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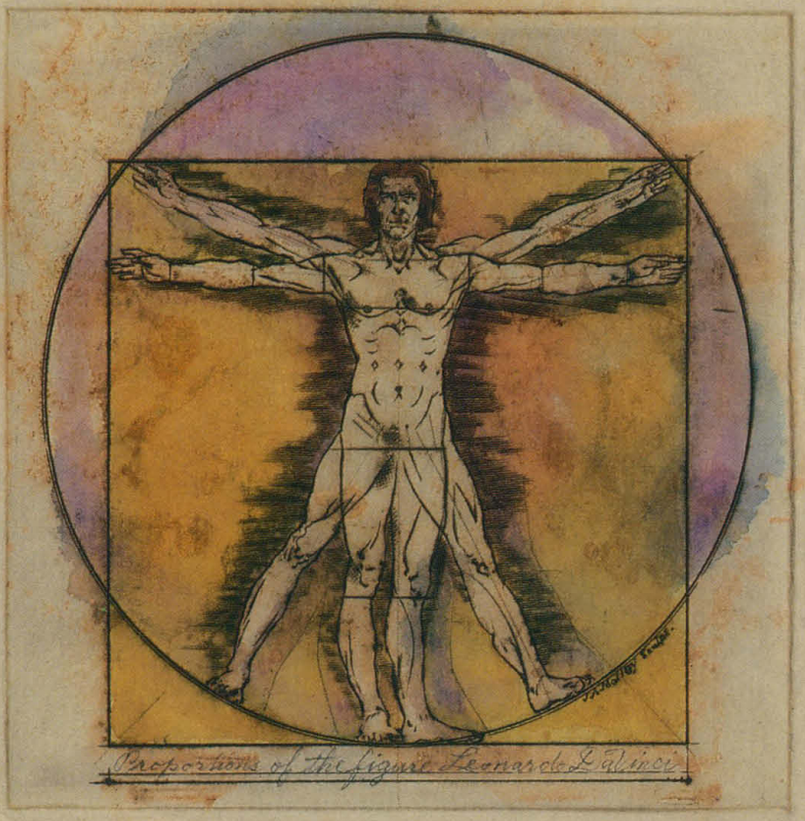

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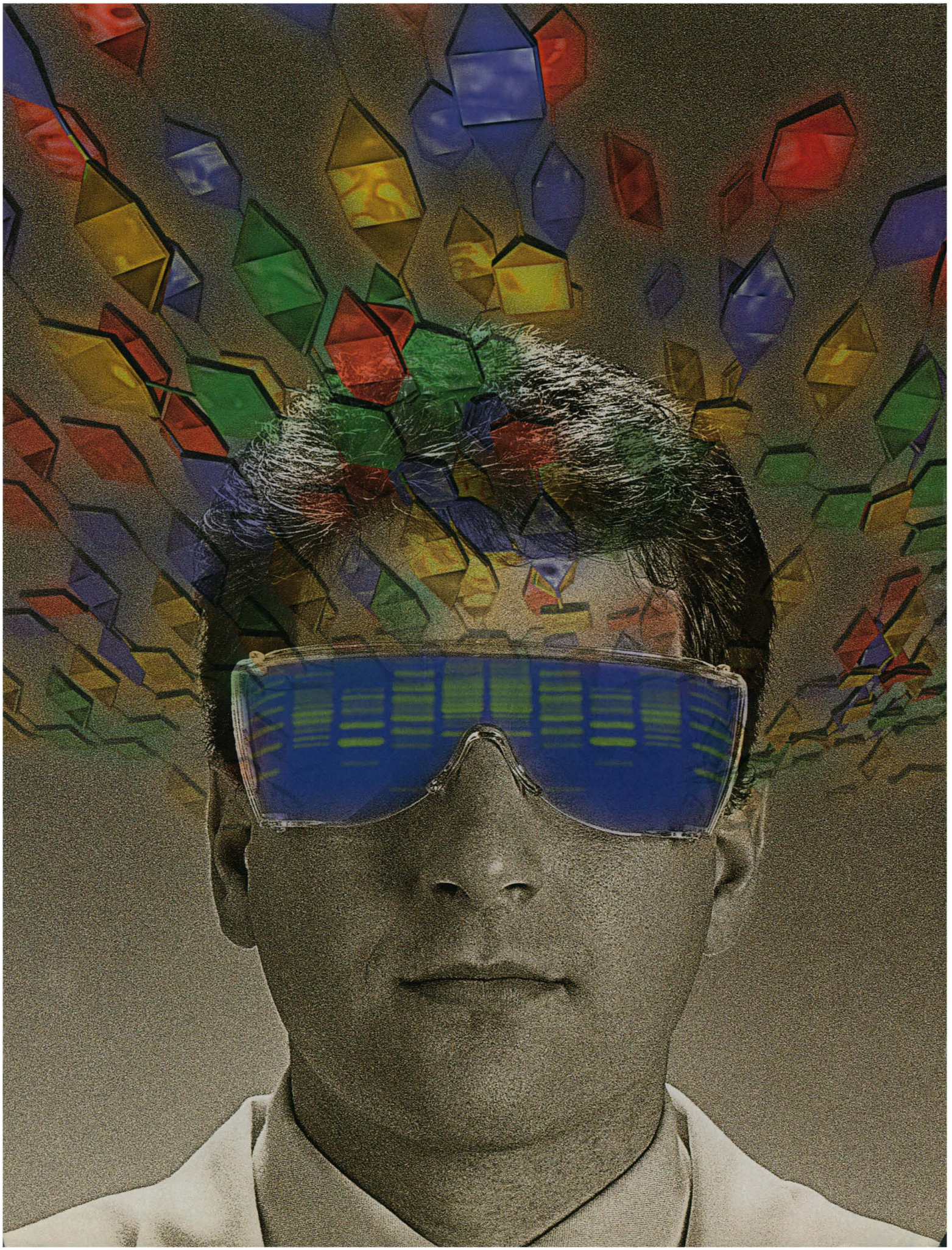

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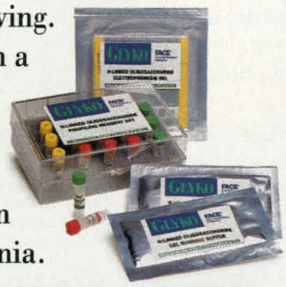

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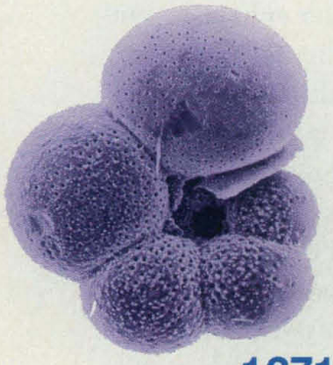
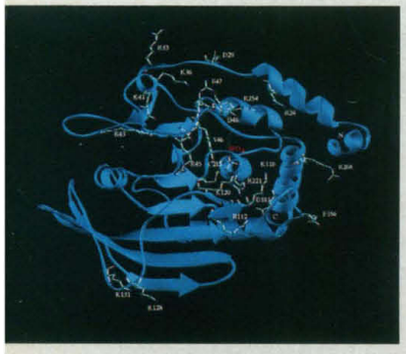


1371

Witness to extinction



1373 & 1397

Catalytic site cleft of protein tyrosine phosphatase 1B

NEWS & COMMENT

RESEARCH NEWS

POLICY FORUMS

PERSPECTIVES

RESEARCH ARTICLES

DEPARTMENTS

COVER

This year's "Women in Science" issue compares the position of female researchers in national cultures around the world—and finds many surprises. For example, women are proportionally better represented in science in Turkey than they are in the United States. The reasons for such startling disparities are discussed in a special news section beginning on page 1467. Policy Forums on women in science appear on pages 1389 and 1392 and a bibliographic update on page 1458. [Photo: NASA; Photoillustration: Tracey Keaton Drew]

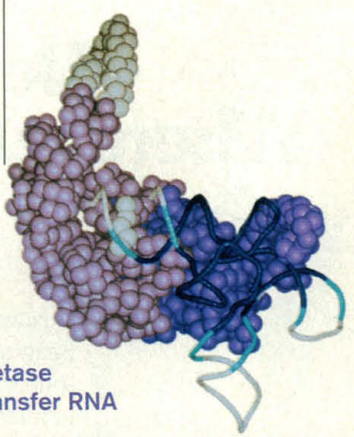
REPORTS

WOMEN IN SCIENCE '94

WOMEN IN SCIENCE '94 COMPARISONS ACROSS CULTURES

1467

Overview: Surprises Across the Cultural Divide • Germany: The Backbreaking Work of Scientist-Homemakers • Fighting for Day Care at the Lab • Post-Unification Blues • Italy: Warm Climate for Women on the Mediterranean • Sweden: Leveling the Playing Field in Stockholm • Turkey: A Prominent Role on a Stage Set by History • The Philippines: Fighting the Patriarchy in Growing Numbers • India: Is Overcoming 'Diffidence' the Route to Success?



1404 & 1432
Seryl-transfer RNA synthetase complexed with serine transfer RNA

Indicates accompanying feature

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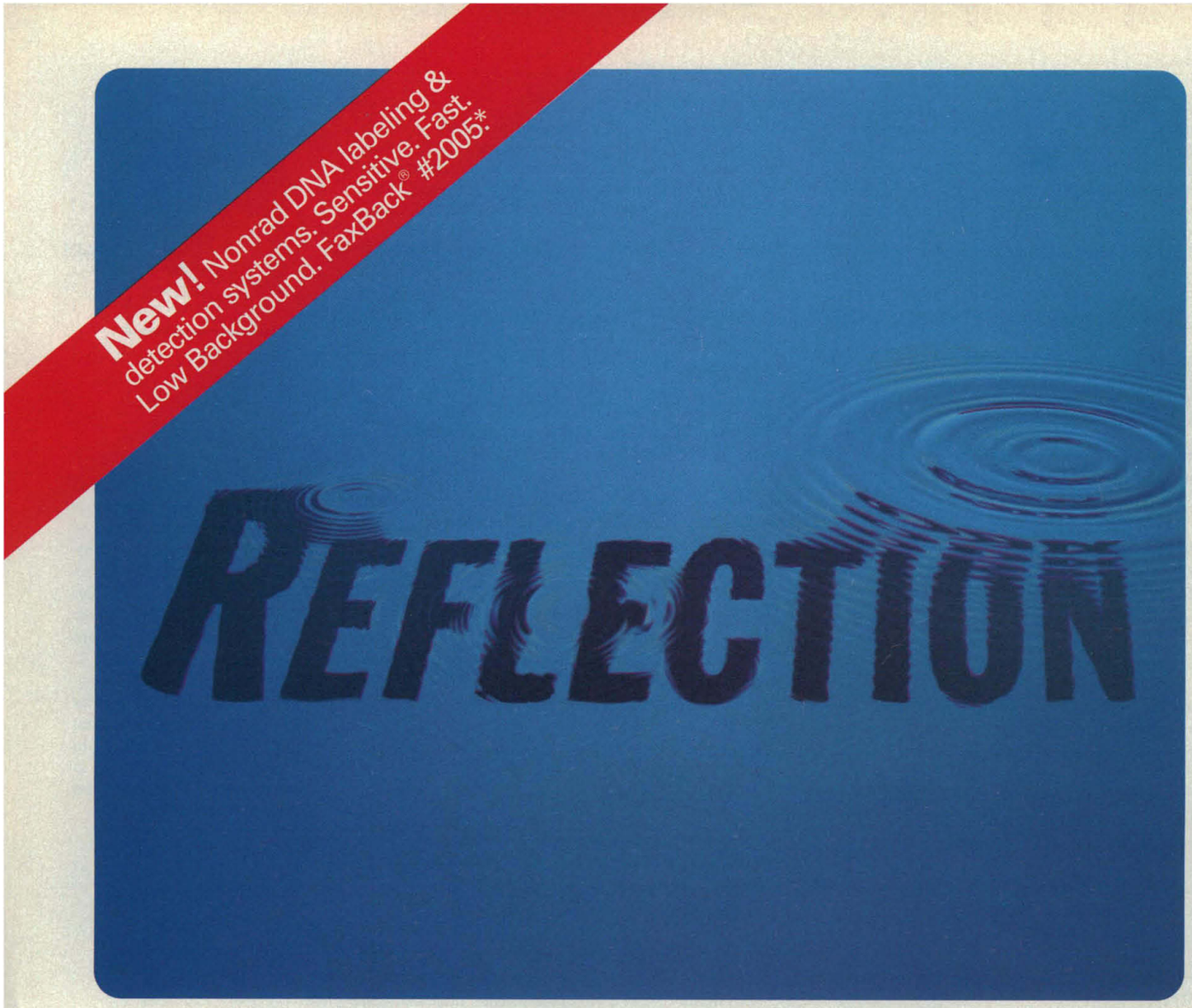

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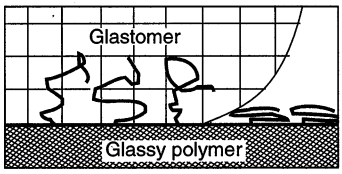
Sliding by

Polymers are often used as lubricants, and polymer surfaces can be subject to wear and friction. The movement of the chains that make up polymers can produce unusual tribological effects. Brown (p. 1411) investigated the interfacial properties and dynamics between two polymer layers, a mobile



elastomer layer and an immobile or glassy polymer surface that was coated with a thin layer of end-attached molecules. These end-attached molecules are chains of the mobile layer material and act as a molecularly thin layer of lubricant. Considerably lower shear stress was observed when both sides of the interface had high segment mobility, but very thin layers of tethered chains could actually increase friction by penetrating into the elastomer.

■

On the face of it

How the arrangement of molecules on a surface influences cell adhesion can be explored by using single crystals as substrates. Hanein *et al.* (p. 1413) show that differential adhesion can occur even on crystal faces that are enantiomeric, that is, they are mirror-image isomers. Cultured kidney epithelial cells from *Xenopus* were allowed to adhere to (*R*,*R*) and (*S*,*S*) crystals of calcium tartrate. Short-term adhesion (10 minutes) occurred preferentially on the {001} faces of the (*R*,*R*) crystals. However, long-term adhesion (24 hours) occurred similarly for both the (*R*,*R*) and (*S*,*S*) crystals on the {101} faces. The short-term response does not seem to depend on exogenous proteins and likely reflects direct interactions with the substrate.

■

Viewing variations

Structural inhomogeneities strongly influence the properties of high-temperature superconductors, but standard probes such as x-ray diffraction are for the most part sensitive to the surface region rather than the bulk. Skelton *et al.* (p. 1416) developed a diffraction probe that uses a tightly collimated beam of high-energy x-rays from a synchrotron source, which offers both high spatial resolution and penetration below the surface. Inhomogeneity occurs in superconductor samples over a scale of 10 micrometers. Such inhomogeneities may be responsible for some of the unusual experimental properties of these materials.

■

Cell walls, pH, and plant development

A developmental asymmetry appears early on for the algae *Fucus* and *Pelvetia*. The first cell division of these zygotes generates a rhizoid cell, which eventually produces the holdfast, and a thallus cell, which produces the fronds. Berger *et al.* (p. 1421) show, by ablating specific cells of the embryo, that a portion of cell wall originally in contact with one cell type can, if brought into contact with the other cell type, cause a switch in fate. A certain type of differentiation is exemplified by the normal development of the rhizoid cell, which begins with elongation of the tip of the cell. Gibbon and Kropf (p. 1419) found that the cytoplasm at the tip is more acidic than that at the base of the cell and the magnitude of the difference correlates with the rate of tip growth.

■

Cost at the pump

For animal cells, the potassium concentration inside the cell is higher than it is outside, while the reverse is true for sodium. These electrochemical gradients are maintained at considerable metabolic cost by a membrane-embedded enzyme that pumps three sodium ions out of the cell and two potassium ions inward. Hilgemann (p. 1429) provides direct measurements of the rate and voltage-dependence of the dissociation of the three sodium ions at the external side of the pump. The first sodium ion to be released surmounts most of the voltage gradient across the membrane, but the dissociation of the second and third sodium ions is affected only weakly by the electric field. The three sodium ions do not depart simultaneously, and the two laggard sites are occupied subsequently by potassium.

■

Waiting for repairs

Mutation rates at a given nucleotide along a gene are determined both by the frequencies of initial DNA damage and of DNA repair. Tornaletti and Pfeifer (p. 1436) and Gao *et al.* (p. 1438; see the news story by Service, p. 1374) have studied, at nucleotide resolution, the excision repair of ultraviolet light–induced cyclobutane pyrimidine dimers in the human *p53* and *PGK1* genes. The repair rates in both genes were highly variable and DNA sequence–dependent. In *p53*, the positions showing slow repair included seven of eight nucleotides that are mutation hotspots in skin cancer. The *PGK1* promoter contained two slowly repaired regions that coincided with transcription factor binding sites.

■

Neighborly help

Determining the fate of early embryonic cells may be more complex than previously thought. When the EMS blastomere is removed from the *Caenorhabditis elegans* embryo, it produces body wall muscle, the fate it would follow if it was left in the embryo. Such experiments led to the belief that EMS is autonomously specified. Experiments by Schnabel (p. 1449) indicate that the determination of the fate of the EMS lineage within the embryo itself requires an inductive signal from neighboring cells to overcome an inhibitory signal from other neighboring cells. This inductive interaction requires the *glp-1* gene.

Taking off and putting on

Phosphatases, which have the opposite action of kinases, dephosphorylate proteins and play an important role in signal transduction processes. Barford *et al.* (p. 1397; see the news story by Marx, p. 1373) present the x-ray structure of human tyrosine phosphatase 1B. Amino-tRNA synthetases perform a daunting nucleic acid–protein recognition task—binding the one correct tRNA molecule for subsequent aminoacylation. Biou *et al.* (p. 1404) and Belrhali *et al.* (p. 1432) discuss the interactions involved in this process revealed by x-ray structures for seryl-tRNA synthetase complexed with seryl tRNA and with seryl adenylate analogs.

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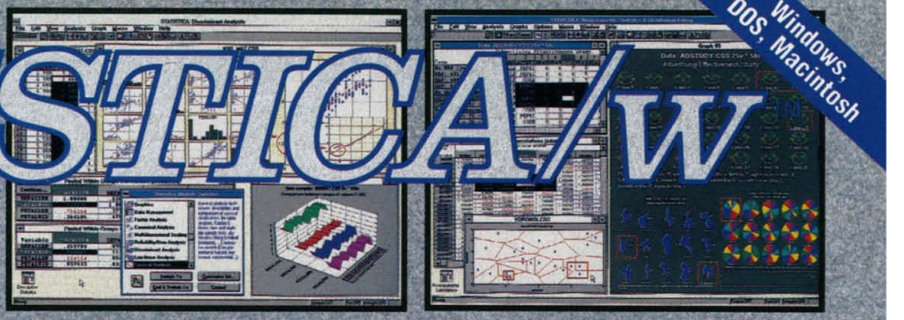

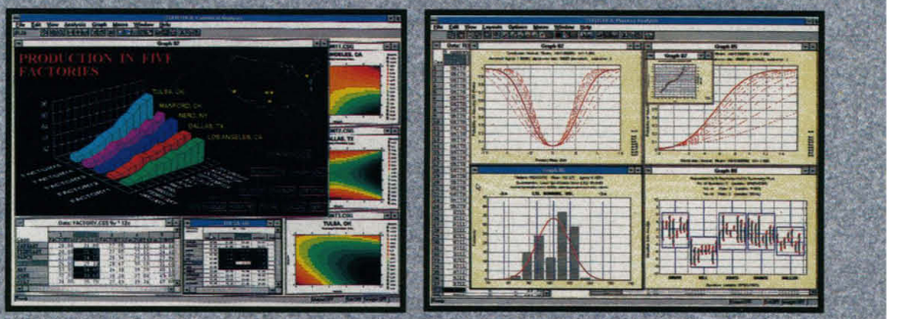

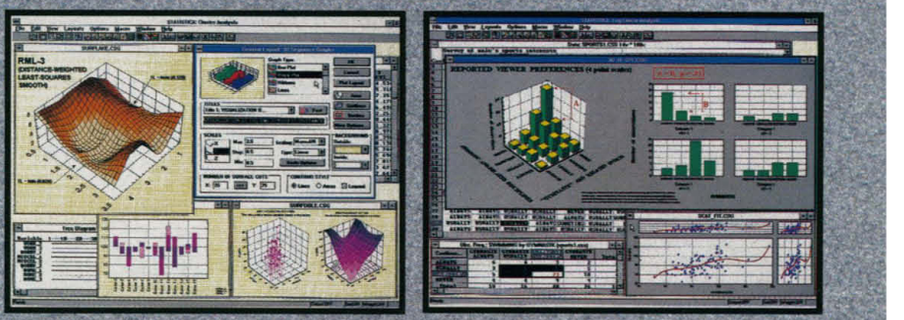

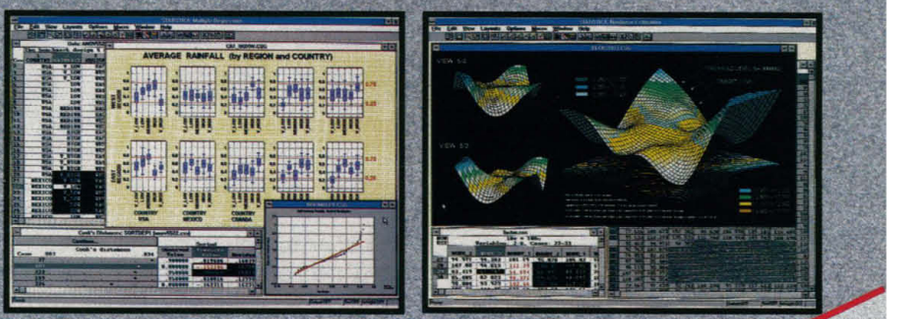

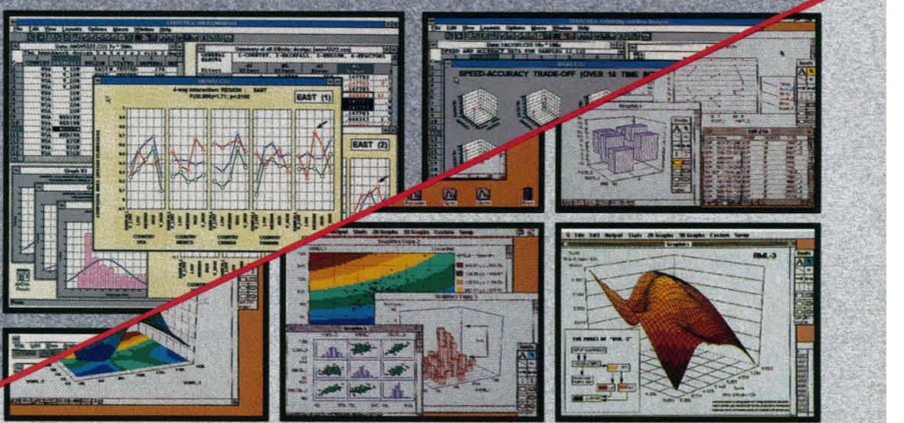

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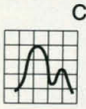

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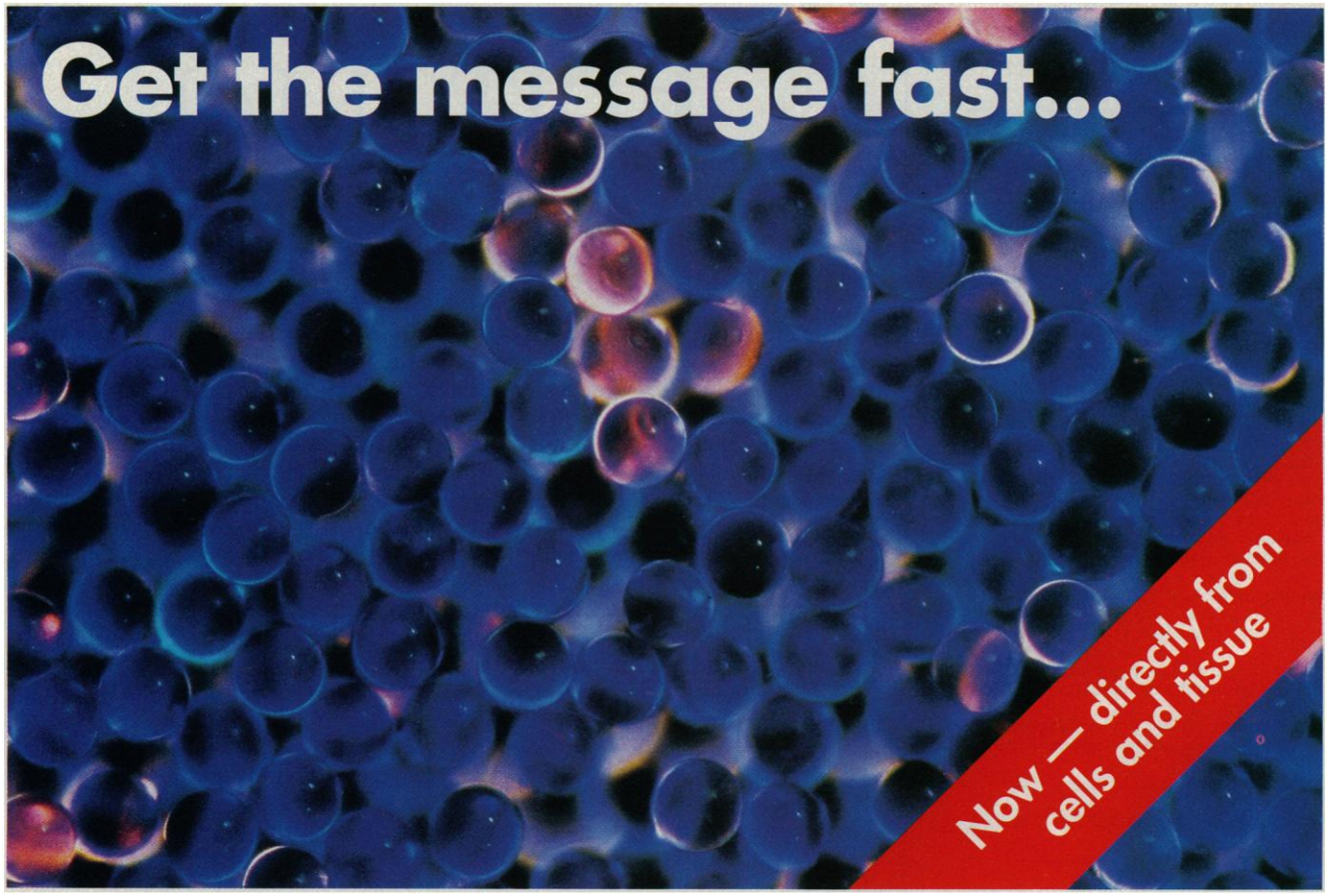

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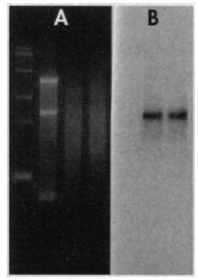

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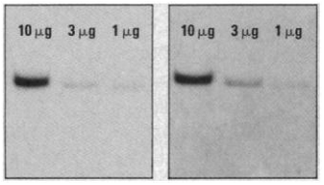

Parallel human genomic Southern blots demonstrate the high sensitivity and low background provided by the Genius System (right, 12-min. exposure) compared to probes prepared with ^{32}P (left, 3-day exposure).

Like traditional radioactive methods, the Genius System provides specific and reliable detection of target sequences.

But unlike other nonradioactive methods, the Genius System uses a unique antibody-based protocol that minimizes background interference, maximizes the signal-to-noise ratio, and produces your results faster.

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Every time you make a Southern blot or dot/slot blot, screen a library or conduct an *in situ* hybridization with radioactive methods, you expose yourself and those around you to the risks of radiation. Every time you use the Genius System to perform these same procedures, you receive the assured safety that only nonradioactive products provide, along with guaranteed sensitivity and specificity.

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Boehringer Mannheim's user-training programs and technical support personnel can help make your conversion to nonradioactive DNA labeling and detection procedures smooth and trouble-free. Contact your Boehringer Mannheim representative or call 1-800-262-4911 (514-686-7141 in Canada).

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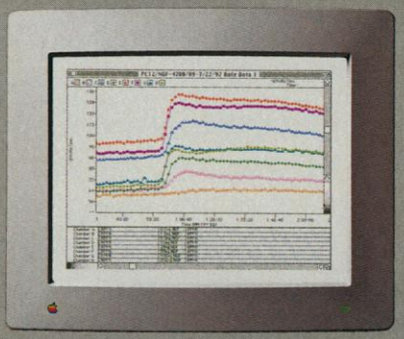
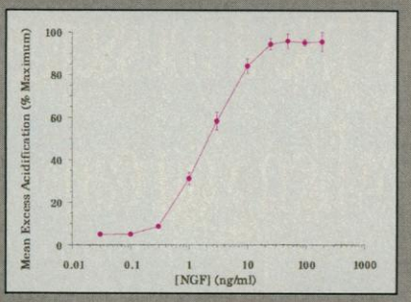
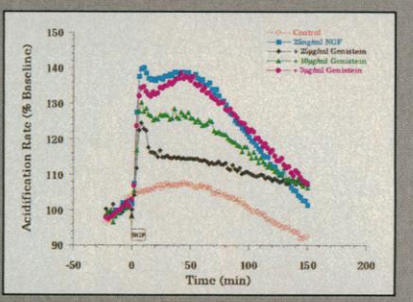
NGF



1 Real-time acidification rate data showing the response of PC12 cells to a 12 min. exposure to nerve growth factor (NGF:0.1-200ng/ml).

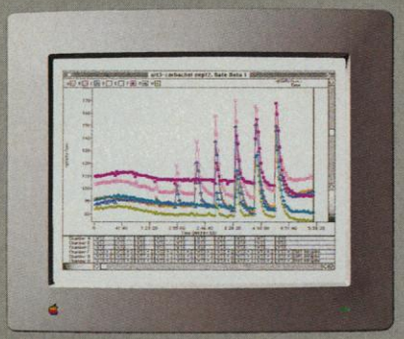


2 Dose response of PC12 cells to NGF. Each point represents data from 7 separate experiments. Calculated EC_{50} value for NGF was 1.9 ± 0.7ng/ml (~152 ± 50pM) ($\bar{x}$ ± S.E.M.).

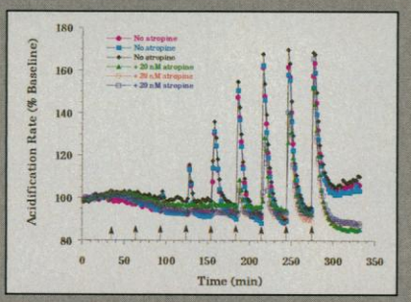


3 Dose dependent inhibition of NGF (25ng/ml) response by tyrosine kinase inhibitor, genistein (3-25μg/ml).

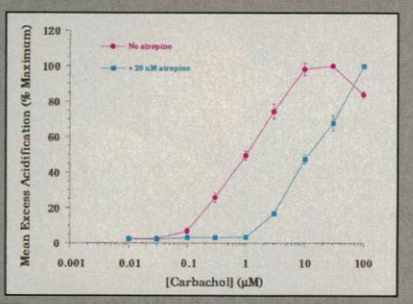
CARBACHOL



1 Real-time acidification rate data demonstrating stimulation of CHO cells transfected with muscarinic M_1 receptor. Increasing doses of carbachol (10nM-100μM) given in presence and absence of 20nM atropine.



2 Data from previous figure expressed as percentages of the basal acidification rates before initial addition of carbachol.



3 The EC_{50} values were calculated as 1.00 ± 0.08μM for carbachol alone and 11.50 ± 0.09μM for carbachol in the presence of 20nM atropine ($\bar{x}$ ± S.E.M.;n = 3).

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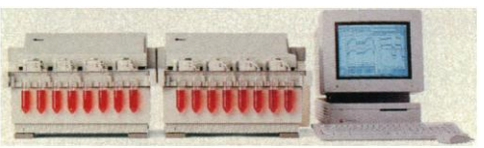

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Our Competitors' Enzymes Can't Pass The Quality Testing Performed On GIBCO BRL Restriction Endonucleases†

Assay Performed	GIBCO BRL	Company A	Company B	Company C
DNA Endonuclease Assay	All Pass	2 failures	All Pass	1 failure
DNA Exonuclease Assay	All Pass	All Pass	2 failures	1 failure
DNA Ligation/Recut Assay	All Pass	2 failures	2 failures	All Pass
Nicking Assay	All Pass	1 failure	2 failures	2 failures
Unit Assay	All Pass	5 failures	3 failures	4 failures

= One Failure

Summary: Seven out of ten restriction endonucleases from each competitor failed one or more of our quality tests.

†Enzymes tested in the manufacturers' recommended buffers: *Bam*H I, *Bgl* I, *Cla* I, *Eco*R I, *Hin*d III, *Kpn* I, *Not* I, *Pst* I, *Sal* I, and *Sst* I (*Sac* I)

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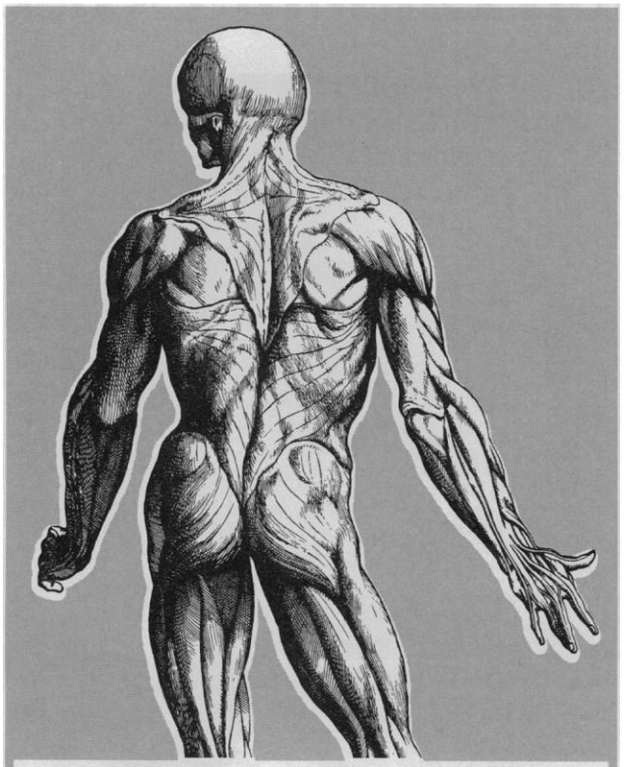

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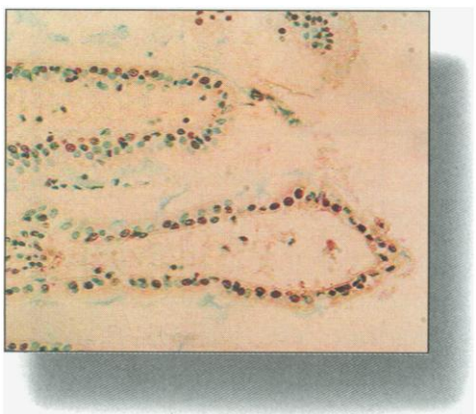
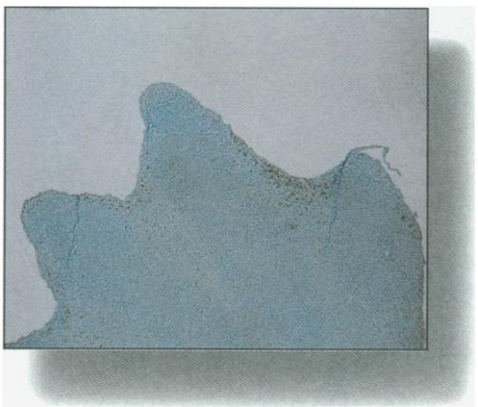
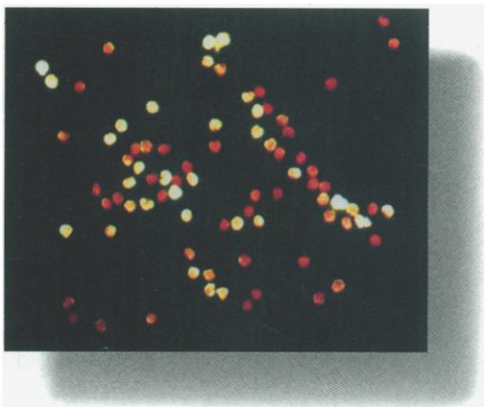


Apoptosis in physiological cell turnover of epithelium in human duodenum[1], ApopTag™ Peroxidase Kit and methyl green (X400)



Developmental cell deletion in remodeling of mouse forelimb bud (14-day embryo), ApopTag™ Peroxidase Kit and methyl green (X200)[2]



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[1]JFR Kerr, AH Wyllie & AR Currie, (1972) *British Journal of Cancer*; 26:239-257. CS Potten, (1977) *Nature*; 269:518-521.

[2]JFR Kerr, J Searle, BV Harmon & CJ Bishop, in: CS Potten (ed), (1987) *Perspectives in mammalian cell death*. Oxford U. Press, pp. 93-128. Z Zakeri, D Quaglino, T Latham & R Lockshin, (1993) *FASEB Journal*; 7:470-478; and manuscripts submitted.

[3]X Li, W James, F Traganos & Z Darzynkiewicz, (1993) manuscript submitted.

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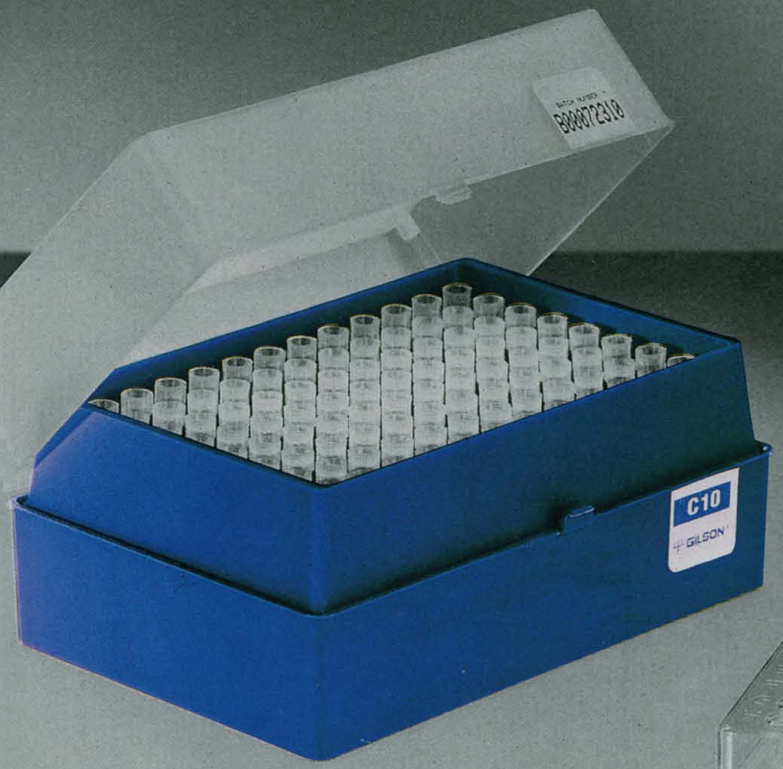

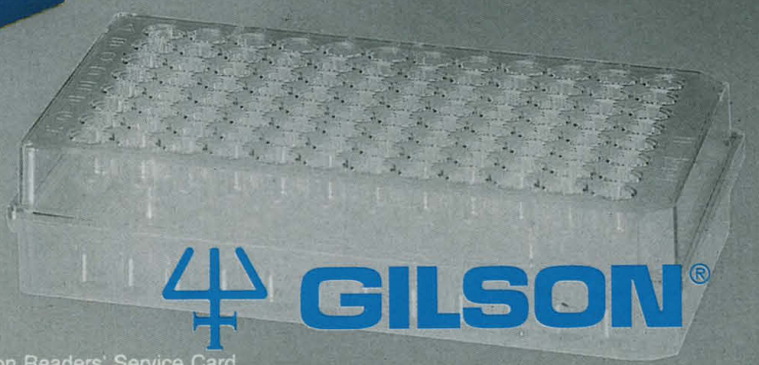

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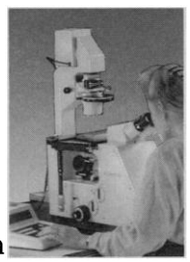

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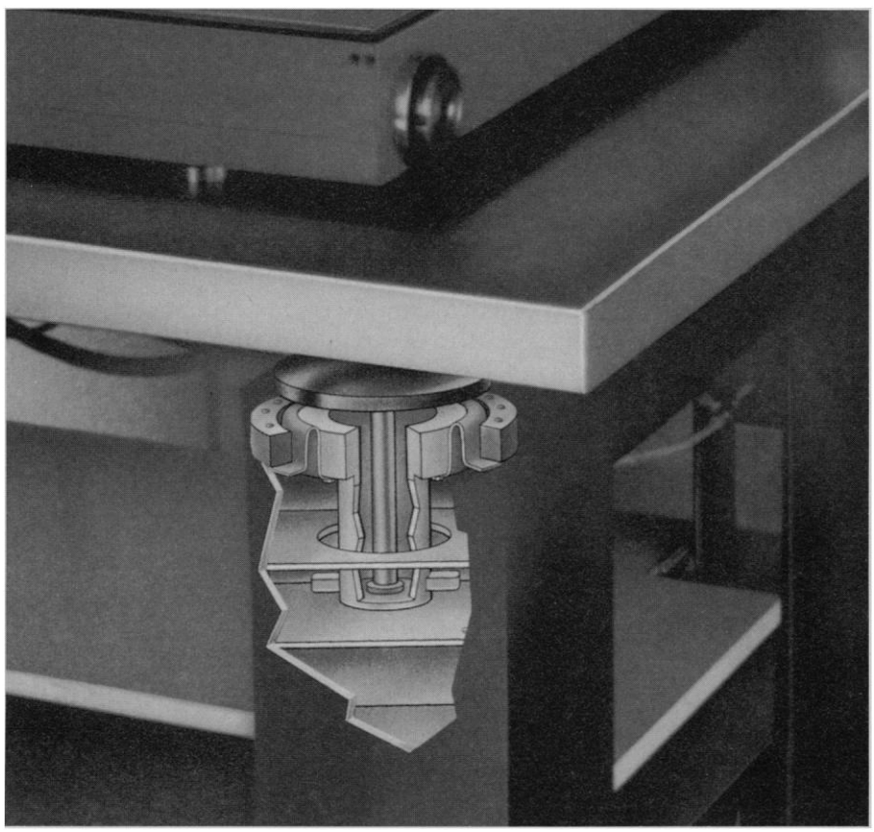

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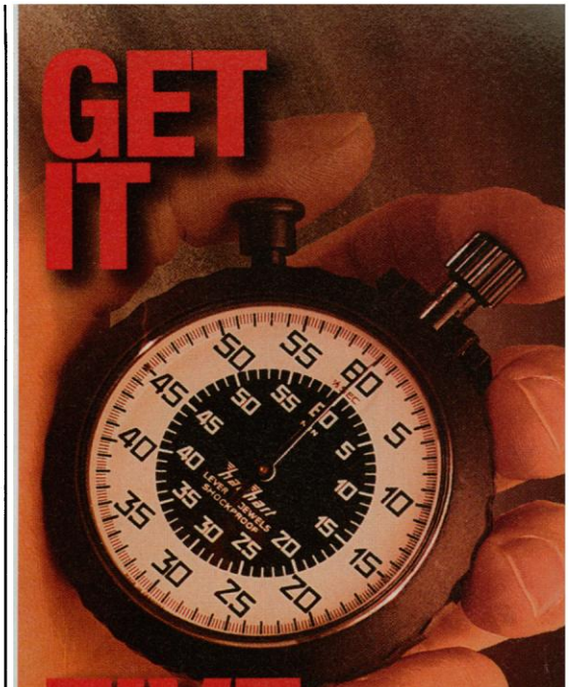

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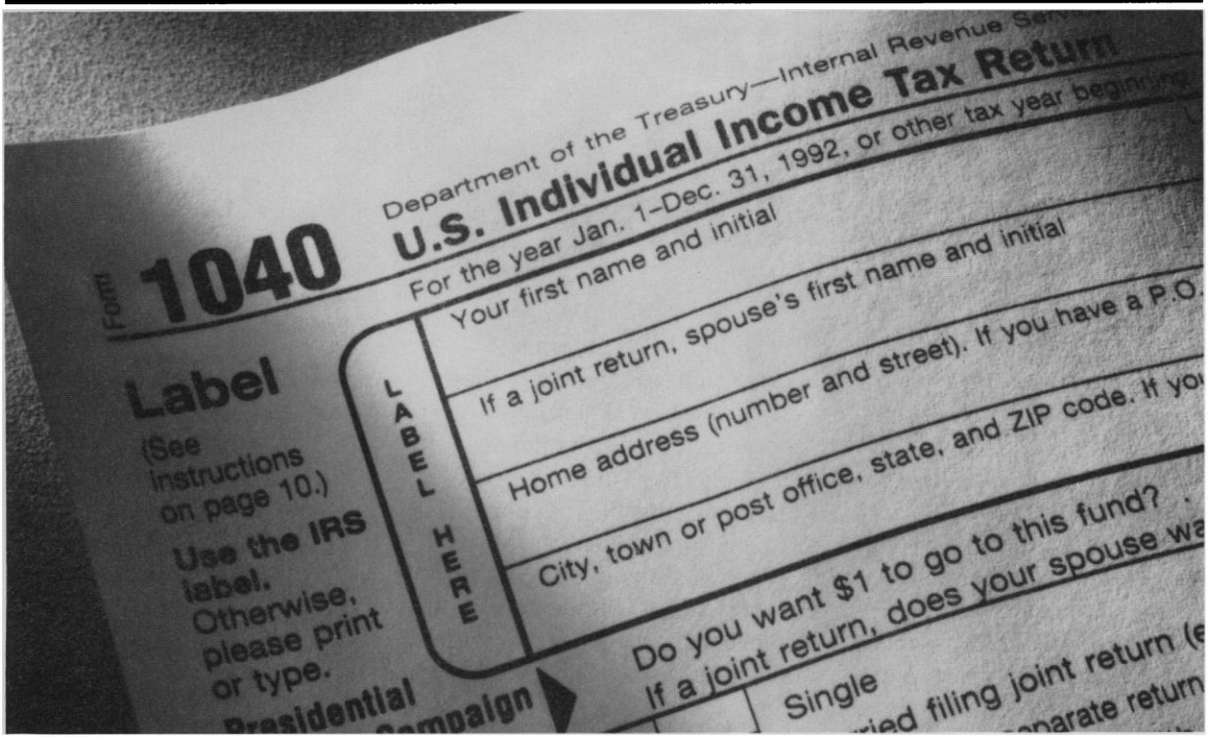

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Our 10-mer oligos are optimized for use in the genetic mapping method developed by Williams *et al.* (*Nucleic Acid Res., 18* 6531-6535). In this technique, single primers are used to amplify DNA polymorphisms, which are useful as genetic markers.

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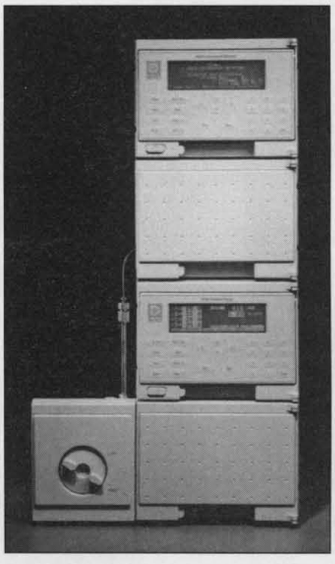
Primer Design Software

DesignerPCR is a primer program that designs forward and reverse primers of unequal length easily, and that can design primers within or flanking a certain region. The program runs under Microsoft Windows. **Research Genetics. Circle 140.**

HPLC System

The DX 500 high-performance liquid chromatography (HPLC) system is based on compact, interlocking modules designed to provide maximum flexibility in an organized, high-performance environment. From this platform, modules can be combined to meet the needs of any HPLC application. All modules feature consistent front panels, menu-driven commands, adjustable displays, and built-in diagnostics. High-speed, module–to–personal computer communications provide a unified system environment for real-time monitoring, intelligent diagnostics, and digital data transfer. **Dionex. Circle 141.**



PCR Optimization Kit

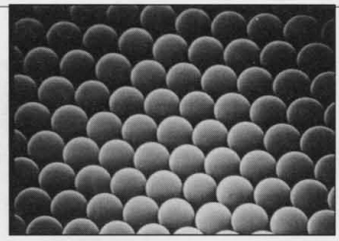
The Opti-Prime polymerase chain reaction (PCR) optimization kit is a testing matrix of 12 buffers and six adjuncts for simplifying determination of the best buffer/adjunct combination for a specific PCR template and primer set. The kit's two-step protocol is used to first determine the optimum buffers, based on pH and magnesium chloride and potassium chloride solutions, then to combine these selected buffers with specific adjuncts to increase yield or decrease nonspecific amplification products. **Stratagene. Circle 142.**

Pure Immunoglobulin from Egg Yolk

The gammaYolk antibody purification kit is for isolation of immunoglobulin (Ig) from egg yolk. From 75 to 100 mg of IgY can be obtained per egg, with a high percentage of specific antibody. Egg yolk immunoglobulin will not bind to FC receptors, will not activate the complement system, and will not react with rheumatoid factor in mammalian sera. Another major benefit is that the likelihood of a response is greatly increased when using highly conserved and weakly immunogenic mammalian antigens because there is no avian-mammalian cross-reactivity. The kit features polymer reagents that selectively precipitate IgY out of solution by a modified volume exclusion action leaving the contaminating proteins, including albumin and lipoproteins, behind. The protocol can be completed in 4 hours with only 30 min of hands-on time. **Middlesex Sciences. Circle 143.**

Immunomagnetic Protein Purification

Dynabeads M-280 Immunomagnetic Separation Technology offers protein separation with reproducible results and reduced nonspecific binding resulting in fewer interference bands and lower background. Dynabeads M-280 products are uniform superparamagnetic polystyrene beads that provide a magnetic solid phase. Dynabeads bind to the ligand-target molecule forming a complex that can be readily separated from the heterogeneous sample by exposure to a magnet. Elution of the pure captured protein is performed using standard elution procedures. **Dynal. Circle 144.**



Molecular Biology Software

Vector NT is a software system for automatic design of genetic molecules. The system recommends optimum cloning steps for constructing any size recombinants. It includes a unique database capable of transferring changes in child-parent trees of molecules. Its graphics capabilities provide publication quality output. The program runs under Windows 3.1. **InforMax. Circle 145.**

Mathematical and Statistical Software

MLAB is an advanced software system with more than 400 built-in functions applicable to a wide variety of data analysis and experimental mathematical problems. It is particularly suitable for modeling and model-fitting problems such as multiple-site ligand binding analysis, chemical kinetics and pharmacological compartmental analysis, drug combination analysis, spectral analysis, and ultracentrifuge data analysis. The program has powerful facilities for solving and curve-fitting ordinary differential equations. It is available in DOS, Macintosh, and UNIX versions. **Civilized Software. Circle 146.**

Oligonucleotide Scanners

A set of 13 oligonucleotides can be used as probes to screen cloned DNA for the presence and type of commonly occurring short tandem repeats or microsatellites. Microsatellites, which consist of sequence motifs from 1 to 6 bp that may occur as tandem repeats, are often used as markers by researchers in genetic linkage analysis, for defining imprinted genomic domains, for establishing loss of heterozygosity in tumor tissues, and for DNA fingerprinting of individuals. The Oligo Scanners provide an easier method of identifying microsatellite sequences and can be labeled either radioactively or nonradioactively. **BIOS Laboratories. Circle 147.**

Literature

Model 270A-HT High Throughput Capillary Electrophoresis System is an eight-page brochure on an automated system that can be used to complement high-performance liquid chromatography or for implementing a quantitative method that facilitates and automates slab gel electrophoresis protocols. **Perkin-Elmer. Circle 148.**

Novocastra Laboratories Product Catalog 1994 features a broad range of monoclonal and polyclonal antibodies for use in immunohistochemistry and flow cytometry as well as nucleic acid probes for in situ hybridization. **Vector Laboratories. Circle 149.**

Cel-Line: Unique Hydrophobic Coatings is a catalog on a line of microscope slides with coatings that prevent cross-contamination and increase microliter capacity. **Cel-Line Associates. 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.

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An environment whose parameters are shaped by the extraordinary is essential for the challenge of modern science. Success in drug discovery requires the most sophisticated technology available and a culturally diverse atmosphere that encourages the personal and professional development of its scientists. The integration of these influences creates a workplace that is spirited, supportive and focused on finding solutions to global health problems.

This is the environment of SmithKline Beecham Pharmaceuticals Research and Development. Our history has been marked by pioneer discoveries including the phenothiazine tranquilizers, the H_2-receptor antagonists for gastrointestinal diseases, the identification of the 6-APA nucleus for beta-lactam antibiotics, the creation of the semi-synthetic penicillins, the first successful development of the ß-lactamase inhibitors to circumvent bacterial resistance and the development of the world's first commercially available, genetically-engineered human vaccine against hepatitis B. These accomplishments have been recognized by the award of a Nobel Prize and fourteen Queen's Awards in the U.K. since 1966.

Bert Adler, photography 1989

We look to the future with great optimism and the opportunity to explore the yet unrevealed panorama of challenges in our quest for superior therapeutics. If you feel strongly about pursuing your career in a progressive environment, please send your resume to: SmithKline Beecham Pharmaceuticals, Research and Development, Dept. S3/11/94, P.O. Box 401, Conshohocken, PA 19428. An Equal Opportunity Employer, M/F/D/V.

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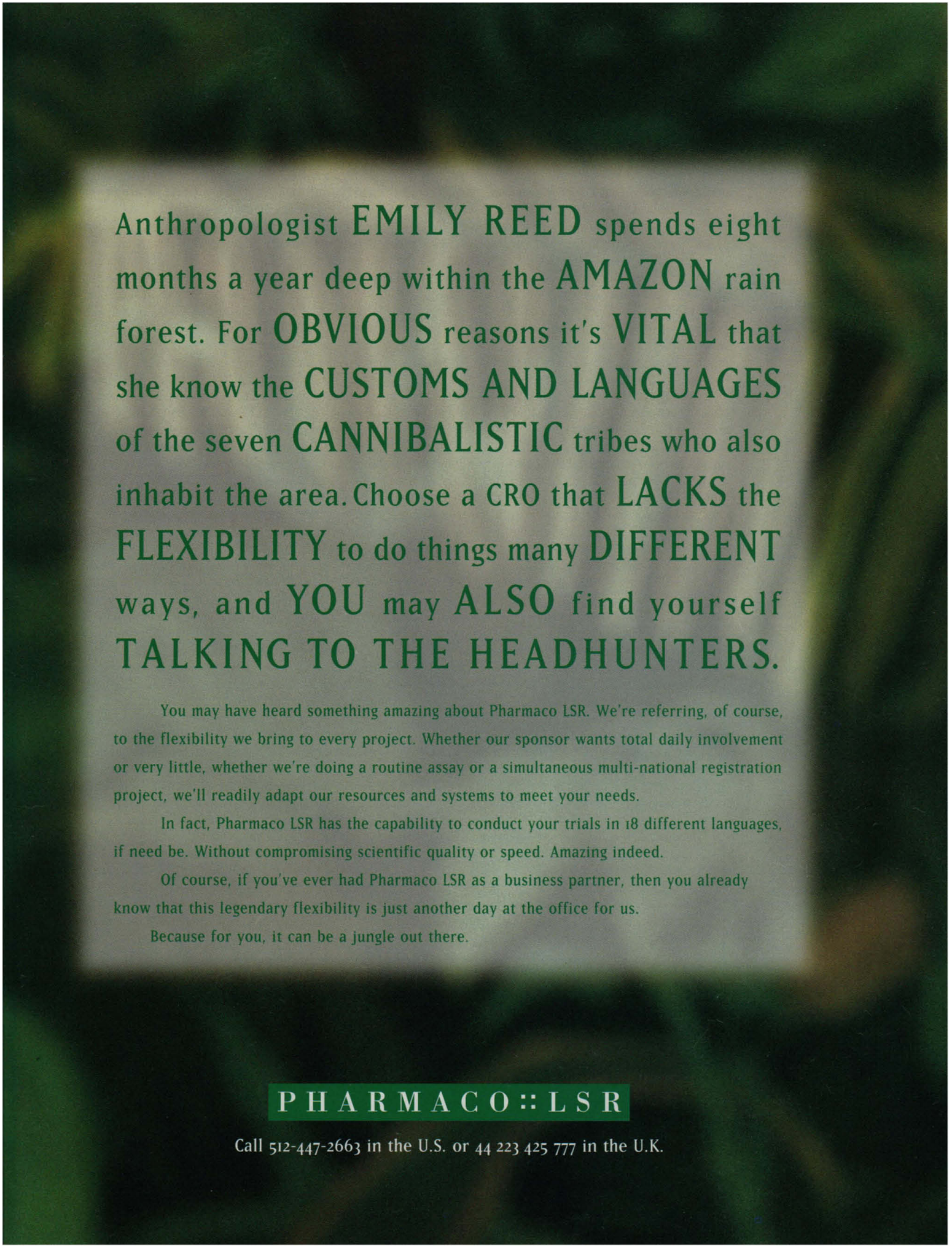
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Tenure-Track And Postdoctoral Opportunities.

Listed below are a few of the outstanding opportunities for conducting research that are now available at the National Institutes of Health.

Tenure-Track Positions

Assistant Professor Equivalent

Molecular and Cell Biology of Hypertension
Harry R. Keiser, MD

Tenure-track position is available for candidate to develop an independent research program in the area of hypertension. Research support will include up to two postdoctoral fellows and technicians for up to six years. MD degree, board eligibility in internal medicine, and a minimum of three to four years postdoctoral training and experience in molecular biology and biochemistry are required. Hypertension-Endocrine Branch (OE-43), NHLBI, Building 10, Room 8C103.

Molecular and Cellular Biology
Brian Safer, MD, PhD

Two tenure-track positions are available to develop independent research programs that complement ongoing research on the integration and expression of transgenes in mammalian cells. One position would involve the development of novel viral or non-viral gene transfer systems for the targeted delivery or modification of genes while the second would examine the mechanisms by which transcription factor activities are regulated in both normal and genetically altered cells. Research support will include up to four postdoctoral fellows and technicians for up to six years. A minimum of three to four years postdoctoral experience is required. Molecular Hematology Branch (OE-43), NHLBI, Building 10, Room 7D18.

Postdoctoral Positions

Genetic Polymorphisms of Cytochrome P450
Joyce Goldstein, PhD

Genetic polymorphisms in human cytochrome P450 enzymes are being identified and their relevance to human metabolism and health examined. Current studies utilize molecular biology techniques such as site-directed mutagenesis, construction and screening of gene libraries, sequencing, and PCR analysis. Applicants should have less than five years postdoctoral training. Molecular biology experience desirable. Laboratory of Biochemical Risk Analysis (OE-43), NIEHS, P.O. Box 12233, Mail Drop B3-04, Research Triangle Park, NC 27709.

Molecular and Cell Biology
Constance Tom Noguchi, PhD

The regulation of the developmental and tissue-specific expression of erythroid genes, including cell surface receptors, and the identification of elements important for differential expression and processing of gene products, are being studied. Experience in molecular biology and less than five years of postdoctoral experience are required. Laboratory of Chemical Biology (OE-43), NIDDK, Building 10, Room 9N37.

Neuroscience and Molecular Biology
Maryann Ruda, PhD

The molecular and cellular responses to neuronal injury and persistent noxious stimuli are being investigated in the spinal cord and dorsal root ganglia. Using animal models, gene expression and transcriptional regulation are being investigated and novel genes identified using PCR and differential display hybridization. Applicants should be recent graduates with an interest in injury or pain pathways. Previous training in molecular biology is not essential. Neurobiology and Anesthesiology Branch (OE-43), NIDR, Building 49, Room 1A11.

Transcriptional Control Mechanisms
Keiko Ozato, PhD

The regulation of embryonic development by nuclear hormone receptors (including RXR) and the regulation of immune responses by interferon regulatory factors are being studied to better understand the mechanisms used to control transcription. *In vivo* footprinting and *in vitro* transcription are currently the main means of analysis. Applicants must be US citizens or permanent residents with less than five years postdoctoral experience. Laboratory of Molecular Growth Regulation (OE-43), NICHD, Building 6, Room 2A01.

Additional Postdoctoral Fellowship Opportunities

For an on-line listing of additional postdoctoral openings you may access the NIH EDNET Bulletin Board's POSTDOC conference by Internet (tn3270.cu.nih.gov) or via modem (1,3014022221 or 1,8003582221). The settings for modem access are "7,Even,1". When connected to NIH, type in ",vt100" at the connect message, "F5E" at initial, and "AJL1" at account.

The Postdoctoral Research Fellowship Opportunities catalog, which describes additional opportunities at the NIH, may be requested from the address below. An electronic version of the catalog may be accessed via the network-based (Internet) Gopher Information System. To access the NIH Gopher server, Gopher client software (available via anonymous ftp "boombox.micro.umn.edu") must be running on your computer and configured to point to "gopher.nih.gov" and port "70". Select *Grants and Research Information* to reveal the *NIH Office of Education* directory. Those interested in receiving information on other postdoctoral opportunities, clinical training opportunities, or accessing Gopher may contact the Office of Education, Building 10, Room 1C129. Phone: 301-496-2427.

To Apply

If you hold a graduate doctoral degree (e.g., PhD, MD/PhD) or a professional degree (e.g., MD, DO, DDS, or DVM) accompanied by previous laboratory research experience, and would like to be considered for one of these positions, please send a cover letter, *curriculum vitae*, bibliography, and statement of research interests to the address listed with each position. In addition, please arrange to have letters of recommendation sent from three scientists who can provide an evaluation of your qualifications.

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Dr. Jean Beebe, Research Scientist
My lab studies differentiation of tumor cells and seeks to develop novel anti-cancer agents. I was particularly attracted by Pfizer's target-based approach to drug discovery. I find that Pfizer supports women not only in philosophy but in practice.

Dr. Debra Williams, Sr. Associate Director/ Group Leader
I have a background in teaching, research and clinical medicine; and fortunately, I have had many choices. As part of clinical research at Pfizer, I am responsible for drug trials for opportunistic infections in AIDS and for clinical studies on a major new antibiotic drug. My work enables me to continue a limited clinical practice as well, and I'm convinced that I made the right decision for me and for my family.

Dr. Linda Chatman, Sr. Pathologist
I always wanted to be a veterinarian, and as I became more specialized, I chose toxicological pathology. Here at Pfizer, I look for adverse effects of compounds and study the mechanism of drug action. I find that the quality of your work is what counts. My experience has been extremely positive. Pfizer provides the career path—then it's up to you.

Dr. Anabella Villalobos, Sr. Research Scientist
I always planned to go into drug discovery, and Pfizer was on the top of my list. In my area, Alzheimer's disease, there is an immediate need for innovative new drugs, and I want to be a part of that drug discovery process. My fascination with science began in high school when a single teacher who truly loved chemistry inspired me.

Dr. Yuhpyng Chen, Principal Research Investigator
As a medicinal chemist, I am currently involved in the synthesis of compounds to treat Alzheimer's, anxiety and depression. Developing research proposals that ultimately become projects is exciting—and working with great biologists is doubly rewarding. When I came to Pfizer ten years ago, there were few women chemists. Today, the number is steadily increasing, and that's the way it should be.

Dr. Melissa Tassinari, Manager
My teratology work is an essential part of new drug discovery. Our primary concern is to ensure that drug candidates have no adverse effects on the reproductive system. At Pfizer, I've had many terrific opportunities; and setting up a lab to conduct a full range of reproductive studies, including neurobehavioral research, is definitely one of them. I find the team approach here to be consistent with my way of operating. That's what I like about my group—we all work toward a common goal.

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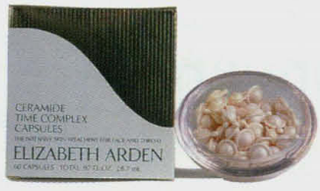

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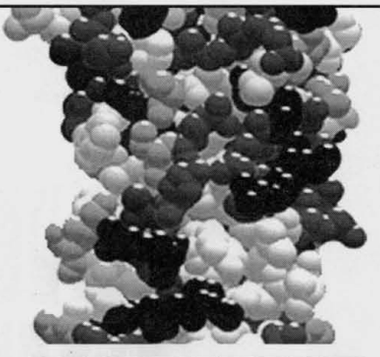

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MOLECULAR BIOLOGY (INFLAMMATION RESEARCH GROUP): Experience in PCR, cDNA cloning, hybridization, library construction and BS/PhD is required. Knowledge of expression in mammalian cells or E.coli and subsequent gene product characterization is desired.

(Job code OA-SC-MZ-001)

CELL BIOLOGY (INFLAMMATION RESEARCH GROUP): Requires experience in cell culturing, hybridoma generation, characterization of monoclonal antibodies or adhesion and lymphocyte proliferation assays; and BS/PhD.

(Job code OA-SC-MZ-002)

BIOCHEMISTRY (INFLAMMATION RESEARCH GROUP): Requires BS/PhD, and experience in purification, characterization and identification in one or more of the following areas: protein chemistry, carbohydrate chemistry or lipid chemistry.

(Job code OA-SC-MZ-003)

CARBOHYDRATE CHEMISTRY LABORATORY (INFLAMMATION RESEARCH GROUP): Requires synthetic organic chemist experienced in carbohydrate synthesis or relevant analytical experience. Experience in molecular modeling, knowledge of interaction between biomolecules and BS/PhD required.

(Job code OA-SC-AV-005)

MOLECULAR BIOLOGY OF NEUROPEPTIDE RECEPTORS: Experience using molecular biology techniques to clone and study the biological role of new neuropeptide receptors. PhD and postdoc experience required.

(Job code OA-SC-FC-001)

COMPUTATIONAL BIOLOGY: PhD in Molecular Biology, general knowledge of diverse gene families, familiarity with relational databases and programming experience required. Focus on sequence analysis, with some design and assistance in implementation of computational tools.

(Job code OA-SC-SC-001)

SCIENTIFIC PROGRAMMER: To work on detection of structural motifs in protein sequences, applying existing software, and developing new applications. Requires BS/MS in Biological Science and at least 3 years' programming experience in C or Fortran.

(Job code OA-SC-RL-001)

PROCESS DEVELOPMENT SCIENTIST: Requires MS/PhD (or equivalent) in life-science or a related scientific discipline; or a ChemE with 5+ years' relevant experience.

(Job code OA-SC-LD-003)

PROCESS DEVELOPMENT ENGINEER: Fermentation, cell culture, recovery and purification in process development. BS/MS in ChemE and 2 years' related experience required.

(Job code OA-SC-LD-004)

VALIDATION ASSOCIATE (VALIDATION DEPARTMENT): Implement/evaluate validation cycle for manufacturing control and information systems. AS in a related area and/or 2 years, pharmaceutical/process industry validation, and PLC experience required.

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Our commitment to science begins with finding and challenging top scientific talent, and continues with an R&D expenditure of more that 50% of our annual revenue. The results of these efforts speak for themselves. Our scientists publish over 220 papers per year on average, and have a peer citation record that compares favorably with the top scientific institutions in the world. And, we have one of the richest product pipelines in the industry which has led to the following key openings.

MRI/Bio-Imaging Scientist

An opening exists for a scientist to establish an imaging technology facility within the Research Division of Genentech Inc. This person will recommend, acquire and apply magnetic resonance and other imaging technology to support and collaborate with scientists in several areas of research including neuroscience, endocrinology, cardiovascular and cancer biology. In addition, original research to develop and publish new imaging techniques is expected.

Requirements include a PhD and/or MD and 3+ years of postdoctoral experience with MRI and other imaging technologies, preferably in an area of preclinical research. An excellent scientific background is required as evidenced by strong scientific training and an outstanding publication record. Job Code: WR-RT.

Scientist/ Senior Scientist Pharmacokinetics

Design, monitor and analyze data from pharmacokinetic studies and provide appropriate input to Regulatory Affairs, Clinical Research and Product Development departments. You'll be expected to communicate your findings in scientific meetings, seminars and publications.

A Ph.D. or MD with strong clinical pharmacokinetics experience is required. A minimum of 2 years' industry postdoctoral experience is ideal. Job Code: TH-SB.

Genentech offers an excellent salary and benefits package which includes child care facilities, free health club membership and fully paid medical/dental/vision coverage, as well as a sabbatical program. If you are interested in joining an organization where individuals are valued and rewarded for their contributions, forward your resume indicating Job Code, to: Genentech, Human Resources, 460 Point San Bruno Blvd., South San Francisco, CA 94080. We promote and actively support affirmative action and equal opportunity employment. Women and minorities are encouraged to apply.

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As we take it upon ourselves to reengineer Syntex for the 1990's, accelerating our pipeline and filling it up with a variety of pioneering new products, we'll continue to remember that true progress goes beyond technology. Finally, it comes down to building a future, and the future comes down to children like Aimee.

We're currently seeking the following professionals to help us improve the state of medical science for the benefit of Aimee, and all the Aimees to come:

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SYNTEX

**Working Mother*, October 1993

WYETH-AYERST RESEARCH

Women's Health Research Institute

Wyeth-Ayerst is a global leader in women's health-care products and research, helping to improve the lives of women every day. We are now the number one provider worldwide of hormone replacement therapy and hormonal contraceptive products and at the forefront of international efforts to improve women's health through research and education.

Currently, we have the following several opportunities available for Research Scientists (Ph.D. and 3-5 years experience) and Senior Scientists (Ph.D. and 0 - 3 years experience). Strong emphasis in all areas will be on the discovery of molecules which may provide therapeutic strategies for the treatment of disorders affecting women's health. Relevant areas include mechanisms of hormone action (steroids, peptides, growth factors), vascular effects of steroids, steroid interactions with neuroendocrine systems, bone biology, and reproductive disorders such as endometriosis.

Molecular Biologists

Requires a strong background in molecular biology of peptides, receptors and/or growth factors as applied to neuroendocrine and implementation of relevant techniques (gene cloning, sequencing, vector construction, site-directed mutagenesis, transfections, cell line generation by targeted tumorigenesis, SI nucleus mapping, nuclear binding, and other molecular techniques).

Endocrinologists

Requires a strong background in cellular and molecular biology of endocrine systems, particularly those controlling neuroendocrine, reproductive, bone metabolism and vascular systems. Experience in the area of hormone action, with emphasis on effects of steroids, neurosteroids, peptides and growth factors and the development of in vivo and in vitro model systems, including relevant cell lines to test effects of endogenous ligands or potential new drugs is essential. Familiarity with molecular biology, cell biology, biochemistry and pharmacology/physiology is necessary.

Peptide Chemist

Requires a strong background in peptide chemistry, particularly in the area of brain and/or gonadal peptides and their receptors. Expertise in the isolation, purification and synthesis of endogenous peptides as well as in the design and synthesis of novel peptides and growth factors are important. Additional experience in the use of molecular modeling for structure-activity studies and drug design and delivery are of value.

Cell Biologist

Requires a strong background in studying the biology of cellular systems that participate in the regulation of reproductive, endocrine and metabolic functions. Demonstrated experience in the development or implementation of technical approaches to establish model systems that allow the evaluation of mechanism of action of drugs or endogenous compounds that may affect organ function in the disciplines of endocrinology and/or gynecology.

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For more than a century, we've understood that the key to innovative research is an innovative research environment. Over the years, we have developed some of the world's most important health care products and services by developing new voices and new viewpoints, by investing in new ideas, and by encouraging a new level of collaboration between men and women from different backgrounds and different disciplines. So when we say that drive, determination and ambition are the most important elements to succeed—we're speaking from experience. Just ask our scientists.

From left: Daman Kowalski, H. Ann Stelmach, Fatima Basha, Belinda Hightower, Carol Cox

I've never been treated differently than my male colleagues. My husband is also a scientist and inventor at Abbott. So we like to think of this as our family business! I've been here 12 years—and I haven't lost any of my enthusiasm. I have always been supported by upper management and worked with outstanding colleagues. In my current project I am involved in some of the most exciting basic research going on anywhere in the world.

FATIMA BASHA, PhD
Senior Group Leader, Associate Research Fellow Volwiler Society*
Pharmaceutical Products Division

This is the most open, unbiased environment I have ever worked in. Abbott has made a commitment to diversity that is evident throughout the company. Of course, opportunities for personal growth and development are available to all scientists—and these opportunities exist in both the scientific and management areas.

H. ANN STELMACH, MBA, PHD
Department Manager, Solutions Technology
Hospital Products Division

From the beginning of my career at Abbott, I've been encouraged to take on as much responsibility as possible. I've had my choice of career paths—from basic and applied research to manufacturing support. And at every stage, I've found an environment that is both challenging and technically stimulating.

CAROL COX, PhD
Director, New Technology Development
Diagnostics Division

Being a woman has just never been an issue at Abbott. Take a look at the path I've followed—from Research Associate into management with more of a traditional business discipline. I truly believe that opportunities exist for continuous learning. You have the chance to broaden your interests, and take your career in virtually any direction you want.

DAMAN KOWALSKI, MS
Business Team Leader
Diagnostics Division

Marriage and parenthood have not presented obstacles to growth or career advancement at Abbott. This is not to say that women are able to rise through corporate America effortlessly. It takes a lot of desire. The key, once you have gained the skills to perform your job, is to go above and beyond what's expected—and take advantage of every opportunity that is presented.

BELINDA HIGHTOWER, RN
Clinical Project Manager
Pharmaceutical Products Division

If you'd like to learn more about career opportunities at Abbott, tell us a little more about yourself.

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**The Volwiler Society was created by Abbott to recognize consistent and exceptional scientific achievement.*

PARTNERS *in the* SEARCH FOR CURES

Sandra R. Allerheiligen, Ph.D.
Bioavailability and
Pharmacokinetic Research

Michelle L. Cloud, M.D.
Clinical Investigation
and Regulatory Affairs,
Internal Medicine

Beverley Greenwood, Ph.D.
Central Nervous System and
GI/GU Research

Katherine A. Richardson, Ph.D.
Morphologic Pathology

Alzheimer's disease, AIDS, diabetes, osteoporosis, depression, schizophrenia. Just some of our contemporary plagues.

In the continuing battle to eradicate devastating diseases, your doctor doesn't stand alone. And neither do you.

The men and women of Eli Lilly and Company's research and development areas are standing with the medical professionals and with those afflicted with these diseases. They — and all the people at Lilly — are committed to finding creative solutions to the medical scourges that prey on humanity. And all are committed to finding those solutions at a cost that is affordable to you and to society. That's our commitment to you and to future generations.

These women are among some of the outstanding Lilly scientists who were recently promoted because of their numerous scientific and technical contributions. We honor them for devoting their lives to saving and improving the lives of others.

Please check our Employment Information Line at (317) 276–7472 for possible career opportunities. We are an equal opportunity employer committed to diversity in the workplace.

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Sally L. Anliker, Ph.D.
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Ilene R. Cohen, Ph.D.
Biochemical Toxicology

Jill A. Panetta, Ph.D.
Central Nervous System and
Endocrinology Research

Sau-Chi Betty Yan, Ph.D.
Cardiovascular Research