
SCIENCE
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
29 MARCH 1996
VOL. 271 • PAGES 1777–1952
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Women & Minorities '96
Maintaining Diversity During Adversity

NEW

Faster, Easier Baculovirus Expression.

To make the baculovirus expression system faster and easier to use than ever before, Invitrogen, the leader in gene expression, has added several new and improved tools to our already extensive product line. With these new products you can now obtain pure recombinant baculovirus in just 14 days!

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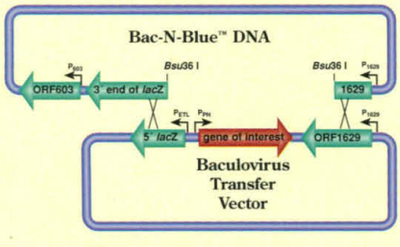
Catalog No. K855-01



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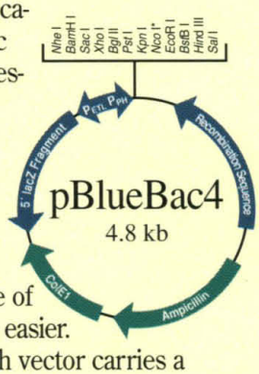

pBlueBac4 *Catalog No. V1995-20*
pBlueBacHis2 *Catalog No. V375-20*
pMelBac *Catalog No. V1950-20*

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Log phase *Catalog No. B855-01**
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Reference:
1. Davis, T. R. *et al.* (1993) *In Vitro Cell. Dev. Biol.* **29A**: 388-390.

* Log phase cells available in North and South America only.

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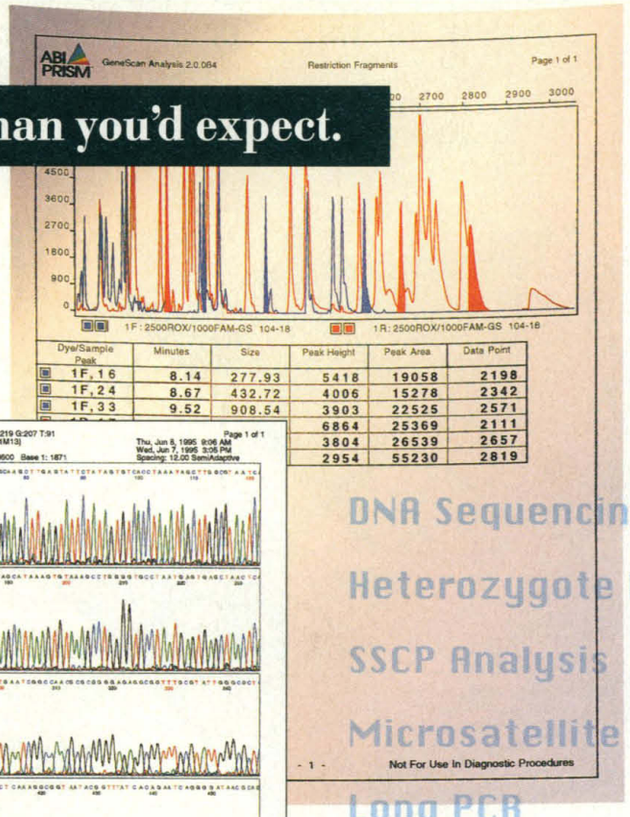

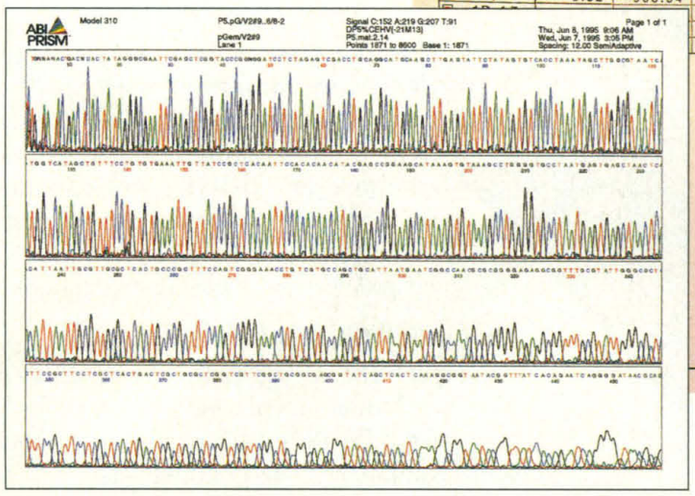

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Heterozygote Detection

SSCP Analysis

Microsatellite Analysis

Long PCR

RT-PCR

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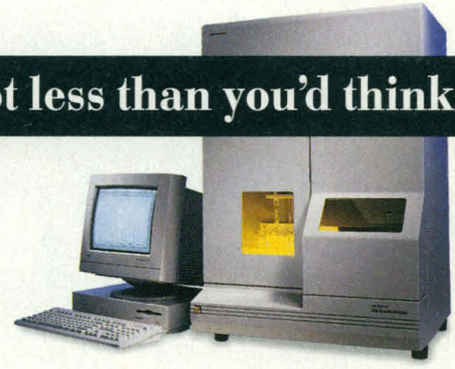

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References

1. Fodde, R., and Loosekoot, M., *Human Mutation*, **3**, 83, (1994).
2. Fischer, S.G. and Lerman, L.S., *Proc. Natl. Acad. Sci., U.S.A.*, **80**, 1579 (1983).
3. Borresen, A. L., *et al., Proc. Natl. Acad. Sci., U.S.A.*, **88**, 8405 (1991).

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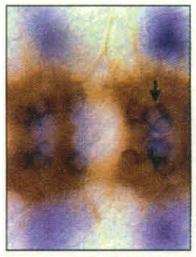
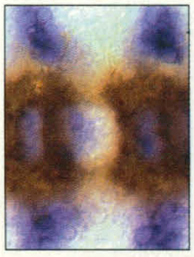
SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

1810 & 1848
Spin control





1807 & 1867
Late-blooming synapses

NEWS & COMMENT

RESEARCH NEWS

POLICY FORUM

PERSPECTIVES

DEPARTMENTS

COVER

Optical micrograph (crossed polarizers) showing parallel dark rods of $FeTiO_3$ (up to 20 micrometers long) that precipitated from solution in the mineral olivine during tectonic transport of a piece of mantle to a location high in the Swiss Alps. These rods formed under high pressure at depths greater than 300 kilometers, indicating profound subduction of continental rocks afterthe collision of Africa and Europe and their return to the surface carrying this piece of mantle. See page 1841 and News story on page 1811. [Image: L. Dobrzhinetskaya, H. W. Green II, and S. Wang]

RESEARCH ARTICLE

REPORTS

TECHNICAL COMMENTS

Maintaining Diversity in Science

Women and Minorities '96

1901

Facing the Big Chill in Science • Gender, Race, and Class • Backlash Strikes at Affirmative Action Programs • The Affirmative Action Debate • Computer Culture Deflects Women and Minorities • The First 'Computers' • Social Science: Researchers Find Feminization a Two-Edged Sword • Minorities at the Starting Gate • Diversity Counts: Recent Data on Women and Minorities

Advice from the Top

Anne C. Petersen: Learning the Trade Secrets • Lydia Villa-Komaroff: Spinning Setbacks Into Success • David Satcher: Reaching Out and Moving Up • Yolanda Moses: With a Little Help From Her Friends

THE AAAS WILL BE MOVING ITS HEADQUARTERS ON 15 APRIL 1996 TO 1200 NEW YORK AVE., NW, WASHINGTON, DC 20005

Indicates accompanying feature

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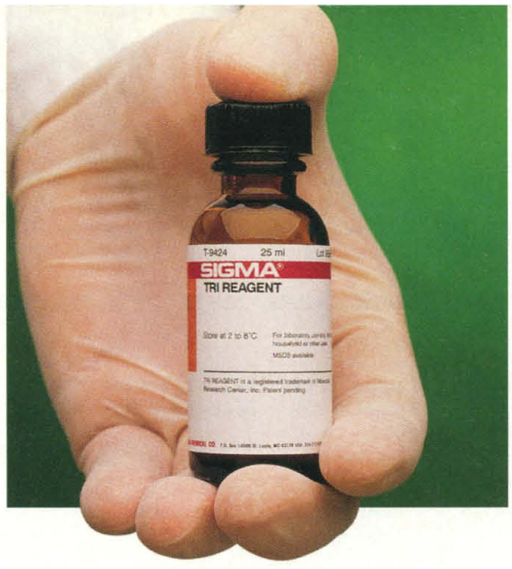

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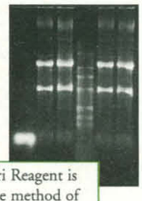

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Out of the depths (I)

More and more rocks exposed at the Earth's surface are now recognized as coming from deep in the mantle. These include xenoliths, which are small rocks carried upward by magmas that may come from depths of 400 kilometers or more, and larger rock packages, typically exposed by tectonic processes in continental collision zones and containing high-pressure minerals such as diamond. Dobrzhinetskaya *et al.* (p. 1841; see the news story by Kerr, p. 1811) show that the Alpe Arami peridotite, a large rock massif in the Alps, may have come from depths of 300 kilometers or more. Olivine in the rocks contains inclusions of a new phase of $FeTiO_3$ (see the cover) that indicate original exsolution of the perovskite phase at high pressures.

■

Out of the depths (II)

The rates and methods by which silicic magmas ascend through the crust have been uncertain. Brandon *et al.* (p. 1845) studied the dissolution of epidote, a mineral that is stable at high pressures in magmas but dissolves at shallow depths, to evaluate magma emplacement and cooling rates. Preservation of epidote in some dikes and intrusions implies that the parent magmas were emplaced and crystallized within 1000 years or so. Such rates are too fast for ascent of these magmas in diapirs.

■

No old greenhouse?

The latest Cretaceous climate has often been considered to be a warm greenhouse climate. Certainly high-latitude regions were warmer than comparable regions today, but there is evidence that the tropical oceans were cooler than one would expect. D'Hondt and Arthur (p. 1838) analyzed oxygen isotopes from planktonic foraminifera in Late Cretaceous sediments from a wide range of latitudes and found that the tropical oceans were cool. There was also a small latitudinal sea surface temperature gradient, indicative of enhanced poleward heat transport but not of a greenhouse-controlled climate.

■

What makes a queen

The differentiation of queen and worker castes in honeybee colonies is regulated by differential pheromone production. Plettner *et al.* (p. 1851; see the Perspective by Robinson, p. 1824) used deuterated enzyme substrates to work out the biosynthetic pathways for these pheromones. Various isomeric compounds that perform different functions in different castes are related, and slight changes in the functioning enzymes produce the caste-specific blends.

■

Magnetic transfer

Higher contrast can be obtained in magnetic resonance imaging (MRI) if the nuclei being studied have a greater fraction of spins aligned "up" versus "down." Recently, optical pumping methods have been used to align spins in the noble gases, such as ^3He and ^{129}Xe. Navon *et al.* (p. 1848; see the news story by Service, p. 1810) now show that when spin-polarized ^{129}Xe is introduced into solution, it can efficiently transfer magnetization to solvent protons through the nuclear Overhauser effect. This effect may find use in conventional MRI and in protein and surface nuclear magnetic resonance.

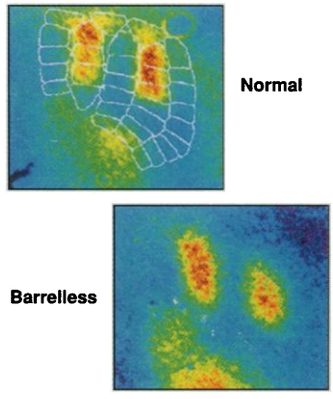
■

Inhibited by cross talk

Multiple signal transduction pathways are often required during development to determine cell fates. How these signaling pathways are integrated, however, is frequently unclear. Axelrod *et al.* (p. 1826; see the Perspective by Blair, p. 1821) examined the interaction between the Notch and Wingless signaling pathways during pattern formation in the developing *Drosophila* wing. During the induction of bristles on the wing margin, *dishevelled*, a gene known to function in the Wingless pathway, acts to inhibit signaling by Notch. Experiments in vitro suggest that this interaction is direct because Dishevelled interacts physically with the carboxyl terminus of Notch. This interaction provides a molecular mechanism for the inhibitory cross talk observed between the pathways.

Not quite connected

Nose whiskers are an important part of the mouse sensory system. Each whisker projects through the thalamus into barrel structures in the cortex, which respond primarily to their "center" whisker but can also integrate signals from neighboring barrels. Welker *et al.* (p. 1864) have identified a naturally occurring mutant in which the barreloid structures of the thalamus are altered and individual cortical barrels are absent. Although sensory processing still occurs and overall input topology is preserved, spatial and temporal discrimination between individual whisker responses is reduced.



■

Nerve and muscle

Formation of the neuromuscular junction occurs when the growth cone of a developing neuron contacts its muscle target and forms a synapse. Kopczynski *et al.* (p. 1867; see the news story by Roush, p. 1807) identified a gene (*late bloomer*, or *lbl*) in *Drosophila* that encodes a member of the tetraspanin family of cell surface proteins. In embryos with mutant *lbl* genes, synapse formation is delayed and other neurons form abnormal connections to the muscle cell targets.

■

Linking cell growth and elongation factors

One form of myeloid leukemia in humans is associated with a chromosomal translocation that has a breakpoint in the *ELL* gene, but the function of *ELL* has been unknown. Shilatifard *et al.* (p. 1873) found that *ELL* encodes a transcriptional elongation factor that increases the catalytic rate of RNA polymerase II transcription by suppressing the transient pausing of polymerase. Recently, the product of the von Hippel–Lindau tumor suppressor gene was also found to be an elongation factor.

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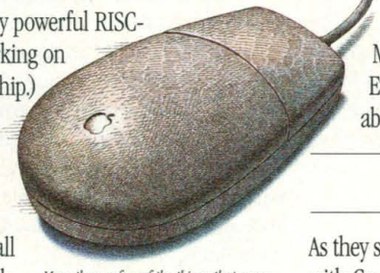

More than a few of the things that seem standard on a personal computer today were pioneered by Apple.

As a result of these Apple innovations, ordinary people can sit down at all kinds of PCs and actually get some work done. Of course, if they sit down at a Macintosh, they can build 3-D graphics. Use virtual reality in very real ways. Videoconference across continents. Collaborate with colleagues on the far side of the corporate campus. Build interactive sites on the World Wide Web. And more. That's the Mac advantage.

People do know the difference.

Today, 56 million people do their work the Macintosh way. Some in school. Some at home. And, when you look at the numbers from recent studies, quite a few in business. We command a 47% share of the U.S. commercial publishing market. And 76.2% of the color pre-press market. And though our dominance in graphics-related businesses may not shock you, consider this: we have a 50% share of the chemical, pharmaceutical, biotechnology, scientific and engineering computing markets.

And then, there's the fact that Macintosh brand loyalty is the highest of any PC in the world: 90% of Macintosh customers buy a Mac the next time around. Which leads people like Andrew Laham, MIS Director at the law firm Fleming, Hovenkamp & Grayson, to say, *"There would be a major crisis if we had to do without Macs. In fact, there would be an open revolt."* Indeed, if the mail we've received lately is any indication, more than a few CFOs out there would revolt, too, if their companies didn't use Macintosh computers.

"NASA saved $800,000 a year on maintenance alone when we replaced their legacy system with a Macintosh system," says Steve Monteith, a member of the Research Triangle Institute TechTracS Team.

And if you replace a Windows system with a Mac? According to a recent study by the Gartner Group, technical support costs for Macintosh tend to be 25% lower than support costs for Windows.** Even *PC World* magazine ranked Apple as one of the best for reliability and service among all makers of personal computers.

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1. *Standard & Poor's Insurance Rating Analysis,* 1995; Lipper Analytical Services, Inc., *Lipper-Directors' Analytical Data,* 1995 (Quarterly). 2. Source: Morningstar, *Variable Annuities/Life* 1/30/96. 3. Of the 2,575 variable annuity funds tracked by Morningstar, the average fund had annual expenses of 1.27% plus an insurance expense of 1.24%. Source: Morningstar, Inc., for periods ending January 31, 1996. 4. *Standard & Poor's Insurance Rating Analysis,* 1995.

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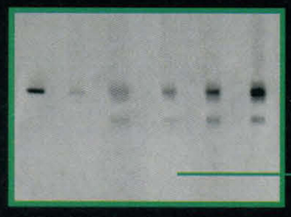

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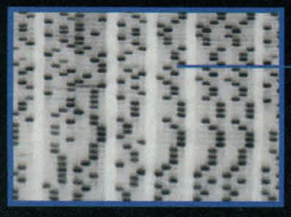

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Biomedicine '96

May 3-6, 1996
Washington, D.C.

Medical Research from Bench to Bedside

Association of American Physicians (AAP)

American Society for Clinical Investigation (ASCI)

American Federation for Clinical Research (AFCR)

and presented in conjunction with

SCIENCE

Join us in Washington, D.C. for a showcase of the latest in biomedical research with clinical applications. The Meeting reflects a unique collaboration between *SCIENCE* and the AAP, ASCI, and AFCR. The program will explore current topics in clinical and basic research emphasizing the multidisciplinary areas of interest to a wide range of investigators. Topics will be presented as Theme Symposia, State-of-the-Art Lectures, and abstract presentations in oral and poster formats.

Theme Symposia

Prominent physicians and scientists highlighting multidisciplinary areas of biomedical research and clinical investigation.

Human Immunodeficiency Virus Disease: Epidemiologic, Pathogenic, and Therapeutic Considerations
Anthony S. Fauci, National Institute for Allergy and Infectious Diseases

Transgenic Models of Metabolic Disease
C. Ronald Kahn, Joslin Diabetes Center
E.M. Rubin, University of California

Intracellular Membrane Trafficking
Jennifer Lippincott-Schwartz, National Institute of Child Health and Human Development

Ion Transport and Disease***
William Harris, Children's Hospital, Boston
Mark T. Keating, University of Utah

Health Outcomes Research
Allan S. Detsky, University of Toronto

Regulation of Apoptosis: Cellular, Molecular and Genetic Factors
John D. Mountz, University of Alabama at Birmingham

Translational Research in Dermatology*
Juoni Uitto, Thomas Jefferson Medical College

Delivering Information to Clinicians in the Era of National Networking***
Edward H. Shortliffe, Stanford University School of Medicine
David Lipman, National Library of Medicine

Developmental Biology: Organogenesis***
Jeffrey A. Whitsett, Children's Hospital Medical Center, Cincinnati
Jeffrey I. Gordon, Washington University School of Medicine

The New Biology of Obesity
Jeffrey S. Flier, Harvard Medical School

Emerging Infections***
Ruth Berkelman, National Center for Infectious Diseases
Monica M. Farley, Emory University School of Medicine

Training in Subspecialty Medicine: Current Status and Public Policy
Eric G. Neilson, University of Pennsylvania
Robert J. Mayer, Harvard Medical School

Abstract Presentations

Original abstracts will be presented either in oral session, chaired by teams of senior investigators, or in poster sessions.

Infectious Diseases/AIDS
James B. Dale, University of Tennessee School of Medicine

Cardiovascular
Christine Seidman, Harvard Medical School

Hematology
Dorothea Zucker-Franklin, New York University

Oncology
George Bosi, Memorial Sloan Kettering Cancer Center

Clinical Epidemiology/Health Care Research**
Pamela G. Williams-Russo, Cornell University Medical Center

Pulmonary/Critical Care
Jeffrey M. Drazen, Harvard Medical School

Gastroenterology/Hepatology/Nutrition
Tadataka Yamada, University of Michigan School of Medicine

Immunology/Allergy/Rheumatology
William J. Koopman, University of Alabama at Birmingham

Gerontology/Aging
Mark A. Supiano, University of Michigan School of Medicine

Endocrinology/Metabolism
Leslie DeGroot, University of Chicago Medical Center

Renal/Hypertension
Barry M. Brenner, Harvard Medical School

Inflammation
William M. Nauseef, University of Iowa

Regulation of Gene Expression
Herbert H. Samuels, New York University

Physiology
J. Chris Gillin, University of California, San Diego

Cytokines/Growth Factors
Derek LeRoith, National Institute of Diabetes and Digestive and Kidney Diseases

Dermatology*
Juoni Uitto, Thomas Jefferson Medical College

Gene Therapy
Elizabeth G. Nabel, University of Michigan

Satellite Symposia/ Meetings

Molecular Medicine Society
May 3, 1996

Association of Subspecialty Professors
May 4-5, 1996

GCRC Program Award for Excellence
May 4, 1996

Basic Aspects of Immunology
Sponsored by the Walter Reed Army Institute of Research
May 1-3, 1996

NIH Conference on Ischemic Acute Renal Failure
May 6-8, 1996

Joint Sessions with:
* *Society for Investigative Dermatology*
** *Society of General Internal Medicine*
*** *Pediatric Academic Societies (APS/SPR/APA)*

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PRODUCTS & MATERIALS

Kit Characterizes DNA Differences

The CFLPScan Kit can rapidly characterize single-base differences between DNA molecules. The assay is more sensitive than either single-stranded conformational polymorphism or restriction fragment length polymorphism analyses. With a simple 2- to 5-min enzymatic reaction, this economical method can detect a single-point mutation in fragments as large as 2 kb. It also simplifies the localization of mutations since differences are revealed as the appearance or disappearance of bands, band shifts, or changes in band intensity near the site of the actual mutation. **Boehringer Mannheim. Circle 139.**

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Radiation-Blocking Chambers

The Beta Finger Block is a radiation-safe mini-chamber for β-emitting radioisotopes. It holds four 1.5-ml microcentrifuge tubes and allows clear viewing of samples. Its compact size allows easy one-handed pipetting and

transporting of samples. Concentrated source isotopes can be safely stored in the Beta Cubee Chamber. Radioisotope shipping vials are protected by sturdy half-inch thick acrylic for maximum protection against emissions. The chamber is equipped with a hinged lid and removable insert intended to fit all standard radioisotope shipping vials. **Nalge Nunc International. Circle 140.**

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Iliac Artery Endothelial Cell System

EndoPack-IA is a complete cell system containing cryopreserved or proliferating normal human iliac artery endothelial cells, optimized cell growth medium, and subculture reagents for the propagation and subculture of the cells in vitro. The system can be used for experimental applications in cardiovascular pharmaceutical development and vascular pathology, including atherosclerosis. **Clonetics. Circle 141.**

■

Gel Analysis Software

SigmaGel is Windows-based software for fast, accurate, low-cost gel analysis. It permits researchers to make lane, spot, and molecular weight measurements directly from an IBM-compatible personal computer. The only other equipment required is a TWAIN compliant scanner. SigmaGel reduces gel analysis to a five-step, icon-driven procedure: (i) scan the gel or load a previously digitized image, (ii) calibrate the image, (iii) select the measurement mode, (iv) transfer the measurements to a spreadsheet window, and (v) output the spreadsheet data, graphs, and images to a Windows-supported device. **Sigma Chemical Co. Circle 142.**

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Optical Trapping and Micromanipulation

The Cell Robotics Workstation is a complete system for optical trapping, micromanipulation, and microsurgery involving cells or submicron particles. Featuring proprietary laser-based optical trapping technology, the computer-controlled workstation can be mounted on Zeiss, Nikon, or Olympus inverted microscopes. User-friendly software allows an op-

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.

erator to inspect, select, isolate, and transport cells and submicron particles such as chromosomes or microbeads. Cells of interest can be dissected, ablated, or otherwise manipulated using the laser modules such as LaserTweezers and LaserScissors. A unique motorized stage and Z-drive provide movement in three directions with precise 0.1-μm resolution and dependable return-to-site process repeatability. **Cell Robotics. Circle 143.**

■

Optical Biosensor System

A new optical biosensor system is designed for high-throughput, unattended biomolecular interaction analysis. The IAsys Auto+ offers all the advantages of the company's microcuvette system, plus a range of new features. New features include the choice of fully or semiautomated operation and simultaneous analysis of two channels for higher throughput. "Intelligent" software mirrors the user logic of interactive manual operation by giving the option automatically to analyze binding responses and adapt sample contact times or experimental sequences. The system features two vibration-stirred microcuvette wells to allow simultaneous experiments using different ligands, analytes, and chemistries with no risk of cross-contamination. **Affinity Sensors. Circle 144.**

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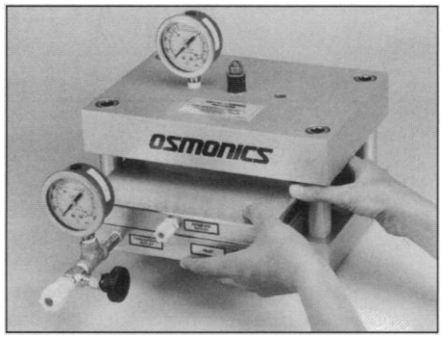
Bibliography Software for Networks

Reference Manager for Windows Version 7 is now available in a Network Edition. The new edition allows any number of licensed user accounts to simultaneously access a database in the bibliographic management program. Multiple users can retrieve references and prepare bibliographies from the same database and each user can maintain individual preferences in separate settings files. Only one user at a time can edit a database. Other new features include the ability to print indexed bibliographies grouped by authors, key words, periodicals, or publication dates, and the ability to create a new reference based on all or part of an existing reference. **Research Information Systems. Circle 145.**

■

Crossflow Membrane Separation

The new SEPA CF membrane filtration unit makes use of reverse osmosis, nanofiltration, ultrafiltration, and microfiltration membranes for a myriad of separations. This lab-scale unit operates in crossflow filtration mode performing small-scale production runs and providing comprehensive scale-up data. The SEPA CF unit consists of a test cell body and rigid holder. The cell body is available in acrylic, polypropylene, or stainless steel, and accommodates any 6 inch by 8 inch flat sheet



membrane. Single or assortment packs of precut membrane are available. In addition, mesh or tubular feed spacers can be loaded in the cell body with membrane and permeate carrier to simulate the flow characteristics of a wide variety of commercially available spiral-wound membrane elements. **Osmonics. Circle 146.**

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Literature

Integrated Separation Systems 1996 Catalog features an expanded line of protein electrophoresis and molecular biology products. New types of precast polyacrylamide gels in single and gradient percentages are now available to suit a variety of protein and nucleic acid separations. **Integrated Separation Systems. Circle 147.**

Spectrum 2000 FT-IR Spectrometer is a brochure on a modular system that is the next step in Fourier transform infrared (FT-IR) spectroscopy performance and usability. Advances include new optical and sampling features; control enhancements; and faster ways to generate, display, and interpret spectra. **Perkin-Elmer. Circle 148.**

The World of Immunological Excellence: 1996/7 Product Guide is a catalog detailing monoclonal antibodies to human, rat, and mouse antigens; cytokines and growth factors; cytoskeletal, extracellular, and other cell components; hormones; antibodies for flow cytometry; reagents for immunochemistry, sera, and blood products; and more. **Harlan Bioproducts for Science** and **Serotec. Circle 149.**

Selecting the Right Shaker for Your Laboratory is a 16-page booklet covering topics ranging from design features that minimize vibrations to the need for shielded wiring, electronic enclosures, and catch basins to protect against corrosive spills. **New Brunswick Scientific. Circle 150.**

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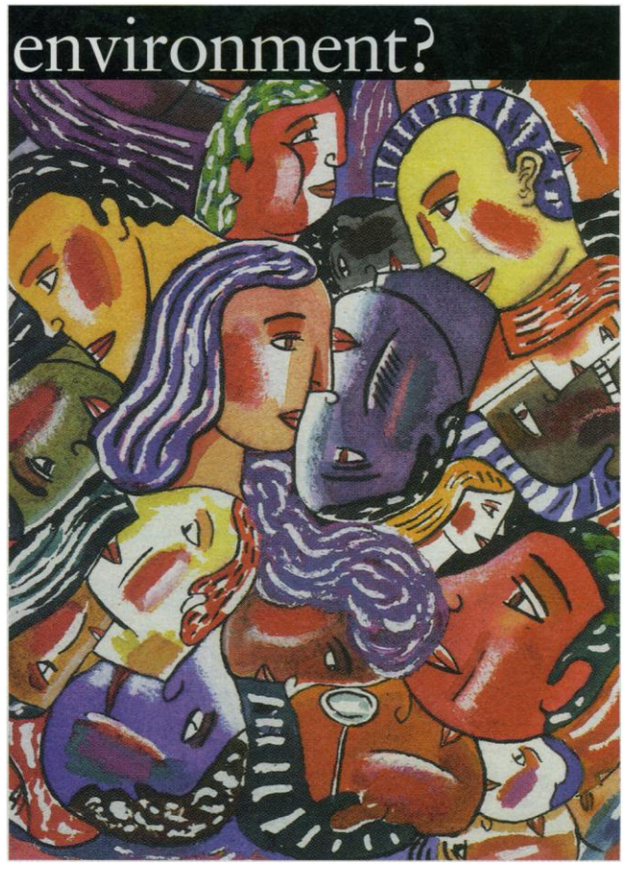

Genentech is known for its extensive product pipeline. And for being the only biotech company to have five products on the market. But how this all happens is equally as impressive.

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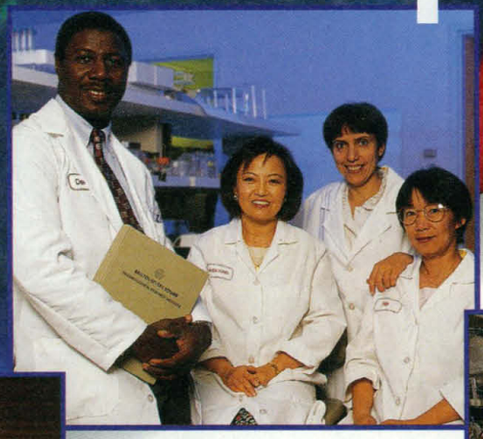

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Research Scientists. Participate in basic and applied research to evaluate targets for the therapeutic intervention of viral diseases. Positions require a B.S./M.S. degree and at least three years of research experience with molecular biology or biochemistry techniques since their degree. Candidates with prior experience in virology or organic synthesis are desirable. Ref. #HDV-257-A.

Protein Biochemist. Antiviral Drug Discovery. Join a multidisciplinary team exploring new viral targets and developing novel therapeutics against a variety of human viruses. Candidates must have a Ph.D. and at least 3 years postdoctoral experience, established expertise in biochemistry and have experience with protein purification and enzyme analysis. Ref. #HDV-257-B.

Medicinal Chemists.
We are looking for creative synthetic organic chemists to participate in the drug design and discovery process in both a classical medicinal and a combinatorial chemistry environment. Ref. #HDC-28.

Please forward/fax your resume with Ref. code# to: Bristol-Myers Squibb Pharmaceutical Research Institute, Human Resources, P.O. Box 5101, 5 Research Parkway, Wallingford, CT 06492-7661. FAX: 203-284-7762.

PRINCETON & NEW BRUNSWICK, NEW JERSEY

Research Investigator. Metabolic Diseases. We are seeking an established scientist in the area of carbohydrate and fatty acid metabolism. Requirements include a Ph.D. in a relevant discipline, 2-5 years experience as well as experience in state-of-the-art whole animal metabolic kinetic methods. Experience with animal models of diabetes and obesity would be an asset. Ref. #BM-420.

Research Investigator. Metabolism and Pharmacokinetics. Develop/validate enzyme immunoassays for quantitating biologicals in biometrics, and provide bioanalytical support for clinical, nonclinical and preclinical studies of new biological drug candidates. Requirements include a Ph.D. in Biochemistry, Immunology or Molecular Immunology with 2-4 years postdoctoral training and proficiency in cell culture techniques and cell-based bioassays. Knowledge of lab automation, or training in BIAcore, CZE, or FACS instrumentation is a plus. Ref. #MS-150.

Please forward/fax your resume with Ref. code# to: Bristol-Myers Squibb Pharmaceutical Research Institute, Human Resources, P.O. Box 11279, Trenton, NJ 08620-0279. FAX: 609-581-8841.

Bristol-Myers Squibb Pharmaceutical Research Institute, the R&D division of Bristol-Myers Squibb, is proud of the diverse and dynamic operating culture that exemplifies our company.

SEATTLE, WASHINGTON

We have the following openings in our Biological Process Research Organization.

RESEARCH ASSOCIATE. Participate in the development of new assays in the area of bioassays and immunoassays. Ability to independently design experiments for the creation and validation of new assay systems and participate in multi-functional teams to research, investigate and solve problems. Ph.D. degree in Biochemistry or Biology with 0-2 years of industrial experience desired. Ref. #37.

RESEARCH INVESTIGATOR. Develop and conduct methods for the folding of therapeutic proteins expressed in bacterial systems; study protein stability and develop formulations for protein therapeutics; evaluate and study protein structure using biophysical methods and theoretical predictions. Requires a Ph.D. in Biophysical or Protein Chemistry with 0-4 years postgraduate experience. Experience in fluorescence, UV, CD, light scattering, and mass spectroscopy is essential. Experience in chromatography, electrophoresis, calirometry, immunological assays, FT-IR, NMR, and molecular graphics desired. Ref. #36.

RESEARCH INVESTIGATOR. Lead a staff of 5 scientists in the integrated design of efficient and robust processes. This group will be responsible for working with and providing instructions to an Operations group that will generate recombinant cell lines, run experimental cell culture, bacterial and yeast bioreactors, and perform automated purification development experiments to support the formulation of production processes. Once the process is developed, this group will write manufacturing instructions for the operations group to produce material at the 10mg to 10 gram scale to be released to discovery scientists. Will be responsible for transferring processes for clinical production. Requires Ph.D. or equivalent in Biochemical Engineering or Biotechnology. Other disciplines will be considered if industrial experience is relevant to biopharmaceutical process development. At least 5 years in developing purification processes for biopharmaceuticals. Ref. #34.

RESEARCH INVESTIGATOR. Lead a group of 10 individuals responsible for the production of recombinant proteins at up to 2-10 grams per batch to be released to discovery scientists for animal studies; production of cell culture supernatant and fermentation cell paste to release to process design scientists for purification development; operation of bank of small scale cell culture reactors, small cell fermentators and of bank of BIOCAD units as specified by process design scientists to support design studies. Minimum M.S. in Chemical Engineering, Biochemical Engineering or Biotechnology with 5 yrs. or greater experience in biopharmaceutical manufacturing setting and at least 2 yrs. of leading a mid-sized technical staff. Expertise in cell culture reactor operation, both at bench scale and at scales up to 100L; expertise in fermentation operation. Ref. #38.

Please forward/fax your resume with Ref. code# to:
Bristol-Myers Squibb Pharmaceutical Research Institute, Human Resources, 3005 First Avenue, Seattle, WA 98121. FAX: 206-727-3606.

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