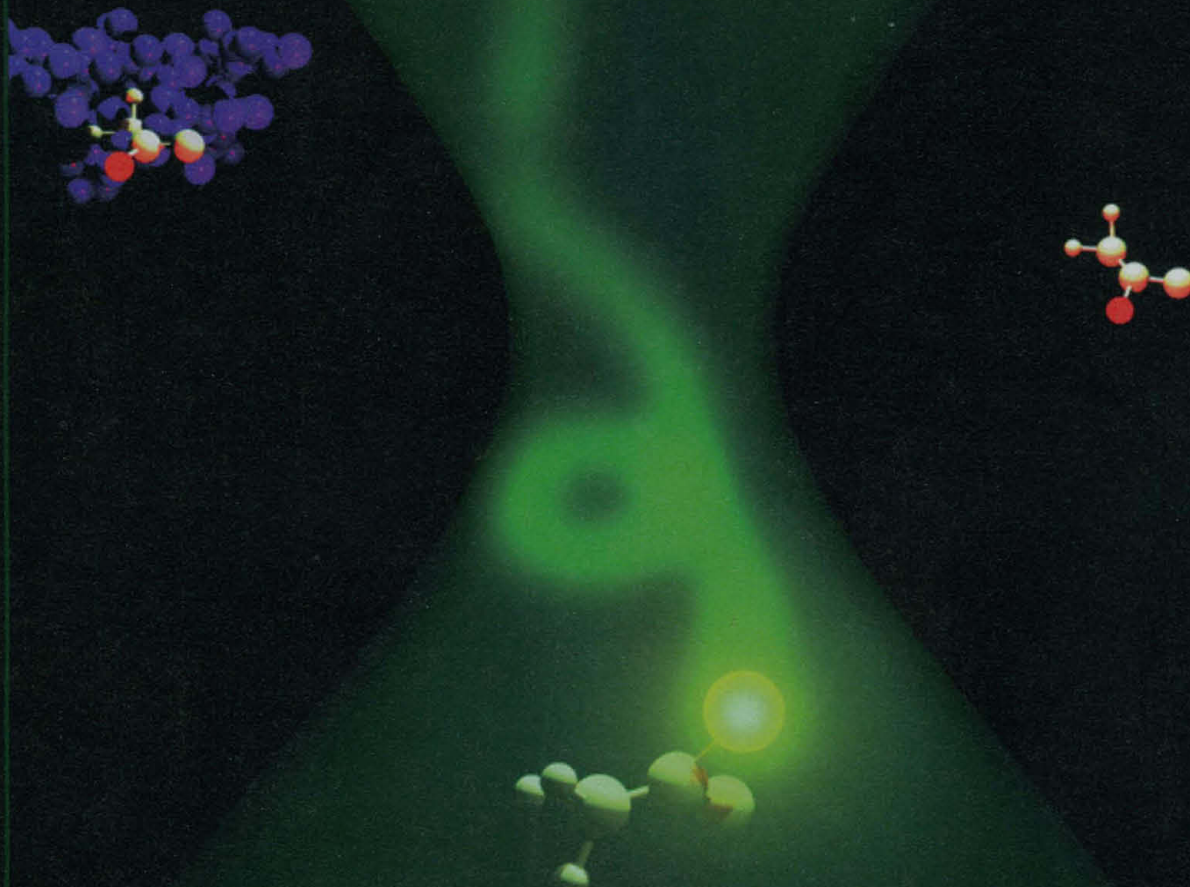
To arrange a **demonstration** of the Olympus **PROVIS** or **iX** Inverted Research Microscope, or for more information, please call 1-800-455-8236.

**Olympus and Research.
Seeing Eye to Eye.**

OLYMPUS®

Olympus America Inc., Two Corporate Center Drive, Melville, NY 11747-3157, Fax: 516-844-5112

Circle No. 43 on Readers' Service Card



It sounds like a miracle!

Unlike conventional fluorescence techniques, Fluorescence Correlation Spectroscopy (FCS) provides a signal which increases as the concentration to be measured decreases.

FCS opens up new avenues in the detection of molecular interactions.

It takes only a few seconds to digitally count the fluorescence-dyed molecules and to determine the percentages of bound and free molecules. The measurement requires no radioactive labelling and is performed in a homogeneous assay (without washing, filtration or other separation processes).

ConfoCor® – the unit for the new FCS technique.

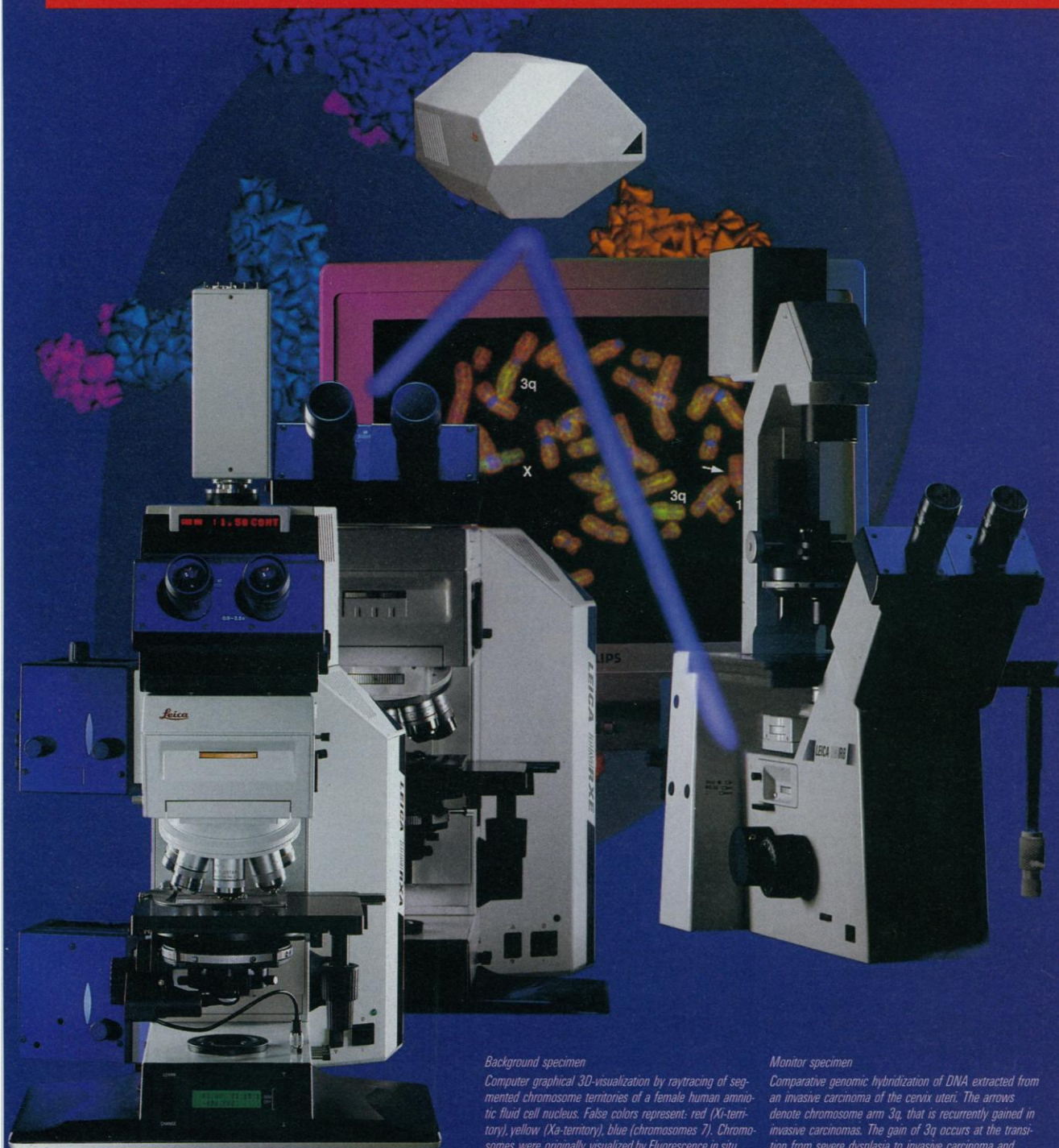
ConfoCor – the indispensable analytical tool in

- pharmacology
- molecular biology
- cell biology
- immunology
- biotechnology/ genetic engineering
- physical chemistry
- medical diagnosis
- environmental analysis.



Carl Zeiss Jena GmbH
 Zeiss Gruppe/Mikroskopie
 D-07740 Jena
 Telefon: (0 36 41) 64-28 89
 Telefax: (0 36 41) 64-31 92
 Internet: mikro@zeiss.de

Top Solutions for Excellent Research



The LEICA TCS 4D UV confocal laser scanning system is designed as an ultra compact spot scanner with short beam path and single detector pinhole. The system is perfectly suited for imaging multi-labeled specimens. The TCS 4D UV features extreme sensitivity, high resolution, perfect superimposing and long term stability. The TCS 4D scanner head is user-switchable between Leica's upright and inverted microscope models without recalibration.

Background specimen

Computer graphical 3D-visualization by raytracing of segmented chromosome territories of a female human amniotic fluid cell nucleus. False colors represent: red (Xi-territory), yellow (Xa-territory), blue (chromosomes 7). Chromosomes were originally visualized by Fluorescence in situ suppression hybridization.

Courtesy of R. Eils, S. Dietzel, E. Schröck, T. Cremer.

Monitor specimen

Comparative genomic hybridization of DNA extracted from an invasive carcinoma of the cervix uteri. The arrows denote chromosome arm 3q, that is recurrently gained in invasive carcinomas. The gain of 3q occurs at the transition from severe dysplasia to invasive carcinoma and serves as a genetic marker of tumor progression.

Courtesy of E. Schröck and T. Ried, National Center for Human Genome Research/NIH.

DAS Mikroskop LEICA DM RXA has been specially designed as the workstation for the latest developments in biology and medicine which require automatic execution of program-controlled routines. Together with LEICA Q-FISH software and the perfect chromatic correction offered by Leica optics, it's the ideal solution for FISH analysis and other new life science applications.

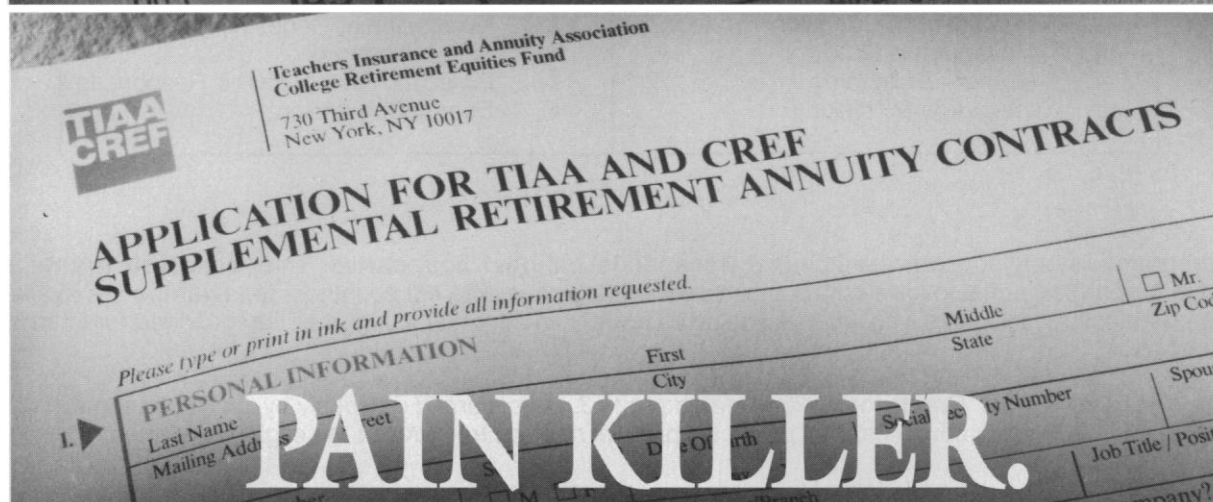
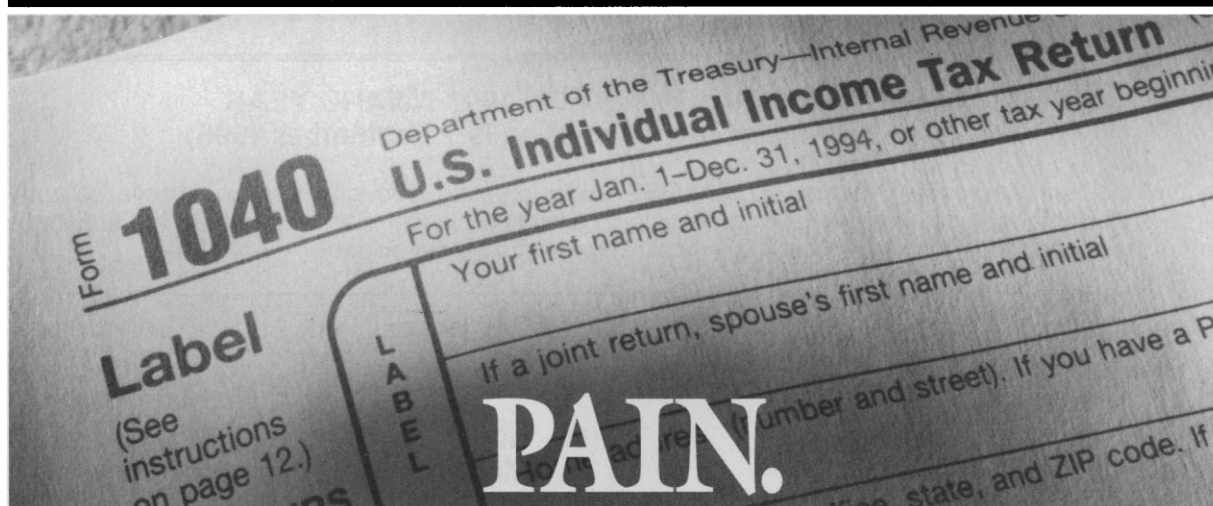
Leica Microscopy and Scientific Instruments Group
CH-9435 Heerbrugg, Switzerland

Tel.: +41 71 70 30 19
Fax: +41 71 72 78 25

Circle No. 10 on Readers' Service Card

Leica

PRINCIPLES of SOUND RETIREMENT INVESTING



For fast relief from the nagging ache of taxes, we recommend TIAA-CREF SRAs. SRAs are tax-deferred annuities designed to help build additional assets—money that can help make the difference between living and living *well* after your working years are over.

Contributions to your SRAs are deducted from your salary on a pretax basis. That lowers your current taxable income, so you start saving on federal and, in most cases, state and local income taxes right away. What's more, any earnings on your SRAs are also tax deferred until you receive them as income. That can make a big difference in how painful your tax bill is every year.

As the nation's largest retirement system, based on assets under management, we offer a wide range of allocation choices—from the TIAA Traditional Annuity, which guarantees principal and interest (backed by the company's claims-paying ability), to TIAA-CREF's diversified variable annuity accounts. And our expenses are very low,* which means more of your money goes toward improving your future financial health.

To find out more, call 1 800 842-2888. We'll send you a complete SRA information kit, plus a free slide calculator that shows you how much SRAs can lower *your* taxes.

Call today—it couldn't hurt.



**Ensuring the future
for those who shape it.SM**

*Standard & Poor's Insurance Rating Analysis, 1995; Lipper Analytical Services, Inc., Lipper-Directors' Analytical Data, 1995 (Quarterly). CREF certificates are distributed by TIAA-CREF Individual and Institutional Services, Inc. For more complete information, including charges and expenses, call 1 800 842-2733, ext. 5509, for a current CREF prospectus. Read the prospectus carefully before you invest or send money.



HUMAN FRONTIER SCIENCE PROGRAM (HFSP)

Bureaux Europe, 20 place des Halles, 67080 STRASBOURG Cedex, FRANCE

Tel: (33) 88 21 51 21 Fax: (33) 88 32 88 97

E-mail: info@hfsp.c-strasbourg.fr

CALL FOR APPLICATIONS FOR 1997 AWARD YEAR (Deadline for receipt of applications is 1 September 1996)

The aim of the Human Frontier Science Program (HFSP) is to promote, through international collaboration, basic research to elucidate the complex mechanisms of living organisms, including man. Applications are solicited for the support of research grants, fellowships and workshops in the areas set out below

RESEARCH AREAS OF THE HFSP

Basic Research for the Elucidation of

(B) Brain Functions

1. Elementary Processes
2. Perception & Cognition
3. Movement & Behavior
4. Memory & Learning
5. Language & Thinking

(M) Biological Functions through Molecular Level Approaches

1. Expression of Genetic Information
2. Morphogenesis
3. Molecular Recognition & Responses
4. Energy Conversion

TYPES OF SUPPORT

The program will only support research that **transcends national boundaries**. Thus, **research grants** will be awarded for programs that involve collaboration between teams in different countries; **fellowships** are available to young post-doctoral scientists who wish to work in a different country; and support will be provided for international **workshops**.

RESEARCH GRANTS Grants for basic research (*up to 3 years*) carried out jointly by research teams in different countries. The principal applicant must be from one of the eligible countries*.

FELLOWSHIPS **Long Term** (*1- 2 years*) and **Short-Term** (*up to 3 months*) Fellowships for researchers early in their careers and from the eligible countries* who wish to do post-doctoral research in foreign countries, or for young researchers from outside the eligible countries who wish to do research in one of the eligible countries*.

WORKSHOPS Grants for international workshops organized by researchers from the eligible countries.

* Current eligible countries are Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Portugal, the Republic of Ireland, Spain, Sweden, Switzerland, the UK and the USA .

RESEARCH GRANTS AND LONG-TERM FELLOWSHIPS : APPLICATION DEADLINE IS 1 SEPTEMBER 1996
(awards to be announced in April 1997)

Applications for Short-Term Fellowships and Workshops can be submitted throughout the year

Guidebooks and application forms will be available in mid-April 1996 and may be obtained upon written request by addressing the form below to the HFSP or by E-mail. Applications using previous year's forms are not accepted. They can also be retrieved through Internet: on our anonymous FTP server at ftp.hfsp.c-strasbourg.fr [directory:/pub/HFSP] or at Netscape or other WWW browser at ftp://ftp.hfsp.c-strasbourg.fr/pub/HFSP.

Surname

First name

Institution

Postal Address

Circle No. 31 on Readers' Service Card

☐

Research Grant

☐

Long-Term Fellowship

☐

Short-Term Fellowship

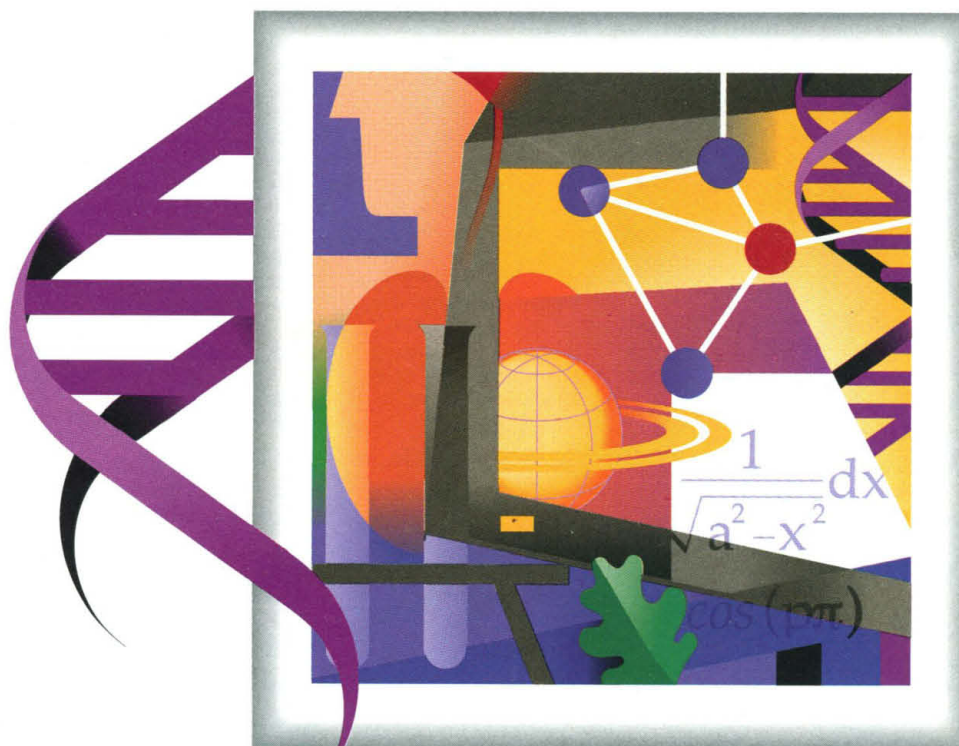
☐

Workshop

(please check the relevant box(es))



GET BETTER NET RESULTS



$$\frac{1}{\sqrt{a^2 - x}}$$

KR SCIENCEBASESM FOR THE WORLD WIDE WEB

When you need accurate, up-to-date information for chemical, pharmaceutical, or biotechnology research, the fastest and easiest way to get the results you're looking for is KR ScienceBase.

You don't have to search multiple sources on the Internet. You don't need specialized expertise in information searching. You don't even need to leave your desk.

With its simple point-and-click interface, KR ScienceBase brings you information that helps you make better

decisions, fuels your creativity, accelerates your research – and reduces your time to market.

Built-in search intelligence works to bring you the results you're looking for. And you can count on the information you find. KR ScienceBase is based on DIALOG®, the world's premier online service with access to thousands of publications and scientific sources.

So get the results you need... KR ScienceBase.

SIGN UP TODAY!
<http://krscience.dialog.com>

Or call 800-334-2564, 415-254-8800, or fax 415-254-8123.
In Europe call +44 171 930 5503.

KR SCIENCEBASESM
KNIGHT-RIDDER INFORMATION

© 1996 Knight-Ridder Information, Inc., 2440 El Camino Real, Mountain View, CA 94040
KR ScienceBase is a service mark, DIALOG is a registered service mark of Knight-Ridder Information, Inc. Registered U.S. Patent and Trademark Office. krsb396

Circle No. 36 on Readers' Service Card