BRING THE POWER OF PCR TECHNOLOGY TO ENVIRONMENTAL ANALYSIS.

Faster analysis with greater sensitivity and specificity. Easier interpretation with increased assurance and semi-quantitative results.

New EnviroAmp® Reagents such as the EnviroAmp® Legionella Kits, together with GeneAmp® PCR Instrument Systems, provide simple yet powerful solutions to your toughest analytical challenges.

The first in a series of kits for PCR-based analysis of water samples, the EnviroAmp Legionella Kits contain reagents and protocols optimized for detecting both Legionella and L. pneumophila. The colorimetric reverse dot blot format with built-in positive and negative controls provides immediate, unambiguous results. 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 local Perkin-Elmer sales representative.

PERKIN ELMER

GeneAmp and EnviroAmp are trademarks of Hoffmann-La Roche Inc. The PCR process is covered by U.S. patents owned by Hoffmann-La Roche Inc.
For CYTOKINE Research

The Broader Spectrum of Premium Quality Cytokines

The cytokine laboratories of R&D Systems provide the most extensive line of both natural and recombinant cytokines. Each protein carries the following assurances:

Superior Quality
Each cytokine is produced and extensively tested in the laboratories of R&D Systems, ensuring extremely high and consistent quality.

Full Biological Activity
The biological activity of each cytokine is determined by bioassay. A description of the appropriate bioassay and the typical ED50 range is included in each package insert.

Highest Purity
All are greater than 97% pure, as determined by N-terminus analysis as well as SDS-PAGE visualized by silver stain.

Additional Reagents
R&D Systems produces over 250 cytokine related reagents (e.g. neutralizing and detection antibodies, genes, probes, and cytokine ELISA assay kits) to provide investigators with a solid foundation on which to do cytokine research.

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

In Europe contact:
British Biotechonology, 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) 56846222
Fax: +81 (03) 56841633

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

Circle No. 25 on Readers’ Service Card
LOOKING FORWARD

YOUR SCIENCE. OUR TECHNOLOGY.
GUARANTEED PCR PERFORMANCE.

As your research uncovers new challenges, PCR technology must advance to meet your needs. Since 1987, Perkin-Elmer has been delivering PCR solutions to laboratories worldwide. By integrating instrumentation, reagents and technical support, Perkin-Elmer has set an uncompromising standard: the PCR Performance Guarantee.

Today, Perkin-Elmer's ongoing efforts to serve the scientific community are joined by Roche Molecular Systems, Inc., as the developer and manufacturer of PCR reagents. Our combined expertise in product innovation and quality manufacturing will accelerate the development and expansion of PCR applications.

The PCR Performance Guarantee is reaffirmed. The dedication and commitment of Perkin-Elmer's worldwide technical support organization are now enhanced by the cooperation of two world leaders, Perkin-Elmer and Roche. Looking forward to advancing PCR technology together. To receive more information, call 1-800-762-4000. Outside the U.S., contact your Perkin-Elmer sales representative.

PERKIN ELMER
Europe Vaterstetten, Germany Tel: 49-8106-381115 Fax: 49-8106-56397
Canada Montreal, Canada Tel: 514-737-6776 Fax: 514-737-9726
Far East Melbourne, Australia Tel: 61-3-590-4636 Fax: 61-3-590-3231
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.

Circle No. 21 on Readers' Service Card
Atomic force micrograph of a living cell, showing filamentous actin and other internal cellular structures. The ability of the atomic force microscope to "see" inside living cells, coupled with its potential for very high resolution imaging, may make this and related instruments powerful tools for molecular cell biology. See page 1944 and the special section on instrumentation beginning on page 1885. [Micrograph: E. Henderson]
QIAEX for Gel Extraction...  
Your DNA will love it!

QIAEX matrix is a uniform, 3 μm silica gel suspension which selectively binds DNA in the presence of high salt. Pure DNA can be recovered from agarose gels – in just 20 μl of TE.

QIAEX means:
- Efficient purification from 50 bp to 50 kb
- Extraction in 15 minutes
- No enzymatic inhibition
- No need for low-melt agarose
- > 80% recovery
- No shearing of large DNA fragments

QIAEX isn't powdered glass like other gel extraction products. DNA purified using the QIAEX Gel Extraction Kit is free from fines or small particles of powdered glass.

DNA size, DNA amount vs. recovery with QIAEX
Recoveries of 32P end-labeled DNA fragments purified with QIAEX
-Gel Extraction- Kit determined by scintillation counting.

DNA size
10 μm
150 kV
1.25E3
0008/00 QIAEX

QIAEX Gel Extraction Kit

150 Preparations
Cat. No. 20020

500 Preparations
Cat. No. 20050

Call now to place your order or for more information.

DIAGEN GmbH, Germany, Orders (0)2103-892-230, Fax (0)2103-892-222, Technical Service (0)2103-892-240

QIAGEN Inc., USA, Orders 800-426-8157, Fax 818-718-2056, Technical Service 800-DNA-PREP (800-362-7737)


Circle No. 46 on Readers’ Service Card
HIV detection just got more sensitive.

Introducing the newest AIDS research products from Du Pont.

HIV research depends on sensitive detection. That's why HIV researchers depend on innovative AIDS research products from Du Pont.

New RT-Detect™
Reproducible non-radiometric detection of reverse transcriptase. Only Du Pont's RT-Detect makes it a practical reality.

This new microplate-based ELOSA (Enzyme-Linked Oligonucleotide Sorbent Assay) kit offers high sample throughput – with minimum hands-on time and excellent sensitivity. And its microplate format is compatible with your existing lab equipment.

HIV-1 p24 Antigen ELISA Enhancements
Improve on an already good thing? It's easy with two new enhancements to our HIV-1 p24 Antigen ELISA.

Our easy-to-use HIV-1 p24 ADD (Acid Disruption Difference) ICD reagent kit increases detection of p24 through acid disruption of immune complexes in a convenient one-day format.

Or, boost sensitivity up to fifteen-fold with our ELAST™ ELISA Amplification System.

And more
We also offer an exceptionally wide range of monoclonals for viral detection – including gp120-neutralizing monoclonal antibodies and recombinant soluble CD4.*

And, for high-throughput screening of potential anti-AIDS pharmaceuticals, our CD4/gp 120 NENQUEST™ Drug Discovery System redefines the state of the art.

Why not detect the Du Pont difference for yourself? For information by fax, 24 hours a day, 7 days a week, call Du Pont FaxBack® at 1-800-666-6527 (or 302-892-0616) and request document #3000. We'll treat you with maximum sensitivity.

*CD4 IS SUPPLIED BY AGREEMENT WITH PROGENICS PHARMACEUTICALS, INC.
**EDITORIAL**

Instrumentation

Science again presents its annual issue on instrumentation. There are many reasons for this regular occurrence, but the key ones are that almost everyone in the experimental sciences depends substantially on instrumentation in research and everyone wants to know what is new.

In addition to reviewing some excellent research, the articles in this issue illustrate some important aspects of modern instrumentation. First, instrumentation is driven by technology. Development and commercialization of new technologies make many of these instruments possible. In many cases, it is the components of homebuilt instruments that are commercial, but there is no question that the instruments would not exist without the industry that produced these components. Second, we see the impact of the instrumentation on the science. New instrumentation allows us to do our work better (sometimes even to do it all) and to do it faster and more efficiently.

High-accuracy mass measurement of peptides and proteins is critical as we begin to characterize these important molecules of life. Chair and Kent describe advances that have allowed the measurement of mass spectra with picomole sensitivity. What is needed to do the job right is both volatilization as well as accurate mass measurement. Laser vaporization coupled with time-of-flight mass spectrometry and electrospray coupled with quadrupole mass filters can give an accuracy of one part in 10^6, thereby making extremely useful information accessible.

Farrow and Rakestraw describe the use of optical degenerate four-wave mixing to detect trace molecular species. This technique is based on the interaction of three input laser beams of the same frequency with a nonlinear medium to produce a coherent signal beam. As the laser frequency is scanned, the mixing is enhanced wherever a molecular resonance occurs, and so the signal is bright against the background, which allows rejection of potential interfering radiation and the possibility of remote measurement. The technique is coherent and highly selective, and thus especially well suited for studying combustion processes.

The new atomic microscopes are becoming increasingly important in our ability to look directly at the surfaces of condensed phases. Radmacher, Tillmann, Fritz, and Gaub point out that in atomic force microscopy, soft is hard. They discuss the problems and advances in imaging soft samples with the atomic force microscope. With hard, conventional samples, surface topology and tip geometry are important. With soft, noncrystalline samples, viscoelastic properties are important. Studies are discussed in which local viscoelasticity and friction coefficients of monomolecular Langmuir-Blodgett films can be mapped out on a nanometer scale.

McConnell et al. describe the cytosensor microphysiometer. This is a potentiometric sensor that uses silicon chip technology to enable two-dimensional scanning of cell response to chemical species by means of a light beam. Typically, metabolism in cells produces acid, so the pH is an excellent marker of metabolic change. Because pH change can be sensed rapidly with this instrument, it is possible to examine many cells more or less simultaneously. Thus, one can quickly determine the response to a large number of possible receptor ligands or chemicals. This type of rapid screening is very different from other more conventional methods and will have an important effect on strategies for drug research. Applications to some particular receptors are discussed.

Stoutland, Dyer, and Woodruff describe new developments in ultrafast infrared spectroscopy. A major advantage of infrared spectroscopy is its specificity for particular species or functional groups. In addition to the elegant technique of upconverting a slice of the full infrared peak, thus applying the time constraint after absorption, a method of providing a tunable, ultrafast, probe pulse is also possible. Advances in technology have permitted infrared spectra to be obtained with a time resolution of picoseconds. Studies of CO binding in cytochrome c oxidase, of CO binding to copper as opposed to iron, and of electron transfer in mixed valence compounds are discussed.

The increase in productivity, both in the ability to solve new problems and the ability to solve problems more efficiently, is the mark of a great deal of current science. Much of this increase comes from new instrumentation. Fortunately, we have recognized the advantages of a continuing investment, both at the research and development level as well as commercially. We must be conscious of the value of this investment. It provides much of the lifeblood of our science.

*John I. Brauman*
When it comes to Superspeeds, the SORVALL® name really gets around.

More SORVALL® Superspeeds are installed around the world than any other centrifuge. Which is why our name is synonymous with Superspeeds. With good reason. Because when it comes to flexibility, reliability and safety, there are no other centrifuges in the 20,000-24,000 RPM range like ours. And no vacuum is required to achieve this new standard in reliability. SORVALL offers the widest choice of rotors, tubes, bottles and adapters, all interchangeable between SORVALL Superspeeds, so your rotor inventory won't become obsolete as your research progresses in new directions. What's more, SORVALL Superspeed rotors offer the only independently tested biosafety containment protection against infectious, radioactive and other hazardous materials in the event of accidental tube breakage or failure. All of which says one thing. When it comes to no-risk Superspeeds, one name is known worldwide. SORVALL. For more information on SORVALL Superspeed centrifuges, call 1-800-551-2121.

SORVALL...a better choice.
Hydrocoral Species Not Extinct

Prolonged seawater warming that accompanied the 1982 to 1983 El Niño–Southern Oscillation (ENSO) disrupted marine ecosystems in the eastern Pacific Ocean, bleaching (through the loss of endosymbiotic zooxanthellae) and killing reef-building corals (1). Two hydrocoral (Millepora) species, M. platyphylla Hemprich and Ehrenberg and M. boschmai de Weerdt and Glynn, were not found alive in their former range in the Gulf of Chiriqui, Panama, for almost 9 years. M. intricata Milne Edwards, a third Indo-Pacific hydrocoral species in the eastern Pacific also virtually disappeared at that time. A few small colonies reappeared in 1985 on the Uva Island reef in the Gulf of Chiriqui, and by 1987 populations had expanded to several scattered patches of up to 5 square meters.

A thorough search from 1984 through 1990 over the former ranges of M. platyphylla and M. boschmai in the Gulf of Chiriqui revealed only dead colonies. As M. platyphylla lives throughout the Indo-Pacific Province, its disappearance in the eastern Pacific was regarded as a local extirpation (2) and the disappearance of M. boschmai, a newly named eastern Pacific endemic species (3), as an extinction event.

The discovery of five live colonies of M. boschmai at Uva Island, Gulf of Chiriqui, Panama, in 1992 shows that this species has survived. The colonies exhibited normal pigmentation and appeared healthy in February and June, although this was not the case for all reef-building corals over this period. Partial bleaching occurred in five scleractinian coral species in the Gulf of Chiriqui when ambient reef temperatures were anomalously high, a result of the strong 1992 El Niño (4). Zooxanthellae densities and chlorophyll a concentrations indicated that bleaching was a result of zooxanthellae loss rather than reduced chlorophyll concentration per zooxanthella. Mean sea surface temperature (SST) was 30.0°C (n = 20) on Uva Reef from 16 to 22 February, which is about 1.0° to 1.5°C above normal. Satellite-derived data documented that SST values of 29° to 30°C dominated the Gulf of Chiriqui from February through April 1992 (5).

We assume that the skeletal elongation rate of the platy M. boschmai is one-half of that of the dendritic M. minicata, which is 5.5 centimeters (cm) per year (2), and estimate that the smallest colony of M. boschmai (12 cm high) is about 4 years old and the largest colony (21 cm high) about 7.5 years old. Recently discovered colonies that were recruited to Uva Island after the 1983 ENSO dieoff could have been derived from remnant colonies that dispersed from local cryptic refugia (1, 6). It is also possible that propagules originated from yet-undocumented populations in the central or western Pacific.

Peter W. Glynn
Joshua S. Feingold
Division of Marine Biology and Fisheries,
Rosenstiel School of Marine and Atmospheric Science,
University of Miami,
4600 Rickenbacker Causeway,
Miami, FL 33149

REFERENCES
5. W. G. Pichel, personal communication.

Lyme Disease: Asking the Right Questions

I would like to elaborate on some of the issues discussed in Marcia Barinaga’s article on the controversy at the Fifth International Conference on Lyme Borreliosis (News & Comment, 5 June, p. 1384). The academic Lyme disease researchers would have us believe that there is a methodological conflict between their own studies and their clinician opponents’ “anecdotal” findings. Nothing could be further from the truth. Although criticisms of the offending abstracts submitted before the conference were not entirely without merit, the presumption that the existing body of academic Lyme disease literature represents some sort of scientific ideal is ludicrous.

The central flaw in the current Lyme disease orthodoxy is the persistent myth of “post-Lyme syndrome.” This condition was suggested by researchers to account for the troublesome fact that many patients do not
fully recover after supposedly curative antibiotic therapy, but continue to suffer from chronic headaches, cognitive deficits, debilitating fatigue, and paresthesias. These persistent symptoms are explained away by the fibromyalgic syndrome (1), which provides a convenient sense of closure to researchers but leaves patients in the throes of devastating chronic illness.

There is ample evidence to retire this model in favor of one involving chronic infection. Some researchers have successfully cultured Borrelia burgdorferi from the skin or cerebrospinal fluid of patients after antibiotic regimens generally accepted as curative by academic researchers (2), while other clinicians have recovered the bacteria from patients who have undergone even long-term high-dose antibiotic therapy (3). In addition, researchers have demonstrated that B. burgdorferi can penetrate and persist within human endothelial cells (4) and fibroblasts (5). Yet most academic researchers continue to deny the prevalence of chronic infection in Lyme disease.

There are also flaws with the academicians’ diagnostic protocols. Lyme disease presents physicians with a diagnostic dilemma because its symptoms are so diverse and the commonly available serological tests used in diagnosis are known to be unreliable. Thus, while it may seem reasonable for researchers to insist that clinicians confine their studies on long-term therapy to patients who are demonstrably seropositive, it is scientifically—and morally—indefensible to advocate a rigid adherence to this overly restrictive diagnostic procedure in a clinical setting to determine treatment. Arbitrarily withholding antibiotic therapy from all seronegative patients guarantees that an unacceptably high percentage of them will go on to develop incurable late-stage Lyme disease. Such a policy also can lead to the underreporting of the real incidence of Lyme disease. The artificially low figures are in turn used by researchers to reinforce their claim that Lyme disease is actually quite rare. Thus the cycle of denial is complete. The facts, of course, strongly suggest that Lyme disease is seriously underdiagnosed. New testing techniques presented at the international conference (6) indicate that Lyme disease will be found to be significantly more common than previously recognized.

The rejection of the offending abstracts at the conference had much more to do with their conceptual challenge to current paradigms in Lyme disease research than with their alleged scientific deficiencies. Good science is as much about asking the right questions as it is the sensible pursuit of answers, and many Lyme disease patients do not feel that the mainstream Lyme disease researchers are asking the right questions.
The existing theories need to be reevaluated in light of the emerging evidence on chronic infection in late Lyme disease.

Carl Brenner
Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY 10964

REFERENCES

Enantiomerically Pure Drugs

In response to an article by Ivan Amato about asymmetric synthesis ("Looking glass chemistry," Research News, 15 May, p. 964), John F. Beary III and C. Robert Eaton, the senior vice president and the manager of the research and development programs of the Pharmaceutical Manufacturers Association, urge discretion in the development of a drug regimen in which all new chiral agents are marketed only as the pure active enantiomer, in cases where the bioactivity resides mainly or solely in that enantiomer (Letters, 10 July, p. 145). They cite the potential additional cost and delay incurred in the synthesis of pure enantiomers on a clinical scale but do not mention impending developments in chemical synthesis (the thrust of Amato's article) which will reduce the time required for such a regimen to reach within the time frame of 12 years cited by Beary and Eaton as that needed for the launch of a drug de novo.

To illustrate their points they cite the case of ibuprofen, the Boots nonsteroidal anti-inflammatory agent currently marketed as a racemate. Only the S enantiomer is active, but as they remark, the R enantiomer is converted into S in a unidirectional manner in vivo. This fact is used to support their case that the therapist might as well administer the racemic mixture as the pure active S enantiomer. Unfortunately, a

No matter how you look at it, data analysis can be a real monster.

That's why GraphPad is pleased to introduce InStat and InPlot, powerful and easy-to-use scientific software that can really take a bite out of your workload. InStat, Instant Biostatistics.

Unlike heavy-duty programs designed for statisticians, InStat is designed for scientists. Even if your knowledge of statistics is a bit rusty, InStat's clear language makes it easy to calculate / tests, nonparametric tests, one-way ANOVA, chi-square, Fisher's test, linear regression and needed sample size. Not sure which test to use? Simply use the built-in help screens.

InPlot. Scientific Graphics.

InPlot makes it equally easy to quickly analyze your raw data and create polished graphs - complete with error bars, log axes and scientific symbols. Curve fitting with nonlinear regression has never been easier. There are even special features for radiogland binding and RIAs. And InPlot is so easy-to-learn, you can create your first graph in minutes.

Both programs are backed by an unconditional, 90-day guarantee and free technical support.* Call (800) 388-4723 today for more information. Because analyzing data no longer has to be like pulling teeth.

GraphPad™ Intuitive software for science.
10855 Sorrento Valley Road, Suite 203 • San Diego, CA 92121 • USA
TEL. (800) 388-4723, (619) 457-3909 • FAX (619) 457-8141
*InPlot costs $95 and is a DOS program. InStat costs $95 and is available in DOS and MAC versions.

Circle No. 38 on Readers' Service Card
more detailed appraisal does not support this stance. The conversion of R to S enantiomer in vivo is incomplete (1), being largely (60%) independent of the size and enantiomeric composition of the administered dose. The clearance of each enantiomer is also independent of the administered dose (2). These observations should be set in the context of findings from clinical trials that twice the dose of racemic ibuprofen is needed to attain the same plasma concentration of S form as compared with the pure S enantiomer (3). In plain language, the S enantiomer of ibuprofen is a better drug than the racemate.

Anti-inflammatory agents are typically administered over long time periods to rheumatoid arthritis patients and are not devoid of side effects. In such circumstances, it is surely imperative to minimize the dose. If the research findings cited are fully sustained, then a clear case will be made for the exclusive licensing of the S enantiomer of ibuprofen and the pursuit of enantiomerically pure drugs in general.

John M. Brown
Dyson Perrins Laboratory,
Oxford University,
South Parks Road,
Oxford OX1 3QY,
United Kingdom

REFERENCES

HIV-Free AIDS Reports
A 31 July News & Comment article by Jon Cohen about HIV (human immunodeficiency virus)–free AIDS cases reported at the VIII International AIDS Conference in Amsterdam (p. 604) ends with a call by Michael Merson “to launch a worldwide study of this situation” as quickly as possible.” I am responding to this call with an offer to provide, to anyone who requests it, now or later (1) a list of references to more than 800 HIV-free immunodeficiencies and AIDS-defining diseases in all major American and European AIDS risk groups. In addition, I can provide references to more than 2200 HIV-free African AIDS cases that all meet the World Health Organization definition of AIDS (1). Each of these cases was diagnosed after the “AIDS test” for antibodies to HIV was introduced in 1984.

There may be more HIV-free AIDS-like cases, as only about 50% of all AIDS cases reported by the Centers for Disease Control (CDC) are confirmed as HIV-positive (2, 3); the remainder are based on presumptive diagnoses (2, 4). Surprisingly, the CDC does not survey HIV in its monthly HIV/AIDS Surveillance reports (5).

Rather than rushing to a “new AIDS virus” as the explanation, Science could focus more attention on “[a]lternatives to a virus” that could resolve the growing paradoxes of the virus-AIDS hypothesis.

Peter Duesberg
Department of Molecular and Cell Biology,
University of California,
Berkeley, CA 94720

Population Genetics: Founding Fathers
In his article “The evolution of sexes” (Research News, 17 July, p. 324), Alun Anderson describes Cambridge University’s Ronald Fisher as “the founding father of modern population genetics.” Fisher was indeed a great geneticist and a statistician. He was among the three founding fathers of modern population genetics (the other two were J. B. S. Haldane and S. Wright), but not the founding father!

D. R. Govindaraju
Department of Biology,
Case Western University,
10900 Euclid Avenue,
Cleveland, OH 44106-7080

Corrections and Clarifications
In the author note for the Nobel lecture “Soft matter” by P. G. de Gennes (24 Apr., p. 495), the last sentence should have read, “It is published here with the permission of the Nobel Foundation and will also be included in the complete volume Les Prix Nobel 1991 (in English) as well as in Nobel Lectures (in English) to be published by Elsevier Publishing Company, Amsterdam and New York.”

In figures 1B and 2C of the report “Dendritic cells exposed to human immunodeficiency virus type-1 transmit a vigorous cytopathic infection to CD4+ T cells” by P. U. Cameron et al. (17 July, p. 383), the y axes should have read, “RTase 10^3 CPM/μl.” The last line of reference 20 should have read “agarose gel stained with ethidium bromide.”
Bio-Rad: The Evolution of Gene Transfer

Earlier methods of Gene Transfer

Particle Delivery

1986 The Gene Pulser* system brings affordable electroporation to biochemists and molecular biologists.

1987 Bacterial electroporation efficiencies increased dramatically with the introduction of the Pulse Controller and 0.2 cm cuvettes.

1987 Bio-Rad introduces DuPont's Biolistic PDS-1000/He particle delivery system to the world market for plant and animal applications.

1988 Bio-Rad pioneers 10<sup>7</sup> transformants/ug. E. coli protocol optimized.

1989 Bio-Rad guarantees high efficiencies with the introduction of convenient Electro-Competent* cells.

1990 Prokaryotic applications and efficiencies boosted by new 0.1 cm cuvettes.

1991 Bios Rad introduces the E. coli Pulser* unit—the first dedicated pulser for efficient, economical library construction.

Support Data

1986-2010 The users club binder—yours free—continually keeps you up to date on the latest gene transfer protocols for plant and mammalian cells, bacteria, yeast and other fungi, etc.

At Bio-Rad we don't have a gene transfer instrument—we have a gene transfer program. One that Bio-Rad has pioneered, researched, and provided to the life science community. Plant and animal cells, bacteria, other cells: Bio-Rad not only gives you the tools to efficiently transform them, but also supports you throughout your research with unparalleled support, free telephone consultation, and unlimited access to published protocols and yet unpublished data. We have been dedicated to gene transfer since 1986, and we will continue to further your success with high quality electroporation and particle delivery products.

Call 1-800-4BIO-RAD today to discuss your particular gene transfer needs.

Reach your finish line faster with New England Biolabs' CircumVent™ DNA Sequencing Kit.

For Thermal Cycle DNA Sequencing, it's fast and simple.

- Fast and easy. Saves valuable research time. No need to denature double stranded DNA templates, eliminates centrifugation steps and independent priming steps. Ideal for multiple sample preparation.
- Permits direct sequencing from colonies, plaques, cosmids or PCR® reactions.
- Incorporates ³²S or ³²P radiolabel
- Requires only nanograms of template. Only femtomoles when using ³²P or ³²P end-labeled primers.
- Diminished secondary structure effects due to high temperature reaction.

CircumVent DNA Sequencing Kit with VENT™ (exo-)

For more information about the new CircumVent™ DNA Sequencing Kit, call 1-800-NEB-LABS.

*PCR is covered by U.S. patents issued to the Cetus Corporation.
The MR 7000 expands your options.

Why settle for an ordinary microplate reader when you can plan for your laboratory’s future today?

With our versatile MR 7000 microplate reader as the foundation, an entire microplate processing system can be yours all at once...or one module at a time.

The MR 7000 reader stores up to 50 protocols and can be easily enhanced with program cartridges for Agglutination, Kinetics, Tissue Culture Growth, ELAcalc Statistical Analysis and custom applications. It also serves as the controlling unit of a system that dispenses reagents and incubates and washes microplates. The System 7000 is an open, user-programmable processing platform designed to automate your microplate testing protocols.

The MR 7000 Microplate Reader and Processing System are elements of Dynatech's integrated line of innovative Microtiter® instruments, software and multisample disposable products created to increase your laboratory's efficiency and productivity.

To expand your laboratory's microplate processing capabilities, call Dynatech at 1-800-336-4543.
HOW TO ACHIEVE ENHANCED CHARACTERIZATION OF BIOMOLECULES.

The Electrospray System from Finnigan MAT simplifies tedious sequencing processes, and lets you produce accurate and intelligent data in a fraction of the time.

Picomole and femtomole sensitivity in molecular weight determination, coupled with structural elucidation achieved in hours—not days or weeks—makes the Electrospray System a powerful tool.

The Electrospray System combines electrospray ionization (ESI) with our high-performance TSQ™ 700 mass spectrometer to provide molecular weight determination of biomolecules, such as peptides and proteins with mass accuracy of 0.01%.

And the innovative Finnigan MAT data processing software extracts meaningful information and presents it in a format tailored for the biochemist, letting you spend more time on science and less time crunching numbers.

To seek higher intelligence in high mass analysis, call a Finnigan MAT office listed below or FAX (408) 433-4823.
Meet Our Family

Every Forma product is characterized by 40 years of superior quality and service. Our equipment has more than the Forma look; it has the high performance and reliability you expect from controlled environment laboratory equipment.

Cell Culture Incubators with CO₂ and/or O₂ control in water-jacketed, forced-draft or HEPA-filtered styles from 5.7 to 32 cu. ft.

Ultra-Low Temperature Freezers with automatic voltage compensators and microprocessor or solid-state controls, upright or chest styles up to 23 cu. ft.

Biological Safety Cabinets in 4 or 6 ft.

styles (NSF Listed) and Laminar Flow Clean Benches in console or benchtop.

Glassware Washers with microprocessor controls and stainless steel pumps.

CryoMed LN₂ storage systems and controlled rate freezers with microcomputer programming.

Blood Bank refrigerators, storage and blast freezers, thawing baths and platelet incubators.

Baths and Circulators in shaker, countertop and floor models with temperature ranges from -40°C to +100°C.

Call your sales representative for information on IEC floor model centrifuges and Savant Instruments products.

Direct sales representation in the USA. International sales and service through authorized distributors in over 70 countries.

Forma Scientific, Inc.
Box 649, Marietta, OH 45750 1-614-373-4763
Telefax: 1-614-373-6770  Telex: 29-8205
USA and Canada 1-800-848-3080

Circle No. 6 on Readers' Service Card
The storage of important scientific data should never be left to chance. Which is why more researchers are using optical disks for their secure data storage. With the fusion of WORM and erasable functionality into a 1 GByte disk drive, Maximum Storage's new DUETTE™ stands alone as the premier optical disk subsystem.

**DUETTE** makes optical storage easy. Just connect the drive to your computer, load the operating software and you're in business. **DUETTE** works just like a standard disk drive, so you already know how to use it.

Need archival permanence? Insert a WORM disk and write away. Want reusable storage? Use an erasable disk instead. With 1 GByte of capacity, these 5 1/4-inch removable disks are ideal for data-intensive scientific applications.

What's more, **DUETTE** is available for both PC and Sun SPARCstation platforms. Data interchange between these two popular computing environments is fully supported, so disks written by a PC can be read by a SPARCstation and vice versa. And support for other popular computing platforms will be available later this year.

Since 1987, Maximum Storage optical disk drives have been the choice of the research, medical and scientific community. With **DUETTE**, this choice is made even easier. And with our direct sales hot line, you can be assured of prices that will not send your budget into hyperspace.

If you're tired of risking your valuable data to bad sectors, stray magnetic fields and head crashes, then call or write for our informative data pack.

Or better yet, pick up the phone and order your **DUETTE** today.

**AVAILABLE NOW!**
To Order, Call Our Direct Sales Hot Line
1-800-THE-MAXX

Maximum Storage, Inc. 5025 Centennial Blvd., Colorado Springs, CO 80919 (719) 531-6888
Circle No. 39 on Readers' Service Card
With Maxline™ Microplate Readers, you leave your lab with a sense of accomplishment, every day.

Maxline readers pioneered enzyme kinetics in the 96-well format. Today, they remain unequaled in performance, software and applications support. The light-tight, stationary reading chamber is central to Maxline’s superior optical performance. The isothermal reading chamber ensures well-to-well temperature uniformity and long-term thermal stability. Combining the throughput and convenience of the 96-well format with the data quality of the best spectrophotometers, Maxline readers offer complete solutions to your toughest application challenges.

No wonder Maxline readers are the choice of leading scientists and the most frequently cited in the literature. Send for your free copy of our annotated bibliography today.

Maxline Microplate Readers. There is a difference.
Saving the Environment is at the Tip of Your Fingers...

esp™ - Environmentally Sensitive Packaging, for Pipet Tips

Instantly refill your empty pipet trays with 96 tips in a single movement.

ESP’s unique system eliminates 70% of the packaging used in traditional racked pipet tips. You save bench space, storage space, the hassle of disposal and the tedious work of manually reloading your trays.

If you could save your local landfills, get your bench-top space back, and put those empty pipet tip trays to good use, without spending any extra money, you would ... wouldn't you? Take advantage of the ultimate in recycling - REUSE.

ESP200™ It is the Biological® choice.

ESP200™ features the highest quality universal fit 200μl pipet tip - 960 tips per pack. Order catalog # 2007

CALL TODAY 1-800-456-7741
When research is moving fast, the best way to keep up with developments—and with competitors—is with Dialog® the world’s most comprehensive online database service.

Dialog takes you beyond the basic research facts of other services to deliver late-breaking news and information. It’s the one source you can count on for everything you need to know, now. And Dialog’s superior searching capabilities enable you to find more thorough and precise answers in less time, making it your best value in an online service.

You can even alert Dialog to notify you automatically of any new developments in your field.

Talk to your company information center about Dialog, or call for free information on Dialog services for the chemistry field.

1-800-3-DIALOG
Outside U.S., 415-858-3785. Fax 415-858-7069

THE ANSWER IS IN DIALOG.
Scientists reluctant to incorporate nonradioactive labeling and detection into their research techniques have historically accused nonradioactive products of lacking sufficient levels of sensitivity. However, recent technological advancements — chemiluminescent detection, to be exact — have allowed select products to meet or exceed the sensitivity levels achievable with $^{32}$P labeling and detection.

### Southern blotting: single-copy gene detection in 30 minutes

The accepted wait for accurate single-copy gene detection using $^{32}$P labeled probes has always been one to three days. Now identical results can be achieved in 30 minutes with the Genius System and its chemiluminescent substrate. In addition, the probes are stable, allowing researchers to reuse them multiple times without relabelling. Furthermore, Southern blots developed with the Genius System can be repeatedly stripped and reprobed using the same procedures as the older radioactive method.

![Human genomic Southern blot (RFLP) showing chemiluminescent detection of single-copy genes following a 2.5 minute X-ray film exposure](image)

Library screening: positive colonies visible in one hour

Using probes labeled with the Genius System, researchers are detecting positive colonies and plaques within one hour versus the overnight exposures required with radioactive techniques.

![Colorimetric detection of recombinant lambda gt 10 phage](image)

Because the Genius System can use DNA, RNA or oligonucleotide probes, many research needs can be met with a single system. Probe labeling utilizes the same techniques currently employed to prepare radioactive probes, and multiple filters can be processed simultaneously.

### Dot blots: guaranteed results in under one hour

With exposure times reduced from overnight to 30-60 minutes, critical answers are relayed quickly, helping research progress as soon as possible.

Comparison of slot blot hybridizations using Genius-labeled oligonucleotide probe (left panel, 60 minute film exposure) and $^{32}$P-labeled probe (right panel, overnight film exposure)

Performance is guaranteed as the Genius System products are function tested in dot blot (also referred to as slot blot) assays. The unique digoxigenin-labeled probes are stable for at least one year and can be reused multiple times, offering savings in terms of the time and money normally spent relabeling decayed radioactive probes. By using the same probe, experimental variables are reduced and reproducibility between experiments is provided.

0.1 pg DNA Guaranteed

Technique-specific information and bibliography available upon request

To receive additional information about the Genius System products, their applications and specifications, or to receive a bibliography of publication references, call Boehringer Mannheim at 800-428-5433.

If you would like to speak directly with a specialist about your individual research needs, call 800-262-4911.

For research use only. Lumi-Phos 530 is a trademark of Lumigen, Inc., Detroit, MI

Circle No. 11 on Readers' Service Card © 1992 Boehringer Mannheim Corporation
The New Standard of Excellence.

The most comprehensive, authoritative scientific dictionary now available, the Academic Press Dictionary of Science and Technology offers you, in one volume, the largest collection of scientific terms available in any single reference source. Containing complete, practical definitions for approximately 124,000 words (not counting abbreviations), the Dictionary covers key terminology in 124 fields of science and technology—including molecular biology, computer science, physics, engineering, chemistry, ecology, behavior, geophysics, veterinary science, mathematics, astronomy, biotechnology, and numerous other fields.

Key Features Include
- Approximately 124,000 fully-defined entries, not counting abbreviations—more than any other scientific dictionary
- Complete coverage of 124 fields of science ranging from acoustics to zoology
- Single volume, large 8 1/2 x 11 1/2, double-column format for easy access
- Cutting-edge definitions in such dynamic fields as artificial intelligence and biotechnology
- More medical terms than any other general scientific dictionary now available
- More coverage of subfields of medicine, including rapidly growing disciplines such as oncology, radiology, hematology, cardiology, and toxicology
- Nearly 2,000 detailed illustrations and technical photographs, including 24 pages of color plates
- Pronunciation guides for difficult or phonetically irregular terms
- Complete appendix of frequently consulted scientific data, including the periodic table, chronology of science, and standard weights and measures

Another distinctive feature of the Dictionary is its 124 Windows. These boxed essays are written by leading scientists in the field, such as Stephen Jay Gould, Michael DeBakey, Rosalyn Yalow, and Linus Pauling, each of whom offers a brief introduction to his or her area of expertise. Presenting practical, concise information on each discipline, the Windows help make the terminology easier to understand.

The Only Source You Need for Scientific Terminology

If your library, institution, or corporation serves practicing scientists and professionals in any scientific field—engineers, computer professionals, and other technical personnel; high school, college, and graduate students; writers, researchers, and educators working with a scientific vocabulary; or general readers interested in science—then the Academic Press Dictionary of Science and Technology is the only scientific dictionary you need. The definitions are clear and accessible to the non-specialist, yet provide all the technical information the specialist requires.

Set a new standard of excellence by adding the Academic Press Dictionary of Science and Technology to your reference collection.
It will become your reference of choice.
Enzymes or membranes. Ions or DNA. Perkin-Elmer's new Model LS-50B Luminescence Spectrometer lets you look at cells in many different ways. This unique, computer-controlled spectrometer measures fluorescence, bioluminescence, chemiluminescence, and phosphorescence, faster, more accurately and with less photo bleaching.

No other luminescence spectrometer gives you more options to meet all of your needs. You can measure multiple fluorescent probes—FURA-2, BCECF, INDO-1, SNARF®-1, SNAFL®-2—in milliseconds with the Fast Filter Accessory. Monitor temperature, stir the sample, and mark when a reagent is added with the biokinetic attachment. Read 96-well microplates or scan TLC plates or gels with the Microplate Reader. Analyze membrane fluidity by measuring changes in anisotropy. Measure the fluorescence of living cells right on the coverslip. And more.

With Perkin-Elmer's worldwide service, technical support and the LS-50B, you've got the perfect fit for any size bioresearch lab. To order or for more information on the Model LS-50B Luminescence Spectrometer, contact your local Perkin-Elmer office. For product literature in the U.S., call 1-800-762-4000.
The Model 491 Prep Cell separates hemoglobin \( A (\pi 7.1) \) from hemoglobin \( C (\pi 7.4) \). Both molecules have identical mass-64.5 kDa. Native-PAGE was performed using Tris-CAPS electrophoresis buffer (pH 9.4).

Now Run Native-PAGE on a Preparative Scale

Using the Model 491 Prep Cell you can purify proteins fast without denaturing. In as little as 5 hours—via native-PAGE or SDS-PAGE—the Prep Cell delivers purified protein in discrete liquid fractions, ready for use. The Prep Cell isolates single proteins from micrograms to 250 milligrams of sample. Proteins are easily obtained in sufficient quantity for sequencing or antibody production or any other downstream application.

If you'd like biologically active purified protein from crude extract in a single, simple step, use the Prep Cell. Call 1-800-4BIORAD now for more information.
High-fidelity sight systems.

True image reproduction.

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

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

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

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

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

For a demo or tech information, call toll-free: 1-800-446-5967.

Olympus Corporation,
Precision Instrument Division,
4 Nevada Drive,
Lake Success,
New York 11042-1179.

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

OLYMPUS
The Image of Quality

Circle No. 3 on Readers’ Service Card
WE'VE PUT A NEW SPIN ON

At TIAA-CREF, our goal has always been to make your retirement dollars go farther. Now, they can go as far as London, Frankfurt or Tokyo—or anywhere else in the world where financial opportunities seem promising—with our new CREF Global Equities Account.

THE CREF GLOBAL EQUITIES ACCOUNT EXPANDS THE HORIZON FOR RETIREMENT SAVINGS.

The CREF Global Equities Account is an actively-managed portfolio of both foreign and domestic stocks selected for diversity and growth potential. As part of a wide range of annuity and investment alternatives already offered by TIAA-CREF, it can increase your ability to create a more balanced, well-rounded retirement plan. While returns may vary over time, the CREF Global Equities Account is based on CREF's already-existing strength and the long-term approach to investing that has made TIAA-CREF America's preeminent pension organization.

WHEN IT COMES TO FOREIGN INVESTING, WE'RE ON FAMILIAR GROUND.

We've been speaking the language of foreign investing for nearly twenty years. That's when we pioneered investing pension funds on an international level. All those years of research, market analysis
and cultivation of regional contacts have given us special insight into the risks and rewards of today's global marketplace.

**DISCOVER MORE ABOUT OUR NEW GLOBAL EQUITIES ACCOUNT.**

The CREF Global Equities Account is offered through your TIAA-CREF retirement annuities, subject to the provisions of your employer's retirement plan. It is automatically available for TIAA-CREF Supplemental Retirement Annuities (SRAs).

To find out more about the CREF Global Equities Account or TIAA-CREF's other annuity and investment alternatives, send for our free brochure. Or call 1 800-842-2776.

You’ll find that at TIAA-CREF, our world revolves around helping you build a secure and rewarding future.

**SEND FOR OUR FREE BOOKLET**

The CREF Global Equities Account—A World of Opportunity and learn more about this exciting new CREF Account. Mail this coupon to: TIAA-CREF, Dept. QC, 730 Third Avenue, New York, NY 10017. Or call 1 800-842-2776.

**Name (Please print)**

**Address**

**City**

**State**

**Zip Code**

**Institution (Full name)**

**Title**

**Daytime Phone ( )**

**TIAA-CREF Participant**

☐ Yes ☐ No

**If yes, Social Security #**

---

Ensuring the future for those who shape it.™

Circle No. 44 on Readers' Service Card
NEW!

8-Channel Pipetman®

Now, pipette eight wells with dependable Pipetman accuracy and precision!

Users of 96-well microplates have long awaited a manual multichannel pipette they can trust as much as single-channel adjustable Pipetman. Now it’s here!

Model P-200-M8:
20 to 200µL x 8

- easy to use
- lightweight, comfortable
- cam-actuated tip ejector

Highly uniform pistons in Pipetman P-200-M8 are the keys to accuracy and precision. The eight-place liquid end rotates to any angle, for convenience. In addition, a sturdy, cam-actuated tip ejector makes removing eight tips without hand contact as easy as one.

Pipetman times eight: dependable accuracy for the microplate!

RAININ
INSTRUMENT CO., INC.

Mack Road • Box 4026, Woburn, MA 01888-4026
617-935-3050
5400 Hollis Street, Emeryville, CA 94608-2508
510-654-9142

To place an order, call 800-4-RAININ

Circle No. 5 on Readers' Service Card

*Pipetman* is a trademark of Gilson Medical Electronics. Exclusive license to Rainin Instrument Company. Prices and specifications subject to change without notice. ©May 1992 Rainin Instrument Co.
Manufacturing Headaches Aren’t The Only Thing DOE Reduces.

Consider this: a major aerospace company calculates that its manufacturing payback is $1.8 million.

A multinational electronics company discovered that it could accomplish in three days what it once took an outside vendor three weeks to do.

How have companies like these been able to improve quality and yield even as they shorten their time-to-market? How have they been able to go beyond simply monitoring their process or product to optimizing and controlling the output so it achieves their targets every time?

With a quality management methodology that has 70 years of proven results behind it.

DOE gives companies a comprehensive view of their complex manufacturing processes. Engineers are able to identify factors that drive the process, adjust the settings to lower the “noise” that may be causing problems, and control all the outputs for an improved final product.

We should know. We’re BBN Software Products, the leading DOE software company. We offer a full line of software solutions ranging from the simple-to-use (BBN/Catalyst) to the sophisticated (RS/Discover). We also offer DOE/Direct, an industry support program to provide the training information and tools you need to begin realizing the benefits of DOE. For our free DOE Demo Disk, call 1-800-395-6392.

BBN Software Products

Costs approximated based on list price of $5,300.00. RS/Discover is a registered trademark and BBN/Catalyst is a trademark of BBN Software Products.
How far will Science's editorial team go to get to the bottom of a news story? To the ends of the Earth . . . as Senior Writer Joseph Palca did when he accompanied a National Science Foundation team to the South Pole last November. Palca was after hot science, and the weather played its part when temperatures hit a balmy 40° below. This allowed the NSF team to brief Palca—and, by extension, Science's readers—on astronomers' latest plans for astrophysical observations, climatologists' most recent probings of the polar cap to get at the Earth's historical talent for blowing hot and cold, and ozone hole aficionados' newest numbers.

Just what you expect from Science; the journal that finds news that's hot even when it's 40° below.
Sydney and Beyond


Like many talented Australians, Joan Freeman decided to make her career in England, where she has done noteworthy work in nuclear physics, mainly at the Atomic Energy Research Establishment at Harwell. Her account of her career is most interesting in its details about persons and places, recounted with a reticent good humor, but it is somewhat disappointing in its lack of scientific details.

At the end of the book the author considers the question why so few girls take up physics. Her answer is that they are deterred by "inbred social traditions, and the results of these in the education system." She herself, however, was born with a "passion for physics" that overcame all such barriers. Nothing in her familial or social environment had any influence on her choice of vocation; she was a physicist from early childhood. Given a fancy doll, she immediately attacked it with pins to discover why the eyes blinked simultaneously.

Freeman was the only child of a rather unhappy marriage between an unsuccessful accountant and an inspired school teacher. The mother was "utterly devoted" to her daughter, scrimping and saving to send her to one of the best private girls schools in Sydney. Physics was not taught there, but in her senior year, after school hours, Freeman sneaked into the Sydney Technical College, a grimy institution in a rough neighborhood where, surrounded by aspiring apprentices, she learned enough basic physics to gain honors in the university entrance exams, while the authorities issued an edict that schoolgirls must never again be allowed into the Tech.

Once Freeman entered Sydney University it was simply a matter of hard study in physics and mathematics. Graduation was followed by six years of wartime radar research and then a scholarship to Cambridge, where she earned the Ph.D. for research on one of the linear accelerators. Nuclear physics at the Cavendish Laboratory was disorganized at that time, since Lawrence Bragg, the laboratory's director, was interested only in x-ray crystallography. In 1948 Otto Frisch came to the Cavendish, having been appointed to the Jacksonian chair in experimental physics. His dreamy, childlike nature was enduring but did nothing to alleviate the administrative chaos. In 1951 Freeman moved on to Harwell, where, with an interlude at M.I.T., she has spent the remainder of her career.

This book should appeal to anyone interested in the life of science in mid-20th century. If it were not so expensive, it would make an ideal gift for any high-school girl who displayed an incipient interest in the physical sciences.

Walter Moore
Indiana University
Bloomington, IN 47405

Vignettes: Performance Tests

My father . . . worked all his adult life as a chemical engineer for the city of Chicago. He was in charge of a laboratory that tested everything the city considered buying, from concrete and asphalt for paving streets to fire hydrants and fire engines. I remember he used to test parking meters by first putting samples of the various models up on the roof of the building for a year to weather them. Then he'd hand out hammers to a group of teenagers, and send them up to try to break into the meters. The last to break was the one that won his approval. When it was time to purchase police paddy wagons, he rounded up a bunch of really mean guys from inside the city jail and turned them loose on the collected models from all the manufacturers; the winning vehicle was the one that required the largest number of inmates to turn it over.

—Frank Drake, in Is Anyone Out There? The Scientific Search for Extraterrestrial Intelligence (Delacorte Press, forthcoming)

On April 12 [1990], half a page of the New York Times was devoted to explaining how "smart" cars and highways would, in some indefinite future, "help unsnarl gridlock." . . . The Times article made no mention of the $500 million already spent by the Department of Defense on a "smart truck" about a year earlier. That five-year program to develop an "autonomous truck" that could drive itself and find its way on and off highways had been phased out because of abysmally deficient performance. When the truck was being taught to guide itself on a highway, it could operate only at noon, with the sun directly overhead, because it was confused by shadows. Eventually, it was able to travel at 12 miles per hour on a straight, paved test track, and "to negotiate curves and to travel at any time of day and even at night using laser range finders." When it tried to make its way across open desert, "avoiding bushes and ditches along the way," its best performance was to guide itself about 600 yards at 2 miles per hour.

—Eugene S. Ferguson, in Engineering and the Mind's Eye (MIT Press)
Many times when you need to measure osmolality you may have only a limited amount of hard-to-come-by sample available. No problem if you’re using the Wescor Vapor Pressure Osmometer. It routinely processes samples of only 10 μL and measures them with 1% accuracy. And it can be calibrated for samples as small as 2 μL.

Extremely simple to use and highly reliable, the Wescor VPO has another key advantage over the older freezing point osmometers. It accepts any biological sample including highly viscous solutions and tissue specimens.

The Wescor VPO has proven to be the ideal instrument for measuring osmolality in all areas of biological research. It’s widely used in marine biology, tissue culture, soil and plant physiology, and laboratory animal studies. And you’ll find it used for Q.C. work in the food, pharmaceutical, beverage, and ophthalmology industries.

Contact us for more details or to arrange a demonstration. Wescor, Inc. 459 South Main Street, Logan, UT 84321 USA. FAX 801-752-4127. Phone 1-800-453-2725.
Innovations in Therapy of Human Viral Diseases
A Wellcome Symposium in Antiviral Therapy
Sheraton Imperial Hotel and Convention Center
Research Triangle Park, NC
December 6-9, 1992

For information on abstract submission and registration:
Wellcome Symposium
Burroughs Wellcome Co.
3030 Cornwallis Road
P.O. Box 12700
Main, Rm 2140A
Research Triangle Park, NC 27709-2700
Telephone: 919-248-4801
Fax: 919-248-8375

Deadline for abstract submission and registration is November 1, 1992.

Participants:
T. Braciale       B. Fields       W. Joklik       J. Pagano
R. Chanock       N. Fraser       S. Katz        W. Prusoff
I. Chen          D. Ganem        B. Larder       B. Roizman
B. Cullen        E. Gilboa       R. Liddington  E. Vitetta
E. De Clercq     D. Hanahan      M. Matteucci   R. Webster
G. Elion         M. Hilleman     S. Morse       C. Wilfert
C. Evans         P. Howley       B. Moss

ORDER ADDITIONAL COPIES
OF ARTICLES YOU HAVE SEEN
IN SCIENCE

For full details and prices, call the Science Reprint Service and ask for Corrine Harris at (202) 326-6527 or fax your request to (202) 682-0816. You may also write us at Science, 1333 H St., N.W. Washington, D.C. 20005.

Master Card and Visa accepted.
Signal Transduction

Protein Kinase C Inhibitors
203290 BisindoylMalEimide
208725 Calphostin C
569397 Staurosporine

Protein Kinase C Activators
405272 (-)-Indolactam V
494462 (-)-7-Octylindolactam V
524400 PMA 524390 PDBu 524392 PDD

Protein Kinase A Inhibitors
116814 cAMP, Rp isomer
371963 H-89
420315 KT5720

Protein Kinase A Activators
116815 cAMP, Sp isomer
28745 Dibutyryl cAMP
116530 Diocyanoyl cAMP

Calmodulin Kinase Inhibitors
420300 K-252a
422706 KN-62
420317 KT5926

High purity and recovery
equivalent to DNA isolated by CsCl gradients,
above 90% recovery from 50 ng to 2000 μg

Rapid and Easy to handle
1. Alkaline cell lysis
2. Adsorption of the lysate
3. Cartridge washing
4. Elution of pure plasmid DNA

Ready to use
kits contain everything you need for purification

Safe
only non toxic reagents are used

Economical
saves time and money

Versatile
purification of RNA or DNA from 40
bases to about 50 kilobases is possible

Please ask for further information

MACHEREY-NAGEL

Please contact your local CALBIOCHEM Point

Australia
Tel (02) 318 0322
Fax (02) 319 2440

Japan
Tel (03) 5443 0281
Fax (03) 5443 0271

United Kingdom
Tel (0602) 430840
Fax (0602) 430951

Germany
Tel (06196) 63955
Fax (06196) 62361

Switzerland
Tel (041) 51 16 51
Fax (041) 51 45 64

USA & Canada
Tel (800) 854-3417
Fax (800) 776-0999

Other Distributors Locally Worldwide

Available in USA from:
The NEST GROUP · 45, Valley Road · Southborough, MA 01772
Telephone (508) 481-6223 · Fax (508) 485-5796

Circle No. 17 on Readers' Service Card

Circle No. 34 on Readers' Service Card
EASILY PURIFY PROTEINS WITH PRP-X500 COLUMNS

PRP-X500 SUPERFICIALLY POROUS ANION EXCHANGE COLUMNS COMBINE THE BEST OF POROUS AND NON-POROUS PACKINGS

HIGH CAPACITY
0.2mg PER RUN FOR EACH SAMPLE COMPONENT

GOOD RECOVERY
PROTEIN RECOVERY IS THE SAME AS NON-POROUS SUPPORTS

FAST SEPARATIONS
ANALYZE FOUR PROTEINS BY ANION EXCHANGE IN 3 MINUTES

FOR MORE INFORMATION ABOUT PRP-X500 PROTEIN ANALYSIS COLUMNS CALL (800) 648-5950 OR CIRCLE THE READER SERVICE CARD.

Circle No. 26 on Readers' Service Card

IXth INTERNATIONAL CONFERENCE ON AIDS
in affiliation with the
IXth STD WORLD CONGRESS
BERLIN, June 7-11, 1993


Satellite symposia will be held by the World Health Organization, various scientific societies and committees. In addition there will be a non-profit exhibition organized by a nongovernmental organization, and a large-scale industrial exhibition.

Topics
Basic Science: Replication; regulatory proteins; cytokines; pathogenesis; therapy; resistance; animal models; vaccines; diagnosis; animal lentiviruses and other human retroviruses; bacteria and other STD agents.

Clinical Science and Care: Course of infection and disease; opportunistic and other infections (diagnosis, therapy and prophylaxis); oncology; organ systems; HIV specific therapies (combination therapy, resistance); care; issues of methodology and quality assurance.

Epidemiology and Prevention: Geographic distribution and patterns of spread of HIV and other retroviral infections; distribution, patterns of spread and prevention in populations at risk; prevention (methods and results); methodological issues; role of STDs as cofactors for HIV infection.

The Social Response: Behaviour and behaviour change; individual and institutional response; societal response; response of the social sciences; problems and activities of developing countries, NGOs and other groups.

Tel. +49-30-798 3687 or +49-30-834 2776
Fax +49-30-834 3061

Important Date
January 15, 1993: Deadline for submission of abstracts