American Association for the Advancement of Science

SCIENCE

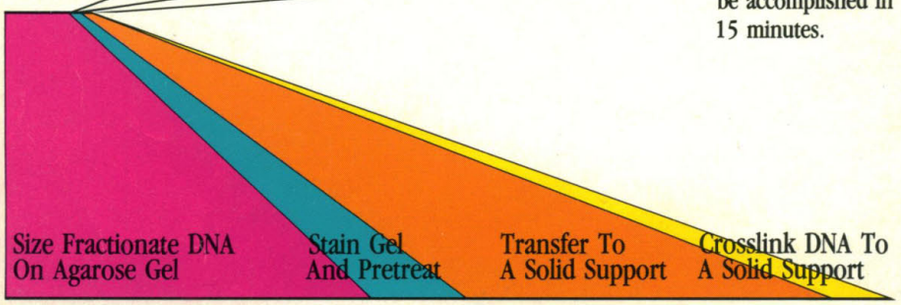
18 January 1991 $6.00
Vol. 251 ■ Pages 241–348

Southerns/Northerns: Electrophoresis, Blotting, and Crosslinking in 2.5 Hours Instead of 30.

Stratagene has streamlined agarose gel electrophoresis and blotting. The system decreases the time required, from sample loading to prehybridization ten fold.

STRATAGENE METHOD—TIME 2.5 HOURS

2 HOURS 15 MIN 15 MIN 30 SECONDS



12 HOURS 4 HOURS 12 HOURS 2 HOURS

CONVENTIONAL METHOD—TOTAL TIME 30 HOURS

VAGE™ System

The VAGE™ vertical agarose/acrylamide gel electrophoresis system allows the casting of agarose or acrylamide gels in the unit. Nucleic acids can be electrophoresed through a 3 mm, 0.8% vertical agarose gel in less than two hours with excellent resolution (Figure 1). Because the gels are thin, staining, depurination, and denaturation can be accomplished in 15 minutes.

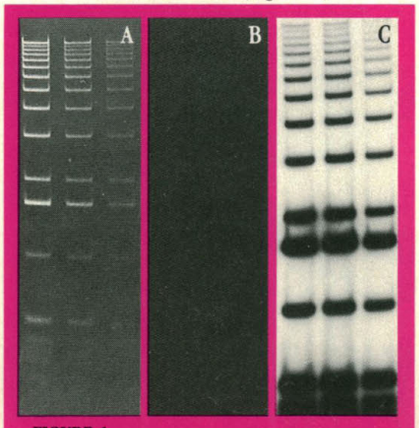
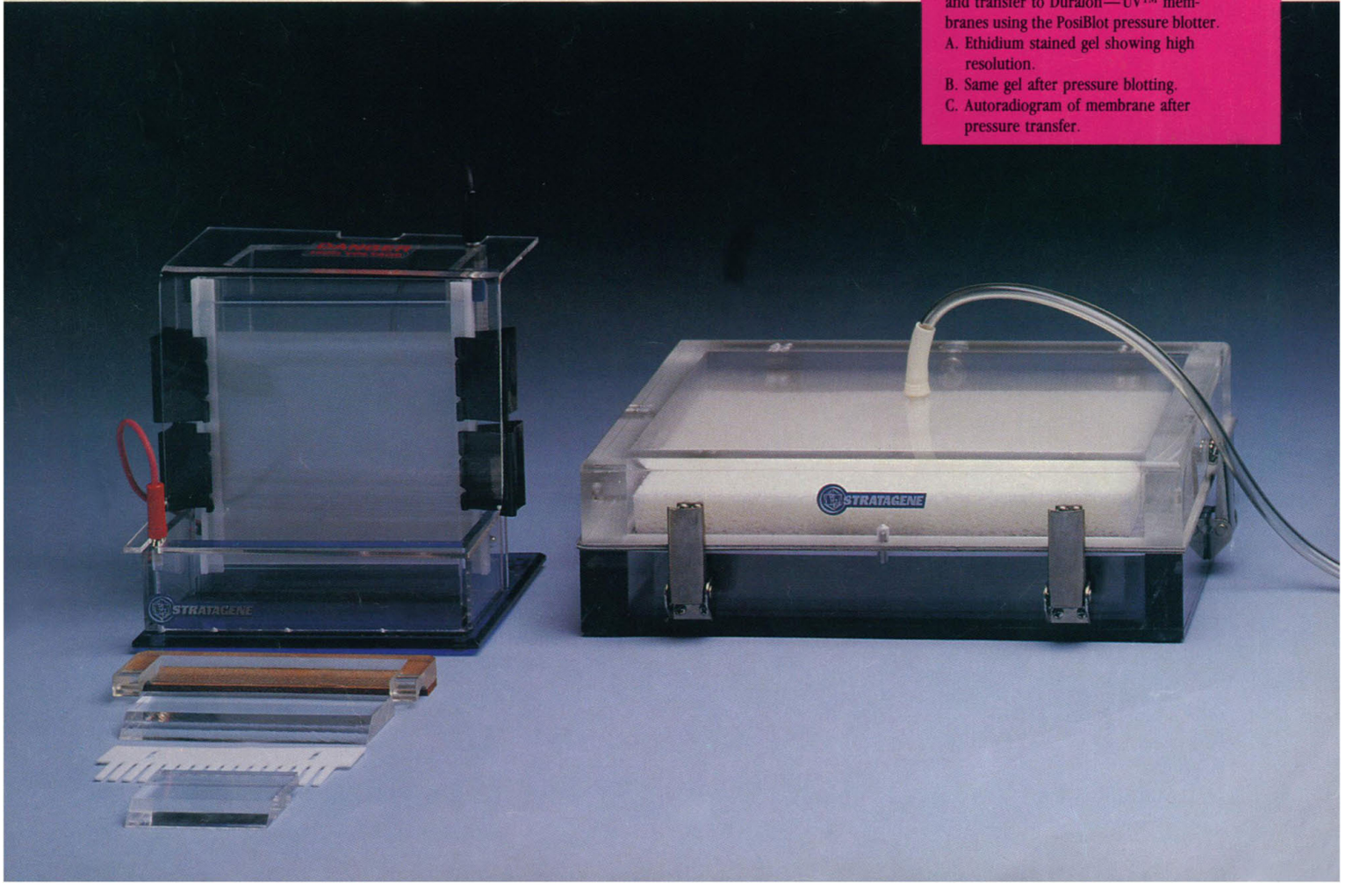


FIGURE 1:
Figure Legend: Fractionation of end labeled DNA markers on 3mm thick 0.8% agarose by the VAGE apparatus and transfer to Duralon—UV™ membranes using the PosiBlot pressure blotter.
A. Ethidium stained gel showing high resolution.
B. Same gel after pressure blotting.
C. Autoradiogram of membrane after pressure transfer.



PosiBlot™* Pressure Blotter

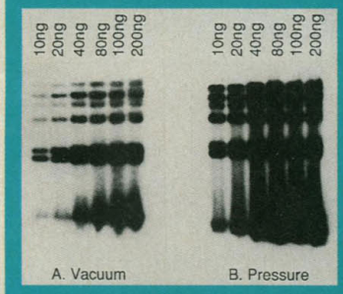


FIGURE 2:
Figure Lengend: ^{32}P end-labeled lambda Hind III markers were electrophoresed in 0.8% agarose. The DNA was then transferred to a nylon membrane with a vacuum blotter at 30mm Hg below atmospheric or with the PosiBlot pressure blotter at 100mm Hg above atmospheric. Both transfers were carried out for 15 minutes. As can be seen, pressure blotting transferred significantly more DNA in the same period of time, especially in the higher molecular weight range (largest band is 23 kilobases).

The PosiBlot™ positive pressure blotter permits the transfer of nucleic acids in 1/3 the time of vacuum blotters and 1/50 the time of capillary blotting (Figure 2). Pressure blotting does not dehydrate gels as do other methods. This allows the use of substantially higher pressure differentials, compared with vacuum blotting, without gel collapse. The PosiBlot apparatus reduces blotting time to 15 minutes.

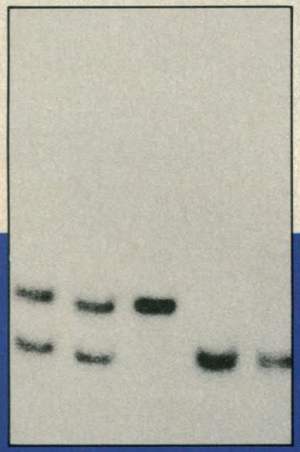


FIGURE 3:
Figure Legend: Autoradiogram showing the resolution of 2.8 and 1.3 Kb Msp I RFLP alleles revealed by a cystic fibrosis human DNA probe using the VAGE, PosiBlot and Stratalinker all in 2.5 hours.

Stratalinker™* UV Crosslinker

The Stratalinker™ UV Crosslinker fixes nucleic acids to solid supports such as nitrocellulose or nylon membranes, in less than one minute. This compares favorably to vacuum baking, which requires 2 hours. The Stratalinker actually monitors the ultra violet energy flux and deactivates the light source upon reaching the user-programmed energy level (Figure 4). Figure 3 shows an autoradiogram of a human genomic Southern blot performed using the VAGE, PosiBlot and Stratalinker all in 2.5 hours.

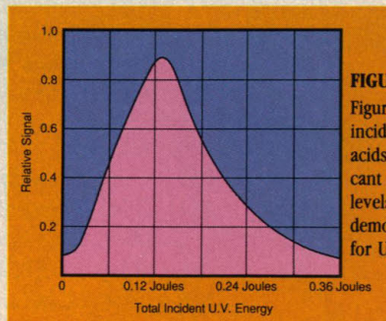


FIGURE 4:
Figure Legend: The effects of altering the incident energy for crosslinking nucleic acids to nylon membranes. The significant drop in signal intensity at energy levels below and above 0.12 Joules demonstrates the limited optimal range for UV treatment.

Stratagene offers a full selection of nitrocellulose, reinforced nitrocellulose and nylon membranes. Each membrane is stringently lot tested to ensure consistency when performing Northern and Southern blotting. Please call Technical Services for detailed information on Stratagene's time saving blotting systems and membranes.

STRATAGENE®
Where Satisfaction Multiplies

Corporate Headquarters:
11099 North Torrey Pines Rd.
La Jolla, CA 92037
Ordering: 800-424-5444
Tech. Services: 800-548-1113
FAX: 619-535-5430
TELEX: 9103809841

Stratagene GmbH
Postfach 105466
D-6900 Heidelberg
(Federal Republic of Germany)
Telephone: (06221) 40 06 34
Telefax: (06221) 40 06 39

Stratagene Ltd.
Cambridge Innovation Centre
Cambridge Science Park
Milton Road
Cambridge CB4 4GF
Telephone: (0223) 420955
Telefax: (0223) 420234
Telex: 81417 INNCEN G

Please contact Stratagene for a distributor near you.

* Patent Pending

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

ISSN 0036-8075
18 JANUARY 1991
VOLUME 251
NUMBER 4991

■ **SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005.** Second-class postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Domestic individual membership and subscription (51 issues): $82. Domestic institutional subscription (51 issues): $150. Foreign postage extra: Canada $46, other (surface mail) $46, air freight $90. First class, airmail, school-year, and student rates on request. Canadian GST Number: Pending. **Change of address**: allow 6 weeks, giving old and new addresses and 11-digit account number. **Postmaster**: Send change of address to *Science*, P.O. Box 1723, Riverton, NJ 08077. **Single copy sales**: $6.00 per issue prepaid includes surface postage; Guide to Biotechnology Products and Instruments, $20. 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 the base fee of $1 per copy plus $0.10 per page is paid directly to CCC, 27 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 $1 + .10. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

■ 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.

COVER Lakes and ponds on the arctic tundra with Itigaknit Mountain in the background, North Slope, Alaska. These aquatic ecosystems are continuously releasing carbon dioxide to the atmosphere. Much of the carbon originates in terrestrial environments, and accounting for this release substantially lowers the estimate of the worldwide arctic sink for atmospheric carbon dioxide. See page 298. [Photograph by George W. Kling]

Introducing Eppendorf® Autoclavable Pipettes

Inspired by customer needs, the new generation of Eppendorf Autoclavable Pipettes combines quality and innovation to deliver accurate and reliable results with safety and comfort.

New, convenient carousel stand —rotates for easy access.

The new Eppendorf Pipettes are autoclavable at 121°C for sterilization or decontamination. For added convenience and safety, volume selection is faster and quieter, and the smooth adjustment knob won't snag or tear safety gloves. Moreover, the comfortable, ribbed, "no-slip" barrel takes the fatigue out of pipetting, and a top-view, digital display is always visible.

And, if ever needed, servicing and calibration can be performed right in the lab.

A new product...and a new guarantee. Brinkmann Instruments is so confident about the quality of the new Eppendorf Autoclavable Pipettes that, for a limited time, we are offering a 30-day return privilege.

Call 800-645-3050 for more information. In New York, call 516-334-7500.
Or write
Brinkmann Instruments, Inc.,
One Cantiague Road,
P.O. Box 1019,
Westbury, NY 11590-0207.
(In Canada: 416-675-7911,
50 Galaxy Blvd.,
Rexdale, Ont. M9W 4Y5.)

eppendorf

BRINKMANN Quality products for research and control.

For information circle reader service number 56
For a demonstration circle reader service number 57
See us at the Pittsburgh Conference — Booths #3435, 3525, 3725

Peruvian cotton economy

EL Paraíso was a large Preceramic settlement in Peru that was inhabited between 1800 and 1500 B.C. Recent excavations of refuse deposits indicate that this settlement may have been an important cotton-growing center (page 277). El Paraíso is situated in a valley bottom along the coast, an ideal location for the cultivation of cotton. Quilter *et al.* propose that the inhabitants of El Paraíso may have traded cotton and its products for other goods with people in nearby coastal and highland communities. Cotton is prized at coastal settlements where it is used for fishing nets and lines; it is also important in the manufacture of textiles, which were prestige commodities in Andean civilizations. The excavations showed that the diets of the inhabitants of El Paraíso were rich in gathered foods—seafood (anchovies, mussels, clams) and wild vegetables and fruits—and that only a small number of food crops were cultivated. Although the inhabitants of this community were knowledgeable about agricultural techniques, they appear to have concentrated their energy raising cotton (but not food) and building a monumental settlement.

New microporous materials

MOLECULAR sieves based on sulfides may have a number of exceptional properties when compared with zeolites and related materials that contain oxygen; for example, the sulfide-based sieves may provide more stable platforms onto which semiconducting sulfide guests can be absorbed. The synthesis and chemical and physical characterization of antimony sulfide frameworks are described by Parise (page 293). Slurries of Sb_2S_3 and $(CH_3)_4N{\cdot}SH$, the latter acting as a template, were heated in the presence of organic cations. Crystallographic analyses showed assembly of the starting materials into a system of channels; the building blocks of the channels were flat s-shaped buckled sheets of Sb_2S_2 ring units joined at the edges. Building blocks of this type have not been found in silicate- and phosphate-based materials. Variations of these antimony sulfide frameworks probably can be made if other cations and other templates are used in the reaction mixtures; the materials should have applications as molecular sieves, sorbents, catalytic surfaces, and ion exchangers.

Tundra carbon budgets

THE arctic is a smaller sink for carbon dioxide (CO_2) than it was previously thought to be: the earlier estimates of the size of this sink may be about 20% too high. The new estimates are based on years of measurements of CO_2 concentrations and CO_2 fluxes from North Slope Alaskan lakes and rivers to the atmosphere (page 298). Kling *et al.* found that CO_2 is continuously released from these Alaskan aquatic ecosystems, which apparently act as conduits for terrestrial gases. The carbon they release comes from dissolved organic carbon in tundra, inorganic carbon in ground water, and erosion of peat. Alterations in the size of the sink as well as other effects of aquatic ecosystems must be considered if accurate projections are to be made of how the global carbon budget could change in the future as a result of climate and land use changes.

Perception of song bird songs

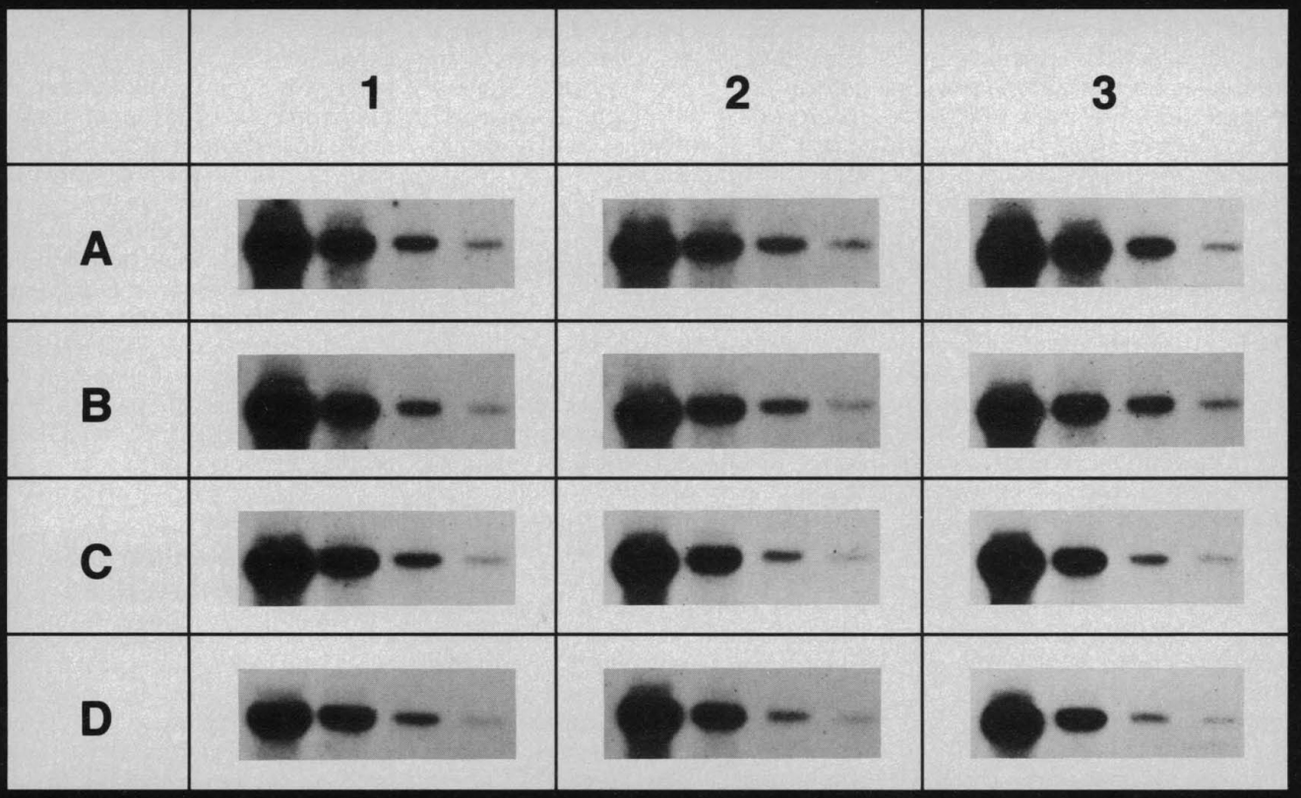
IN response to the song of a male of her species, a female roller canary will thrust her breast forward, raise her tail, and vibrate her outstretched wings to indicate a readiness for mating. Although this response is usually made only to the songs of conspecific males, the female roller canary was found to react in the same way to the songs of males outside her species if lesions were made in a portion of the caudal nucleus of the ventral hyperstriatum (HVc) of her brain (page 303). The HVc of male canaries is part of the network of brain nuclei that is essential for song production; because female canaries do not sing normally, the role of the HVc in females has been unclear. Brenowitz shows that the HVc plays a role in the perception of songs by females and in discrimination of songs of conspecific males from those of other males, in this case, the white-crowned sparrow. The HVc lesions did not in any way alter the character of the solicitation display made by the female in response to songs. The development of song perception in female canaries may be markedly different from its development in males; according to the motor theory of song perception, the male canary may only be able to perceive sounds after he is able to produce them.

Concerted evolution in multi-gene families

WHAT molecular mechanism causes multi-gene families to lose their heterogeneity as they evolve? This drive toward homogeneity, called concerted evolution, has been observed in genes of both individuals and populations. Hillis *et al.* studied the concerted evolution of the tandemly repeated ribosomal genes of parthenogenetic lizards of the *Heteronotia binoei* complex, a complex that also includes sexual species (page 308). The parthenogens formed from hybridization events between two species of sexual ancestors; backcrossed individuals were triploid, having received one haploid set of chromosomes from one ancestor and two sets from the other. Although the parthenogens had three sets of ribosomal genes, many were found to have three sets of only one of the ancestral types. Thus, biased gene conversion had been operating to switch the genes to the dominant form. At least with regard to their ribosomal genes, the parthenogens do not have a "permanent hybrid" genome; instead their genome continues to evolve in a concerted fashion. ■ RUTH LEVY GUYER

Blot After Blot — Lot After Lot

sure blot®



Titered DNA: 3.0 ug, 1.0 ug, 0.3 ug, and 0.1 ug of *Eco* RI digested genomic DNA.

Hybridized with ^{32}P-labeled J_H probe.

Presented here are the results of our rigorous quality control testing on a recent lot of **sure blot**® positively charged nylon membrane. Three separate samples (1-3) were taken from the lot and hybridized, stripped and rehybridized for a total of four separate hybridizations (A-D). This testing regimen is conducted on every lot of **sure blot** precut and roll membrane to ensure the highest quality results in your Southern and Northern hybridization experiments, blot after blot, lot after lot.

To learn more about Oncor® sure blot, Oncor sure blot blue and our full line of DNA/RNA hybridization and detection products call our Technical Service line 1-800-77ONCOR.

The Molecular Pathology Company **oncor** 209 Perry Parkway, Gaithersburg, MD 20877

Circle No. 148 on Readers' Service Card (301) 963-3500, FAX (301) 926-6129

High-fidelity sight systems.

True image reproduction.

Without distortion. Without losing sharpness at the edges. With excellent contrast and texture. It could only be a major new stereo system from Olympus—the SZ Series of stereo microscopes.

High-fidelity sight is due to newly developed Olympus optics, providing enhanced image flatness and contrast as well as a larger field of view.

These superior optics are now integrated into microscopes of versatile design for the biological, research and education fields.

There are three models. Offering options in long working distances and zoom ranges. Offering attachments for CCTV use and photomicrography among other applications.

Offering the one thing a microscope must provide: superior vision. The SZ Series stereo microscopes from Olympus—they'll change the way you look at things.

For a demo or tech information, call toll-free: **1-800-446-5967.**
Olympus Corporation,
Precision Instrument Division,
4 Nevada Drive,
Lake Success,
New York 11042-1179.

In Canada:
Carsen Medical & Scientific Co., Ltd.
Markham, Ontario (416) 479-4100

OLYMPUS®
The Image of Quality

For information circle reader service number 52
For demonstration circle reader service number 60

Econo System Simplifies Chromatography

Complicated Chromatography

Econo System and Econo-Pac® Cartridges

Before the Econo System, chromatography was a complicated process. You spent a lot of money, read a lot of manuals, made connections, made adjustments, measured, mixed, stirred, tapped, sat, watched, waited, hoped.

With the Econo System and Econo-Pac cartridges chromatography is easy: twist on a prefilled cartridge, push some buttons, and that's it.

Econo System features, such as automatic gradient formation and fraction collection, simplify chromatography. Prepacked Econo-Pac cartridges for ion exchange, desalting, and hydrophobic interaction meet all protein and nucleic acid purification needs.

Call us now at 1-800-4BIORAD for more information.

BIO-RAD

Chemical Division

U.S. (800) 4BIORAD • California • Ph. (415) 232-7000 • Fx. (415) 232-4257; New York • Ph. (516) 764-2575 • Fx. (516) 764-2186; Canada • Ph. (416) 624-0713 • Fx. (416) 624-3019; Australia • Ph. 61-2-805-5000 • Fx. 61-2-805-1920; Austria • Ph. 43/222/82 89 010 • Fx. 43/222/82 85 629; Belgium • Ph. 32/2/91 85 55 11 • Fx. 32/2/91 82 65 54; France • Ph. 33/1/49 60 68 34 • Fx. 33/1/46 71 24 67; Germany • Ph. 49/89/31 88 40 • Fx. 49/89/31 88 41 00; Kowloon • Ph. 852/789/3300 • Fx. 852/789/1257; Italy • Ph. 39/2/213 87 51 • Fx. 39/2/213 90 32; Spain • Ph. 34/1/661 7085 • Fx. 34/1/661 9698; Japan • Ph. 81-3-534-7240 • Fx. 81-3-534-8037; The Netherlands • Ph. 31/8385-40666 • Fx. 31/8385-42216; Switzerland • Ph. 41/1/810 16 77 • Fx. 41/1/810 19 33; England • Ph. 44/442/23 25 52 • Fx. 44/442/59118; New Zealand • Ph. 64/9/443/3099 • Fx. 64/9/443/3097

Circle No. 41 on Readers' Service Card

Hard Copy your PCR products with one-step TA Cloning™...

A Universal System for Cloning PCR Products

Direct hard copy cloning of PCR* products into the multifunctional pCR2000™ vector is now possible with the new TA Cloning kit from Invitrogen. This system eliminates inefficient, time consuming reactions normally involved in cloning PCR products and allows direct cloning of amplified nucleic acids from genomic DNA, cDNA or recombinant lambda, cosmids and YACs.

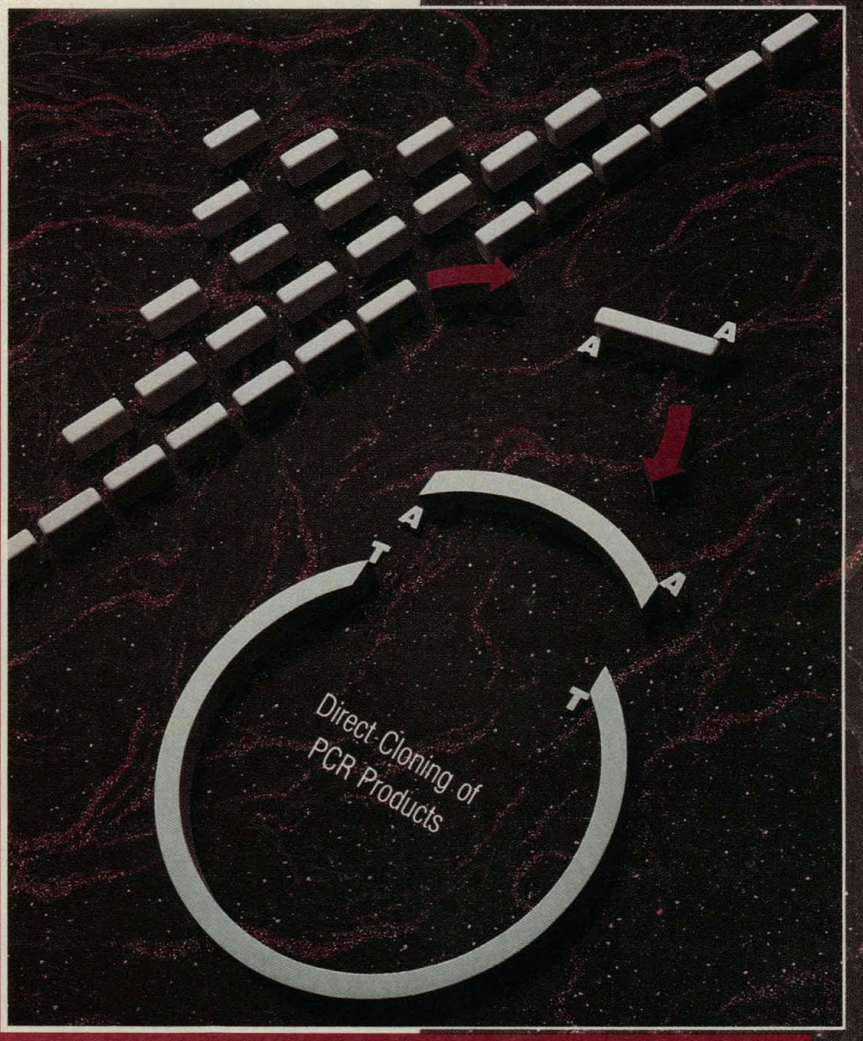
TA Cloning requires:

- NO purification of PCR products
- NO modification of primers to incorporate restriction sites
- NO restriction enzyme digestion
- NO modifying enzymes
- NO sequence information

The TA Cloning system from Invitrogen allows blue/white color selection of recombinants from the pCR2000 vector and is useful for most PCR reactions including:

• Symmetric PCR • Inverse PCR • Alu PCR • Sequence independent PCR • mRNA PCR • Sequence Tagged Site PCR • Anchored PCR

TA Cloning is an ideal system for direct sequencing and expression of PCR products and provides a means of safeguarding precious samples for future analysis, probe generation or other manipulations. The prepared pCR2000 vector is designed to take advantage of the universal ragged ends generated by the terminal transferase activity inherent in thermophilic polymerases. Each kit contains prepared pCR2000 vector, ligation reagents and competent *E. coli* for 20 reactions. For more information on these and other PCR products call;



Toll Free **1-800-544-4684**
11588 Sorrento Valley Road • #20
San Diego, CA 92121

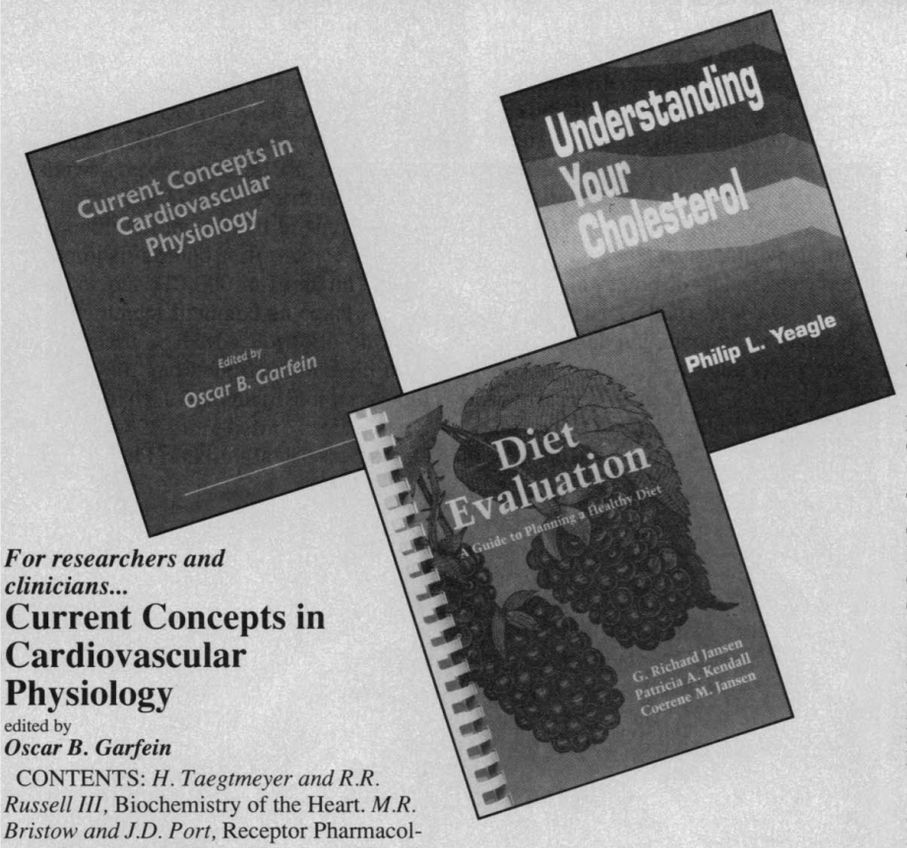
Invitrogen CORPORATION

BRITISH BIO-TECHNOLOGY LIMITED, UK, TEL: 44-865748747 • AMS BIOTECHNOLOGY, UK, TEL: 44-993822786 • BIO-TRADE, Austria, TEL: 43-2228284694 • FUNAKOSHI PHARMACEUTICALS, Japan, TEL: 81-32932352 • CELBIO, Italy, TEL: 39-24048646 • KEBO LAB AB, • Sweden, TEL: 46-86213400 • GENOFIT GmbH, FRG, TEL: 49-6221303923 • GENOFIT-SA, Switzerland, TEL: 41-227948400 • BDH INC., Canada, TEL: 800-268-2129 • MEDOS COMPANY PTY LTD, Australia, TEL: 61-38089077

*PCR is covered by U.S. Pat. #'s 4,683,202 and 4,683,195 issued to Cetus Corporation.

Circle No. 78 on Readers' Service Card

FOR IMPROVED CARDIAC CARE...



For researchers and clinicians...

Current Concepts in Cardiovascular Physiology

edited by
Oscar B. Garfein

CONTENTS: *H. Taegtmeyer and R.R. Russell III,* Biochemistry of the Heart. *M.R. Bristow and J.D. Port,* Receptor Pharmacology of the Human Heart. *M.N. Levy,* Neural and Reflex Control of the Circulation. *S. Oparil and R. Katholi,* Humoral Control of the Circulation. *J.I.E. Hoffman,* Coronary Physiology. *E.G. Lakatta and W.L. Maughan,* Cardiovascular Function. *M.F. Arnsdorf,* A Matrical Approach to the Electrophysiology and Biophysics of Cardiac Excitation. Each chapter includes references. Index.
1990, 554 pp., $160.00/ISBN: 0-12-275820-X

Lipoprotein(a)

edited by
Angelo M. Scanu

Lipoprotein(a) is a low-density lipoprotein that transports cholesterol through the blood. It is linked to atherosclerosis and heart disease and is unaffected by diet. This book contains a cohesive explication of Lp(a) genetics, the role of plasminogen, and Lp(a)'s impact on the cardiovascular system.
1990, 226 pp., $55.00/ISBN: 0-12-620990-1

Cholesterol Metabolism, LDL, and the LDL Receptor

N.B. Myant

This book is a valuable reference work that covers cholesterol and metabolism in a single volume.

CONTENTS: The LDL Receptor in Perspective. Cholesterol in Animal Tissues. HMG-CoA Reductase. Acyl-CoA: Cholesterol Acyltransferase. LDL: Physical and Chemical Characteristics. Apolipoprotein B (ApoB). LDL: Origin and Metabolism. The LDL Receptor: Biochemistry and Cell Biology. The LDL Receptor: Structure, Biosynthesis, and Molecular Genetics. Normal and Defective LDL-Receptor Function *in Vivo*. Glossary. Appendixes. Index.
1990, 465 pp., $69.95/ISBN: 0-12-512300-0

For the educated lay audience...

Understanding Your Cholesterol

Philip L. Yeagle

The aim of this book is to make a major public health concern understandable to an educated lay audience.

CONTENTS: Cholesterol: Friend or Foe. The Good and Bad Cholesterols. The Incriminating Evidence. Detection. Therapy: Diet or Drugs. Fish Oil and Atherosclerosis. Oat Bran: A Magic Cure? Exercise and Cholesterol. Creating a Healthy Diet. Shopping Smart for the Heart. Children and Cholesterol. What Does Cholesterol Do for You? Glossary. Sources of Additional Information.
Paperback $9.95/ISBN: 0-12-769035-2
December 1990, 111 pp.

Diet Evaluation

A Guide to Planning a Healthy Diet

G. Richard Jansen, Patricia A. Kendall, and Coerene M. Jansen

Diet Evaluation: A Guide to Planning a Healthy Diet is a laboratory manual for assessing diet adequacy and identifying specific diet components. The food composition information for over 2,000 foods, including common "fast foods," is presented in terms of nutritional shares so that diets controlled in calories, fat, cholesterol, and sodium yet adequate in protein, vitamins, minerals, and dietary fiber can easily be planned. A unique planning system for a heart healthy diet is included.

CONTENTS: Introduction. Nutritional Standards and Guidelines. Who Are Guidelines For? Basis of Diet Guide. How to Use This Guide. Health Promotion and Disease Prevention. Obesity. Coronary Heart Disease. Diabetes Mellitus. Hypertension. Cancer. Osteoporosis. Dietary Recommendations. **Diet Guide Nutrient Nutri-Unit Tables:** Nutrient Nutri-Unit Values for Foods and Beverages. **Menu Items with Maximum Quantities of Nutrients:** Index of Food Items in Nutri-Unit Tables.
Comb Bound: $49.95/ISBN: 0-12-380215-6
September 1990, 279 pp.

Order from your local bookseller or directly from

ACADEMIC PRESS
Harcourt Brace Jovanovich, Publishers
Book Marketing Department #27011
1250 Sixth Avenue, San Diego, CA 92101

CALL TOLL FREE
1-800-321-5068
Quote this reference number for *free postage and handling* on your prepaid order ➥ **27011**

Circle No. 26 on Readers' Service Card

Pure mRNA in Minutes...

...Directly from Small or Large Samples of Cells or Tissue.

FastTrack™ and MicroFastTrack™ set the industry standard in high quality mRNA isolation.

MicroFastTrack™*: 20 Reactions

- Ideal for PCR, Northerns and cDNA synthesis
- Isolation from samples ranging in size from $10\text{-}3\times10^6$ cells or 10-250mg of tissue.
- Reproducible yields of high quality mRNA.

FastTrack™*: 6 Reactions

- mRNA isolation for Northerns, cDNA, library construction, PCR, microinjection, RNA protection studies and *in vitro* translation.
- Isolation from samples ranging in size from $10^7\text{-}10^8$ cells or 0.4-1.0 gram of tissue.
- Fast, efficient recovery of large amounts of polyA+ RNA from a variety of sources.

Both systems offer:

- High yields of intact mRNA with low ribosomal contamination.
- Eliminate the need for total RNA isolation or the use of toxic chemicals.
- The most cost effective means of generating high quality mRNA.
- Consistency, convenience and the fastest isolation time.

For the very best in direct mRNA isolation FastTrack™ and MicroFastTrack™ are the choice of thousands of research labs worldwide. When the quality of your mRNA is important, turn to the original source for purity, reliability and convenience; turn to Invitrogen.

***Toll Free* 1-800-544-4684**

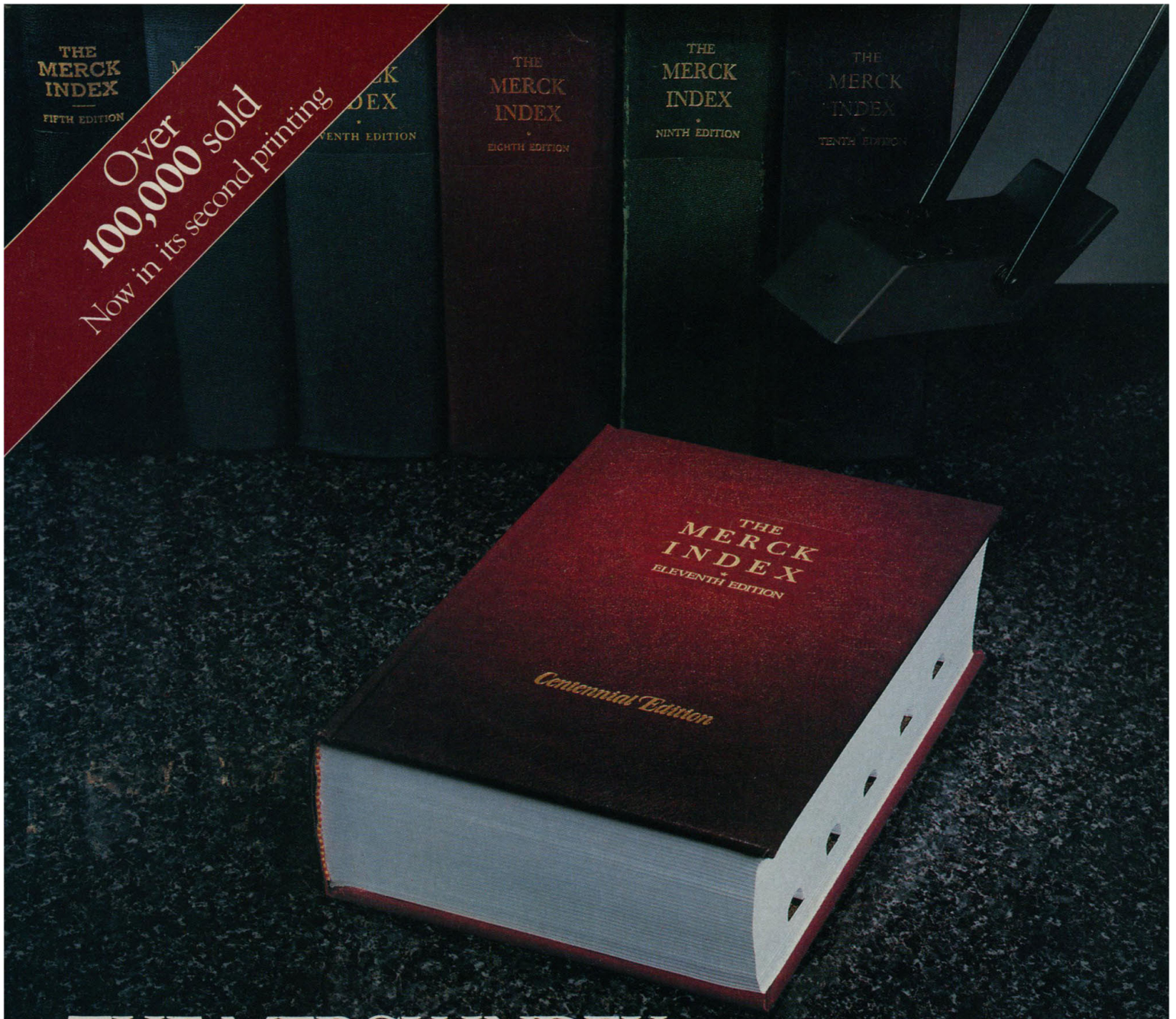
Invitrogen
CORPORATION

11588 Sorrento Valley Road • Suite 20 • San Diego, CA 92121

BRITISH BIO-TECHNOLOGY LIMITED, UK, TEL: 44-865781045 • AMS BIOTECHNOLOGY, UK, TEL: 44-993822786 • BIO-TRADE, Austria, TEL: 43-2228284694 • FUNAKOSHI PHARMACEUTICALS, Japan, TEL: 81-56841622 • CELBIO, Italy, TEL: 39-24048646 • KEBO LAB AB, Sweden, TEL: 46-86213400 • BDH INC., Canada, TEL: 800-268-2129 • MEDOS COMPANY PTY LTD, Australia, TEL: 61-38089077

**patent pending.* *mRNA model courtesy of* BIOSYM

Circle No. 79 on Readers' Service Card



THE MERCK INDEX:
A 100-year-old classic... always contemporary

To order, call toll-free 1-800-999-3633, extension 753 (VISA or MasterCard only) or complete the coupon.

Since 1889, *The Merck Index* has kept up-to-date with the progress in science, accommodating the diverse interests of its readers. The newest edition, the Eleventh/Centennial Edition, continues this tradition with information on more than 10,000 significant drugs, chemicals and biologicals. New entries include pharmaceuticals with novel mechanisms of action, unique, naturally occurring compounds, and chemicals of environmental concern. It also features an entirely new therapeutic category/bioactivity index and CAS Registry Number indices.

Circle No. 36 on Readers' Service Card

Merck & Co., Inc., a research-intensive company, publishes *The Merck Index* as a non-profit service to the scientific and medical communities.

Enclosed is my payment for $35.00 for the Eleventh/Centennial Edition of THE MERCK INDEX. I will not be charged for shipping (U.S. only).

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

Card No. _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____

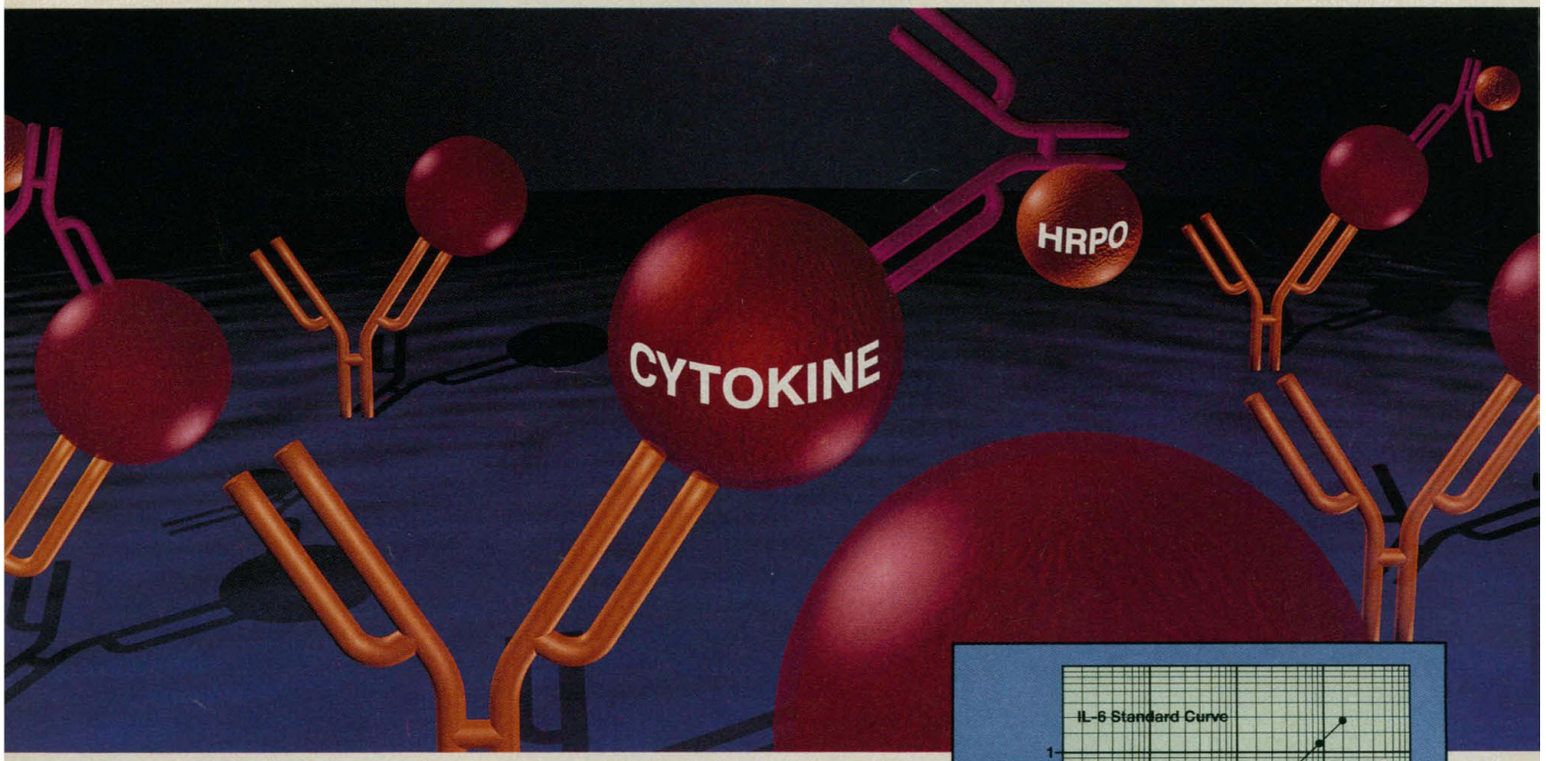
State _____ Zip _____

Please allow four to six weeks for delivery.

Merck & Co., Inc.
Professional Handbooks
Department 753
P.O. Box 229
Norwood, NJ 07648

Quantikine™

For the precise Quantitation of Cytokines in fluids...



The Tool to Accurately Measure Cytokines

Immunoassay vs. Bioassay

The usual assay for a specific cytokine is based on its ability to affect the growth or differentiation of an actively growing, indicator cell line.

However, since most of these indicator cell lines can respond to many growth or inhibitory stimuli (including other cytokines), precise detection and quantitation of a specific cytokine in such complex fluids as: cell culture medium, serum, plasma, urine and synovial fluid (see *e.g.* J. of IMMUNO. **145**:8, 1990 pp 2514-2519) proves difficult and often imprecise.

Now with the Quantikine™ series of "sandwich" immunoassays, a precise, accurate quantitation of a given human cytokine can easily be made in a variety of complex biological fluids.

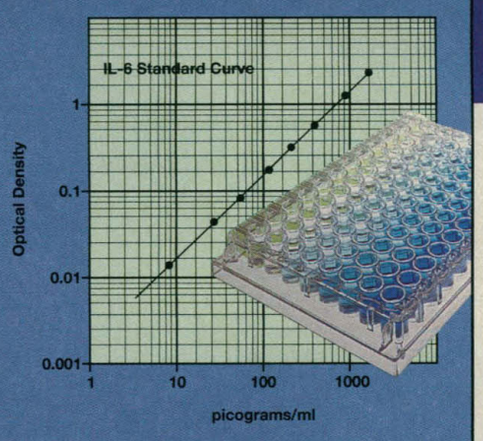
Each Quantikine kit has been formulated under exacting standards to ensure that it is:

Sensitive -detects less than 10 pg/ml.

Rapid -results in less than 4.5 hours.

Specific -unaffected by the presence of other cytokines.

Calibrated -to WHO (National Institute for Biological Standards and Control) interim reference standards.



ELISA Kits for:

IL-1α	IL-4	TNF-α
IL-1β	IL-6	TNF-β
IL-2	IL-8	G-CSF
IL-3		

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

To place an order or request product information, call us at **1-800-328-2400**.

In Europe contact:

British Bio-technology, Ltd.
4-10 The Quadrant, Barton Lane
Abingdon, Oxon OX14 3YS
Telephone: 0865 781045
Fax: 0235 533420
Telex: 838083 BIOTEC G

In Japan contact:

Funakoshi Co., Ltd.
9-7, Hongo 2-Chome
Bunkyo-ku, Tokyo 113
Telephone: 81 3 5684 1616
Fax: 81 3 5684 1633
Telex: J28489 FUNA

Your Source for Cytokine Reagents

R&D Systems
614 McKinley Place N.E.
Minneapolis, MN 55413
In Minnesota: (612) 379-2956
Fax: (612) 379-6580
Telex: 750627

R&D SYSTEMS

Circle No. 68 on Readers' Service Card

A Capital Science Meeting

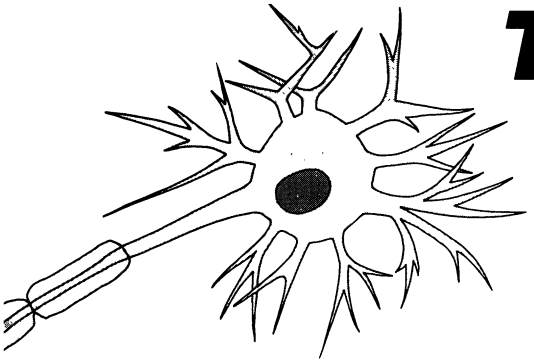
Plan now to attend the next

AAAS Annual Meeting

Washington, DC

14-19 February 1991
Sheraton Washington / Omni Shorham Hotels

American Association for the Advancement of Science



The Neurosciences

Challenges for the '90s

A Three-day Seminar at the AAAS Annual Meeting
Sheraton Washington Hotel, Washington, DC
Seminar Dates: ***16-18 February 1991***

Program

Organized by Katrina L. Kelner *(*Science *magazine)*

Stimulus Transcription Coupling in Neuronal Cells

(Saturday, 16 February, 8:30 am)

Inducible Proto-Oncogenes in the Nervous System —James I. Morgan *(Roche Institute);* Regulation of Neuronal Gene Expression by Depolarization —Michael Greenberg *(Harvard);* Pleasure, Pain, and Proto-oncogenes —Michael J. Iadarola *(NIDR, NIH);* NGF Induces Transcription of Genes Encoding Zinc-Finger Proteins —Jeffrey Milbrandt *(Washington Univ., St. Louis)*

Plenary Lecture

(Saturday, 16 February, 1:00 pm)

Molecular Insights into the Function of Neurotransmitter Receptors and Ionic Channels —Shosaku Numa *(Kyoto Univ., Japan)*

Structure and Function of Potassium Channels

(Saturday, 16 February, 2:30 pm)

A Minimalist Potassium Channel —Arthur M. Brown *(Baylor College);* Molecular Studies of Voltage-gated Potassium Channels —Lily Y. Jan *(UC-San Francisco);* Structure-Function Correlations in a Family of Rat Brain Potassium Channels —Walter Stuhmer *(Max Planck Inst.);* Biophysical and Molecular Mechanisms of Potassium Channel Gating —Richard W. Aldrich *(Stanford)*

Olfaction and Taste

(Sunday, 17 February, 8:30 am)

From Ions and Molecules to Perception and Cognition —Gordon M. Shepherd *(Yale);* Molecular Mechanisms of Transduction in Olfaction: A Model for Receptor-Ligand Signaling Systems —Stuart Firestein *(Yale);* Long-term Potentiation and Serial Memory Processing in the Olfactory Hippocampal Circuit —Gary S. Lynch *(UC-Irvine);* The Initial Events in Taste Transduction —Stephen D. Roper *(Colorado State);* Sensory Coding of Gustatory Information —David V. Smith *(Univ. of Cincinnati)*

Activity-dependent Plasticity in Development and Learning

(Sunday, 17 February, 2:30 pm)

Long-term Potentiation: A Cellular Model for Learning —Roger A. Nicoll *(UC-San Francisco);* Mechanisms for Use-dependent Synaptic Plasticity in the Developing and Mature Visual Cortex —Wolf Singer *(Max Planck Inst.);* Regulation of Synapse Stabilization by Regulation of a Receptor System —Martha Constantine-Paton *(Yale);* Spontaneous Activity and the Patterning of Connections in Fetal Development —Carla J. Shatz *(Stanford)*

Cognitive Processes

(Monday, 18 February, 8:30 am)

Memory: Brain Systems and Cognition —Larry Squire *(Veterans Admin. Med. Ctr., San Diego);* Attentional Control of Visual Perception: Cortical and Subcortical Mechanisms —Robert Desimone *(NIMH, NIH);* Components of High-level Vision: A Cognitive Neuroscience Analysis —Stephen Kosslyn *(Harvard);* Neural Circuits That Mediate Perceptual Judgments of Motion Direction —William T. Newsome III *(Stanford)*

Molecular Basis of Neurological Disease

(Monday, 18 February, 2:30 pm)

Molecular Genetic Approaches to Identification of Mutant Genes in Neurological Disorders —Joseph B. Martin *(UC-San Francisco);* Molecular Genetics of Hereditary Retinal Disease: Retinoblastoma —Thaddeus P. Dryja *(Mass. Eye and Ear Infirmary);* Neuronal Polarity and Microtubule System: A Target of Alzheimer's Pathology —Kenneth Kosik *(Brigham and Women's Hosp.);* Molecular Biology and Genetics of Prions Causing Neurodegeneration —Stanley B. Prusiner *(UC-San Francisco)*

Poster Session

(Date and time to be announced)

Adjournment

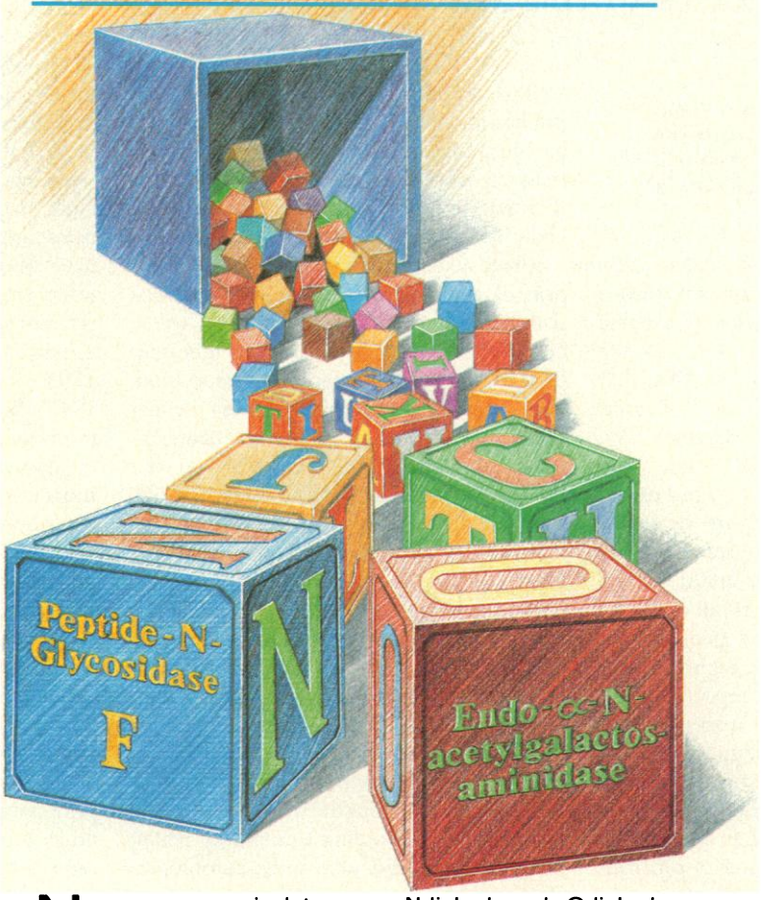
(Monday, 18 February, 5:30pm)

Special Discounts for Graduate Students & Postdocs

For complete details and a registration form, see the 19 October 1990 issue of *Science* magazine, or write to the AAAS Meeting Promotion Dept., 1333 H Street, NW, Room 815, Washington, DC 20005 (Phone: 202-326-6462; FAX: 202-289-4021).

American Association for the Advancement of Science

TOOLS FOR GLYCOBIOLOGY



Now you can isolate your N-linked and O-linked oligosaccharides, or simply strip them from your protein .... reliably and effectively.

Oxford GlycoSystems' Peptide-N-glycosidase F and Endo-α-N-acetylgalactosaminidase are high-purity products which specifically cleave the N-glycosidic or O-glycosidic bond respectively. Because they are uniquely screened for specificity and contaminating activities, they give results you can always depend on. They are available for immediate delivery.

- **reliable** - pre-screened for specificity and contaminating activity
- **simple** - supplied with extensive batch data and directions for use
- **convenient** - pre-aliquoted and supplied with a working buffer

Call us today for more information on Peptide-N-glycosidase F (cat. no. E-5003) and Endo-α-N-acetylgalactosaminidase (cat. no. E-5004) - dependable tools for glycobiology and protein biochemistry.

Oxford GlycoSystems

North America and Canada: Oxford GlycoSystems Inc., Cross Island Plaza, 133-33 Brookville Boulevard, Rosedale, New York 11422, USA. Tel (718) 712 2693. Fax (718) 712 3364.

Europe: Oxford GlycoSystems Ltd, Unit 4, Hitching Court, Blacklands Way, Abingdon OX14 1RG, United Kingdom. Tel +44 (235) 553066. Fax +44 (235) 554701

Circle No. 153 on Readers' Service Card