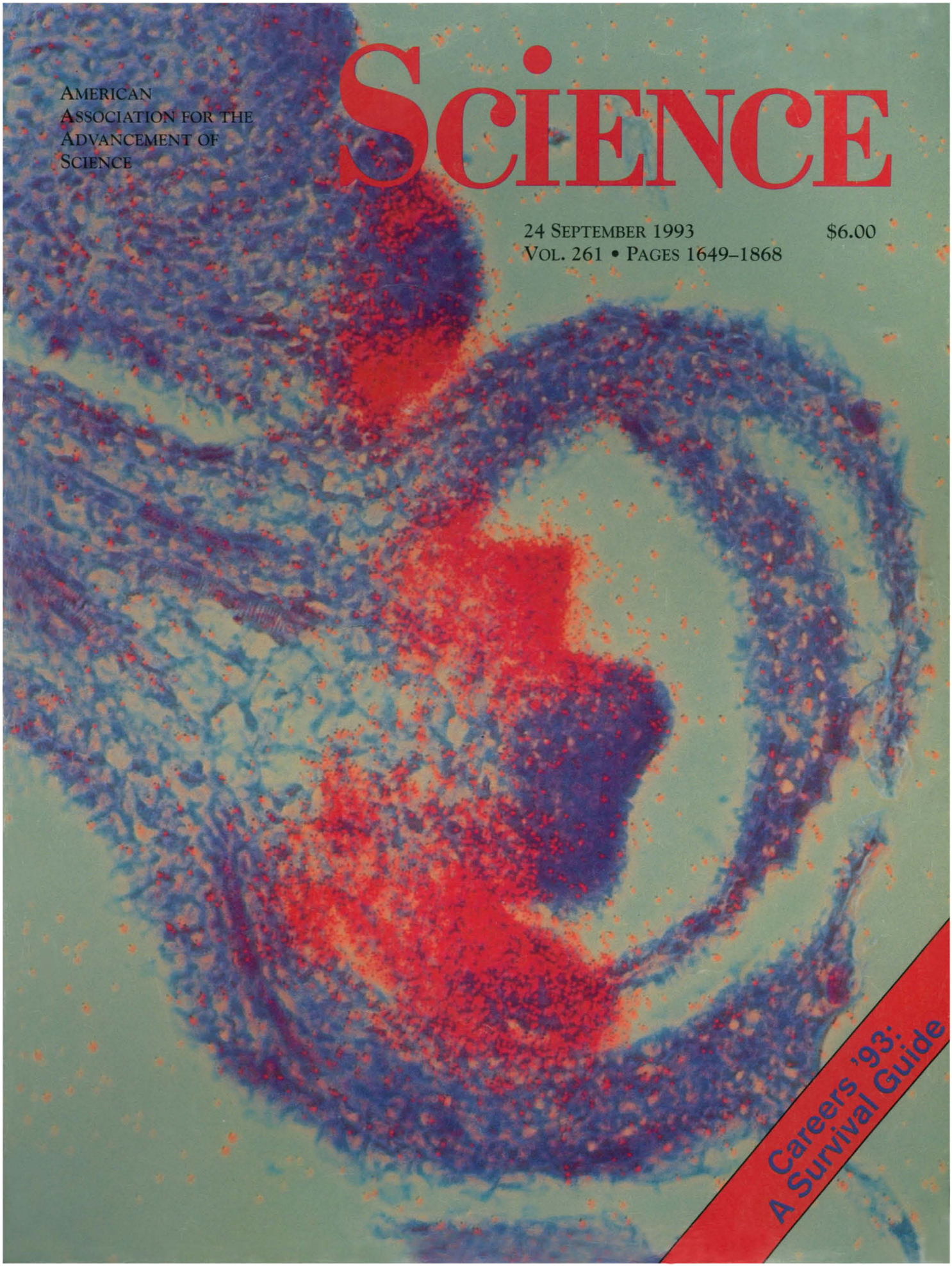
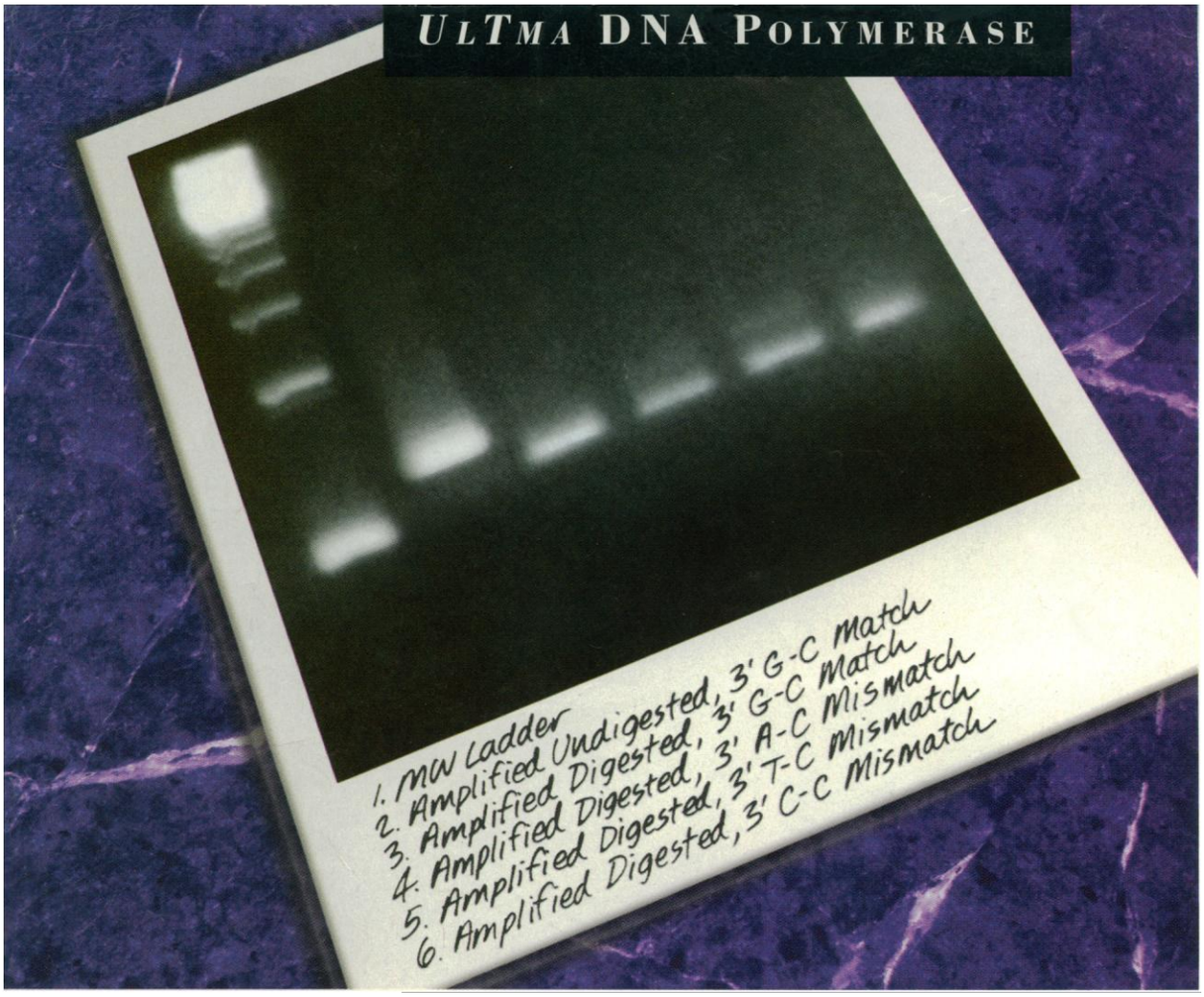
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

24 SEPTEMBER 1993 $6.00
VOL. 261 • PAGES 1649–1868



Careers '93: A Survival Guide



PCR EFFICIENCY OF *UlTma* DNA POLYMERASE IS DEMONSTRATED BY THE ROBUST YIELD OF THE AMPLIFIED PRODUCT (LANE 2). EXCEPTIONAL FIDELITY IN PCR–EVERY CYCLE, EVERY TIME–IS EVIDENCED BY 100% *Bam*H I DIGESTION OF AMPLIFIED PRODUCTS DERIVED FROM CORRECT (MATCHED) AS WELL AS MISMATCHED PRIMERS.

The Only Proofreading Enzyme Guaranteed For PCR.

For cloning applications requiring high fidelity PCR, the new *UlTma*™ DNA Polymerase corrects misincorporations and prevents misextensions while maintaining amplification efficiency.

Derived from *Thermotoga maritima*, *UlTma* DNA Polymerase is genetically engineered to achieve an optimal balance between proofreading and polymerase activities. Extensive studies in our labs have resulted in a proven enzyme with well-documented, optimized protocols for your most demanding PCR application.

UlTma DNA Polymerase. Another innovation from Perkin-Elmer and the latest addition to our growing family of PCR enzymes. All backed by our PCR Performance Guarantee. In the U.S., call PE XPRESS at 1-800-762-4002 to order. Or call 1-800-762-4001 for technical information. Outside the U.S., contact your Perkin-Elmer representative.

PERKIN ELMER

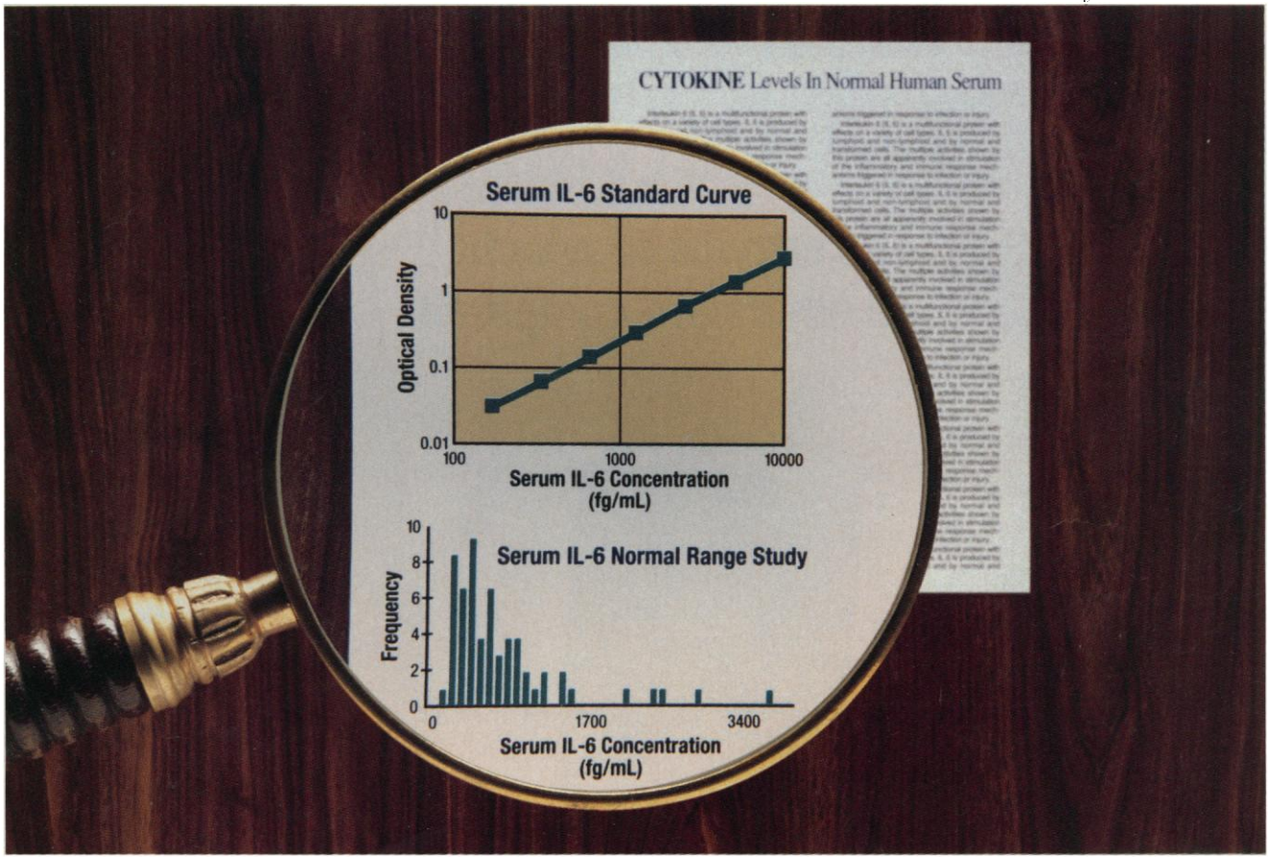
Europe Vaterstetten, Germany Tel: 49-8106-381-115 Fax: 49-8106-6697
Canada Montreal, Canada Tel: 514-737-7575 Fax: 514-737-9726
Far East Melbourne, Australia Tel: 61-3-560-4566 Fax: 61-3-560-3231
Latin America Mexico City, Mexico Tel: 52-5-651-7077 Fax: 52-5-593-6223

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

Roche

Circle No. 25 on Readers' Service Card

Focus in on Measuring...
FEMTOGRAM Levels of CYTOKINES



Quantikine™ HS (High Sensitivity) Immunoassays
No other assay can measure cytokines at these low levels

Cytokines occur in extremely low levels in biological fluids. Now it is possible, with the Quantikine HS (High Sensitivity) series of immunoassay kits, to easily and precisely quantitate cytokines in a variety of biological fluids.

- Femtogram Sensitivity
- No Interference from other Cytokines
- No Interference from Soluble Receptors
- Performs Normal Range Studies

- Multiple Sample Types:
  - Urine
  - Plasma
  - Serum

- Quantikine HS Immunoassays Available for:
  - IL-6
  - IL-1β
  - TNF α
  - FGF basic

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

To obtain a catalog, detailed product information or to place an order call 1-800-343-7475

In Europe contact:

British Bio-technology, Ltd.
4-10 The Quadrant, Barton Lane
Abingdon, Oxon OX14 3YS
Telephone: +44 (0865) 781045
Fax: +44 (0235) 533420

In Japan contact:

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

R&D Systems
614 McKinley Place N.E.
Minneapolis, MN 55413
Telephone: 800-343-7475
Fax: (612) 379-6580

R&D SYSTEMS

1·800·343·7475

Circle No. 35 on Readers' Service Card

SEQUENASE® VERSION 2.0 T7 DNA POLYMERASE

The enzyme to which all others are compared.

Sequenase Sequencing Kits are Versatile for Sequencing:

- PCR Products
- GC Rich Templates
- M13 and Plasmid Clones

Sequenase Version 2.0 DNA Sequencing Kits Are Flexible and Easy to Use:

- Contain dGTP, dITP or 7-deaza dGTP Nucleotide Mixes for Resolving Compressions
- Sequence Information Close to the Primer with Mn
- Generate Long Reads
- Adapted for Glycerol Tolerant Gels

A. PCR Products
Sequence of a PCR product obtained with the Sequenase RapidWell DNA Sequencing Kit. This gel was run using Glycerol Tolerant Gel Buffer.

B. Long Sequences
Sequencing gel [^{35}S] generated using single-stranded M13mp18 template and the Sequenase Version 2.0 DNA Sequencing Kit.

C. Plasmid with RapidWell Kit
Sequencing gel generated using the Sequenase RapidWell DNA Sequencing Kit and double-stranded pUC19 with Mn^{2+}.

USB offers the Complete Range of Sequencing Products Featuring Sequenase Version 2.0 T7 DNA Polymerase, the Premier Enzyme for Sequencing:

- Highly Processive
- Incorporates Nucleotide Analogs
- No Exonuclease Activity

Sequenase Kits Featuring the Two-Step Protocol Yield:

- Low Gel Background
- Uniform Band Intensities
- Easy to Read Gels

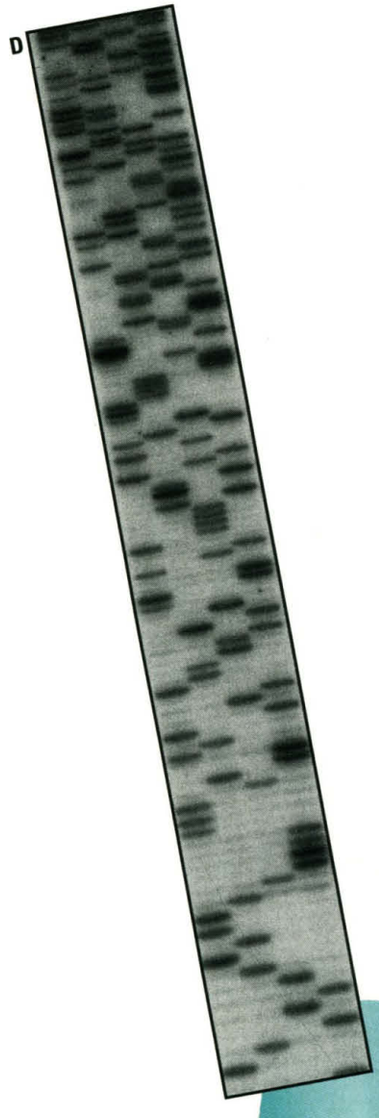
Sequenase Products are Supported By the Sequencing Experts:

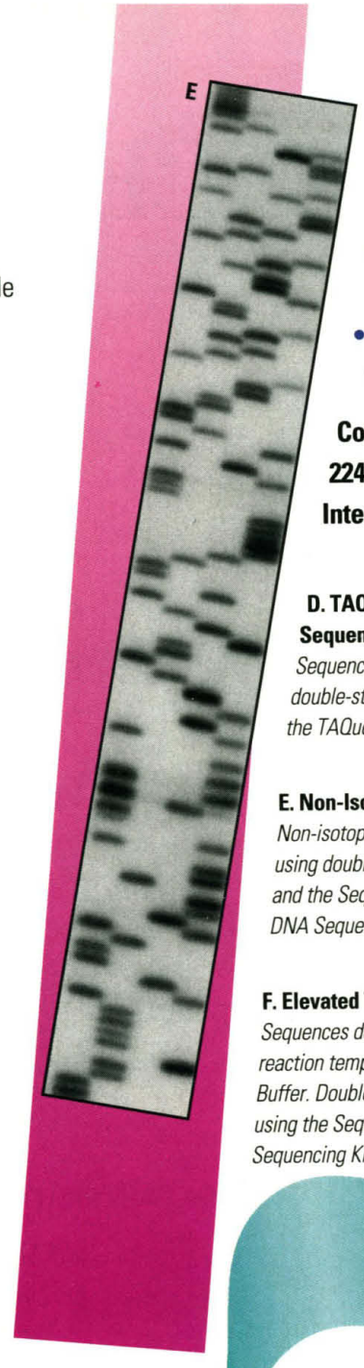
- Innovative New Products and Detailed Protocols
- Sequencing Manual and Video Available
- Experienced Technical Support by Phone or Fax

USB Offers Additional Kits for a Complete Range of Sequencing Needs:

- TAQuence® Cycle Sequencing Kit for Sequencing Small Amounts of Template
- Sequenase® RapidWell™ DNA Sequencing Kit for Ease and Convenience
- Sequenase Images™ Non-Isotopic DNA Sequencing System for Non-Isotopic DNA Sequencing

Contact United States Biochemical Corporation, P.O. Box 22400, Cleveland, OH 44122. 800-321-9322. Fax: 800-535-0898. International: 216-765-5000. Telex: 980718. Fax: 216-464-5075.





D. TAQuence Cycle Sequencing Kit

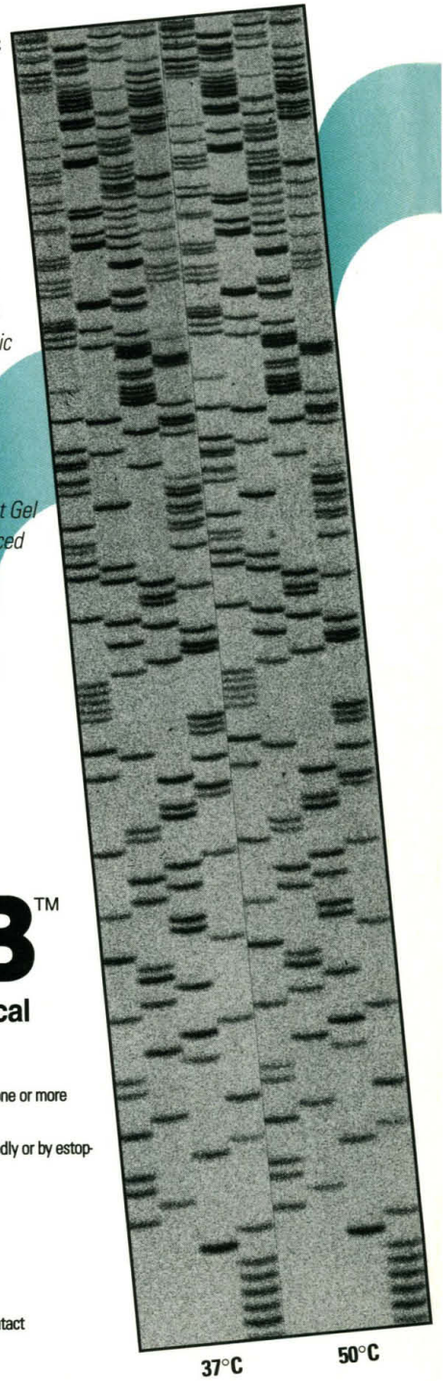
Sequencing gel [^{32}P] generated using double-stranded pUC19 template and the TAQuence Cycle Sequencing Kit.

E. Non-Isotopic

Non-isotopic sequencing gel generated using double-stranded plasmid template and the Sequenase® Images Non-Isotopic DNA Sequencing System.

F. Elevated Temperature

Sequences demonstrating the use of high reaction temperature and Glycerol Tolerant Gel Buffer. Double-stranded DNA was sequenced using the Sequenase RapidWell DNA Sequencing Kit.



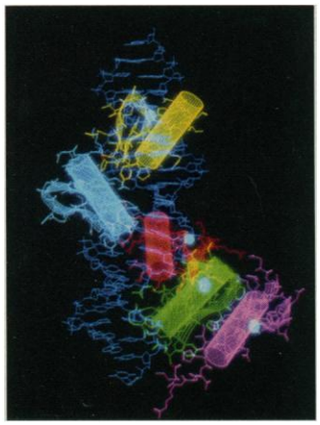
USB™
United States Biochemical

Circle No. 15 on Readers' Service Card

ISSN 0036-8075
24 SEPTEMBER 1993
VOLUME 261
NUMBER 5129

SCIENCE

AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE



1701

The versatility of fingers

1674

NEWS

SPECIAL NEWS REPORT

PERSPECTIVES

ARTICLE

RESEARCH ARTICLE

REPORTS

DEPARTMENTS

COVER

Distribution of *APETALA3* RNA (red) in young flowers of the *leafy-5* mutant of *Arabidopsis*. The expression of *APETALA3*, which determines the identity of floral organs, is nearly normal in *leafy-5* and *apetala1-1* single mutants. In contrast, very little *APETALA3* RNA can be detected in plants that carry both the *leafy-5* and *apetala1-1* mutations, which indicates that *LEAFY* and *APETALA1* have overlapping roles in activating floral homeotic genes. See page 1723. [Photo: Detlef Weigel]

SPECIAL SECTION

1716

Tracking turtles through time

CAREERS '93: A SURVIVAL GUIDE

1765

Foreign Nationals Change the Face of U.S. Science • Surprise! Foreigners Can Get Jobs in Japan • Researching the Japanese Job Market • Opportunities in Europe: Away From the U.S. Rat Race • CERN: A Mecca for U.S. Physicists • Doctor-Doctor: Growing Demand for M.D.-Ph.D.s • Molecular Medicine: A Calling for the Dual-Degreed • Pharmaceuticals: Good Opportunities in Small Packages • Chemists at Work • New Life Ahead for Social Sciences • Anthropology: Nature-Culture Battleground • Cognitive Neuroscience: A World With a Future • How Much Money Is Your Ph.D. Worth? • Succeeding in Science: Some Rules of Thumb

◩ Indicates accompanying feature

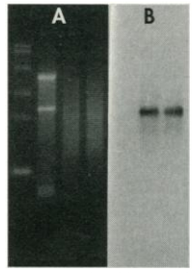
■ **SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005.** Second-class postage (publication No. 484460) paid at Washington, DC, and additional mailing offices.

Domestic individual membership and subscription (51 issues): $87 ($47 allocated to subscription). Domestic institutional subscription (51 issues): $205. Foreign postage extra: Mexico, Caribbean (surface mail) $50; other countries (air assist delivery) $95. First class, airmail, student and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. **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 2033, Marion, OH 43305-2033. **Single copy sales:** $6.00 per issue prepaid includes surface postage; Guide to Biotechnology Products and Instruments, $20. Bulk rates on request.

...Oligotex-dT for mRNA purifications

Get messenger RNA fast with Oligotex-dT, an innovative new product from QIAGEN. Oligotex-dT Kits efficiently purify mRNA from total RNA – in just 20 minutes. Using Oligotex-dT means:

- No cellulose columns or magnetic systems
- Convenient spin column or batch format
- No ethanol precipitation
- Simultaneous processing of many samples



Poly A+ mRNA isolated from total liver RNA with Oligotex-dT. A: Agarose/ formaldehyde gel. B: Northern blot of (A) probed with ^{32}P-β-actin.

Oligotex-dT captures greater than 90% of mRNA sequences from less than 1µg to 5 mg of total RNA, and all in microspin format. Oligotex-dT can replace soluble oligo-dT primers in cDNA-synthesis to provide an ideal support for use in cDNA-cloning and subtractive hybridization. Put an end to those sticky oligo-dT cellulose problems... ...get the Oligotex-dT message.

Oligotex-dT is a highly concentrated, ready-to-use suspension consisting of 1.1 µm latex particles which provide a large surface area heavily coated with oligo-dT primers.

For additional information about Oligotex-dT Mini, Midi, Maxi Kits and Oligotex-dT Suspension, or to have a product specialist contact you, please call QIAGEN Inc., DIAGEN GmbH or your local distributor.

DIAGEN GmbH Max-Volmer-Straße 4, 40724 Hilden, Germany, Orders (0)2103-892-230, Fax (0)2103-892-222, Technical Service (0)2103-892-240
QIAGEN Inc. 9500 De Soto Avenue, Chatsworth, CA 91311 USA, Orders 800-426-8157, Fax 818-718-2056, Technical Service 800-DNA-PREP (800-362-7737)

DISTRIBUTORS: AUSTRALIA: PHOENIX Scientific Pty. Ltd. (03) 868 6888 **AUSTRIA:** BIO-TRADE (0222) 889 18 19 **BENELUX:** Westburg B.V. NL: (033) 95 00 94, B: (07811) 9815 (toll free) **DENMARK:** KEBO Lab A/S (44) 88 72 00 **FINLAND:** KEBO OY (90) 804 4900 **FRANCE:** Coger (1) 45 32 35 17 **GREECE:** Bio+Analytica (01) 64 62 748 **HONG KONG/CHINA**: Diagnotech Co., Ltd. (892) 542 0566 **INDIA:** Genetix: (11)-550 6463 **ISRAEL:** BIO-LAB Laboratories Ltd. (02) 524 447 **ITALY:** Genenco (M-Medical srl) (055) 5001871 **JAPAN:** Funakoshi Co., Ltd. (3) 5684-1622 **KOREA:** LRS Laboratories, Inc. 924 8697 **NORWAY:** KEBO Lab AS (02) 30 17 18 **PORTUGAL:** Izasa Portugal (01) 758 07 40 **RSA:** Whitehead Scientific Supplies (021) 981-1560 **SINGAPORE:** TIBS TRADING PTE LTD (Biotech Branch) 292 9783 **SPAIN:** Izasa S. A. (3) 401 01 01 **SWEDEN:** KEBO Lab AB (08) 621 34 00 **SWITZERLAND:** KONTRON Instruments AG (01) 733-5-733 **TAIWAN:** Formo Industrial Co., Ltd. (02) 736 7125 **UK:** Hybaid Ltd. (081) 614 100

QIAGEN

Circle No. 20 on Readers' Service Card

edited by PHIL SZUROMI

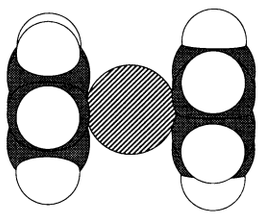
A firmer grip on zinc fingers

Variety appears to be the rule on how zinc fingers, a common motif in eukaryotic transcription factors, contact DNA. Pavletich and Pabo (p. 1701) present the x-ray structure of the human glioblastoma protein, which has five zinc fingers, complexed with a high-affinity DNA binding site. In this structure, the first zinc finger does not even contact DNA, but instead interacts with the second zinc finger. The remaining fingers wrap around the major groove, but there is no simple periodic nature to these contacts. This structure thus differs from the one determined previously by these authors for Zif268, a three–zinc finger protein, in complex with DNA. This variety prompts the authors to suggest that proteins designed to bind DNA through zinc fingers may be more easily found through screening and selection than through rule-based design.

■

Potassium selectivity

One might expect that potassium-selective channels would have pores that contain mainly amino acid residues with negatively charged side chains, yet in the *shaker* channel in *Drosophila*, numerous hydrophobic residues line the pore. Kumpf and Dougherty (p. 1708) pre-



sent a theoretical study of the energetics of monovalent cations with two benzene molecules in order to model alkali-ion interactions with hydrophobic groups. Potassium forms the preferred complex in an aqueous environment. In a Perspective, Miller (p. 1692) discusses the role of oxygen cages and π interactions in potassium selectivity and points out the need for more detailed structural data.

Signaling through tyrosine phosphorylation

Researchers wondering how various growth factors and cytokines control gene expression have converged on a common answer. Four reports (Larner *et al.*, p. 1730; Silvennoinen *et al.*, p. 1736; Ruff-Jamison *et al.*, p. 1733; and Sadowski *et al.*, p. 1739) present evidence that epidermal growth factor, platelet-derived growth factor, colony-stimulating factor–1, granulocyte-macrophage colony-stimulating factor, and interleukins -3, -5, -6, and -10 all induce phosphorylation of certain cytoplasmic proteins on Tyr residues. This phosphorylation activates DNA binding by these proteins, which may account for enhanced transcription of specific genes in response to these growth factors. Interferon-α and interferon-γ were recently shown to activate transciption factor complexes containing Tyr-phosphorylated proteins. Shuai *et al.* (p. 1744) show that activation of transcription by interferon-γ requires phosphorylation of a single Tyr residue on a protein called Stat91. Some, but not all, of the growth-promoting agents mention above also caused formation of DNA binding complexes that contained Stat91. Montminy (p. 1694) discusses the implications of these findings in a Perspective.

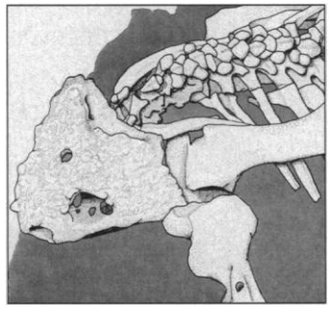
■

Cold and distant

Pluto is cold, of course, but just how cold has been uncertain. Brightness measurements at infrared and millimeter wavelengths are difficult, and previous estimates of the planet's surface temperature have ranged from 30 to 60 kelvin. New observations at several wavelengths by Stern *et al.* (p. 1713) favor the lower end of this temperature range, a result consistent with what is known about Pluto's atmospheric pressure and composition. However, the totality of observations suggest a nonthermal overall emission spectrum, perhaps indicative of a dappled surface, with distinct cold and not-so-cold areas.

Where turtles came from

The relation of turtles, with their distinctive body plan, to other reptiles has been uncertain. They appear to have risen abruptly in the fossil record in the Late Triassic with what were



thought to be many specialized features. Lee (p. 1716), however, shows that they share many common morphological characteristics with pareiasaurs, which were large, heavily armored reptiles that were abundant during the Late Permian yet have not been well studied. Affinities between turtles and other previously suggested intermediate relatives are shown to be less likely.

Crystal clocks and mountain building

One problem in understanding the history of orogenic events is that continued or multiple episodes of heating, deformation, and metamorphism of rocks act to overprint or to obscure the earliest parts of the record. This problem is particularly common for geochronology because loss of argon or other daughter elements from minerals resets isotopic clocks. Hames and Hodges (p. 1721) have attacked this problem by modeling argon diffusion in micas in conjunction with detailed dating of different parts of the crystal using a laser. This technique allowed reconstruction of the chronology of multiple events affecting rocks in the Vermont Appalachians over 150 million years.

■

Oral collagen and rheumatoid arthritis

Rheumatoid arthritis (RA) is thought to be an autoimmune disease involving the production of T cells reactive with an antigen in joint tissues. Animal studies have identified type II collagen, the major structural component of cartilage, as a potential autoantigen and have shown that disease progression can be inhibited by oral administration of collagen, presumably by inducing antigen-specific tolerance. Trentham *et al.* (p. 1727; see news story by Barinaga, p. 1669) conducted a randomized, double-blind clinical trial in which 60 RA patients were fed chicken type II collagen or a placebo for 3 months. Patients who received collagen had fewer swollen and tender joints than patients in the placebo group and showed no apparent side effects. Four patients who received collagen exhibited complete remission.

FINALLY,

an Electroporator

WITH ALL

THE FEATURES YOU NEED

And None *you* Don't.

Too many electroporation devices come with a long list of fancy features and a shocking price. Now, the new Electroporator II from Invitrogen gives you all the versatile electroporation capability you need without the high cost.

YOU'VE GOT *the* POWER.

The easy-to-use Electroporator II uses standard electrophoresis power supplies, so you don't pay for an extra power supply you don't need. But the compact, durable Electroporator II still delivers all the power you *do* need, including pulse lengths from 1 to 25 ms.

BACTERIA, YEAST *and* MAMMALIAN CELLS WELCOME.

With the Electroporator II, it's easy to optimize field strength and pulse length for maximum transformation efficiency, no matter what cell type. And because it works with 0.1, 0.2 and 0.4 cm cuvettes, electroporation of bacteria, yeast or mammalian cells is no problem.

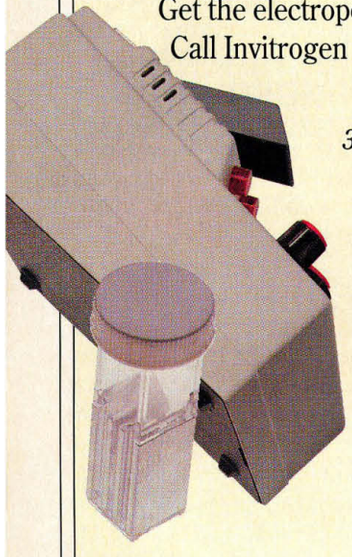
Get the electroporation device that delivers everything you need without the sticker shock.

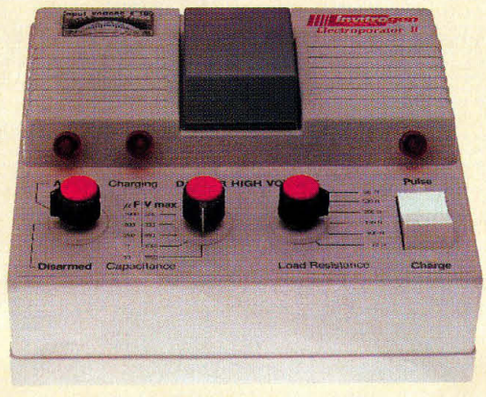
Call Invitrogen today to order the Electroporator II (catalog no. S1670-01).

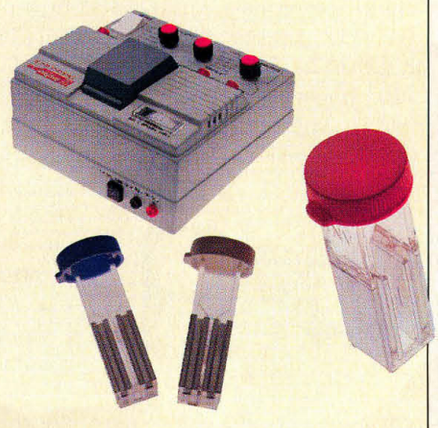
(800) 955-6288 or Fax (619) 597-6201

Invitrogen®

3985 B Sorrento Valley Blvd., San Diego, CA 92121







European Headquarters:
Invitrogen *BV*
De Schelp 26, 9351 NV Leek
The Netherlands
Tel: (0) 5945-15175
Fax: (0) 5945-15312

Toll free Telephone Numbers
The Netherlands 06-02208848
Belgium 078-111173
Germany 0130 8100 43
Switzerland 155-1966
Austria 0660-8127

UK Tel: (0865) 781045 Fax: (0235) 533420
France 05 90 72 49
Sweden 020 793149
Norway 050 11033
Denmark 80 01 85 92

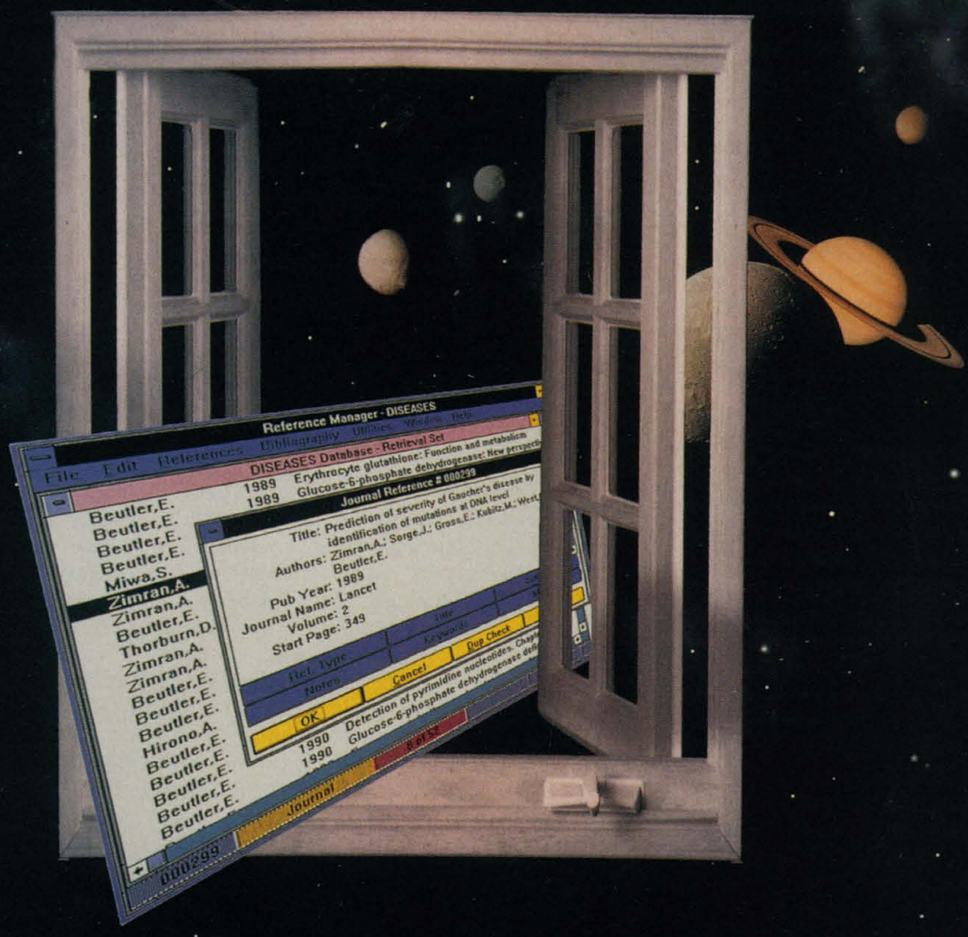
RD SYSTEMS

CELBIO
Italy
Tel: 39-238103171
Fax: 39-238101465

Japan
Tel: 81-356841622
Fax 81-356841633

Austria 43-1-8891819 Australia 61-38089077 Finland 35-804208077 India 33-594127 Israel 972-8472563 Spain 34-14091251 or 34-3-4560607 Singapore 65-779-1919 Germany/Switzerland 62-21303907

Circle No. 42 on Readers' Service Card



Reference Manager® Opens New WINDOWS

The leading bibliographic software is now available for Microsoft® Windows™!

Since 1984, Reference Manager has been the leading bibliographic management software package for scientists, information professionals, and other scholars. Now Reference Manager is available for the Microsoft Windows operating system as well as for MS-DOS, Macintosh, and the NEC 9801.

In addition to the features found in its DOS and Macintosh counterparts, Reference Manager for Windows contains a number of enhancements, including greatly increased flexibility in bibliographic formatting and the ability to "cut and paste" entire references or their components using the standard clipboard function of Windows.

Reference Manager for Windows - The Best Bibliographic Management Software is now the only product of its kind for Microsoft Windows!

MICROSOFT® WINDOWS™ COMPATIBLE

RIS

Research Information Systems

2355 Camino Vida Roble, Carlsbad, CA 92009-1572

(800) 722-1227 • (619) 438-5526 • Fax: (619) 438-5573

Circle No. 6 on Readers' Service Card

IMAGES™ CHEMILUMINESCENT DETECTION SYSTEMS

The Ultimate in Sensitivity, Convenience and Flexibility

- **Sensitivity Equal to Radioactive Methods**
- **Reliable, Reproducible Results**
- **Safe - No Radioisotopes**
- **Complete, Convenient Systems**

NEW Sequence with biotinylated primers OR biotinylated nucleotides using Sequenase® Images

The Images Product line includes:

Sequenase Images™ Non-Isotopic DNA Sequencing System
- Sequenase Images™ Non-Isotopic DNA Sequencing Kit
- Sequenase Images™ Detection Kit

Gene Images™ Detection System
- Gene Images Non-Isotopic Nucleic Acid Detection Kit
- Random Primed Images® Biotin Labeling Kit

Protein Images® Non-Isotopic Western Blotting Detection Kit

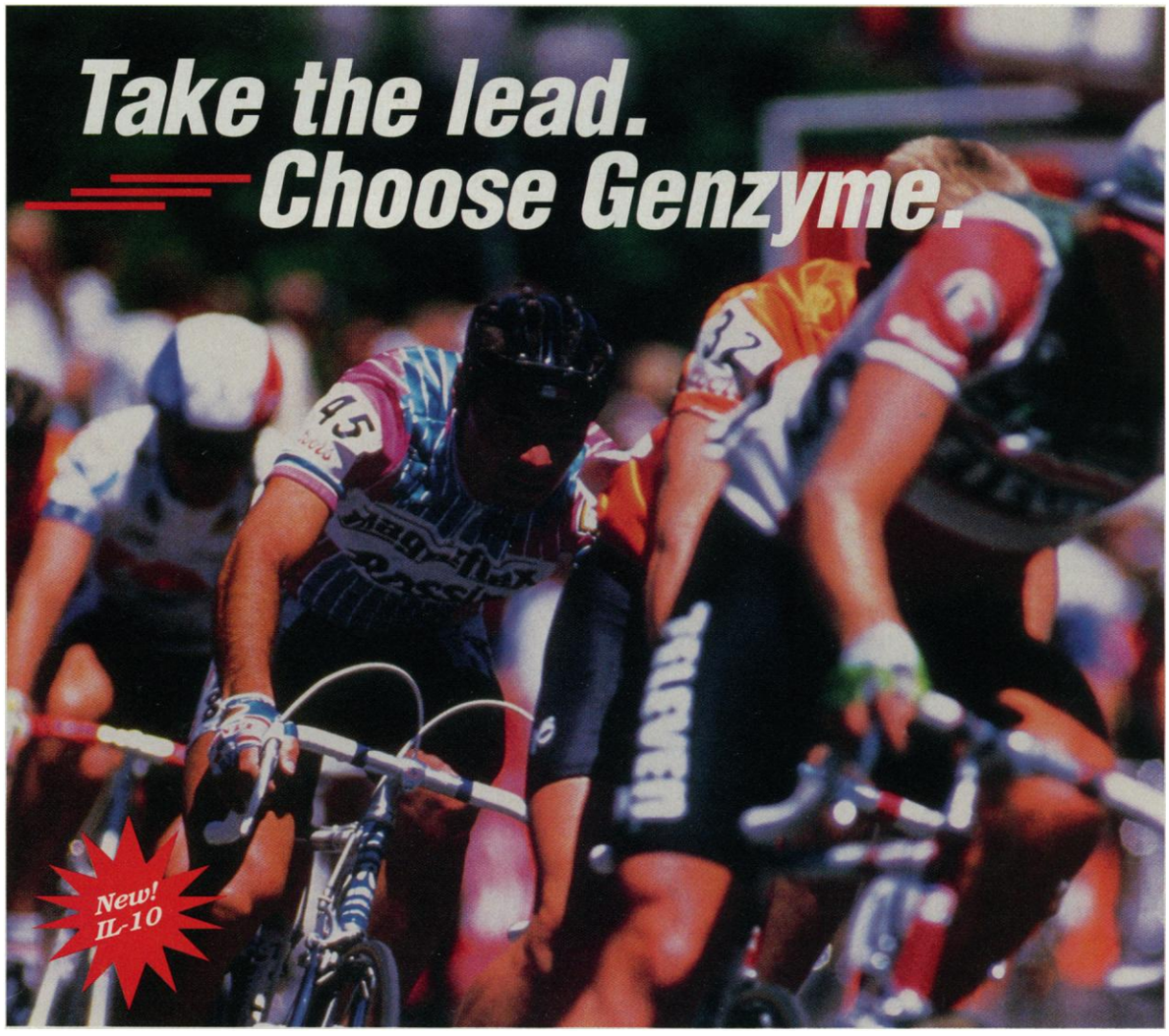
Colony Images™ Non-Isotopic Colony/Plaque Screening Kit

For more information on our Images Non-Isotopic Systems or to receive our technical brochure, contact United States Biochemical Corporation, P.O. Box 22400, Cleveland, Ohio 44122. Phone: 800-321-9322. Fax: 800-535-0898. International: 216-765-5000. Telex: 980718. Fax: 216-464-5075.

USB™
United States Biochemical

USB INTERNATIONAL OFFICES: Cambridge, England • Bad Homburg, Germany INTERNATIONAL DISTRIBUTORS: Alpha Scientific – Thessaloniki, Greece • BioTrade – Austria • Cambridge BioScience – Cambridge, England • Getter (2000) Ltd.– Tel-Aviv, Israel • Integro B.V.– Holland • Kebo – Spanga, Sweden • Ballerup, Denmark • Espoo, Finland • Oslo, Norway • Labex Corp. – Calcutta/New Delhi, India • Lucerna-Chem AG – Lucerne, Switzerland • Quimigranel-SA – Spain/Portugal • Societa Italiana Chimici – Roma, Italy • Sopachem – Belux • Touzart et Matignon – Paris, France • Toyobo Company, Ltd.– Osaka, Japan • Trace Scientific – Melbourne, Australia

Circle No. 30 on Readers' Service Card



To be a leader in the cytokine research race requires a combination of scientific excellence and superior reagents.

Genzyme can help accelerate your research by providing consistent quality, published applications, guaranteed performance, and next day delivery.

Genzyme offers the most complete line of mouse and human cytokine products:

- ***cytokines***
- ***growth factors***
- ***antibodies***
- ***receptor reagents***
- ***cell adhesion products***
- ***ELISA Kits***

For research only, not for use in diagnostic procedures.

For more information or to place an order, call 1-800-332-1042 (in USA) or contact your International Genzyme Distributor (see list below).

genzyme One Kendall Square, Cambridge, MA 02139 USA
FAX: 617-252-7700, U.K. Sales: 0-800-373-415

RA Tuteur SA/27-3631 **AUS, NZ** Lab Supply/(02)5503222 **AUT, HUN** Scandic/(0222)4707491 **BEL** Innogenetics/032164820 **BR** Biosys/(0187)22-4610 **CAN** InterMedico/(416)470-2520 **RCH** Prolab/6989617 **EE** Lucerna Chem/041-44 9344 **ET** Gamma Trade Co/23480997 **FRA, ALG, MOR, TUN** Tebu/(1)34846252 **D** IC Chemikalien/(089)9612051 **GR** Biomedica/80.54.223 **HK, PRC, PHI** Tradeworld (HK) and Co./(852)6996208 **IND** Biotech India/(542)311473 **IR** Eskan Teb Tech Co./4279491 **IL** Enco Scientific Services Ltd/02-354276 **I** Omnia Res/026127621 **JPN** Cosmo Bio/(03) 3663-0723 **ROK** LRS Laboratories/02-924-8697 **KUW** Al Sedan Trading/2420469 **NL** Sanbio/04132-51115 **PAK** Progressive Medicals/2412601-3 **POR** Quimigranel/858 15 64 **KSA** Farabi Corp./4025322 **SWE, DEN, NOR, FIN** Novakemi/46-8-390490 **SGP, LAO, VN, CAM, BUR** Singapore Biotech/(65)7791919 **ESP** Quimigranel/(91) 556.16.14 **CH** Flow Laboratories/041-614814713 **ROC** Union Biomedical/(02)733-2531 **TR** Atlas Kimya/1344400 **UK** NBS Biologicals/(0707)275733

Circle No. 59 on Readers' Service Card

NOW, EIGHT TIMES MORE PRECISION THAN EVER BEFORE.

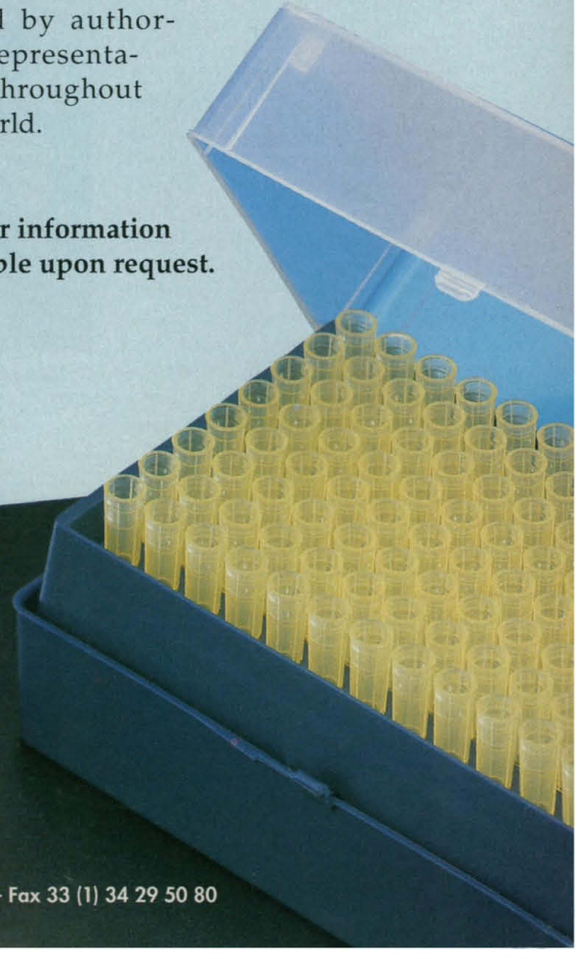
The new Gilson Pipetman 8X200 brings a new standard of accuracy and precision to multichannel pipetting for 96-well microplates. On all eight channels, and across the full volume range (20-200 µl), you benefit from Pipetman quality and performance.

The 8X200 has all the well-known features of Pipetman • Rugged construction • Continuously adjustable volume setting for maximum versatility • Direct numerical readout in microlitres for mistake-free pipetting • Classic, fatigue-free design.

Special new features available only from Gilson include • An adjustable angle for comfortable pipetting • Strong, easy to operate tip ejector • Individually replaceable channels • Ultra-clean tips, factory-sealed for your protection.

The Pipetman 8X200 can be repaired and recalibrated by authorized representatives throughout the world.

Further information available upon request.



GILSON®

72 rue Gambetta, BP 45, 95400 Villiers-le-Bel, France - Tel. 33 (1) 34 29 50 00 - Telex 606 682 - Fax 33 (1) 34 29 50 80

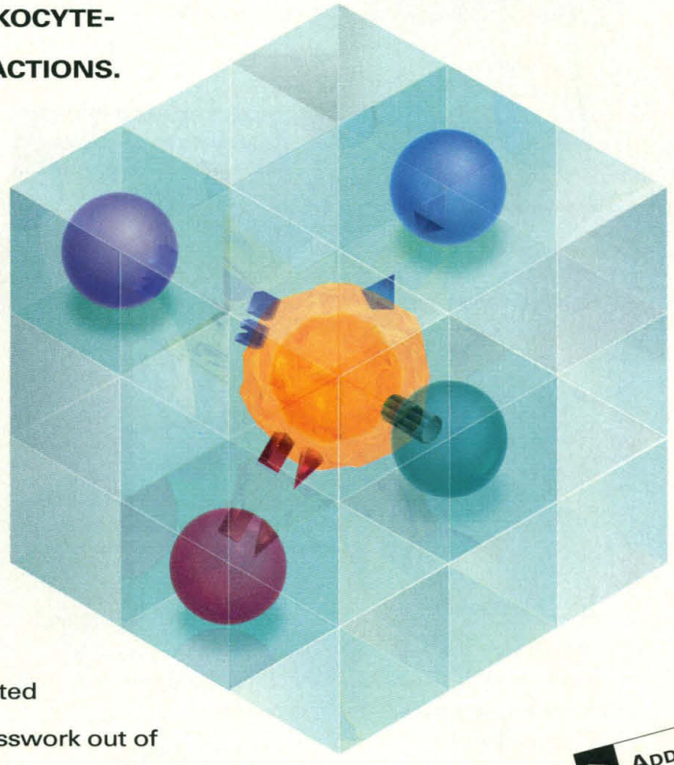
Circle No. 5 on Readers' Service Card

CAMFOLIO™

TOOLS FOR EXPLORING CELLULAR INTERACTIONS AT THE MOLECULAR LEVEL

THE CAMFOLIO APPROACH TO UNDERSTANDING THE COMPLEX PHENOMENA OF LEUKOCYTE-ENDOTHELIAL INTERACTIONS.

Begin with the most comprehensive selection of unique monoclonal antibodies to human cell adhesion molecules. Portfolios of complementary molecules, formulated for multiple assays, give you the flexibility to explore multiple pathways of interest. Clone-specific references and documented functionality take the guesswork out of experimental design. By letting you define the variables, CAMFolio monoclonal antibodies give you more control over your research. For information on CAMFolio monoclonal antibodies relevant to leukocyte-endothelial interactions or for a complete catalog of CAMFolio monoclonal antibodies, contact Becton Dickinson today.



ELAM-1 (E-SELECTIN)

GMP-140 (P-SELECTIN)

ICAM-1 (CD54)

INTEGRIN α4 (VLA-4)

LECAM-1 (L-SELECTIN)

LFA-1α (CD11A)

LFA-1β (CD18)

MAC-1 (CD11B)

SIALYL-LE^X

VCAM-1

NEW ADDITIONS TO THE INTEGRIN AND NEURAL CELL ADHESION MOLECULE PORTFOLIOS.

Becton Dickinson
Advanced Cellular Biology
2350 Qume Drive
San Jose, CA 95131-1807
Ordering (800) 223-8226
Customer Support (800) 952-3222
Fax (408) 954-2009

Becton Dickinson Canada, Inc.
(416) 822-4820
Fax (416) 855-1243

Becton Dickinson
European HQ
Erembodegem-Aalst, Belgium
(32) 53-720211
Fax (32) 53-720450

Nippon Becton Dickinson
Company, Ltd.
Tokyo, Japan
(81) 3-3403-9991
Fax (81) 3-3403-5008

Becton Dickinson Worldwide Inc.
Singapore
(65) 861-0633
Fax (65) 860-1590

BECTON DICKINSON

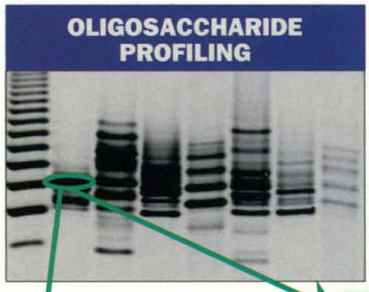
Circle No. 18 on Readers' Service Card

Separate, quantify, or sequence carbohydrates in one day with Glyko FACE® technology

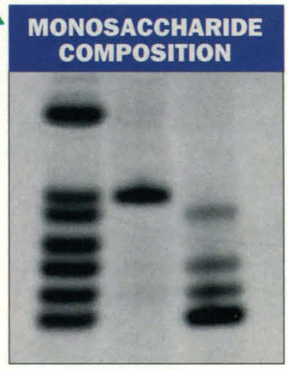
If you're working with DNA or protein, you're ready to work with carbohydrates

Glyko's FACE *(Fluorophore Assisted Carbohydrate Electrophoresis)* technology, makes it possible for you to work with and analyze complex carbohydrates using the same technique you already use every day in your laboratory: polyacrylamide gel electrophoresis.

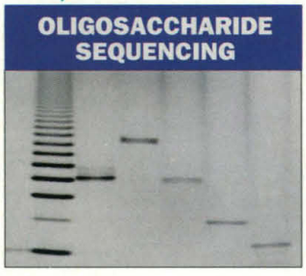
Now, in less than one day, you can perform profiling, composition, or sequencing experiments such as the ones shown here, using FACE chemistry kits.



◀ **FACE gel profile of N-linked oligosaccharides released from a number of different glycoproteins**



▶ **FACE gel showing the monosaccharide compositional analysis of a tri-sialylated, triantennary oligosaccharide**

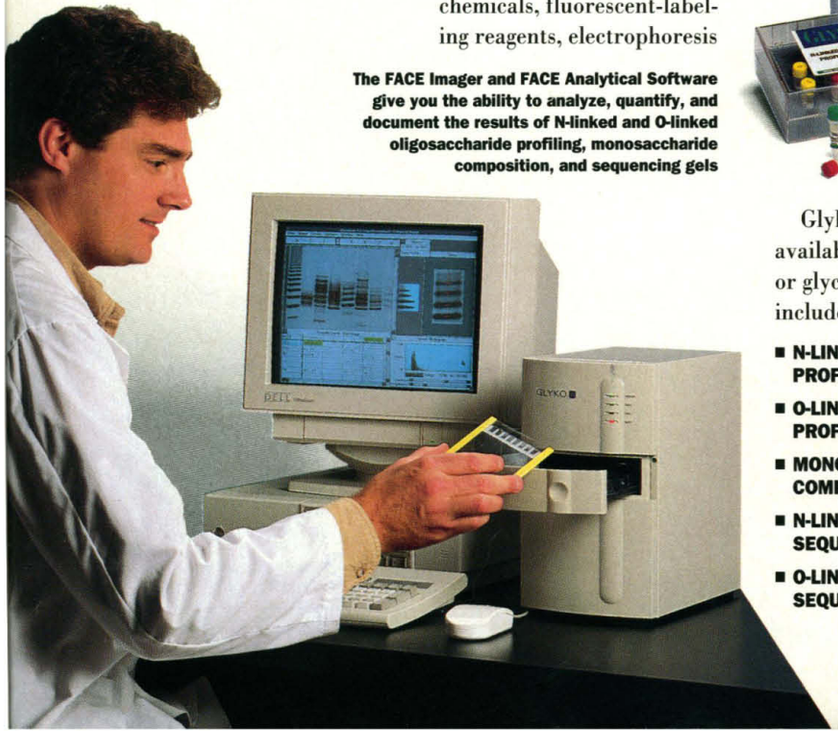


◀ **FACE gel illustrating the enzyme-based sequencing of a tri-sialylated, triantennary oligosaccharide**

Color-coded FACE kits make carbohydrate analysis easy and reliable

FACE kits are color-coded and are designed to provide a complete approach to carbohydrate analysis...starting with the enzymatic or chemical release from the glycoconjugate to the separation, isolation, or sequencing of oligosaccharides.

Everything you need is included: enzymes or release chemicals, fluorescent-labeling reagents, electrophoresis standards, controls, running buffers, precast polyacrylamide gels, and complete protocols.



The FACE Imager and FACE Analytical Software give you the ability to analyze, quantify, and document the results of N-linked and O-linked oligosaccharide profiling, monosaccharide composition, and sequencing gels

Glyko FACE kits now available for carbohydrate or glycoconjugate analysis include:

- **N-LINKED OLIGOSACCHARIDE PROFILING KIT**
- **O-LINKED OLIGOSACCHARIDE PROFILING KIT**
- **MONOSACCHARIDE COMPOSITION KIT**
- **N-LINKED OLIGOSACCHARIDE SEQUENCING KIT**
- **O-LINKED OLIGOSACCHARIDE SEQUENCING KIT**

Sequence your oligosaccharides with Glyko recombinant glycosidases

Glyko offers the most complete line of recombinant glycosidases available, each cloned to be free of other glycosidases, protease activity, and carbohydrates:

- **PNGase F, releases Asn-linked oligosaccharides**
- **NANase I, releases α2-3 N-acetylneuraminic acid**
- **NANase II, releases α2-3,6 N-acetylneuraminic acid**
- **NANase III, releases α2-3,6,8 N-acetylneuraminic acid**
- **Neuraminic Acid Linkage Analysis Kit contains NANase I, II, and III**
- **HEXase I, releases β1-2,4,6 N-acetylglucosamine**
- **MANase I, releases α1-2,3,6 mannose**
- **FUCase I, releases α1-6 fucose**

We want to be your carbohydrate research partner

When your research requires a unique application of FACE technology, Glyko scientists will work with you to develop a custom FACE kit.

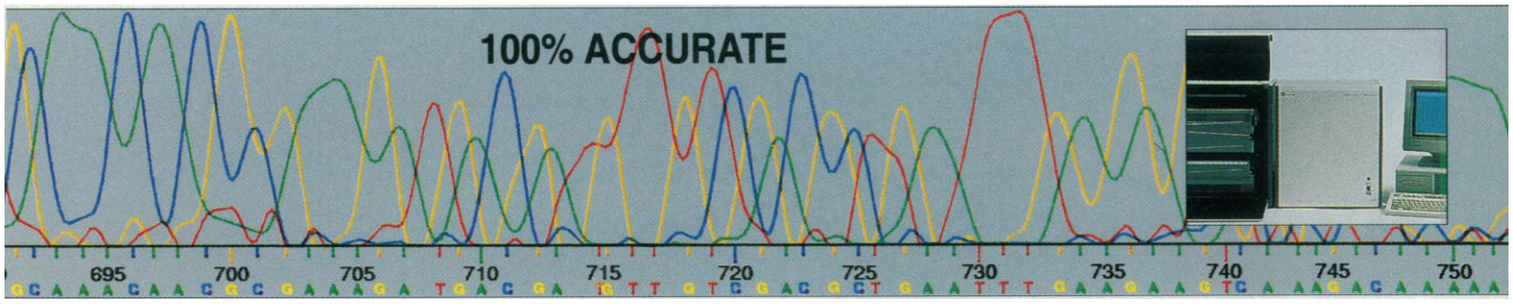
If you have only an occasional need for carbohydrate analysis, or lack the personnel to perform the analyses you require, our scientists can do it for you.

For more information, please call Glyko, Inc. toll free at 1 800 33 GLYKO (334 5956) or fax us at 1 415 382 7889.

GLYKO

Circle No. 45 on Readers' Service Card

P H A R M A C I A B I O T E C H



The longer your DNA sequence, the more you need ALF™ DNA Sequencer.

It's no longer in doubt. ALF™ DNA Sequencer is the most accurate sequencing instrument available today. Totally error-free runs of 740 base pairs are not uncommon and well over 99% accuracy is routinely obtained from much longer nucleotide sequences (1).

Recently published studies (2-5) also confirm the sequencing supremacy of ALF.

For example, when ALF and two other instruments were assessed for sequencing precision (2,3), the high accuracy of ALF could not be matched by either of its rivals, who displayed sequencing errors of 5-10% in the 200-300 base pair range.

In another study (4), the leading competitor's DNA sequence error as a function of length increased rapidly from 1% in the 0-350 nucleotide range to about 17% at 500 nucleotides, reaching a plateau of 25% error at 560 nucleotides. Furthermore, to get reliable data, this instrument required a redundancy of 8.4 reads per nucleotide.

In contrast, a standard ALF DNA Sequencer was more than 99% accurate over 500 base pairs and sequenced with a low overall redundancy of 2.8 (one third of the rival sequencer) in the course of the European Community *Saccharomyces cerevisiae* genome sequencing project (5).

1. Data supplied by M. Uhlén and T. Hultman from routine sequencing run at the Royal Institute of Technology, Stockholm, Sweden.

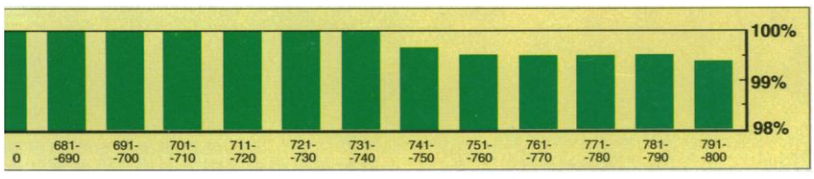
2. Comparison of three non-isotopic aotomated DNA sequence analysis systems. Poster presentation at the *San Diego Conference on Nucleic acids, Nov. 20-22, 1991.* Van Ranst, M., Fiten, P., Voet, M., Volckaert, G., Opdenakker, G.

3. Uniform scoring system for the assessment of DNA sequencing accuracy. *Meth. Mol. Cell. Biol. 3 (1992) 243-245,* Van Ranst, M., Fiten, P., Voet, M., Volckaert, G., Opdenakker, G.

4. Sequence length and error analysis of Sequenase and automated Taq cycle sequencing methods. *BioTechniques 14 (1993) 442-447,* Koop, B.F., Rowan, L., Chen, W.-Q., Deshpande, P., Lee, H., Hood, L.

5. An efficient low redundancy large scale DNA sequencing strategy: Primer walking on plasmid and cosmid DNA using *T7 DNA polymerase* and fluorescein-15*-dATP as internal label. Submitted for publication in *BioTechniques*, Voss, H., Wiemann, S., Zimmermann, J., Grothues, D. Sensen, C., Schwager, C., Stegemann, J., Erfle, H., Rupp, T., Sproat, B., Ansorge, W.

ALF - the most accurate DNA sequencer available today.



Fully automated base calling from a routine 800 base sequencing run. ALF was 100% accurate up to 740 base pairs (1).

That's 100% certain.

Ask for more information.

Circle No. 40 on Readers' Service Card

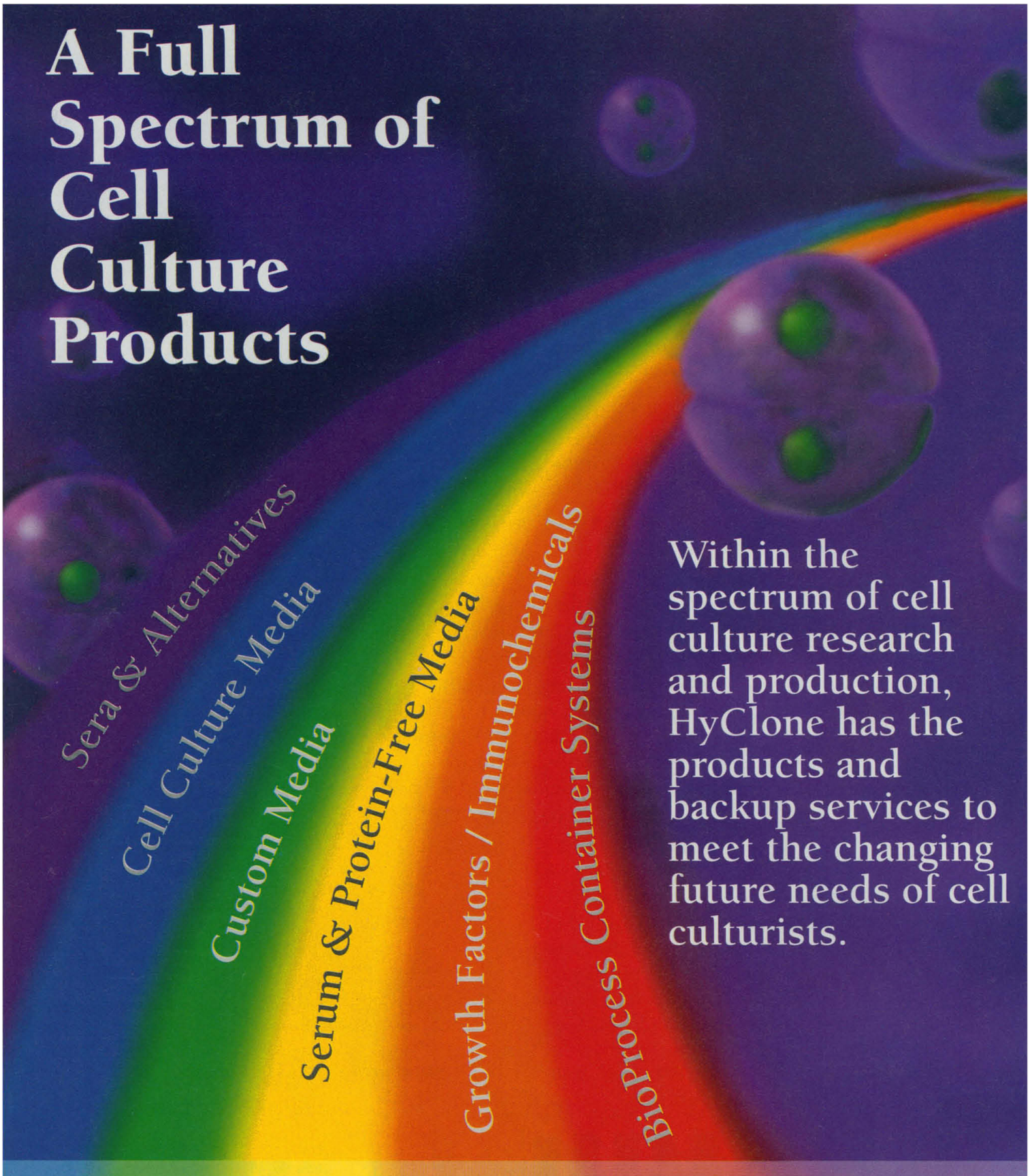
1143

Pharmacia

Head office Sweden 46 (0)18 16 50 00 **Australia** 02 367 4200 **Austria** 01 68 66 25 **Belgium** 02 727 43 51 **Brazil** 011 872 68 33 **Canada** 800 463 5800 **Denmark** 48 14 10 00 **Finland** 90 5021 077 **France** 130 64 34 00 **Germany** 0761 49 030 **Great Britain** 0908 60 30 65 **Hong Kong** 811 86 93 **Holland** 03480 77911 **India** 812 26 76 30 **Italy** 02 273 221 **Japan** 03 34 92 94 99 **Malaysia** 03 735 3972 **Norway** 63 89 23 10 **People's Republic of China** 01 25 65 603 **Portugal** 01 417 24 72 **Republic of Korea** 02 511 0801 **Spain** 93 589 07 01 **Sweden** 08 623 85 00 **Switzerland** 01 821 1816 **Taiwan** 02 831 5310 **United States** 800 526 3593 **Eastern Europe** + 43-(0)1 982 38 26 **Far East** 852 811 8693 **Latin America** 55-11 872 68 33 **Middle East** 30 -(0)1 96 27 396 **Other countries** 46 (0)18 16 50 00

(9306)

A Full Spectrum of Cell Culture Products



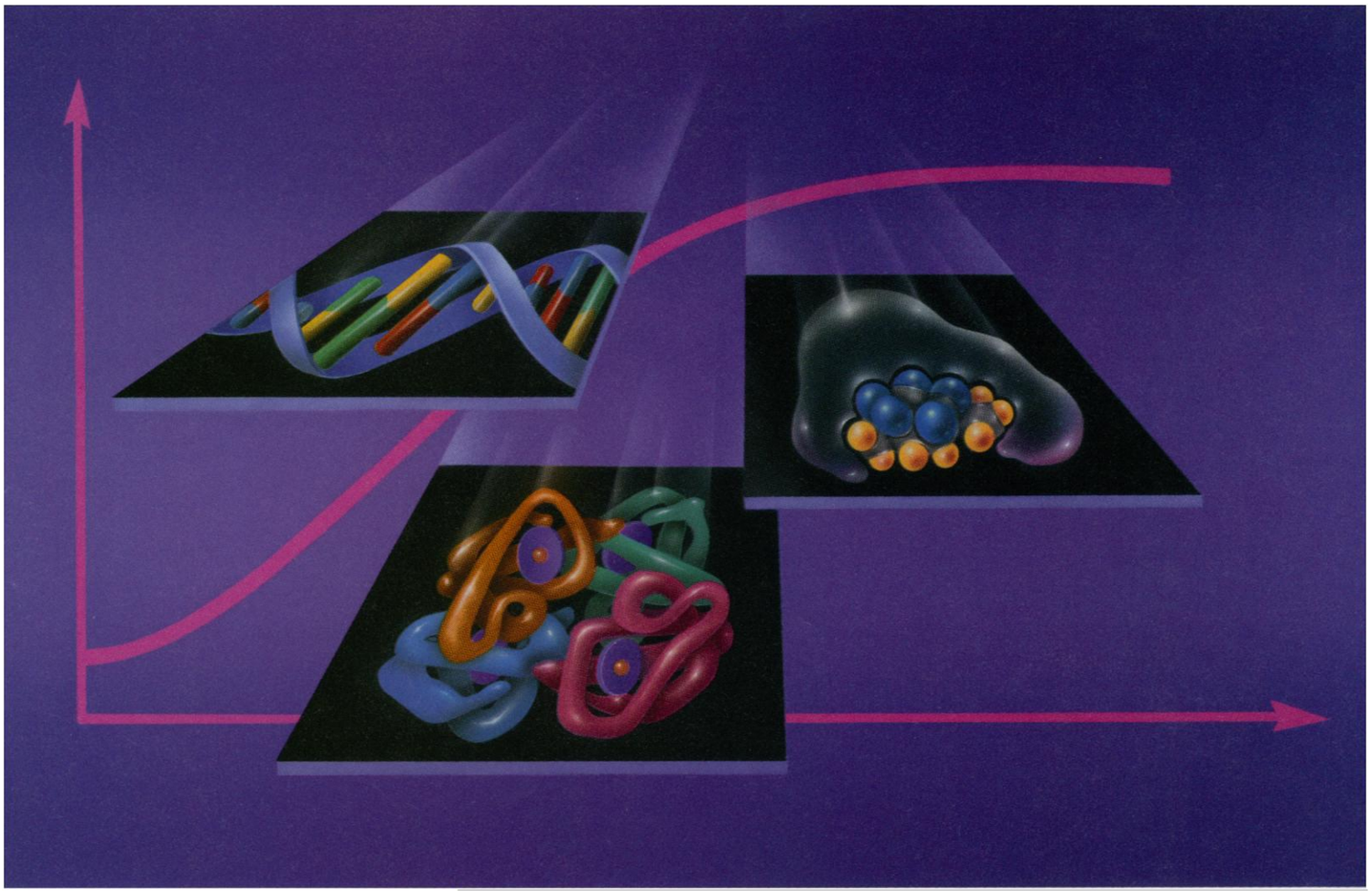
Within the spectrum of cell culture research and production, HyClone has the products and backup services to meet the changing future needs of cell culturists.

HyClone® Laboratories, Inc.

"Innovative Products for Cell Culture"

HyClone Laboratories, Inc. 1725 South HyClone Road, Logan, Utah 84321 Phone: 1-800-HYCLONE (492-5663) FAX: 1-800-533-9450
HyClone Europe, Ltd. Nelson Industrial Estate, Cramlington Northumberland NE23 9BL United Kingdom
Phone: 44-670-734093 FAX: 44-670-732537
Other Countries: 1-801-753-4584 FAX: 1-801-753-4589

Circle No. 27 on Readers' Service Card



Now Get UV Results Faster.

Introducing Lambda Bio, the first UV/VIS spectrometer designed to provide you with results faster than ever.

No programming, no method development is required. With a single keystroke, Lambda Bio's technology allows biochemists to run over 50 predefined methods.

From DNA concentration to protein assays, enzyme kinetics and substrate analysis. All are preprogrammed, ready to run at the push of a button. Also included are many other methods for DNA/RNA analysis. And you can also create your own methods for specific application needs.

New Lambda Bio UV/VIS Spectrometer

There's more: A built-in printer gives you fast documentation of results; a unique, space-saving work-top tray facilitates sample preparation. And Lambda Bio is backed by the worldwide network of service and technical support of Perkin-Elmer, the world leader in PCR technology and analytical instrument systems.

For fast, easy, and accurate results, choose Lambda Bio. Because simpler is faster.

For more information, contact your local Perkin-Elmer office. For product literature in the U.S., call **1-800-762-4000.**

PERKIN ELMER

The Perkin-Elmer Corporation, 761 Main Avenue, Norwalk, CT 06859-0012, USA;
Perkin-Elmer Ltd., Post Office Lane, Beaconsfield, Bucks HP9 1QA, UK; Bodenseewerk Perkin-Elmer GmbH, Postfach 10 11 64, 7770, Ueberlingen, Germany
The GeneAmp PCR process is covered by U.S. patents owned by Hoffmann-La Roche Inc. and F. Hoffmann-La Roche Ltd.
All analytical instruments and systems manufactured by Perkin-Elmer are certified under the quality requirements of ISO 9001.

For information circle reader service number 33
For sales call circle reader service number 34

RNA Synthesis

Create Biologically Active Ribozymes

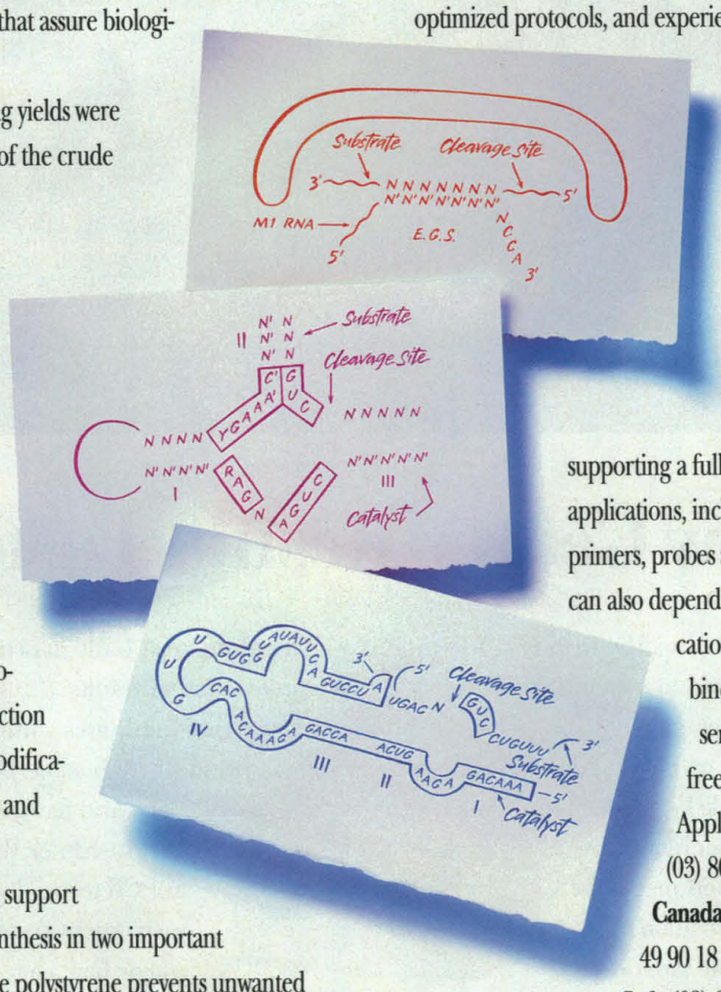
At last you can create the high-quality RNA oligonucleotides you need for ribozyme, protein binding and other studies. Introducing Applied Biosystems RNA phosphoramidites and columns–superior reagents that assure biologically active RNA.

One user[1] says, "Coupling yields were excellent, as was the quality of the crude product analyzed by PAGE."

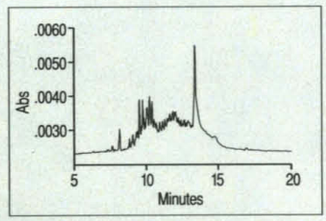
Unique Chemistry

Applied Biosystems reagents offer advantages other products can't equal. The labile base-protecting groups on our new RNA phosphoramidite monomers produce a superior oligo by permitting faster deprotection. Reduced exposure to heat during deprotection minimizes potential base modifications, phosphate migration, and internucleotidic cleavage.

Our proven polystyrene support promotes successful RNA synthesis in two important ways. The inert nature of the polystyrene prevents unwanted side reactions, and its hydrophobic nature facilitates efficient coupling. As a result, you get a higher yield of the full-length oligoribonucleotide you need.



Why not choose the products able to deliver long, high-quality synthetic RNA?



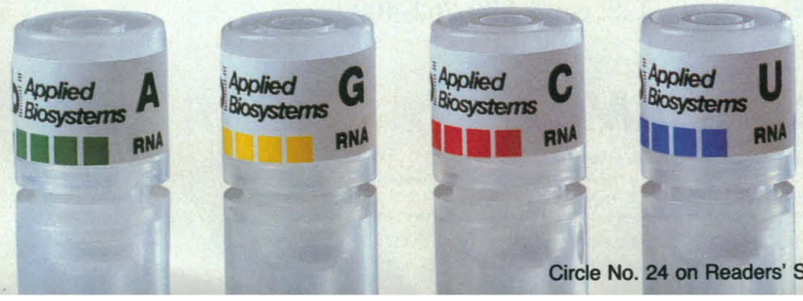
Capillary electrophoresis of a crude 50-mer ribozyme made for Dr. Arnold Hampel at Northern Illinois University. It demonstrated full biological activity, comparable to that of a transcribed ribozyme.

Your Strategy for Success

Our combination of quality reagents, fully automated DNA/RNA synthesizers, optimized protocols, and experienced technical support staff ensures your success in RNA synthesis. And with our proven order fulfillment record, you know you'll get reagents when you need them.

For over a decade we've helped break new ground in molecular biology by supporting a full range of oligonucleotide applications, including sequencing and PCR primers, probes and gene synthesis. Now you can also depend on us for RNA synthesis applications such as ribozyme, protein binding, tRNA interaction, antisense studies and more. For free product information phone Applied Biosystems at: **Australia** (03) 808-7777, **Benelux** (0) 3465-74868, **Canada** (800) 668-6913, **France** (1) 49 90 18 00, **Germany** (0) 6150/101-0, **Italy** (02) 8912 6011, **Japan** (03) 3699-0700, **U.K.** (0925) 825650, **U.S.** (800) 345-5ABI.

Innovation, Integration, Expertise.



[1] Brian Sproat, European Molecular Biology Laboratory, Heidelberg, Germany

Applied Biosystems

A Division of Perkin-Elmer Corporation

Circle No. 24 on Readers' Service Card

Taq DNA POLYMERASE

Expect the best in performance and value...

Taq DNA Polymerase, Sequencing Grade		
100	M2091	$ 46
5x100	M2032	$ 1 184
1x500	M2035	$ 1 184
25x100	M2036	$ 8 828
5x500	M2037	$ 8 828
1x2500	M2038	$ 7 725
5x2500	M2039	$ 303000

...Promega.

*

Pure & Simple

*

This product has not been licensed for use in the polymerase chain reaction (PCR). The PCR process for amplifying nucleic acids is covered by U.S. Pat. Nos. 4,683,195 and 4,683,202, assigned to Hoffmann-La Roche. Patents pending in other countries.

Promega

Promega Corporation
2800 Woods Hollow Road
Madison, WI 53711-5399 USA
Telephone 608-274-4330
Fax 608-277-2516
Telex 62057092

800-356-9526
Fax 800-356-1970
or
Fisher Scientific
800-766-7000

Circle No. 49 on Readers' Service Card

The real beauty is in the eye of your budget

When you look at them from a cost point of view, the new Ohaus Analytical Standard balances are purely gorgeous. When you look at them from a performance point of view, they're still purely gorgeous.

Their simple, two button operation makes them easy to use, their capacities range from 62 to 202 grams with readability to 0.1mg and one model has a Moveable FineRange™. All Analytical Standard models are programmable to compensate for environmental conditions and have menu lock out capability to eliminate tampering. Their weighing chambers and stainless steel platforms are so large that sizable sample containers fit inside with room to spare.

As the newest member of our Analytical Family, the Analytical Standard offers that rare combination of performance, features and price that makes it exactly right. For complete information, call or write Ohaus Corporation, 29 Hanover Road, Florham Park, NJ 07932. 1-800-672-7722

OHAUS®

Exactly right.

Circle No. 38 on Readers' Service Card

Finally an Affordable Densitometer

Introducing the Model GS-670 for low cost, high quality imaging

The new Model GS-670 densitometer costs less—significantly less—than any other personal densitometer, and it offers more: more scanning wavelengths, more sample flexibility, and more software options.

The densitometer's variable wavelength light source lets you tailor your scanning to maximize sensitivity and accuracy. The transmittance and reflectance modes accommodate any type of sample, whether it be a wet or dry gel, film, blot, or TLC plate.

And the revolutionary new software—on both Windows® and Macintosh® platforms—provides multi-resolution scanning, automatic spot finding and peak detection, area and volume quantitation, and publishable output.

The Model GS-670 densitometer: More features, less money: easy to use, easier to afford. Call 1-800-BIORAD today for a free demo in your lab, using your samples.

BIO-RAD **Bio-Rad Laboratories**

Life Science Group

U.S. *(800) 4BIORAD* • ***California*** *Ph. (510) 741-1000* • ***New York*** *Ph. (516) 756-2575* • ***Australia*** *Ph. 02-805-5000* • ***Austria*** *Ph. 0222-877 89 01* • ***Belgium*** *Ph. 091-85 55 11* • ***Canada*** *Ph. (416) 624-0713* • ***China*** *Ph. 2563146* • ***France*** *Ph. 01-49 60 68 34* • ***Germany*** *Ph. 089-318 84 0* • ***Italy*** *Ph. 02-21609 1* • ***Japan*** *Ph. 03-3534-7515* • ***Hong Kong*** *Ph. 7893300* • ***The Netherlands*** *Ph. 08385-40666* • ***New Zealand*** *Ph. 09-443 3099* • ***Scandinavia*** *Ph. 46 (0) 8 590-73489* • ***Spain*** *Ph. (91) 661 70 85* • ***Switzerland*** *Ph. 01-810 16 77* • ***United Kingdom*** *Ph. 0800 181134* *REV 031193*

Circle No. 48 on Readers' Service Card

Open the door to a new era of carbohydrate analysis

GlycoTAG™ automates the whole process of pyridylamination (PA),
the fluoresence labeling method using 2-aminopyridine at the reducing end of the sugar chain.
Carbohydrate structural analysis comes closer to us!

- Fully automated reaction processing for up to 12 samples.
  The total reaction time for a sample is only 2 hours.
- Able to adapt to various analysis methods, such as HPLC, LC/MS and NMR.
- You can obtain highly reproducible data.
- Able to detect by the order of pmol to fmol using HPLC.
- Highly stable fluorescence labeling.

Carbohydrate Analysis System

GlycoTAG™

TaKaRa
BIOMEDICALS

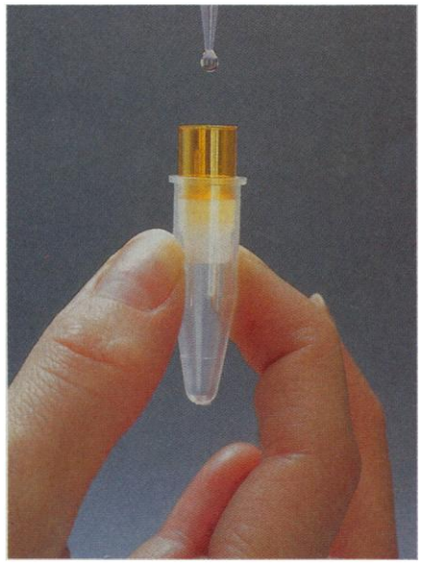
TAKARA SHUZO CO., LTD.
Shijo-Takakura, Shimogyo-ku,
Kyoto 600, Japan
Phone: +81 75-241-5167
Fax: +81 75-241-5208

Circle No. 56 on Readers' Service Card

Should you be using ethanol precipitation when you can get 99% DNA recovery with Microcon?

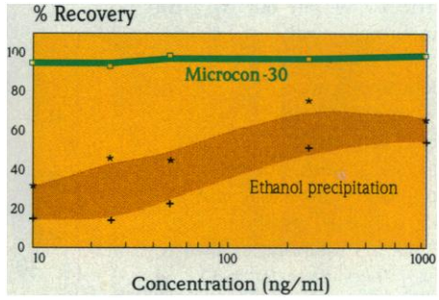
Amicon's Microcon™ Microconcentrators concentrate nucleic acids in minutes with up to 99% recovery.

If you still use ethanol precipitation or other traditional procedures to concentrate or desalt your nucleic acid samples, try Microcon! Now, there is no reason to wait hours or even overnight to concentrate your samples, losing much of your product in the process. Just spin the sample up to 14,000 x g, rapidly reducing as much as 500 µl to as little as 5 µl. You can typically get highest recovery in only 5 - 30 minutes!



amicon
a GRACE company
CALL 1-800-426-4266
FOR FREE SAMPLES

Percent DNA Recovered

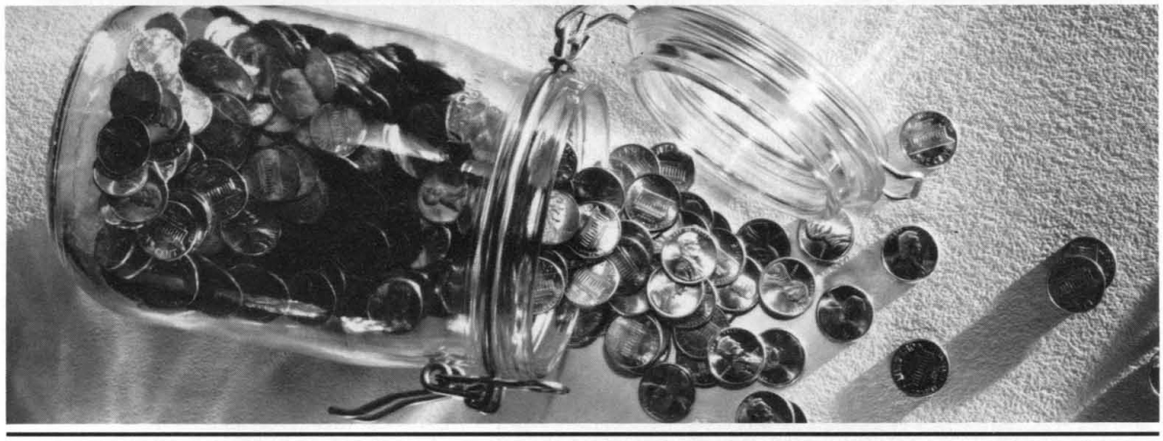


Take us for a free spin!

For a limited time, get two free samples of Microcon and see for yourself how effective it is compared with ethanol precipitation.
To order a set with the desired cut-off (3-, 10-, 30- or 100,000 MW), call 1-800-426-4266.
Offer good while supplies last.

Amicon, Inc., 72 Cherry Hill Dr., Beverly, MA 01915
Circle No. 23 on Readers' Service Card

PRINCIPLES *of* SOUND RETIREMENT INVESTING



EVERYONE WILL GIVE YOU THEIR TWO CENTS WORTH, BUT WILL THAT BE ENOUGH TO RETIRE ON?

Today there seems to be an investment expert or a financial adviser just about everywhere you turn. But just how qualified are all the experts?

Peace of mind about your retirement comes from solid planning. From investments and services that are designed and managed with your needs and retirement security specifically in mind. The kind of investments and services TIAA-CREF has been providing for more than 75 years.

WE'LL HELP YOU GET WHAT YOU WANT OUT OF RETIREMENT.

Because our counselors are trained retirement professionals, they have only you and your future in mind. So you're treated as the unique person you are, with special needs and concerns about retirement. And that makes for an understanding, comfortable relationship.

HELPING YOU BUILD A REWARDING RETIREMENT.

With TIAA-CREF, you have plenty of choice and flexibility—from TIAA's traditional annuity, with its guarantees, to the investment opportunities available through the variable annuity accounts of CREF. And because we're nonprofit, our expense charges are among the lowest in the insurance and mutual fund industries.* So more of your money is where it should be: working for you.

Today, TIAA-CREF is the largest private pension system in the world—with over $112 billion in assets, serving over one million participants nationwide.

TIAA-CREF: THE CHOICE THAT MAKES SENSE.

It's tough to wade through all the "advice" to find a reliable pension plan provider.

But as a member of the educational and research community, the best choice is simple: TIAA-CREF. Because when it comes to helping you save for your retirement, our annuities will add up to more than spare change.

TIAA CREF

Ensuring the future for those who shape it.℠

SEND NOW FOR A FREE RETIREMENT INVESTMENT KIT.

Mail this coupon to: TIAA-CREF, Dept. QC, 730 Third Avenue, New York, NY 10017. Or call **1 800 842-2733, Ext. 8016.**

Name (Please print) _____

Address _____

City _____ *State* _____ *Zip Code* _____

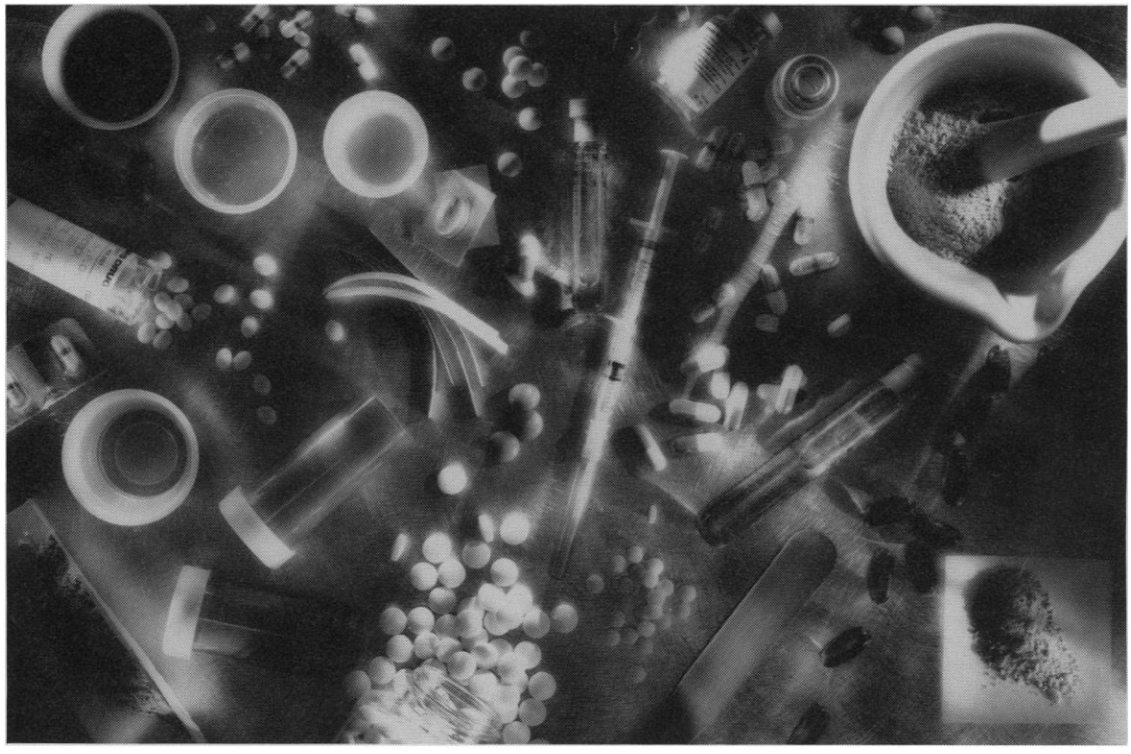
Institution (Full name) _____

Title _____ *Daytime Phone* ( ) _____

TIAA-CREF Participant ☐ *Yes* ☐ *No*

If yes, Social Security # _____ – _____ – _____

*A.M. Best Co., Best's Insurance Reports: *Lipper Analytical Services Incorporated,* Mutual Fund Performance Analysis.
CREF annuities are distributed by TIAA-CREF Individual and Institutional Services.



New extra-strength formula. Pharmaceutical data on Dialog.

Dialog® is adding more strength to serve the pharmaceutical industry better, with broader, more in-depth coverage of patents, business news and basic clinical research.

Whether you're looking for competitive intelligence, legal and regulatory updates, company information or chemical formulations, Dialog gives you more sources than any other online service. They include such essentials as Pharmaprojects, Investext® and PTS Promt,™ plus biomedical data on Embase, Medline® and Biosis.®

Powerful new ingredients: Unlisted Drugs, IMSworld and Prous Science collections.

We're adding the complete IMSworld collection and Unlisted Drugs. We're further strengthening our industry coverage with the Prous Science publications: Drugs of Today, Drugs of the Future, Drug News & Perspectives and Drug Data Report. And our global partner, Data-Star,® brings you the leading European health care and business sources.

You'll find answers faster on Dialog, too, thanks to the online industry's most advanced array of search tools. RANK for speedy trend analysis. MAP for multi-file searching with chemical registry or patent numbers. REPORT for customized output.

Complete coverage combined with unmatched efficiency: it's a powerful formula that makes Dialog the ultimate pharmaceutical news and research source. Try it today. For more information, call Dialog Sales, 800-3-DIALOG.

The Answer is in Dialog

Dialog Information Services, Inc. A Knight-Ridder Company

Circle No. 52 on Readers' Service Card

Will your oligo work?

New Gene Runner™ can tell you in seconds... before you waste lab time and money. It runs on Windows™ and it's easy as ...

If you haven't analyzed oligos before you start work (or if you depend on clumsy, time-consuming software) Gene Runner can make your life a good deal easier.

Oligo analysis is based on thermodynamic (nearest neighbor) algorithms and identifies stable secondary structures that can block PCR®, hybridizations and sequencing reactions.

Gene Runner does it in seconds - *before* you go to the lab!

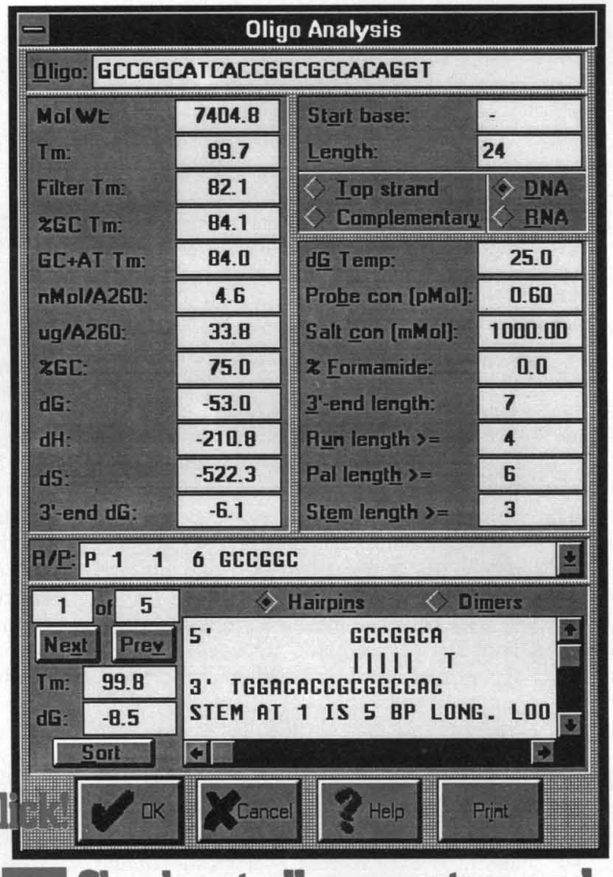
A formatted printout summarizes all critical information. And it's ideal for notebooks and distribution by core facilities.

Targeted PCR Primer Selection. Highlight a region or feature and Gene Runner will generate a list of optimal primer pairs yielding a product with that region.

Multiple alignments

You can align literally hundreds of sequences in record time!

1 Enter your oligo



2 Click!

3 Check out all parameters and secondary structure data...!

Gene Runner saved this investigator predictably fruitless work. Note structural stability and Tm of this hairpin loop.

With Gene Runner, you can clone without maps, printouts or rulers ! ! !

To find the right enzymes, it creates a list of strategies based on restriction digest *overhang matching.* Select a strategy and automatically create the recombinant sequence and a report listing enzymes and operations such as partial fill-ins and blunts.

State-of-the-art sequence editor

It functions like your Windows® word processor. Sequences with aligned translations can be inserted into your documents.

And you get all these features:

• Fast restriction and detailed fragment analysis • Hybridization probe and sequencing primer selection • Sorting • Auto highlighting • Voice verification • Open reading frame analysis • Publication quality printouts • Color coded sequences • Multiple undo/redo • Reads and writes most file formats • Full manual *on line* when needed!

Call 914-969-0855 for a FREE **DEMO**

$ 499/$ 399 Academic

914-969-0855

60 day Money Back guarantee

GENE RUNNER

... takes the curves out of the helix

Hastings Software, Inc. • PO Box 567 • Hastings on Hudson, NY 10706 • Fax 914-376-4433

Circle No. 41 on Readers' Service Card

Explore the Outer Limits Using GIBCO BRL RT-PCR Products

Products for the pioneers in gene research

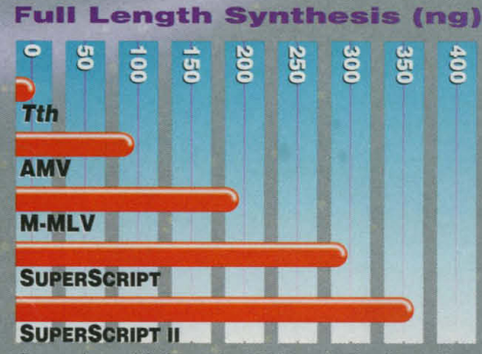
There's no limit to how far you can go with GIBCO BRL RT-PCR* research products featuring SUPERSCRIPT™ or SUPERSCRIPT II Reverse Transcriptases (RT). Life Technologies, the innovator in PCR-related systems, offers several leading-edge products for superior RT-PCR results.

SUPERSCRIPT RNase H⁻ RTs generate more full length cDNA and substantially greater yields of first strand cDNA than any other RT.

SUPERSCRIPT Preamplification System provides better first strand cDNA synthesis for subsequent PCR amplification without intermediate extractions or precipitations. Both oligo(dT) and random hexamers are available for maximum flexibility.

3′ and 5′ RACE Systems offer superior PCR-ready first strand cDNA. These systems are ideal for messages with limited sequence information near the 3′ and 5′ ends. Both RACE systems take you from RNA to PCR in <3 hours.

Exon Trapping System provides the fastest, most direct approach for identifying genes in cloned genomic DNA. Utilizing SUPERSCRIPT II RT, a unique splicing plasmid, and UDG for ligase-free cloning, 20–40-kb of genomic DNA can be screened in a single transfection.



Comparison of full-length cDNA synthesis with various reverse transcriptases under optimal reaction conditions using 1 µg of a 7.5-kb RNA template.

*The polymerase chain reaction (PCR) process is covered by patents owned by Hoffman-LaRoche Inc. For research use only. Not intended for any human or animal diagnostic or therapeutic use.
SUPERSCRIPT™, TECH-LINE℠ and the Satisfaction Guarantee logo are marks of Life Technologies, Inc.

Call for more information or a free brochure.
To order/TECH-LINE℠: (800) 828-6686

LIFE TECHNOLOGIES™

Corporate Headquarters
8400 Helgerman Court
P.O. Box 6009
Gaithersburg, MD 20884-9980 **U.S.A.**
(301) 840-8000

U.S.A. Orders
P.O. Box 68
Grand Island, NY 14072-0068 **U.S.A.**
Facsimile: (800) 331-2286
To order/TECH-LINE: (800) 828-6686

Canada Orders
Burlington, Ontario **Canada**
To order/TECH-LINE: (416) 335-2255

U.S.A. Office for Latin America
Telex: 64210 BRL GARG UW
Facsimile: (301) 258-8238
To order/TECH-LINE: (301) 840-4027

Circle No. 60 on Readers' Service Card

93-098

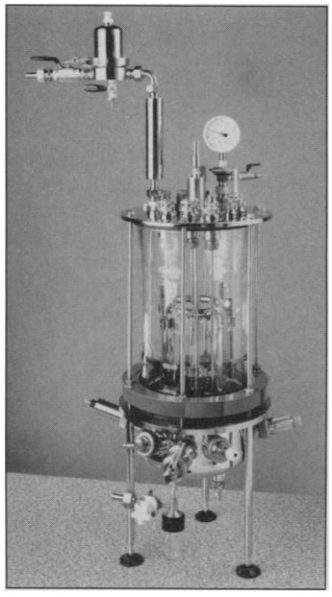
PCR-Based Tissue Typing

The GeneAmplimer HLA DRB Biotinylated Probe Set I and Probe Set II provide sensitive, reproducible polymerase chain reaction (PCR)–based analysis of human leukocyte antigen class II loci used in tissue typing research, as well as in parentage testing, forensic analysis, and human cell-line tracking. Superior to traditional tissue typing by serology, these probes enable users to distinguish 60 DRB1 alleles in every possible heterozygous combination. Samples need only DNA, not class II positive cells. The typing is reproducible and shows differences in alleles and hybridization patterns for every type. **Perkin-Elmer. Circle 139.**

■

Sterilizable Bioreactor Vessels

Discovery 210 bioreactors feature vessels that can be steam-sterilized on the bioreactor mainframe without the need for disassembly or an autoclave. The vessels are available in 5-, 7-, 10-,



15-, and 20-liter versions. All the vessels have 12 19-mm top plate ports, while the large vessels come with five 25-mm side entry Ingold style ports for DO_2, CO_2, pH, temperature, or cell density measurement. A choice of direct or magnetic drive options is available to suit either animal cell or microbial cultures. **LH Fermentation. Circle 140.**

■

Graphing Software for Macintosh

DeltaGraph Pro Version 3 for Macintosh is a major new upgrade to a graphing program. Version 3 combines powerful new charting functions with improved usability—including a streamlined interface and intuitive presentation graphics metaphor. The upgraded version adds 13 new chart types, multiple document support, Apple scripting, and extensive data linking capabilities. **DeltaPoint. Circle 141.**

■

Plasmid DNA from Bacterial Culture

The SpinBind Mini-Prep System offers a fast method to obtain high-quality plasmid DNA from bacterial culture in less than half the time traditional methods take. There are no resins to resuspend, no phenol extractions or ethanol precipitations, and no ribonuclease. Plasmid DNA purified with the SpinBind system can be used immediately for restriction digestion, sequencing, and cloning. The system contains all necessary reagents; no syringes or dedicated equipment are required. **FMC BioProducts. Circle 142.**

■

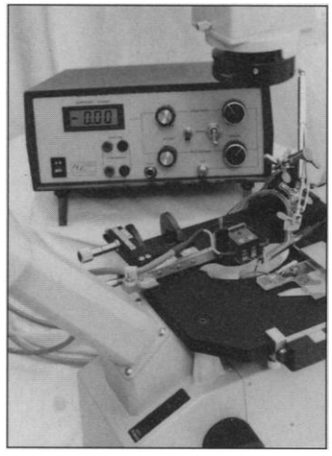
Saturated Phenols

Saturated phenols are available at three pH levels for purification of nucleic acids. Type I saturated phenol is equilibrated to pH 6.6 and packaged under nitrogen for excellent stability. It is provided with a bottle of supplemental buffer to yield a pH 7.9 organic phase for DNA purification. Type II saturated phenol is buffer-equilibrated to pH 4.5 for purification of RNA. Both types are also available premixed with chloroform:isoamyl alcohol. **AMRESCO. Circle 143.**

■

Microforge Kit

The CPM-2 Coating and Polishing Microforge Kit enables the user to turn most inverted microscopes into a coating and polishing microforge for micropipettes.



The system is an economical alternative to expensive dedicated microforges. The kit assembles and disassembles quickly to free the microscope for other purposes. The CPM-2 consists of a controller that adjusts the current through either the coating or polishing filament. It also provides adjustment of air flow for heat curing and pipette tip contamination prevention. Also included are objective protectors, an XYZ manipulator for the polishing filament, pipette holder, and footswitch. **Scientific Instruments for Basic Research. Circle 144.**

Image Processing Software

Image-Pro Plus for Windows extends the sophisticated full color and gray scale image analysis capabilities of the manufacturer's DOS- and UNIX-based Image-Pro Plus. Users can capture and process images; make manual and automatic measurements and classifications; define areas of interest; extract individual color channels, process them, and then merge them back into the original image; analyze histograms and line profiles; and save data and objects in a variety of formats. **Media Cybernetics. Circle 145.**

■

Literature

The MultiScreen Assay System is a brochure that describes the advantages of this 96-well filtration system designed to simplify research assays and drug discovery techniques over conventional techniques like enzyme-linked immunosorbent assays and cell harvesters. **Millipore. Circle 146.**

Multiplex DNA Sequencing Syringe Pipettes describes these devices to transfer 8 or 12 DNA samples by microplate—row or column—to sequencing gels, nylon membranes for visualization, or to another microwell plate. **Hamilton. Circle 147.**

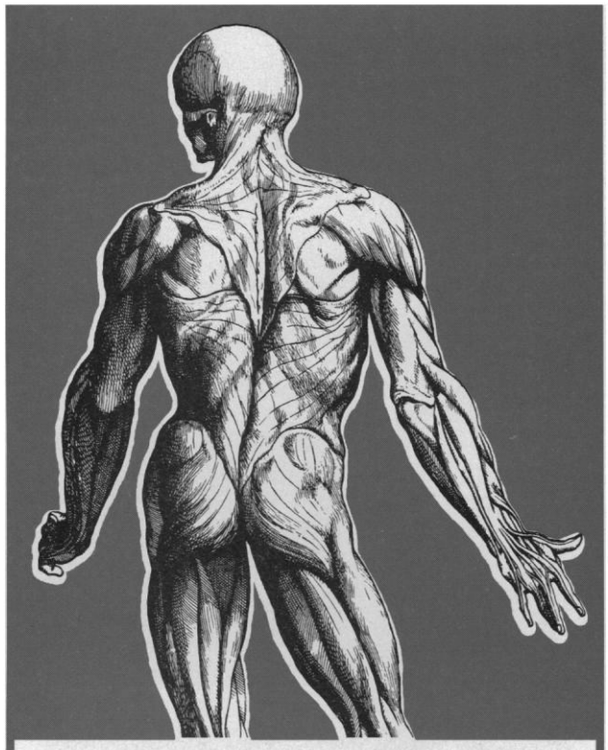
1993–1994 Sigma Peptides and Amino Acids catalogs offers a selection of 4000 products. **Sigma Chemical. Circle 148.**

The Complete Data Acquisition and Analysis System for Confocal Imaging describes the InSIGHT-IQ Confocal Microscope Computer System. **Meridian Instruments. Circle 149.**

1993 Chemicon Catalog lists reagents for use in environmental compounds testing, including a full line of polyclonal antibodies, antigens, and antigens labeled with horseradish peroxidase. **Chemicon International. Circle 150.**

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

SCIENCE
and HUGO Present



HUMAN GENOME
1 9 9 4

THE GENES AND BEYOND

HORIZONS IN MEDICINE, BASIC RESEARCH, AND TECHNOLOGY

OCTOBER 2 – 5, 1994
WASHINGTON, D.C.

Mark your calendar now! For the fifth year, Science magazine and The Human Genome Organisation (HUGO) are pleased to sponsor the most comprehensive update on the genome project. The meeting will span issues in mapping, development, signal transduction, genome analysis, medical ethics, and policy.

The genome project is having a revolutionary effect on medical diagnosis, biotechnology, and investigations in cell and molecular biology.

- What are the newest advances in technology?
- How can the genome project be applied to understanding fundamental cellular processes?
- What are the latest developments in identifying disease genes?
- What are the social and policy issues facing us in the future?

For answers to these questions and a complete update on the genome project, don't miss this meeting!

Send me Human Genome 1994 info today!

Name_____

Title_____

Organization_____

Address_____

_____

City_____

State_____ Zip_____

Phone_____

Fax_____

Mail or fax to: Global Trade Productions, Inc., 5203 Leesburg Pike, Suite 1313, Falls Church, VA 22041. Fax (703) 671-7695.

Call (703) 671-1400 today or send in the coupon for more information.

Circle No. 61 on Readers' Service Card

Imagine the Possibilities

At Berlex, we're building an impressive team with some of the finest talent in the pharmaceutical industry. To meet the challenges before us, we're seeking several key members to help advance our scientific mission and arrive at new possibilities in Oncology and Cardiovascular research.

If you've been looking for the opportunity to join forces with an internationally recognized pharmaceutical team, imagine building your career with Berlex at our new state of the art facility in Richmond, California.

Cardiovascular Research
Research Associate to
Senior Scientist positions—PO**35A**

Cell Biology
Research Associate to
Senior Scientist positions—PO**35B**
Cell Culturist—PO**35C**

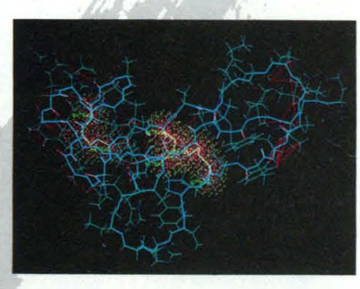
Analytical Peptide Chemistry—PO**35D**
Protein Chemistry—PO**35E**
Biochemistry—PO**35F**
Molecular Biology—PO**35G**
Oncology Research—PO**35H**
Cell Line Development—PO**35I**
Chemical Development—PO**35J**
Associate Scientist to Senior Scientist positions

Development Research–Pharmacology—PO**35K**
Biophysical Chemistry—PO**35L**
Group Head

Medicinal Chemistry—PO**35M**
Scientist, Postdoctoral

Process Development
Associate I to
Research Scientist I—PO**35N**

Operations
Process Development
Plant Engineer—PO**35O**



As a U.S. subsidiary of an international Fortune 500 company, Berlex offers competitive salaries and a full complement of benefits, including relocation assistance to our new 53-acre campus facility in the San Francisco Bay Area. To join our team, please send your resume today, to: Berlex, HR Employment, indicating **PO** number corresponding with the position of your interest, 15049 San Pablo Avenue, Richmond, CA 94804-0099. We are an equal opportunity employer.

BERLEX

THE BEST IS YET TO COME

BS/MS
Assistant Scientists

Pfizer is a lot more than a pharmaceuticals and healthcare industry leader. It's a group of people dedicated to discovering, developing and marketing innovative pharmaceuticals, animal health and food industry products that improve the quality of life worldwide. As a Fortune 100 company, Pfizer is committed to continuing its remarkable growth by investing close to a billion dollars annually in research and development.

If you have a BS or MS, 2-5 years relevant laboratory experience and strong theoretical knowledge, take advantage of this opportunity to join multi-disciplinary teams in one of the following areas:

Inflammation
Evaluate the activity of novel anti-inflammatory agents *in vitro* and *in vivo*. Experience in conducting pharmacological experiments *in vivo* required and expertise in cell culture, blood cell isolation and quantitative antibody-based assays desired.

Pulmonary Biology
Join a team investigating potential therapeutic agents *in vivo* and *in vitro* laboratory models of respiratory disease. The ability to analyze, summarize, and communicate results effectively is required. Experience with pulmonary function evaluation or smooth muscle tissue bath pharmacology is desirable.

Antibody Discovery and Engineering
This team develops immunoglobulins for drug discovery. Previous experience in hybridoma cell line generation, immunoassay development, molecular biology and analytical biochemistry techniques is required. Computer skills preferred. Experience developing antibodies using a combinatorial library/panning approach would be advantageous.

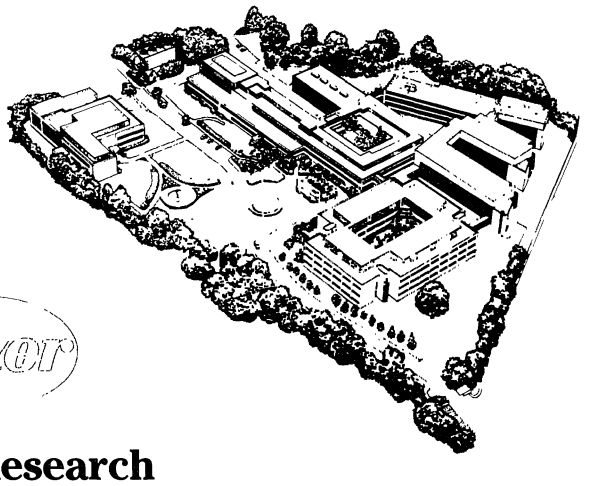
Immune Suppression
Participate in the investigation of novel therapeutics for use in transplantation and autoimmune diseases. Requires relevant laboratory experience in *in vivo* models, primary cell culture, maintenance of established cell lines and cellular immunological techniques. Experience in flow cytometry is desired.

Prokaryotic Molecular Biology
Join this team, discovering novel classes of antibacterial agents using the tools of microbiology and molecular genetics. Requires previous experience with modern techniques in bacterial genetics such as strain construction, mutant analysis, cloning and gene expression. Knowledge of electroporation techniques and PCR desirable.

Prokaryotic Biology
Join our Animal Health Discovery Research Group in seeking novel antibiotics. Evaluate new compounds *in vivo*, including coordination of compound submissions, collection of data and writing of reports. Experience in bacteriology or related biological science required.

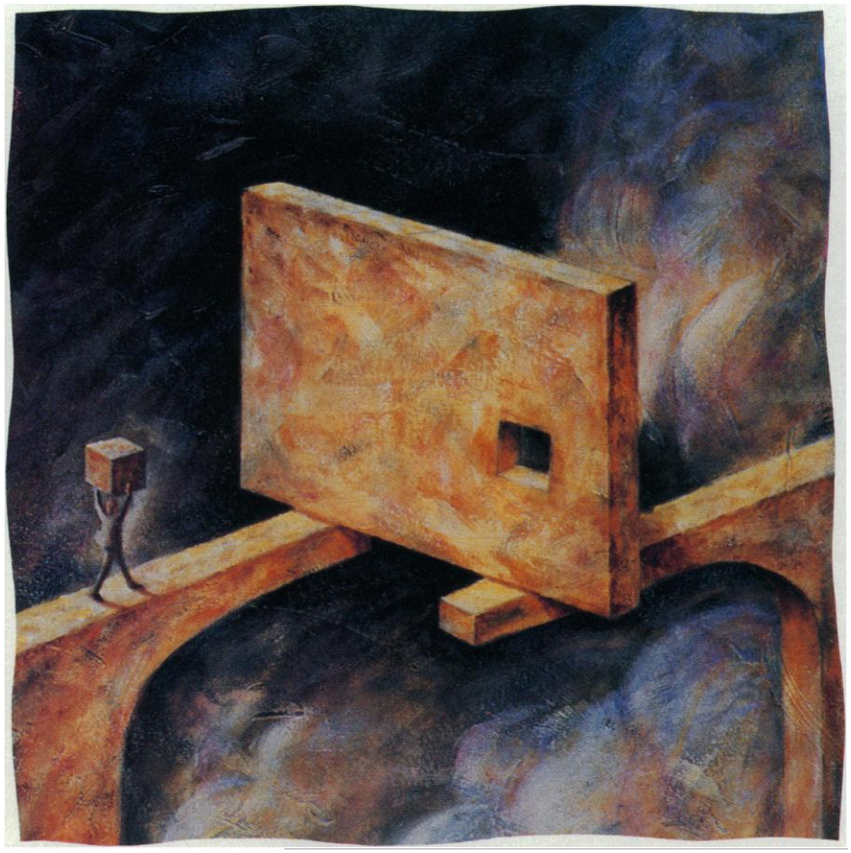
Our excellent benefits include competitive salaries, health and dental care, paid holidays and vacations, savings, investment and pension plans, and relocation assistance to our attractive Connecticut shore location.

To learn how you can be part of our success, please send your cover letter indicating position of interest, resume and three references to: **Ms. Ellen Buller, Supervisor, Employee Resources, Pfizer Inc, Central Research Division, Eastern Point Road, Groton, CT 06340.** We are an equal opportunity employer.



Pfizer

Central Research
Bringing science to life.



The Right Per the Success of

Research Scientists

Candidates for the following positions must possess a Ph.D. and at least two years of post-doctoral experience.

[redacted] Protein biologists experienced with protein expression in *E. coli*. Must be familiar with bacterial proteases, protein purification and protein folding. **(Job Code OA-SC-FM-001)**

[redacted] Molecular biologists with knowledge in the following areas: cell biology, immunology, receptor biology and human physiology. **(Job Code OA-SC-FL-001)**

[redacted]

- Synthetic organic chemist experienced in carbohydrate synthesis to conduct basic and applied research. Relevant analytical experience required. Experience in molecular modeling and knowledge of interaction between biomolecules desired. **(Job Code OA-SC-AV-005)**

- NMR spectroscoptist with excellent theoretical and practical knowledge of NMR instrumentations and two-dimensional techniques. Candidates must be experienced in computer graphic systems and molecular modeling programs (particularly those applicable to carbohydrates). **(Job Code OA-SC-DC-015)**

[redacted] Molecular/cellular biologists with the ability to develop and expand projects in the discovery and characterization of molecules involved in leukocyte trafficking and activation. **(Job Code OA-SC-JH-032)**

[redacted]

- Molecular/cellular biologists experienced in gene regulation leading to cell proliferation or differentiation. Responsibilities will include developing assays based on signal transduction and ligand/receptor interaction. **(Job Code OA-SC-SH-001)**

At Amgen, we understand that our future success as a company is linked to the accomplishments of each and every individual on our team. To that end, we support a stimulating research environment that actively encourages individualism and supports a diverse mix of ideas. We are pursuing an active research program, and offer opportunities for interactions with peers in the academic community through collaborative relationships with universities. If this is the type of environment that would bring out your best, take a close look at the following opportunities. Now is the right time... and Amgen is the right place.

---

son in the Right Place is Essential to the Whole.

• Cell biologists familiar with specialized tissue culture, explant or organ cultures. Candidates must be interested in establishing specific bioassays for exploratory research. **(Job Code OA-SC-SH-002)**

• Molecular biologists experienced in eukaryotic gene expression, vector development and gene transfer via adenoviruses (AAV). **(Job Code OA-SC-SH-003)**

Protein Chemistry Protein chemists experienced in purification and characterization of natural and recombinant proteins. Familiarity with chromatographic and electrophoretic techniques required. **(Job Code OA-SC-BK-008)**

Stem Cell Biology Molecular/cellular biologists or biochemists experienced in receptor biology, hematopoietic growth and differentiation. **(Job Code OA-SC-JC-017)**

Post-Doctoral Positions

Candidates for the following positions must possess a Ph.D.

Biomedical Sciences Molecular/cellular biologists interested in an interactive program studying the molecular regulation of hematopoietic stem cell migration, proliferation, differentiation, receptor function and characterization. **(Job Code OA-SC-FL-001)**

Developmental Biology Molecular/cellular biologists with, or seeking, experience in transgenic models for cell growth and differentiation. **(Job Code OA-SC-BB-001)**

Research Associates

Candidates for the following positions must possess a BS/MS in a related field.

Bacterial Expression Experience in molecular biology required. Protein purification and bacterial genetics experience desired. **(Job Code OA-SC-MM-001)**

Developmental Biology Experience in *in situ* hybridization, immunohistochemistry and localization of gene expression required. **(Job Code OA-SC-BB-002)**

Inflammation Experience in one or more of the following areas: hybridoma technology, adhesion assays or models of inflammation. **(Job Code OA-SC-JH-033)**

Molecular/Cellular Biology Experience in tissue culture and/or DNA/RNA techniques required. Familiarity with cDNA library construction and screening, cell staining, DNA cloning, FACS, PCR, Southern, Northern, Western blot and gene expression required. **(Job Code OA-SC-JH-037)**

Pharmaceutics and Drug Delivery

• Experience in carbohydrate and protein chemistry required. **(Job Code OA-SC-JL-001)**

• Experience in biomolecule synthesis/modification/derivatization required. Knowledge of spectroscopic and chromatographic methods desired. **(Job Code OA-SC-OK-001)**

Protein Chemistry Experience in purification and characterization of natural and recombinant proteins. Familiarity with chromatographic and electrophoretic techniques required. **(Job Code OA-SC-BK-009)**

Sequencing Experience in DNA sequencing required. Basic skills in molecular cloning and computers preferred. **(Job Code OA-SC-SS-001)**

Stem Cell Biology Experience in receptor biology, hematopoietic growth and differentiation required. **(Job Code OA-SC-JE-002)**

At Amgen, our staff plays an integral role in maintaining the highest of standards and product excellence. We offer a highly competitive compensation and benefits package that includes a retirement and savings plan, on-site child care and fitness centers, three weeks vacation and medical/dental/life insurance plans. If it sounds like Amgen could be the right place for you, it's definitely the right time! Please FAX/mail your resume to: **FAX: (805) 447-1985, Amgen Inc., Staffing, Job Code (See Above), Amgen Center, Thousand Oaks, CA 91320-1789.** We are an Equal Opportunity Employer M/F/D/V.

AMGEN®

Committed To Training The Next Generation Of Scientists And Clinical Researchers.

The National Institutes of Health is the world's largest institution committed to basic and clinical biomedical research. The NIH, with more than 4,000 doctoral level scientists and a clinical center that is home to half of all research beds in the country, has traditionally provided exceptional postdoctoral training opportunities in basic and clinical research. In addition, the NIH is fully committed to helping develop the upcoming generation of scientists by providing research and clinical training for students and programs for college faculty. The following descriptions are provided to introduce the various educational opportunities available at the National Institutes of Health.

Postdoctoral Training

Postdoctoral opportunities are available in a variety of disciplines in the basic biomedical sciences at the NIH through the **Laboratory Research Pathway**. Candidates should have either a graduate doctoral degree (e.g., PhD, MD/PhD) or a professional degree (e.g., MD, DO, DDS, DMD, or DVM) accompanied by previous laboratory research experience. A catalog featuring descriptions of NIH research laboratories and other postdoctoral opportunities is available from the NIH Office of Education and an on-line version may be found on Internet. **Subspecialty and Clinical Research Training** at the NIH allows physicians to become board-certified specialists who are also prepared for careers in academic medicine. In-depth training in clinical and/or basic research complements the fellow's clinical training and 21 programs are accredited by the ACGME or by boards in their respective disciplines. A number of other programs offer credit toward board certification on an individual basis. A new **Re-Entry Postdoctoral Training Program** has been developed to assist individuals with doctoral degrees who have had to interrupt their research careers because of family responsibilities. Research training, workshops, formal course work, and mentoring are provided to assist participants in their retraining and eventual re-entry into research careers.

Medical and Dental Student Programs

Eight to ten weeks of basic research training is provided by the **Summer Research Fellowship Program** for medical and dental students during the summer following their first or second year. In addition, twenty different **Clinical Electives** are available for third- and fourth-year students, providing clinical and clinical research experiences unduplicated elsewhere.

Graduate Student Programs

Students interested in doctoral training in genetics are encouraged to consider the **NIH-George Washington University Graduate Program in Genetics**. NIH and GWU faculty provide didactic instruction, and dissertation research is conducted in an NIH laboratory. Full tuition and stipend support is provided.

Undergraduate Student Programs

Students may participate in state-of-the-art biomedical research through either the **Summer Internship Program** or the fall **Research Semester for Undergraduate Students in the Biomedical Sciences**. The summer program also provides workshops on career pathways and strategies for a successful career as well as a weekly seminar series. The Research Semester provides students with an introduction to the development of public policy in the biomedical sciences.

Undergraduate Faculty Programs

Participants in the **Undergraduate Faculty Summer Institute** are able to enhance their personal scientific development and to gain assistance in updating their courses in molecular and cellular biology.

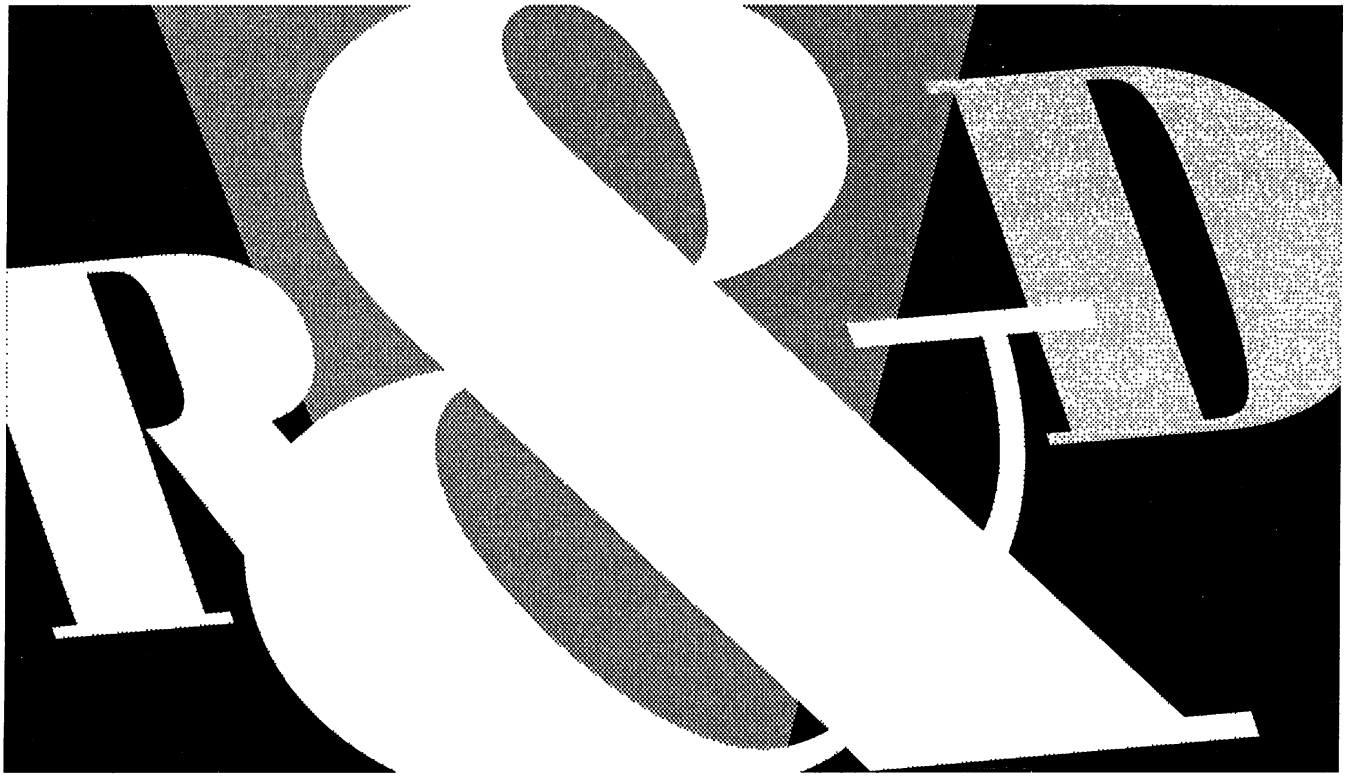
To find out how the NIH can play a role in your research training, please contact the NIH Office of Education for information on any of these programs.

National Institutes Of Health

Office of Education

Building 10, Room 1C129, 9000 Rockville Pike, Bethesda, MD 20892 • 301-496-2427 • FAX 301-402-0483

OPHTHALMOLOGY • DERMATOLOGY • NEUROLOGY



WE FOCUS ON WHAT'S IMPORTANT

We're Allergan, a Fortune 500 company and a global leader in the eye and skin care products industry.

At Allergan, we devote extensive resources to R & D. We're always looking for promising opportunities in the rapidly expanding global marketplace. And we're always seeking ways to develop innovative technologies and applications that will have an impact on quality of life.

Currently, we're focusing our energies on a variety of ophthalmological, dermatological and neurological research projects, including the fight against juvenile cerebral palsy, and are seeking the following individuals:

RESEARCH ASSOCIATES

Positions require a BS/MS and experience in one of the following:

- Biochemistry
- Chemistry (Formulation)
- Analytical Chemistry
- Bio Analysis (HPLC, GC-MS)
- Molecular Biology

RESEARCH SCIENTISTS/MANAGERS

Positions require a Ph.D. or equivalent degree (MD or DVM) and experience in:

- Chemistry
- Dermatology
- Immunology
- Molecular Biology
- Ophthalmology
- Pathology
- Toxicology

RESEARCH MANAGER

Positions require a BS/MS.

- Section Manager
  - Ophthalmology-Anti Invectives
- Regional Managers
  - Houston
  - New York

OTHER POSITIONS

Opportunities are also available in:

- Biostatistics
- Regulatory Affairs
- Compliance

Allergan rewards innovative thinking with a generous salary and benefits package. For information on opportunities in our R & D organization, send your resume to: Allergan, Inc., Human Resources Dept., 2525 Dupont Drive, Irvine, CA 92715.

Helping The World See Things Clearly.

ALLERGAN INC.™

Changing the way medicine is practiced...

The ability to apply our innovative technology to important medical problems is the cornerstone of our remarkable success. It's the product of visionary individuals working in an environment conducive to inspiration. An environment that's produced more FDA-cleared DNA probe products than any one else. An environment dedicated to changing the way medicine is practiced.

The importance of genetic probe technology is growing, and we are at the brink of exciting diagnostic and therapeutic breakthroughs.

...through the continual evolution of genetic-probe technology.

Our interest is high in those exceptional candidates prepared with a BS, MS or PhD in the areas of Biology, Microbiology, Molecular Biology, Biochemistry, Chemistry or Virology.

As one of the few emerging biotech companies that is profitable and has proven R&D, manufacturing, marketing and sales skills, Gen-Probe will continue to grow and prosper based on our sound technology, our philosophy of innovation and the expertise to continue improving existing products while developing new ones.

Explore our current opportunities by calling our Jobline at (619) 625-8666, or write to us at 9880 Campus Point Drive, Dept. 341, San Diego, CA 92121. We are an equal opportunity employer.

GEN-PROBE®

Howard Hughes Medical Institute

Fellowships for Biological and Biomedical Sciences

The Howard Hughes Medical Institute announces the 1994 competitions for fellowship programs that support training in fundamental biological and biomedical research. Awards, based on international competitions, focus on research directed to understanding basic biological processes and disease mechanisms. Fellowships may be held at academic or not-for-profit research institutions.

Predoctoral Fellowships in Biological Sciences

Up to five years of support for full-time graduate study toward a Ph.D. degree in biostatistics, cell biology and regulation, epidemiology, genetics, immunology, neuroscience, or structural biology. Applicants must not have completed the first year of postbaccalaureate graduate study in biology. *Application deadline: early November.*

Postdoctoral Research Fellowships for Physicians

Three years of support for training in fundamental research subsequent to at least two years of postgraduate clinical training and no more than two years of postdoctoral research training. *Application deadline: early January.*

Research Training Fellowships for Medical Students

An opportunity for medical students in the United States to explore a burgeoning interest in fundamental research. Support is awarded for one year of full-time fundamental research in a laboratory at the student's medical school or another institution (except NIH). *Application deadline: early December.*

Research Scholars at the National Institutes of Health

Under this joint HHMI-NIH program, medical students in the United States spend an intensive year in research in the intramural program at the NIH in Bethesda, Maryland. Residence is provided at the Cloister on the NIH campus. *Application deadline: early January.*

For Program Announcements and Applications

For Predoctoral Fellowships:
Hughes Fellowship Program
The Fellowship Office
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418
United States of America
(202) 334-2872

For Other Programs:
Howard Hughes Medical Institute
Office of Grants and Special Programs
Department AL94
4000 Jones Bridge Road
Chevy Chase MD 20815-6789
United States of America
(301) 215-8889

EXPERIMENT WITH SCIENCE, NOT YOUR CAREER.

As we move our cellular therapies through the development phase, SyStemix's established reputation as an innovator increases. Our cellular therapies are derived from our revolutionary work with the human Hematopoietic Stem Cell. Therapies which will benefit people from all walks of life, all over the world.

If you have development phase experience, come develop further with us. We have opportunities for managers and individual contributors in the following areas:

CELL PROCESSING/PURIFICATION

DEVICE DEVELOPMENT

BIOPROCESS ENGINEERING

GMP MANUFACTURING

PROCESS DEVELOPMENT: MABS VALIDATION AND SCALE-UP

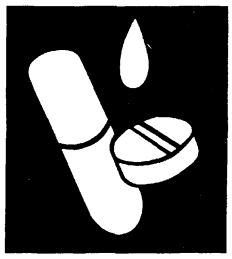
FORMULATIONS DEVELOPMENT

PROTEIN PURIFICATION

BIOCHEMISTRY: HPLC AND ASSAY DEVELOPMENT

We offer a strong compensation and benefits package, including equity participation, within a team environment emphasizing participation and collaboration. If you share our scientific interests as well as our work style, take advantage of this unique opportunity to develop your career with us. Phase one begins by sending your resume to: SyStemix, Inc., Dept. SCCS93, 3155 Porter Drive, Palo Alto, CA 94304 or via FAX to (415) 856-4919. We are proud to be an equal opportunity employer.

SYSTEMIX



Scientists

Ciba-Geigy Pharmaceuticals Division is respected internationally for its life-extending and health-enhancing products. Our commitment to research is evidenced by our investment in the most advanced scientific instrumentation, as well as in the accomplished professionals who utilize them. In addition, we have recently occupied our new, state-of-the-art Life Science Building—one that was designed and built to encourage the scientific interaction and teamwork that ensure success.

BIOPHYSICAL CHEMISTRY

We are seeking innovative candidates with the desire to work in a multidisciplinary environment with Molecular Biologists, Medicinal Chemists, Computational Chemists, etc.

PROTEIN CRYSTALLOGRAPHY
Research Scientist

Focusing on structure-based drug design strategies, your research will include structure determination of targeted proteins, including enzymes and enzyme-inhibitor complexes using X-ray diffraction techniques. Funds have been approved for the purchase of X-ray diffraction equipment suitable for macromolecular structure determination, and a Silicon Graphics Onyx workstation dedicated to protein X-ray structural studies.

To qualify, you should have a PhD in Biochemistry, Biophysics or a closely related discipline with experience in protein purification and crystallization, X-ray data collection/refinement, and protein structure determination. Please refer to Position 306 on resume.

PROTEIN NMR SPECTROSCOPY
Postdoctoral Associate

Focusing on rational drug design strategies, your research will include NMR structure determination of targeted proteins, including enzymes and enzyme-inhibitor complexes. Our facility is equipped with a Bruker AMX-500 MHz NMR spectrometer and an Avance-600 MHz NMR spectrometer. The spectrometers contain multi-channel interface electronics, triple resonance probes, shaped pulse and gradient-enhanced capability. In addition, we have two Silicon Graphics Indigo-extreme workstations and one Onyx workstation dedicated to NMR data processing and analysis.

To qualify, you should possess a PhD in Biophysical Chemistry or a closely related discipline, along with a strong background in the application of experimental NMR techniques to solve protein structures. A working knowledge of spin physics and experience in NMR pulse-programming, multi-dimensional NMR data collection/processing and 3-D structure calculations are required. Programming skills in "C" or FORTRAN is highly desirable. Please refer to Position PDS on resume.

TOXICOLOGY/BS-MS-PhD

We are seeking several Scientists to join our Toxicology Research Departments—a dynamically growing team of highly qualified professionals, dedicated to excellence.

RESEARCH/
STAFF SCIENTIST

As Study Director, you will perform GLP toxicological evaluations; supervise a group which conducts and evaluates data collected from Segment I, II and III studies; and perform visceral and skeletal examinations. You must have a Master's degree in Toxicology, Pharmacology, Anatomy, Endocrinology or a relevant discipline, with 12+ years of toxicology or reproductive toxicology experience (or a PhD with 0-7 years of related experience). Working knowledge of GLPs, statistics and computers is important. Please refer to Dept. 312/307 on resume.

RESEARCH SCIENTIST

As an integral part of our Experimental Toxicology Research Department, you will use molecular biology techniques (Western Northern blots) to conduct in vitro and ex vivo hepatic microsomal enzyme induction studies. In addition, you will participate in investigative toxicology studies with an emphasis on mechanism of hepatotoxicity. You must have a PhD (or equivalent) in Toxicology, Biochemistry or relevant discipline, along with 0-5 years of related industrial experience. Please refer to Dept. 383 on resume.

ASSOCIATE SCIENTIST

In this position, you will conduct toxicology studies in accordance with SOPs and GLP regulations; perform oral/parenteral dosing, handling, feeding and weighing of small animals; collect biological specimens (blood and urine); and identify, evaluate and record signs of toxicological/pharmacological effects. You must have a BS in Toxicology (or relevant discipline) with 1-3 years of experience, to include handing, caring for and performing procedures on animals. A background in a pharmaceutical/contract lab and knowledge of GLPs would be preferred. Please refer to Dept. 396 on resume.

We offer competitive compensation commensurate with your experience and education, and the resources of an industry leader. For confidential consideration, please send your resume, indicating salary history/requirements and the code for your position of interest, to: **Staffing Center-JN, Ciba-Geigy Corporation, Pharmaceuticals Division, 556 Morris Avenue, Summit, New Jersey 07901.** We are an equal opportunity employer M/F/D/V.

Preparing for the future

ciba

GENSIA - YOU'LL BE GLAD YOU KNEW US "WHEN"

Gensia, Inc. is a San Diego, CA - based, publicly traded biopharmaceutical company that sets a rapid pace in scientific achievements. Our mission is to discover, develop and market novel pharmaceutical products. The initial focus is on the treatment and diagnosis of cardiovascular, cerebrovascular, and neurological diseases, diabetes and inflammation.

We have filed our first NDA on Arasine, and will soon be filing our next NDA on our second program the GenESA system which combines Arbutamine (a novel catecholamine drug) with a closed-loop, computer controlled drug delivery device.

Our future plans call for even more extensive clinical research programs, relocation to a 150,000 square foot, state-of-the-art headquarters facility, and the addition of biotech professionals with unique skills to help us expand, and share in our future growth.

We are interested in discussing employment possibilities with qualified professionals in these areas:

CHEMISTRY

Medicinal Chemist/Synthetic Organic Chemist
Designs and synthesis research of novel compounds for therapeutic targets. Requires PhD in Chemistry and 3+ years medicinal chemistry experience.
Dept. MC/ME

Associate Director/Director Medicinal Chemistry
Requires strong leadership and organizational skills and a strong record of scientific accomplishments. Requires PhD in Chemistry with 4+ years drug discovery experience. Dept. AD/ME

Associate Director/Director Chemical Development
PhD in Chemistry, 4+ years pharmaceutical industry experience including process chemistry group experience focused on the synthesis of development candidates. Dept. AD/ME

PHARMACOLOGY/ PHARMACOKINETICS

Cardiovascular Pharmacologist
Design, conduct and supervise evaluation of cardio-protective drug candidates for in vivo models of cardiac disease. PhD in Pharmacology/Physiology or relevant medical science and 1+ years post-doc experience including surgical techniques, CV diseases and experimental design/analysis. Dept. CP/MY

PHARMACEUTICAL AND DELIVERY SYSTEMS DEVELOPMENT

Associate Director, Analytical
Lead our Pharmaceutical and Delivery Systems Development group to support preclinical development. PhD and 7+ years development experience preferably in sterile product development/manufacturing.
Dept. AD/YJ

Analytical Research Scientist
Develop parenteral formulation, conduct scale-up studies, transfer technology to production and prepare documentation for regulatory submission. PhD with 1+ years parenteral formulation experience or MS with 4+ years related experience. Dept. AR/YJ

At Gensia we have the human and financial resources, and the vision to meet the long-term challenges necessary to bring new drugs to market. There's an entrepreneurial environment at our San Diego headquarters. Here the quality of life complement the excitement of working in the heart of one of the nation's top biotech and academic centers, with a team of highly creative scientists. If your current position doesn't fulfill your high capacity potential, this is the perfect time to join forces with a dynamic forerunner.

At Gensia we offer a competitive salary and comprehensive benefits package which includes a stock option plan. We invite qualified candidates to submit a resume to: **Gensia, Inc., Human Resources, Dept. (please indicate appropriate dept. code), 11025 Roselle St., San Diego, CA 92121-1204, or FAX it to (619) 622-5540.** Gensia is proud to offer equal employment and a culturally diverse work environment to everyone.

GENSIA®

THE

BIOGEN

MISSION

Career Growth

Biogen is a profitable fifteen year old biotechnology company engaged principally in developing genetically engineered human pharmaceuticals. As a result of its early research, Biogen now derives revenues from five products being sold by its licensees or affiliates in various countries. Biogen currently directs its research and development into areas where the company has particular strength - inflammation, cardiovascular disease, AIDS and certain cancers.

Senior Toxicologist

Working in close collaboration with the Director of Toxicology and Preclinical Pharmacology, this experienced senior level professional will assist in the design and implementation of overall toxicology/pharmacology testing programs. Additional areas of involvement include assisting in the preparation of IND and PLA/ELA submissions. The ideal candidate will possess a PhD and 3-5 years' experience in pharmaceutical/contract toxicology laboratory testing of biologics. Experience with GLP regulations is required, as is experience with monkey pharmacology/toxicology testing. A strong immunology background is highly desirable.

Research Scientist

Working within our Viruses/Growth Control department the successful candidate will head a laboratory and direct the research efforts on the molecular and cellular biology of signal transduction in tumor and/or smooth muscle cell biology fields. A Ph.D. with at least 2-3 years' post-doctoral experience in a relevant field is required.

Research Associate - Analytical Protein Chemistry

We are seeking a highly motivated individual to join our analytical protein chemistry group. This individual will be responsible for routine analyses and will be involved in the development of analysis methods utilizing peptide mapping, amino acid analysis, electrophoresis, protein sequencing and mass analysis. A degree in Biochemistry or Chemistry, familiarity with the above techniques, and the ability/willingness to perform routine, precision analyses is highly desired.

Process Chemist

This unique and exciting position requires a seasoned, hands-on Chemist to assist with the development and refinement of production methods for synthetic peptides for use in human clinical trials and commercial production. The successful candidate will develop process improvements for Hirulog™ manufacturing, and provide overall scientific leadership to the Process Development group in the area of chemistry and bulk pharmaceutical production. A PhD in Chemistry (Organic Synthesis, Medicinal Chemistry or Pharmaceutical Chemistry) with hands-on experience in the synthesis, purification and characterization of complex organic molecules is required. Peptide synthesis background is preferred. Additional requirements include 4+ years of industrial experience in the scale-up to manufacturing processes, which would include knowledge of cGMP's. General organic chemistry skills with professional experience in the Pharmaceutical industry highly desired.

Regulatory Affairs Manager

An exceptional opportunity for a proven professional to develop critical NDA and IND submissions for our inaugural biotherapeutic products. This is a high visibility role responsible for ensuring the smooth progression of the approval process and maintaining compliance with all FDA regulations and interpretations. Candidates will need creative intelligence, a high energy level, excellent communication skills and the ability to function effectively in a team environment. Also required are 5 years' regulatory experience with a research-based human therapeutics company. A Master's degree in Biochemistry, Pharmacy, Pharmacology or the Biological Sciences is preferred; cardiovascular experience a plus.

Biogen offers what few companies in our industry can - Scientific Challenge, Stability, Profitability, and Growth. In addition, our compensation and benefits package, which includes relocation assistance, is one of the best in the industry, and is designed to attract and retain the finest talent available. If you are one of the best, you have an opportunity to join us now. We encourage interested and qualified candidates to respond at their earliest convenience by sending their resume to: Joe Tringali, Biogen, Inc., 14 Cambridge Center, Cambridge, MA 02142, FAX# (617) 252-9595. Biogen is an Equal Opportunity Employer.

BIOGEN

WADSWORTH CENTER FOR LABORATORIES AND RESEARCH
STAFF SCIENTIST POSITIONS

The Wadsworth Center is the multidisciplinary basic research and public health laboratory of the New York State Department of Health. It has a staff of over 800 employees including 170 doctoral level scientists housed in 850,000 square feet of modern research facilities located in Albany, New York. Core technical facilities in Biochemistry, Ultrastructural Analysis, Immunology, Molecular Genetics and Information Resources ensure state-of-the-art equipment and laboratory services. Qualified scientific staff are eligible for Faculty appointment in the School of Public Health, State University of New York, which provides an opportunity for academic interaction in graduate education.

DIVISION OF CLINICAL SCIENCES

Applications are invited for tenure track positions at the Wadsworth Center. The level of appointment is commensurate with experience.

GENETIC MECHANISMS OF DISEASE
MOLECULAR GENETICS

Applications are invited for several research staff scientist positions in mammalian molecular genetics. Investigators concentrating in molecular mechanisms of human disease pathogenesis, chromosome and/or gene structure, or gene expression are encouraged to apply. Candidates are expected to establish an independent research program.
Dr. Anne Messer, Search Committee Chair

GENE KNOCKOUT/TRANSGENICS

We are seeking a research scientist to direct a new gene knockout and transgenic core facility at the Wadsworth Center. This scientist will have the opportunity to pursue an independent research program.
Dr. Lorraine Flaherty, Search Committee Chair

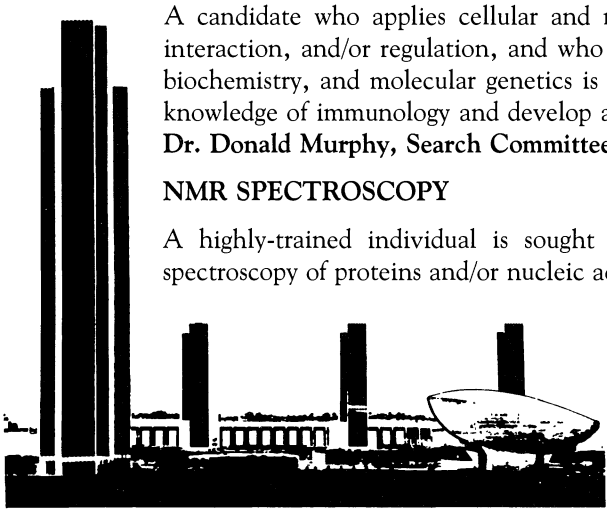
DNA DIAGNOSTICS

A molecular geneticist is sought with expertise in all aspects of DNA analysis of human specimens and two years relevant clinical experience. The individual will interact with the medical community to provide diagnostic reports and regulatory oversight of clinical genetic laboratories. A productive research program in an associated area is encouraged.
Dr. Kenneth Pass, Search Committee Chair

CYTOGENETICIST

An individual with training and experience in cytogenetics is sought to augment an ongoing program in cytogenetic testing and regulatory oversight of clinical laboratories. The incumbent should have expertise in classic cytogenetic techniques as well as current procedures such as FISH.
Dr. Kenneth Pass, Search Committee Chair

CELLULAR IMMUNOLOGY



A candidate who applies cellular and molecular approaches to the study of lymphocyte activation, interaction, and/or regulation, and who will interact with established groups in virology, cell biology, biochemistry, and molecular genetics is being sought. The successful candidate should possess a broad knowledge of immunology and develop an independent basic research program.
Dr. Donald Murphy, Search Committee Chair

NMR SPECTROSCOPY

A highly-trained individual is sought with expertise in multidimensional, multinuclear high-field spectroscopy of proteins and/or nucleic acids to establish a state-of-the-art NMR facility. Funds for both equipment and support personnel are available for this major initiative. The successful candidate will develop an independent research program and interface with the ongoing structural interests of Wadsworth Center staff scientists.
Dr. Robert Trimble, Search Committee Chair

WADSWORTH CENTER FOR LABORATORIES AND RESEARCH

CANCER BIOLOGY AND DIAGNOSTIC MARKERS

Candidates should have experience and interest in the molecular alterations related to the evaluation, diagnosis, and prognosis of cancer. The individual chosen would be encouraged to develop an independent research program related to this area and serve in an advisory capacity to the Laboratories and the Department of Health on the clinical status and utility of these diagnostic procedures. **Dr. John Galivan, Search Committee Chair**

STEM CELL HEMATOPOIESIS

An individual is sought for a staff scientist position to develop an independent research program in the cell biology and molecular biology of stem cells. Areas of research could involve, but are not restricted to, normal and abnormal hematopoiesis, regulation of stem cell differentiation, and applications to bone marrow transplantation and gene therapy. **Dr. Thomas Ryan, Search Committee Chair**

DIVISION OF ENVIRONMENTAL SCIENCES

The Center's Division of Environmental Sciences comprises extensive and well-equipped toxicology, environmental analytical chemistry, and environmental microbiology research laboratories, and has close collaborative interactions with the Health Department's epidemiology groups with access to its data bases. To complement these areas the Division intends to expand its activities in environmental molecular epidemiology, reproductive, neuro- and immunotoxicology, and human toxicology. Multiple State-funded positions are available for investigators at various levels who will establish independent research programs.

MOLECULAR EPIDEMIOLOGY

Areas of interest include measurement of xenobiotics in human-derived specimens (molecular dosimetry), biological markers of xenobiotic exposure, effect and susceptibility e.g., protgein/DNA adducts, oncogene activation/tumor suppressor gene inactivation, cytogenetic changes and somatic cell mutations. These investigators will participate in population-based studies to better define health risks associated with environmental exposures. **Dr. Laurence Kaminsky, Search Committee Chair**

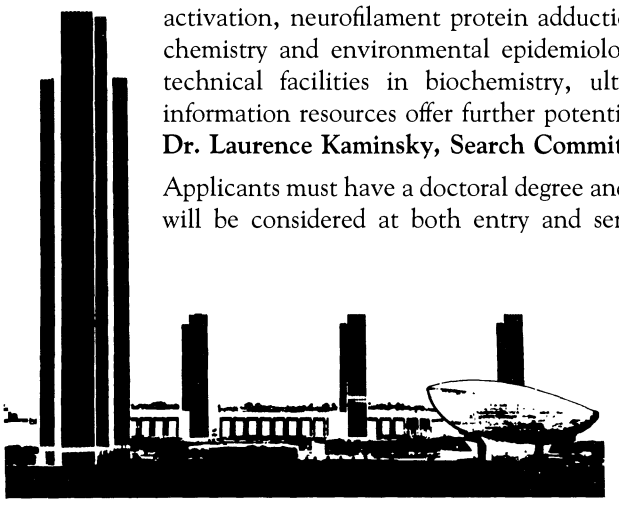
REPRODUCTIVE, NEURO-, AND IMMUNOTOXICOLOGY

Applications are requested from research scientists who apply biochemical and/or molecular approaches to one of the following disciplines; reproductive immunology, reproductive toxicology, neuroimmunology, or neuroimmunotoxicology. Candidates are expected to establish an independent research program.
Dr. David Lawrence, Search Committee Chair

HUMAN TOXICOLOGY

Areas of interest include in vitro toxicology using human cell lines, expression and characterization of human P450s and other xenobiotic metabolizing enzymes, genotyping and phenotyping of individuals for xenobiotic metabolizing systems, and noninvasive testing of human xenobiotic metabolizing capacities.

The evolving molecular epidemiology and human toxicology groups will collaborate with various on-going research programs in the Division of Environmental Sciences, including studies of xenobiotic activation, neurofilament protein adduction, genetic and immunotoxicology, environmental analytical chemistry and environmental epidemiology. In addition, the Center's scientists associated with core technical facilities in biochemistry, ultrastructural analysis, immunology, molecular genetics and information resources offer further potential for collaborative interactions.
Dr. Laurence Kaminsky, Search Committee Chair



Applicants must have a doctoral degree and at least several years post-doctoral experience. Appointments will be considered at both entry and senior levels. A curriculum vitae with a description of career goals and the names of three references should be sent to the attention of the appropriate **Search Committee Chair at the Wadsworth Center for Laboratories and Research, New York State Department of Health, P.O. Box 509, Albany, New York 12201-0509.** *Applications will be accepted through December 31, 1993. The Wadsworth Center is an affirmative action/equal opportunity employer. Women and minorities are encouraged to apply.*

WADSWORTH CENTER FOR LABORATORIES AND RESEARCH
POSTDOCTORAL POSITIONS

Postdoctoral positions are available immediately in research programs of the following investigators:

Dr. David Anders. Molecular genetic and biochemistry of human cytomegalovirus DNA replication. Experience in either molecular biology, virology, protein biochemistry, or eukaryotic expression systems preferred.

Dr. Marlene Belfort. Mobile self-splicing introns. Analysis of self-splicing RNAs and DNA-based intron mobility in prokaryotes using genetic and biochemical approaches. Experience in protein and/or nucleic acid chemistry, genetics desirable.

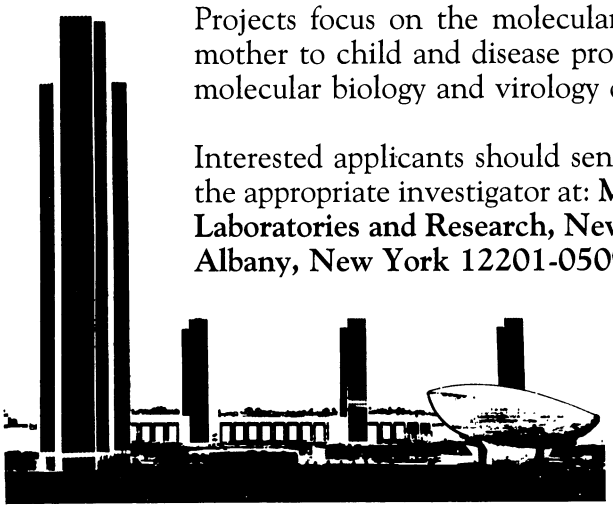
Dr. Lorraine Flaherty. Molecular genetics of mouse developmental mutations. Characterization, mapping, and cloning of genes affecting mouse development. New mutations under study include ones causing polycystic kidney disease, cerebellar dysfunction, deafness, and facial malformations.

Dr. Joachim Frank. Structure and function of ribosomes. Electron microscopy and image processing are being used to explore the three-dimensional structure of ribosomes (pro and eukaryotic) and ribosome-ligand complexes. Experience in ribosome biochemistry required.

Dr. Jan S. Keithly. Molecular biology and biochemistry of parasitic protozoa. (1) Molecular mechanisms of multi-drug resistance in haemoflagallates; identification of metabolic targets for chemotherapy in *Crytosporidium parvum.* (2) Testing and development of molecular probes for diagnosis of *Giardia duodenalis* and C. *parvum.* Training in biochemistry, cell and/or molecular biology desirable.

Dr. David Lawrence. Biochemical Immunology and Immunotoxicology. Biochemistry of resting and activated lymphocytes with emphasis on oxidative stress mechanisms and biochemistry of cellular thiols and lipids. Molecular and/or cellular biological expertise is required.

Dr. Paul Masters. Molecular biology of coronaviruses. Ongoing projects involving viral RNA-protein interactions, nucleocapsid assembly, mutant characterization and engineered genetics of the largest known RNA virus. Prior experience in virology or molecular biology is desirable but not required.



Drs. Barbara Weiser and Harold Burger. Molecular and viral pathogenesis of HIV. Projects focus on the molecular and viral determinants of HIV transmission from mother to child and disease progression in HIV-infected individuals. Experience in molecular biology and virology desirable.

Interested applicants should send curriculum vitae and names of three references to the appropriate investigator at: **Molecular Genetics Program, Wadsworth Center for Laboratories and Research, New York State Department of Health, P.O. Box 509, Albany, New York 12201-0509.** *The Wadsworth Center is an affirmative action/equal opportunity employer. Women and minorities are encouraged to apply.*

In an ever changing world, innovation is our destination... teamwork is our way of getting there.

PROVIDING OPPORTUNITIES

RECOGNIZING ACHIEVEMENT

ENCOURAGING DIVERSITY

THE R.W. JOHNSON PHARMACEUTICAL RESEARCH INSTITUTE of Johnson & Johnson is rapidly becoming a worldwide leader in drug discovery...shortening the cycle times from discovery of compounds to the selection of candidates for new drug-development and being recognized for the quality of its regulatory submissions.

Scientific excellence is an essential ingredient of our success as today's world health care leader. Our R&D customers—the Johnson & Johnson companies Cilag, Ortho-McNeil Pharmaceutical and Ortho Biotech, need information about the synthesis, physicochemical properties, metabolism, stability, medical efficacy, possible side effects and manufacture of potential drugs to ensure the speedy approval and ultimately to market their biotechnolgy-derived and traditional drugs.

But it is our people who will be the catalyst for tomorrow's successes. Talented women and men from diverse backgrounds with the skills, desire and competitive spirit who can work closely together on the teams that will meet the challenges of this changing world.

If your career is pointed in our direction, you'll want to consider the advantages of joining The R.W. Johnson Pharmaceutical Research Institute. We're seeking entry through senior level candidates at several sites in the following fields:

Pharmacy, Biology, Biochemistry, Toxicology, Immunology, Chemistry, Biochemical Engineering, Pharmacology, Pathology, Microbiology and Statistics.

Interested applicants are invited to send their resume to:

R&D Careers—Department SC
R.W. Johnson Pharmaceutical Research Institute
P.O. Box 300, Raritan, NJ 08869-0602

THE R.W. JOHNSON
PHARMACEUTICAL RESEARCH INSTITUTE

Raritan, NJ Spring House, PA La Jolla, CA Zurich, Switzerland Toronto, Canada

We are an Equal Opportunity Employer Commited to Workforce Diversity.

OUR NEW DRUG DISCOVERY FACILITY

All pharmaceutical companies depend upon the strength of their R&D capabilities. To ensure that we continue our proud tradition of scientific success, we have invested more than $300 million in the construction of a new state-of-the-art Drug Discovery Facility (DDF). More than one million square feet in size, it provides our scientific professionals with the most advanced equipment and technology available in our industry today.

BUILDING FOR THE FUTURE...

That's Schering-Plough

The DDF complex in Kenilworth, NJ has centralized most of our major NJ-based pharmaceutical research activities in microbiology, virology, molecular and cell biology, chemistry, pharmacology, tumor biology and biochemistry. It is an environment that encourages the active exchange of ideas.

The DDF complex will help us continue to meet the scientific challenges facing pharmaceutical research well into the 21st Century.

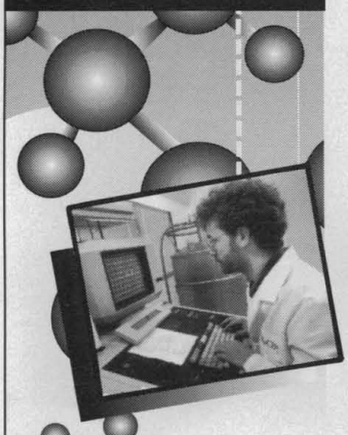
Imagine what you could accomplish with resources as advanced and extensive as these... and imagine what a foundation for your professional development they could provide.

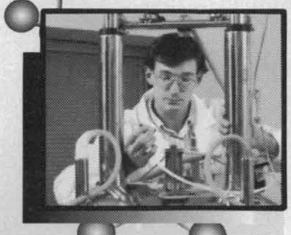
If you would like more information about Schering-Plough and our DDF complex, send us your resume or letter of interest to: Schering-Plough Research Institute, Kenilworth, NJ 07003. Att: Human Resources, Department DDF. We are an equal opportunity employer.

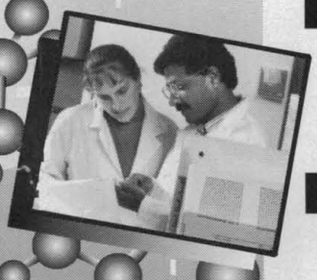
Schering-Plough
Research Institute

Using Science for Human Advantage

EXTENSIVE GROWTH — EXCITING OPPORTUNITIES







Advanced technologies, visionary management, a progressive approach: these are the strengths behind Procept's focus and the reason for our rapid growth. We are expanding on our core technologies — T cell biology and receptor structure-based small molecule drug design — to create novel therapeutic compounds that enhance the clinical management of diseases involving the immune system. With intense activity in all phases of research, and accelerating pre-clinical/clinical studies, we are clearly adding to the momentum of our discovery. Take advantage of the resulting opportunities.

RATIONAL DRUG DESIGN

Senior Scientists — Computational Chemistry

You will lead/coordinate molecular modeling activities directed toward protein structure-driven lead discovery and optimization; manage software and hardware systems; and serve as a resource for synthetic chemists. Requires PhD + 4 years experience in drug discovery-related molecular modeling; and knowledge of major software used for small molecule and protein modeling.

Senior Scientists — Synthetic Organic Chemistry

Opportunities for innovative synthetic chemists to join our Rational Drug Design Team. Experience in multistep synthesis of organic molecules; and interest in protein structure-based drug design. Requires PhD in Organic or Medicinal Chemistry; and 2-4 years post doctoral studies in synthetic chemistry. Experience in the development of SARs and optimization of drug candidates is desirable.

Research Associates — Synthetic Organic Chemistry

Requires background in multiple reaction sequences, chromatographic purification and product identification, including acquisition and interpretation of NMR spectra. Also requires MS/BS in synthetic Organic/Medicinal Chemistry, with 3 years experience.

IMMUNOLOGY/IMMUNOCHEMISTRY

Senior Scientist — Immunochemistry

You will design *in vitro* molecular assays for measuring receptor-ligand interactions. Experience is required with quantitative techniques in immunochemistry including ELISA-based assays, radiolabeling proteins, immunoprecipitations, and gel-electrophoresis. Expertise in molecular biology is desirable. Requires PhD and 2-4 years experience.

Senior Scientist — Immunology

You will design and perform *in vitro* cell-based assays for the immunological properties of the recombinant TCR: e.g., binding to antigen presenting cells expressing appropriate MHC molecule plus peptide, and competing with cell surface TCR for clonotypic antibodies. You will also investigate the immunogenicity of recombinant TCRs and develop strategies for raising TCR clonotype specific mAbs required to probe recombinant TCR structure. Requires PhD and 2-4 years experience.

Senior Scientist — Immunology

As a cellular immunologist primarily interested in T cell biology, you will investigate the role of the CD2 molecule in the T cell surface binding events regulating T cell activation and anergy, and the potential of novel therapeutic agents to modify CD2 function. Requires PhD with 5-8 years experience.

Research Associates — Immunochemistry

You will support the development of novel assays measuring receptor-ligand interactions for use in drug screening programs. Proficiency in either ELISA-based assays, FACS analysis, or general techniques in immunochemistry is highly desirable. Requires BS in Biological Sciences with 1-3 years experience.

MOLECULAR BIOLOGY/PROTEIN EXPRESSION

Staff Scientist — Protein Expression

You will be involved with gene expression and protein production in bacterial, insect, and mammalian cell hosts. Requires PhD and 2-4 years experience in microbial genetics, physiology, and gene expression. Knowledge of E. coli molecular genetics is essential. Fermentation skills, knowledge of mammalian or insect expression systems, and industrial experience are highly desirable.

PROTEIN BIOCHEMISTRY

Senior Scientist — Biophysical Chemistry

You will interact with a structure-based drug design team to evaluate the binding of lead immunosuppressive compounds to target receptors. Includes determination of affinity, stoichiometry, specificity and effects on target receptor structure. Requires PhD in Chemistry/Biochemistry with 2+ years postdoctoral experience studying protein-ligand interactions, preferably utilizing various spectroscopic techniques (fluorescence/CD/UV-VIS).

In addition to extensive business and academic affiliations, we offer state-of-the-art facilities, support for your continuing career development, and an outstanding compensation and benefits package that includes incentive stock options. Please send your curriculum vitae to: ***Director of Human Resources, Procept, Inc., 840 Memorial Drive, Cambridge, MA 02139.*** We are an equal opportunity employer.

PROCEPT

WYETH-AYERST RESEARCH

Wyeth-Ayerst, a major division of American Home Products Corporation, is a leading manufacturer and marketer of health care products.

Leading the way for a healthier world

As a research-based pharmaceutical company, we are committed to helping people lead healthier lives through innovative pharmaceutical and nutritional products.

At Wyeth-Ayerst, our commitment to tomorrow is evidenced in the products we develop, the research we pursue, the excellence we achieve.

Our continued success depends upon the talent of multi-disciplinary research teams made up of scientists like you...bringing to market pharmaceutical products that improve health and enhance the quality of life.

Join Wyeth-Ayerst Research for an unparalleled opportunity for professional growth. We seek both entry-level and experienced candidates to staff key positions in drug discovery and development research at our three primary U.S. Research and Development facilities.

WYETH AYERST™

We offer competitive salaries and professional opportunities as well as a full range of benefits.

Equal Opportunity Employer, M/F/D/V

RADNOR, PENNSYLVANIA

Candidates with M.D., R.N., B.S./M.S. or Ph.D. degrees in appropriate disciplines are sought to staff key positions at our suburban Philadelphia location in Clinical Research, Clinical Operations, Research Quality Assurance, Biostatistics and Clinical Data Management, Regulatory Affairs, Biotechnology/Microbiology, Nutrition and the Women's Health Institute. Respond to Wyeth-Ayerst Research, Human Resources, P.O. Box 8299, Philadelphia, PA 19101.

ROUSES POINT/ CHAZY, NEW YORK

This location on beautiful Lake Champlain invites candidates with B.S./M.S. or Ph.D. degrees in the appropriate scientific disciplines to inquire about our openings in Analytical Chemistry, Chemical Development, Pharmaceutical Sciences, Toxicology and Drug Safety. Respond to Wyeth-Ayerst Research, Human Resources, 64 Maple St., Rouses Point, NY 12979.

PRINCETON, NEW JERSEY

Candidates with B.S./M.S. or Ph.D.'s in the appropriate scientific discipline (Molecular Biology, Biology, Immunology, Pharmacology, Biochemistry, Toxicology, Organic Chemistry and Analytical Chemistry) are sought to staff positions in Cardiovascular-Metabolic Disorders, Central Nervous System Pharmacology, Drug Metabolism, Exploratory Toxicology, Molecular Genetics, Synthetic Organic Chemistry, Inflammation/Allergy/Immunology and Analytical Chemistry. Respond to Wyeth-Ayerst Research, Human Resources, CN 8000, Princeton, NJ 08543-8000.

At each of these sites, you will find the most advanced resources and the convenience of outstanding cultural, educational and leisure activities just minutes away.

We are proud to offer an excellent quality of work life.

Wyeth-Ayerst offers the ideal environment to spark your enthusiasm and challenge your ingenuity. In support of your research efforts, you will find responsible management and innovative colleagues, as well as state-of-the-art resources and equipment. The free-flow of scientific and technical knowledge is encouraged by frequent in-house seminars and Company-sponsored participation in conferences and worldwide symposia. Our research scientists are encouraged to establish their reputations by developing a strong record of publications.

Outstanding professional opportunities.

Company policies that support your professional growth include a job posting program, training activities and a benefits package that offers tuition reimbursement. Our Research & Development Career Ladders provide the structure to recognize education, skills and experience from the level of a recent college graduate to that of an experienced Ph.D. or M.D. research scientist who is a recognized authority in a particular field.

SOMATIX

Somatix Therapy Corporation is the **SCIENTIFIC LEADER IN THE FIELD OF GENE THERAPY**. Our assets include highly efficient gene transfer technology, broad-based, intellectual property and product development programs for Cancer, Neuroscience and Hemophilia. We currently have the following **OPPORTUNITIES** available for qualified professionals.

VECTORS DISCOVERY/DEVELOPMENT

Senior Research Scientist

Focusing on retroviral-mediated gene transfer, you will research and develop packaging systems for vectors, including the discovery of novel approaches and improvement of existing systems for clinical applications. A Ph.D. or M.D.; training in retrovirology with an emphasis in Murine leukemia viruses, HIV or SIV; completion of 1-2 postdoctoral fellowships; and experience managing a laboratory are required. Box #93-028

Research Scientist

Focus on retroviral-mediated gene transfer, and the development of methods for production, concentration and purification of retroviral particles. A Ph.D. in a biological science or virology, completion of a postdoctoral fellowship in virology at a major university and experience working with DNA and RNA viruses as expression vectors and protein biochemical purification are required. Box #93-027

Postdoctoral Fellows

Two positions available to work on development of vector systems for *in vivo* control of gene expression or retroviral replication and RNA splicing. A Ph.D. in a related field is required. Box #93-035

Research Associates

You will focus on the construction of retroviral expression vectors, PCR technology, gene transfer, Southern and Northern blot analysis, and analysis of gene expression. You will need a BS and at least 2 years of research experience. Previous experience in molecular biology and tissue culture is preferred. Box #93-034

NEUROSCIENCE (CNS)

Postdoctoral Fellow

Investigate various means of killing brain tumor cells based on gene transfer. A Ph.D. with 1-2 years of postdoctoral experience is required. Experience in basic molecular biology and cell culture is highly desirable. Box #93-021

ONCOLOGY

Senior Research Scientist

Using retroviral gene transfer techniques, you will establish procedures for both culturing cells from solid tumors and genetic modification, as well as transfer technology from the laboratory bench to the clinic and oversee clinical trials of tumor vaccines. A Ph.D. and 5-7 years of related experience are required. Box #93-033

Senior Research Scientist (Immunology)

Focus on investigation of cytotoxic T cells against tumor specific antigens, and the determination of the predominant T cell response to these antigens. A Ph.D or M.D. in Immunology and completion of at least 1-2 postdoctoral research fellowships are required. Experience in human, Murine T cell lines, mammalian cell culture, T cell proliferation, lymphokine and cytotoxicity assays is also required. Box #93-010

HEMOPHILIA

Research Scientist

Developing new and efficient methods of gene delivery, with an emphasis on retroviral mediated *ex vivo* gene therapy to deliver Factor VIII and Factor IX protein. A Ph.D. in Cell/Molecular Biology or Biochemistry, preferably with an emphasis on gene delivery, and 2-4 years of postdoctoral experience are required. Box #93-036

Postdoctoral Fellow

Develop efficient methods to deliver Factor VIII and Factor IX protein after *ex vivo* manipulation of host cells. A Ph.D. in Cell/Molecular Biology or Biochemistry is required. Experience in Somatic gene therapy is preferred. Box #93-032

Located in the San Francisco Bay Area, Somatix offers a competitive salary and benefits package. To learn more, please send your CV/resume, indicating appropriate Box # to: Somatix Therapy Corporation, Attn: Human Resources Department, 850 Marina Village Parkway, Alameda, CA 94501. We are an equal opportunity employer.

Our ideas created an industry. Yours will expand it.

Applied Biosystems, a leading supplier of systems and tools for biotechnology research, is currently seeking talented professionals to be part of a multi-disciplinary team bringing tomorrow's technology into the clinical arena today. Based in the San Francisco Bay Area, you'll also enjoy the natural beauty and cultural benefits of Northern California.

SCIENTIST/DIAGNOSTICS

You will establish and implement a GMP program to develop and commercialize consumable diagnostics products. Responsibilities will involve defining reliable and effective processes, specifications, test methods and manufacturing procedures, as well as establishing a quality assurance program.

Requirements include an MS or PhD in a physical or biological science along with a good understanding of cGMP regulations and a minimum of 3-5 years in the development and commercialization of in-vitro DNA diagnostics products. Experience with PCR, DNA probe chemistry and DNA sequencing is desirable. (Ref. #2002S)

SCIENTIST/PROCESS DEVELOPMENT

In this challenging position, you will develop derivatized supports for nucleic acid and peptide synthesis by designing and optimizing syntheses, and developing test methods and procedures. You will interact in a team environment with Research, Manufacturing and Marketing.

The ideal candidate will possess an MS or PhD with equivalent hands on laboratory experience in organic chemistry or related fields, and 3+ years of experience in the chemical or biotech industry. (Ref. #1831S)

SCIENTIST/PROCESS DEVELOPMENT

We are seeking a Molecular Biologist to develop and commercialize DNA Sequencer and fragment analysis kits.

Requirements include an MA or PhD in Molecular Biology/Biochemistry with 3 years' experience in DNA sequencing, PCR and magnetic bead protocols including 2 years' industrial experience. Background in multicomponent kit development, automated sequencing/electrophoresis instrumentation, fluorescent labelled oligomers highly desirable. Good written and oral communication skills essential. (Ref. #1932S)

SCIENTIST/R&D

Consider this opportunity for a Scientist/Molecular Biologist. Responsibilities will include sequencing evaluation and amplification (PCR) experiments using routine and developmental methods, sample and gel preparation, data analysis, and the preparation of analytical reports.

The ideal candidate will have a PhD and a minimum of 2 years of industrial experience. A basic understanding of electrophoresis principles is required and expertise with optical/mechanical systems at the developmental level is preferred. A self-motivated person with the ability to work in a small, highly interactive team environment is essential. (Ref. #2198S)

We offer a competitive salary and generous benefits package. Please send your resume, indicating Reference Code, to: Applied Biosystems, Human Resources, 850 Lincoln Centre Drive, Foster City, CA 94404. We are an equal opportunity employer.

Applied Biosystems

A Division of Perkin-Elmer Corporation

genzyme

The **strength** *of an organization can be measured by the* **scope** *of its products. At Genzyme, we have developed a* **product pipeline** *spanning the areas of biotherapeutics, diagnostic products and services as well as pharmaceuticals and fine chemicals. This* **diversified marketing strategy,** *combined with the talents and energy of our people, has enabled us to* **achieve success** *on a global scale.*

Genzyme has the resources and the expertise to continue our progress in many promising areas. You can contribute to our success. We have opportunities in:

- **Gene Therapy**
- **Non-viral Delivery Systems**
- **Transgenic Systems**

Genzyme rewards success with an excellent compensation and benefits package, including 3 weeks' paid vacation, a 401(k) plan with a company match, extensive insurance benefits and an Employee Stock Purchase Plan.

Please send your resume to Human Resources, Dept. S924, Genzyme Corporation, One Mountain Road, Framingham, MA 01701.

An equal opportunity employer.

ADVANCING HEALTH CARE PRODUCTS AND SERVICES WORLDWIDE

AMERICAN ASSOCIATION FOR CANCER RESEARCH SCIENTIFIC CONFERENCES: 1993-1994

NOVEMBER 7-11, 1993
Molecular Approaches to Cancer Immunotherapy
Chairperson: Ralph A. Reisfeld, San Diego, CA
Grove Park Inn, Asheville, NC

NOVEMBER 9-13, 1993
Interactions of Cancer Susceptibility Genes and Environmental Carcinogens
Joint Meeting with International Agency for Research on Cancer (IARC)
Chairpersons: Frederick P. Li, Boston, MA, and Ruggero Montesano, Lyon, France
IARC, Lyon, France

DECEMBER 5-9, 1993
Cell Signalling and Cancer Treatment
Joint Meeting with British Association for Cancer Research and European Organisation for Research and Treatment of Cancer (PAMM Group)
Chairpersons: Garth Powis, Tucson, AZ; Paul Workman, Macclesfield, England
El San Juan Hotel, San Juan, PR

JANUARY 17-22, 1994
Risk Assessment in Environmental Carcinogenesis
Co-Sponsored by the Environmental Mutagen Society
Chairpersons: Philip C. Hanawalt, Stanford, CA; James A. Swenberg, Chapel Hill, NC
Whistler Resort and Conference Center, Whistler, B.C., Canada

JANUARY 31-FEBRUARY 5, 1994
Molecular Genetics of Progression and Metastasis
Chairperson: Lance A. Liotta, Bethesda, MD
Big Sky Resort, Big Sky, MT

FEBRUARY 19-24, 1994
Cancer: Perturbations in Cell Cycle Control and Genomic Integrity
Chairpersons: Thea D. Tlsty, Chapel Hill, NC; Lawrence A. Loeb, Seattle, WA
Banff Springs Hotel, Banff, Alberta, Canada

MARCH 5-11, 1994
Growth Factors, Development, and Cancer
Joint Meeting with Friedrich Miescher-Institut
Chairpersons: Harold L. Moses, Nashville, TN; Bernd Groner, Basel, Switzerland
Congress Center, Interlaken, Switzerland

APRIL 10-13, 1994
85th Annual Meeting
Chairperson: Karen S. H. Antman, New York, NY
Moscone Convention Center, San Francisco, CA

OCTOBER 16-20, 1994
Transcriptional Control of Cell Growth and Differentiation
Chairpersons: Eric N. Olson, Houston, TX; Bruce M. Spiegelman, Boston, MA
Chatham Bars Inn, Chatham (Cape Cod), MA

NOVEMBER 7-11, 1994
Modern Developments in Cancer Therapeutics
Joint Meeting with Academia Sinica
Chairperson: Yung-chi Cheng, New Haven, CT
Academia Sinica, Taipei, Taiwan, R.O.C.

AACR members will receive brochures on the above special conferences as soon as they are available. Nonmembers should call or write:

American Association for Cancer Research
Public Ledger Building
620 Chestnut Street, Suite 816
Philadelphia, PA 19106-3483
215-440-9300 • 215-440-9313 (FAX)