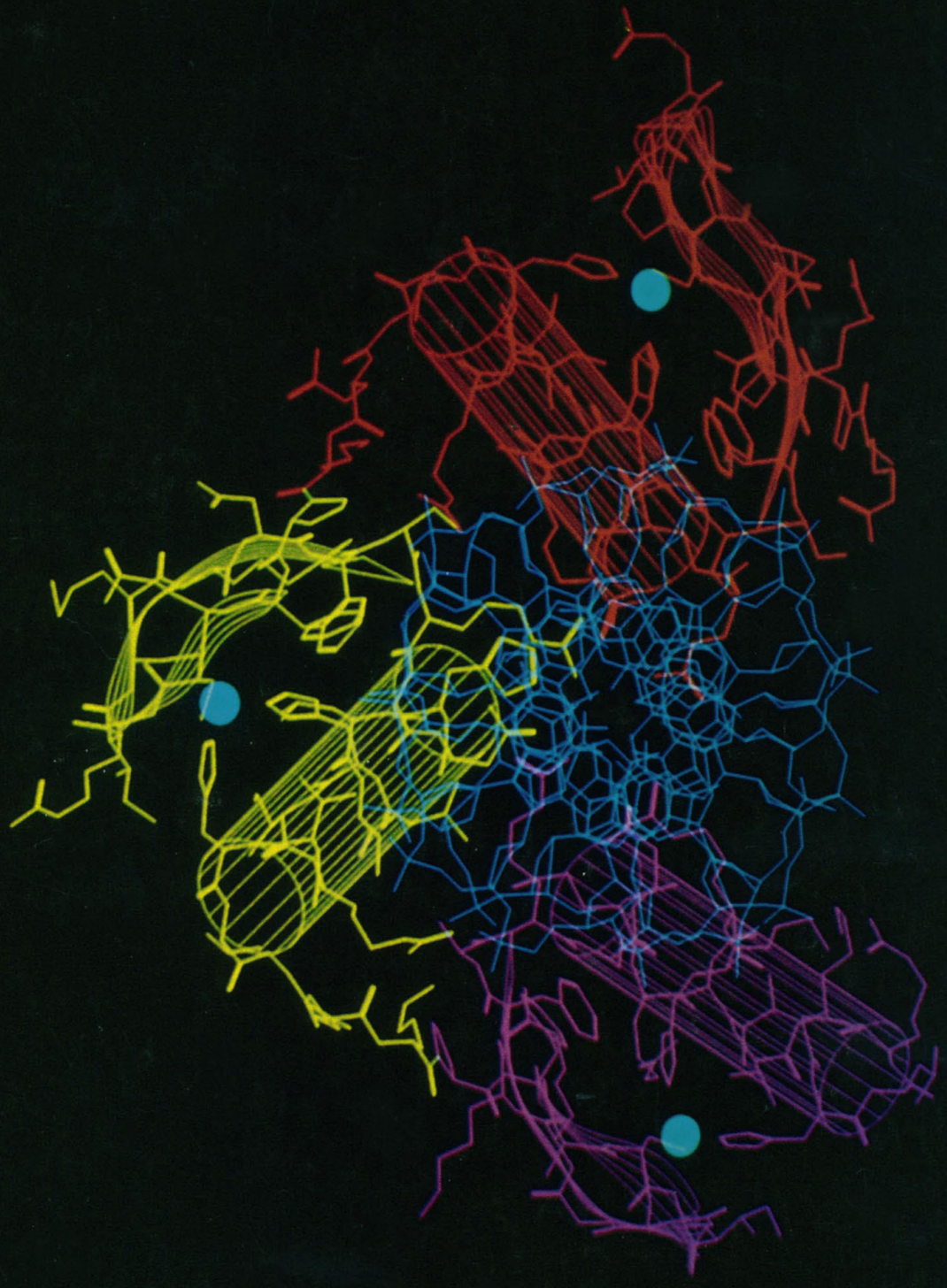
American Association for the Advancement of Science

SCIENCE

10 MAY 1991 $6.00
VOL. 252 ■ PAGES 749–888



Introducing the family overachiever

The Optima™ TLX ultracentrifuge shares many features with our L and XL floor models.

Like a rugged, imbalance-tolerant drive. A cooling system with no CFCs. And convenient step programming.

But this smallest Optima **redefines** overachievement by packing its 120,000 rpm/625,000 *g* in a tabletop size. It can be used virtually anywhere, including under a fume hood, and achieve separation* efficiencies only possible with micro-ultracentrifugation:

- Protein separations in 55 minutes.
- Subcellular fractions in 20 minutes.
- Viruses in 60 minutes.
- Membranes in 15 minutes.
- DNA in 2.5 hours.
- RNA in 1 hour.

The Optima TLX. Another **useful innovation** from Beckman. Contact Beckman Instruments, Inc., 1050 Page Mill Road, Palo Alto, CA 94304. (800) 742-2345. Offices worldwide.

**Ask for document DS-691F for a bibliography of over 600 application references.*

BECKMAN

Circle No. 87 on Readers' Service Card

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

ISSN 0036-8075
10 MAY 1991
VOLUME 252
NUMBER 5007

■ **SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005.** Second-class postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Domestic individual membership and subscription (51 issues): $82 ($50 allocated to subscription). Domestic institutional subscription (51 issues): $150. Foreign postage extra: Canada $46, other (surface mail) $46, air freight $90. First class, airmail, school-year, and student rates on request. **Change of address**: allow 6 weeks, giving old and new addresses and 11-digit account number. **Postmaster**: Send change of address to *Science*, P.O. Box 1723, Riverton, NJ 08077. **Single copy sales**: $6.00 per issue prepaid includes surface postage; Guide to Biotechnology Products and Instruments, $20. Bulk rates on request. **Authorization to photocopy** material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of $1 per copy plus $0.10 per page is paid directly to CCC, 27 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 $1 + .10. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

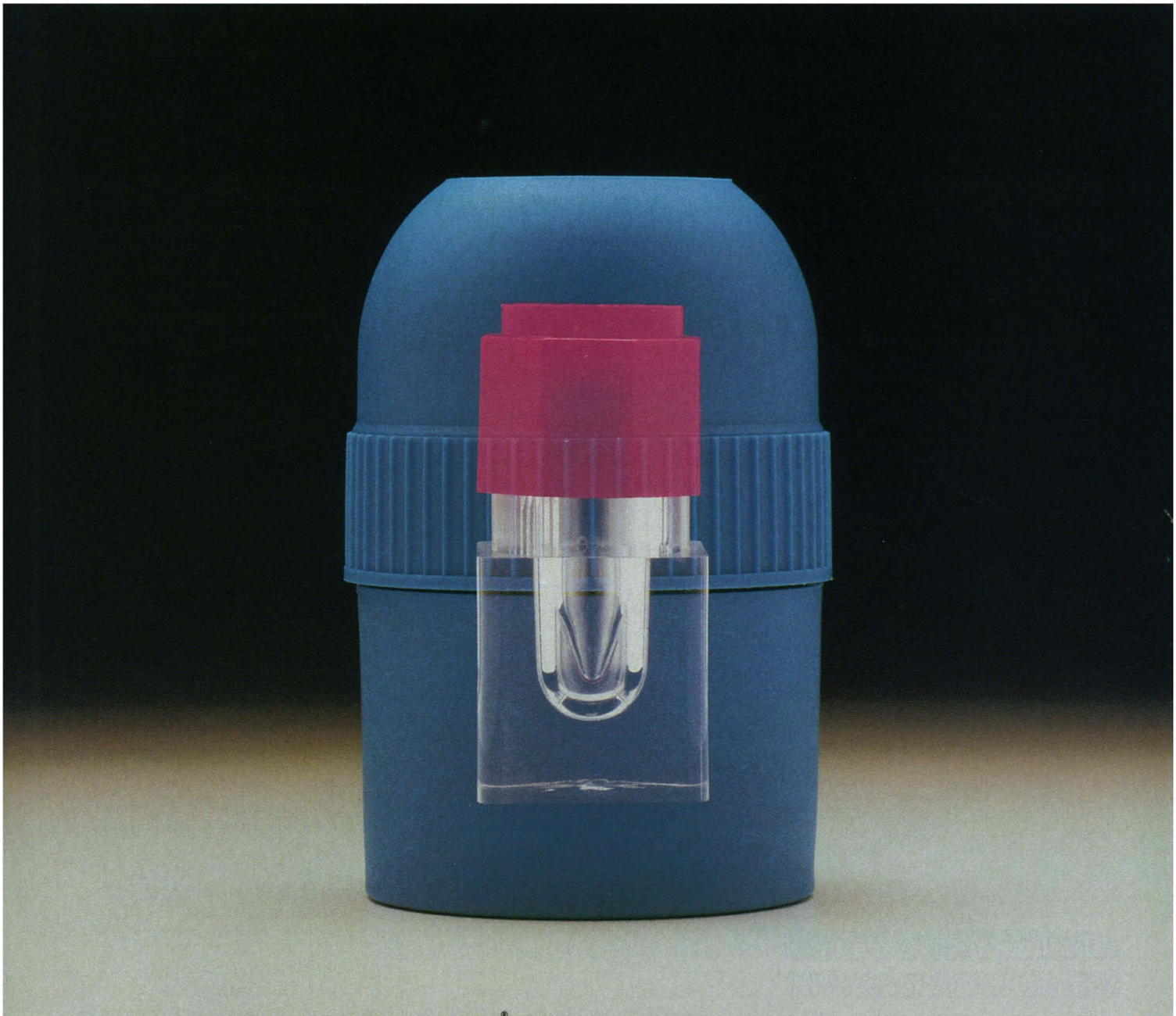
COVER Crystal structure of a zinc finger–DNA complex from the mouse protein Zif268. The view is down the axis of the double-helical DNA and emphasizes the symmetry of the complex. The DNA is blue; individual zinc finger domains are red, yellow, and purple; and zinc atoms are light blue. Similar DNA-binding domains occur in a large family of eukaryotic regulatory proteins. See page 809. [Photograph by N. P. Pavletich and C. O. Pabo]

Reports

Technical Comment

Book Reviews

Products & Materials



LOOK TO NEN® RESEARCH PRODUCTS. THE LEADER IN QUALITY, SAFETY AND CONVENIENCE.

The surest way to keep pace with complex life science research is to work with a partner who can help you meet the challenge. That partner is DuPont NEN Research Products.

When you needed safer, more convenient radiochemical packaging, we set a new standard with the NENSURE™ system.

We responded to environmental concerns by starting the first recycling program for plastic foam packaging and lead shielding for radioactive materials. Currently available in the U.S., this program will soon be extended to other countries.

To respond even faster to your inquiries, we can now deliver the most up-to-date product information by fax, 24 hours a day, 7 days a week. Simply call DuPont FaxBack™ at 1-800-666-6527 (or 302-892-0616) and request document #900.

For innovative solutions to your research needs, look to DuPont for quality products and services.

Call us today for more information on our extensive line of NEN Research Products for life science research.

United States 1-800-551-2121 • Canada 1-800-387-8391 • Australia (008) 257149 • Belgium (02) 724 2717 • Denmark (043) 633266 France (01) 4550-6141 • Germany (06172) 87-2600 • Italy (055) 247-8044 • Japan 03-3224-8763 • Latin America/Asia Pacific FAX (508) 663-6834 • Netherlands (073) 206550 • Sweden (08) 7503700 • Switzerland (01) 841-0330 • United Kingdom (0438) 734680.

DUPONT

Fingers touch DNA

ZINC fingers are structural motifs found in many DNA-binding proteins in the portion of the protein that makes direct contact with the DNA. Therefore, an understanding of the physical interactions of zinc fingers with DNA can provide important clues to how these DNA-binding proteins recognize DNA and how the bound proteins regulate gene expression (page 809). Pavletich and Pabo provide x-ray diffraction data on a complex of DNA with the DNA-binding domain of the mouse protein Zif268 (cover). This domain contains three zinc fingers linked to form a C that fits into the major groove of the DNA. Each finger makes its primary contact with a base pair triplet. As is true for other structural motifs of prokaryotic and eukaryotic DNA-binding proteins, the α helices of Zif268 are critical for site-specific recognition of DNA. In theory, it should be possible to identify and produce zinc fingers that recognize each of the 64 possible base pair triplets; then, the various fingers could be assembled into novel DNA-regulating proteins.

Transition zone rocks

THE upper and lower mantles of the earth are separated and distinguished by a seismic transition zone at a depth of 400 to 670 kilometers. Rocks that formed in this deep region of the earth and were transported to the crust by an eruptive kimberlite are now helping in the characterization of this otherwise inaccessible zone (page 827). Sautter *et al.* describe the rocks (xenoliths) that have been recovered at the Jagersfontein kimberlite at the southeastern edge of the Kaapvaal craton of South Africa. The chemical compositions and crystal organizations of the rocks and their inclusions indicate what types of mineralogic changes can occur in the transition zone and clarify relations of two of the mantle's main mineral constituents—pyroxene and garnet. The findings constrain hypotheses about the structure of the mantle, the physical conditions that pertain and the dynamic processes that occur at the transition zone, and the conditions of the crust at the time that the rocks later reequilibrated. Kerr describes the impact of these studies on continuing controversies regarding the structure and properties of the mantle (page 783).

Assessing biodegradation

IT has been difficult to assess the extent to which organics that are contaminating ground water are eliminated by microorganisms both because such sites are fairly inaccessible and because many abiotic processes, such as dilution and volatilization, can affect the level of a contaminant. Madsen *et al.* have tackled the problem of uncertain measurements by applying a set of tests of microbe abundance and activity to sediments in and near a contaminated aquifer (page 830). Their studies were carried out at a site where a truckload of coal tar was buried 30 years ago; coal tar components—naphthalene and phenanthrene—have spread through the sediments. Samples from boreholes near the burial site, at a distance from it but still within the contaminated area, and in a nearby pristine site were compared. Close to the burial site, bacteria were not only more prevalent than elsewhere but were adapted for rapid metabolism of the contaminants. Both bacteria that can mineralize the organics (break them down to inorganic compounds) and protozoa that prey on the quickly multiplying bacteria were found to flourish in association with contaminated sediments. These results strengthen the proposal that "bioremediation" may be brought about by the actions of microbes.

Sex determination in fruit flies

IN fruit flies, sex is not determined by X and Y chromosomes. It is determined by the ratio of X chromosomes to other non-sex-related (autosomal) chromosomes in the fly and bythe actions of a number of regulatory genes. Two such genes that produce protein products that are known to bias sex determination toward the production of females are called *transformer* (*tra*) and *tra-2*. Exactly how the expression of these genes influences sex differentiation is now known (page 833). In studies by Hoshijima *et al.*, the products of *tra* and *tra-2* were shown to induce the maximum production of female-style messenger RNA molecules by the *doublesex* (*dsx*) gene. The *dsx* messenger RNA molecules are assembled in the female manner when the female-specific exon is spliced to a common exon; the gene products made from *tra* and *tra-2* activated the female-specific acceptor site on *dsx*, favoring its usage in assembly of the messenger RNA molecules. The resulting gene product promotes femaleness by repressing male-specific differentiation.

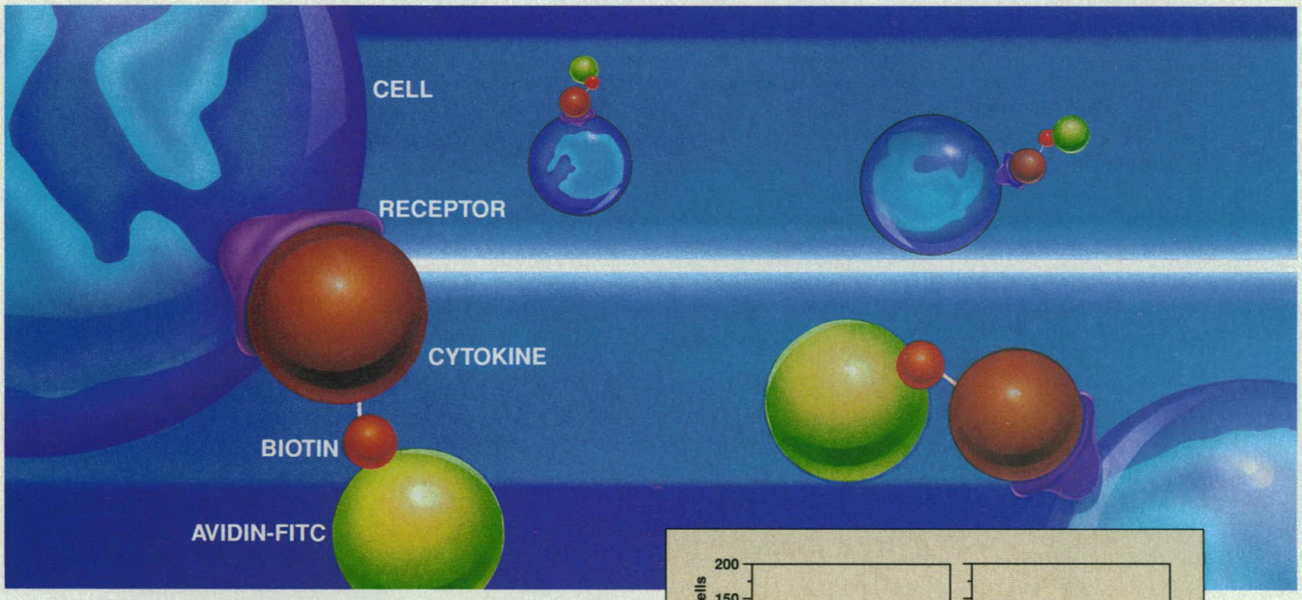
Hepatitis virus and transcription factors

THE hepatitis virus infects and takes over a host liver cell, disrupting the cell's normal functioning and using some of the host-cell machinery to bring about its own replication. Some of the targets of the viral takeover are host transcription factors, proteins that regulate gene expression. Maguire *et al.* have found that the X protein (pX) of the hepatitis virus, which is produced in infected liver cells, has an effect on at least two cellular transcription factors, CREB and ATF-2 (page 842): interaction with pX alters the DNA-binding specificities of CREB and ATF-2. In complexes with CREB or ATF-2, pX causes binding to enhancer elements that have nucleotide sequences that differ from those these proteins usually recognize; the enhancer is one of a small number of elements that controls the expression of the four genes of the virus. The commandeering of host transcription factors by the pX protein may lead to altered gene expression of both viral genes and genes of the host cell.

■ RUTH LEVY GUYER

Fluorokine™

to determine the up/down regulation of cytokine receptors.



LABELED CYTOKINES

A New Research Tool

Many diverse stimuli can change the density of cytokine receptors expressed on a cell's surface and thus dramatically alter its responsiveness.

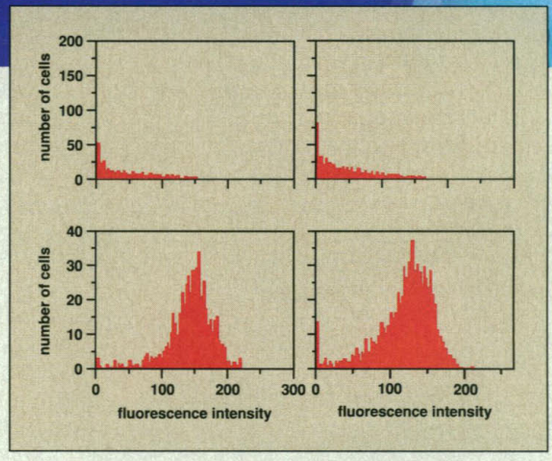
However, direct receptor analysis has proven difficult, and in mixed cell populations, impossible.

Now with R&D Systems' Fluorokine series of receptor analysis kits, a direct fluorescence measurement can easily be made. Moreover, when used in combination with an appropriate anti-CD or other cell surface marker, a differential analysis of cytokine receptors on subpopulations of cells can be achieved.

Each kit features a specific cytokine preconjugated to biotin or phycoerythrin, companion reagents including a necessary cell wash buffer and detailed instructions for use with a flow cytometer.

The reagents provided have been precisely formulated and quality controlled to ensure:

- optimal labeling of each cytokine to provide maximum fluorescence
- retention of the cytokine's biological activity
- specific binding to the desired receptor as demonstrated by complete inhibition of binding in the presence of:
  – excess unlabeled cytokine
  – neutralizing antibodies to the cytokine



APPEARANCE OF IL-4 RECEPTORS

Peripheral Blood Lymphocytes (PBLs) were activated with phytohemagglutinin and IL-2. The up-regulation of IL-4 receptors was monitored by flow cytometry as the increase in fluorescent intensity as a function of time.

FLUOROKINE kits available for:
IL-1α, IL-2, IL-3, IL-4, IL-6, IL-7, IL-8, TNF-α, G-CSF, GM-CSF, and TGF-β

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

Research use only. Not for diagnostic or therapeutic procedures.

In Europe contact:

British Bio-technology Ltd.
Brook House, Watlington Road
Cowley, Oxford OX4 5LY
Telephone 44(0865) 781045
Fax (0865) 717598
Telex 838083 BIOTEC G

In Japan contact:

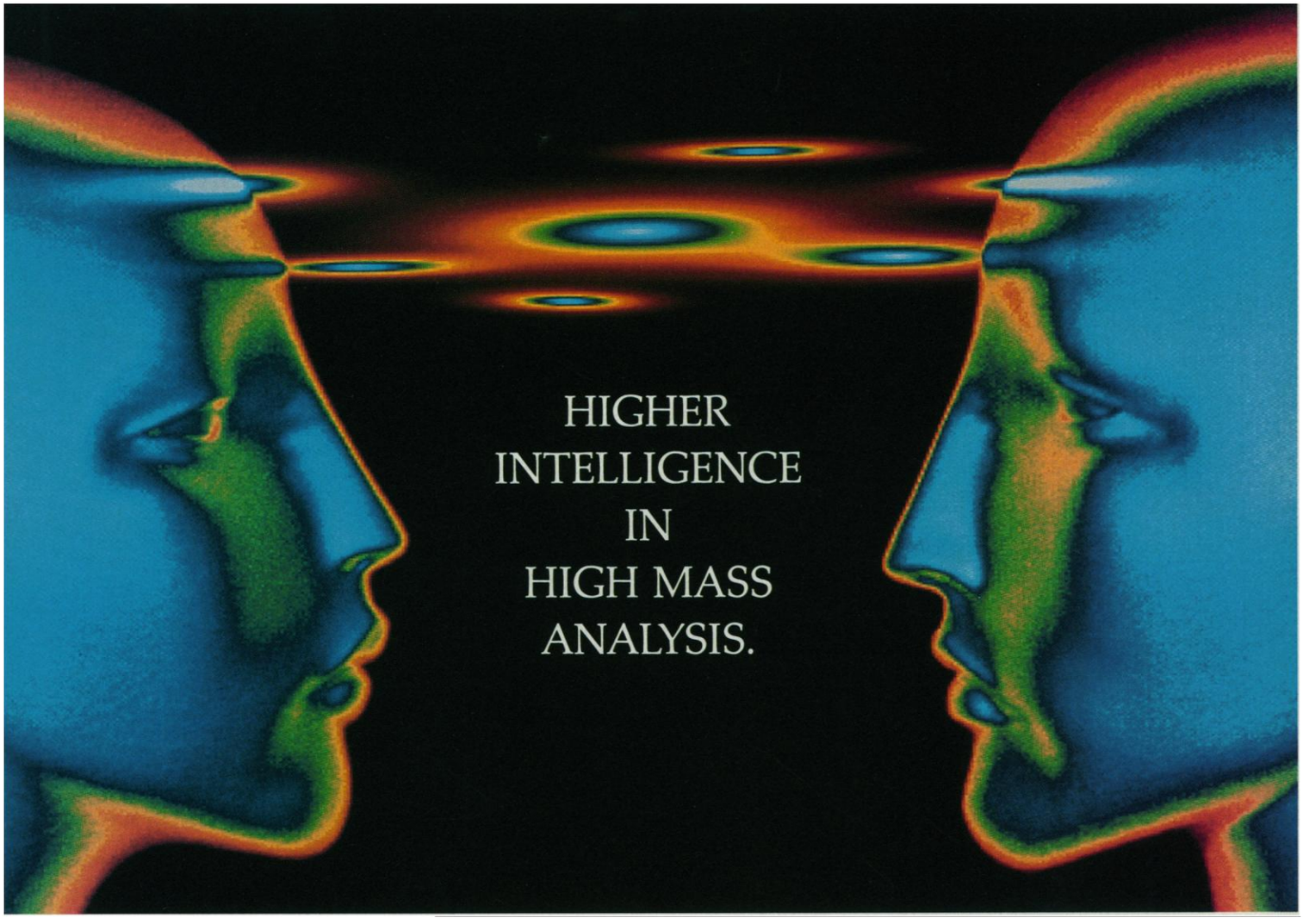
Funakoshi Pharmaceutical Co., Ltd.
Tokyo
Telephone (03) 293-2352
Fax 81-3-293-2388
Telex J28489 FUNA

Your Source for Cytokine Reagents

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

R&D SYSTEMS

Circle No. 147 on Readers' Service Card



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.

Finnigan MAT

A subsidiary of Thermo Instrument Systems, Inc.

California (408) 433-4800 • Georgia (404) 424-7880 • Ohio (513) 891-1255 • Illinois (708) 310-0140 • New Jersey (201) 740-9177 • Maryland (301) 698-9760
Germany 421-54931 • UK 442-233555 • France 1-6941-9800 • Italy 6-601-1742 • Netherlands 838-527266 • Sweden 08-680-0101

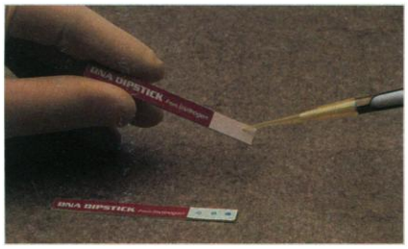
Circle No. 88 on Readers' Service Card

The DNA DIPSTICK™*

Makes Quantification Fast & Simple!

Invitrogen Introduces a Fast, Simple, Non Radioactive Method For Quantification of Nucleic Acids with The DNA DIPSTICK.

- Quantitates Nucleic Acids at Concentrations as Low as one Nanogram per Microliter



Quantification Doesn't Get any Easier

- Provides a Permanent Record of Results
- Is More Consistent Than Conventional Techniques
- Requires no Special Equipment for Fast Inexpensive Results
- Ideal for Quantification of single or double stranded DNA, RNA or oligonucleotides

Now you can have fast, accurate nucleic acid measurements which are critical for PCR Amplification, Subcloning, DNA sequencing, and cDNA or Genomic DNA Library Construction.

Because time and accuracy are very important in today's rapidly changing world, Invitrogen is committed to providing DNA Technology that is as advanced as it is simple.

To order, ask for catalog #K5632-01.

1-619-597-6200
1-800-955-6288

Invitrogen

3985 • B Sorrento Valley Blvd., San Diego, CA 92121 (Fax) 597-6201

BRITISH BIOTECHNOLOGY LTD, UK – TEL: 44-235529449 • AMS BIOTECHNOLOGY UK LTD, UK – TEL: 44-993822786 • BDH INC., CANADA – TEL: 800-268-0310 • BIO-TRADE, AUSTRIA – TEL: 43-2228284694 • CELBIO, ITALY – TEL: 39-24048646 • FUNAKOSHI PHARMACEUTICALS, JAPAN – TEL: 81-356841622 • ITC BIOTECHNOLOGY GMBH, GERMANY – TEL: 06221-303907 • KEBO LABS AB, SWEDEN – TEL: 46-86213400 • MEDOS COMPANY PTY LTD, AUSTRALIA – TEL: 61-38089077

* patent pending

Circle No. 127 on Readers' Service Card

Ultramicro Leader.

Gilson Pipetman® P-10, the NEW world standard for 0.5 to 10μL liquid measurements.

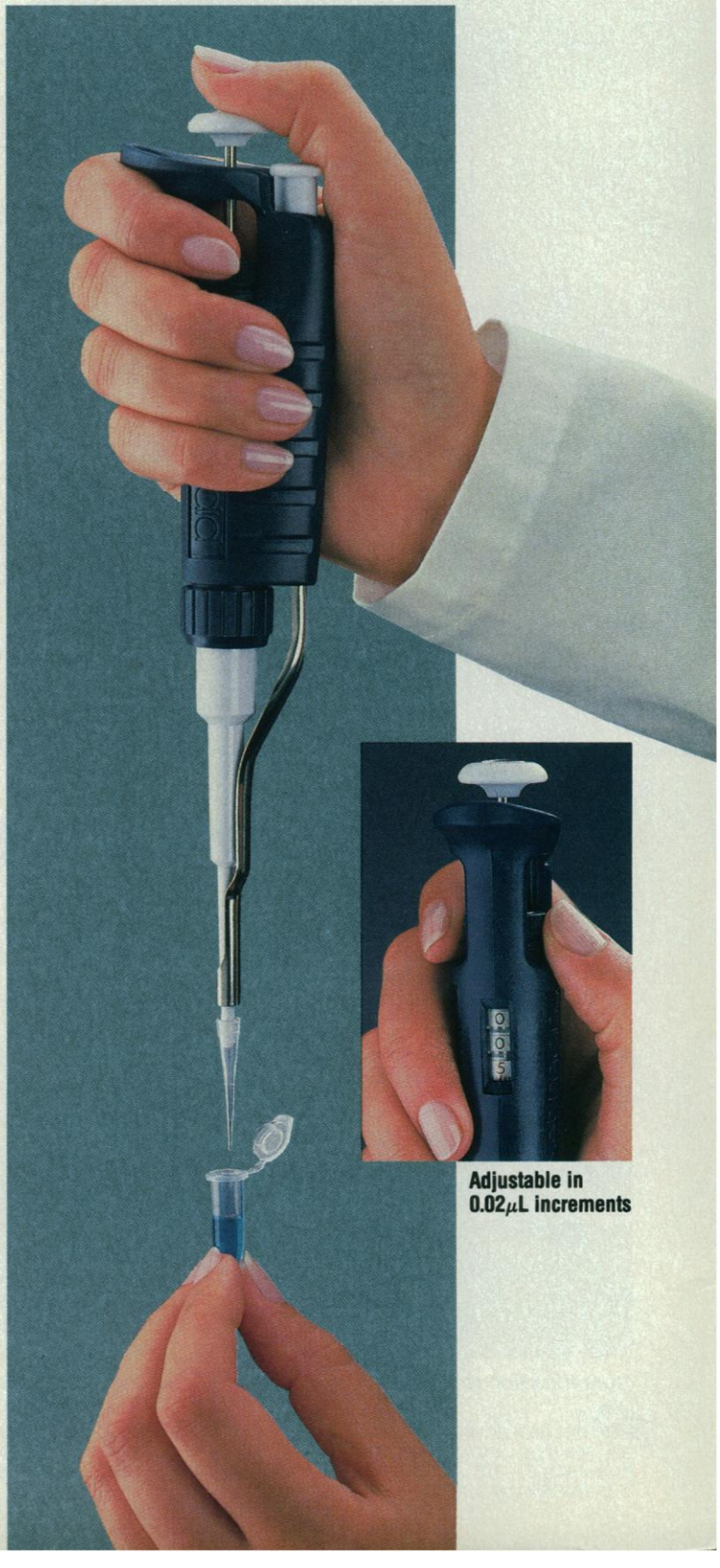
With the new Micro-10™ tip, P-10 has the smallest total air volume of any manual air-displacement pipette—your guarantee of superior accuracy and precision at 0.5μL:

- mean error less than 5%
- standard deviation 2.8%

The piston extends to the end of the shaft—not beyond it—reducing risks of damage and cross-contamination.

The capillary end on the Micro-10 tip eliminates errors due to "residual cling," allowing a sample droplet as small as 0.5μL to be released easily.

Just $245 gives you true ultramicro performance, a one-year warranty and toll-free telephone access to Rainin's Pipetman technical support group. To place your order, call 800-472-4646; in Massachusetts 617-935-3050.



Adjustable in 0.02μL increments

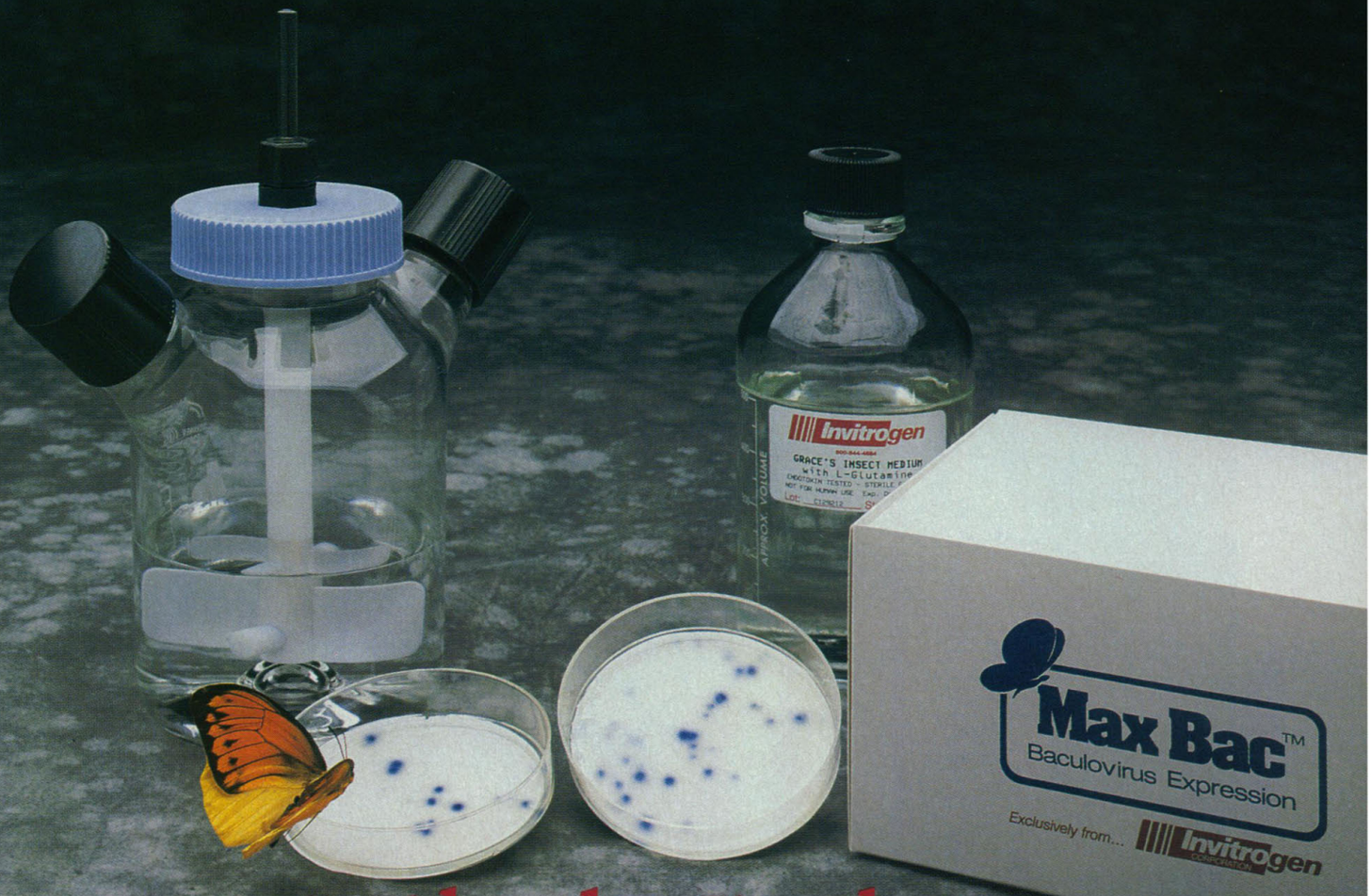
RAININ
INSTRUMENT CO., INC.

Mack Road, Woburn, MA 01801 • 617-935-3050
1715 64th Street, Emeryville, CA 94608 • 415-654-9142

"Micro-10" is a trademark of Rainin Instrument Company, Inc.
"Pipetman" is a trademark of Gilson Medical Electronics.

Circle No. 71 on Readers' Service Card

The Most Sophisticated System for Maximum Protein Expression...



Is Also the Simplest!

The MaxBac™ baculovirus expression kit is the most efficient means for generating large amounts of recombinant proteins (up to 500mg/L) from cloned genes. The recombinant proteins produced are antigenically and functionally similar to their natural counterparts.

The MaxBac™ expression system offers:

- High level recombinant protein expression.
- Simple visual or immunological identification of recombinants.
- Production of functionally active proteins from cloned genes.
- Unique glycosylation for comparison of proteins from other eukaryotic systems.
- Production of proteins which are better suited to crystallography studies.
- Proper transport and modification of recombinant proteins.

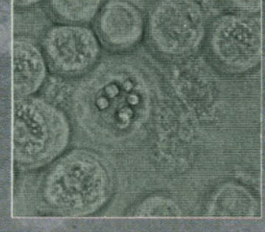


Figure 1. Infected Sf9 insect cells showing viral occlusions.

- A sophisticated alternative to prokaryotic and mammalian expression systems.

The MaxBac kit contains all of the materials needed to reliably generate recombinant proteins, including the recently developed BlueBac transfer vector. The BlueBac vector imparts a blue color to recombinants grown on indicator media, allowing fast, accurate differentiation and plaque purification. Find out why MaxBac, the most sophisticated system for protein expression, is also the simplest. To get more information on the MaxBac kit, custom baculovirus expression or individual MaxBac components call toll free:

1-800-955-6288

Invitrogen CORPORATION

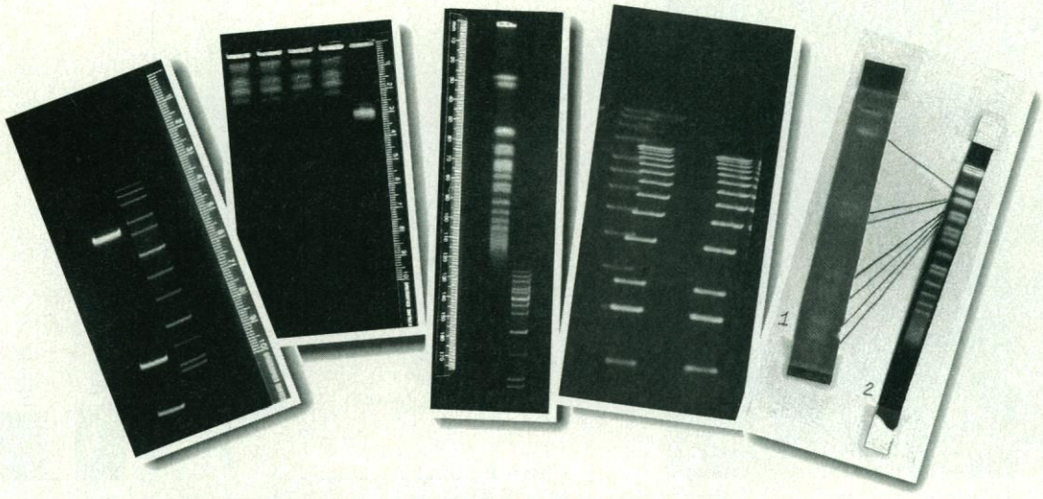
3985-B Sorrento Valley Blvd.,
San Diego, CA 92121

(619) 597-6200 Phone • (619) 597-6201 Fax

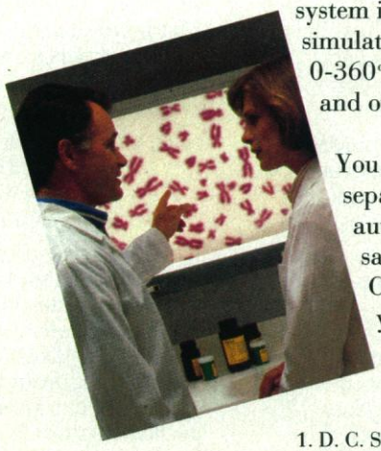
BRITISH BIOTECHNOLOGY LTD, UK – TEL: 44-235529449 • AMS BIOTECHNOLOGY UK LTD, UK – TEL: 44-993822786 • BDH INC., CANADA – TEL: 800-268-0310 • BIO-TRADE, AUSTRIA – TEL: 43-2228284694 • CELBIO, ITALY – TEL: 39-24048646 • FUNAKOSHI PHARMACEUTICALS, JAPAN – TEL: 81-356841622 • ITC BIOTECHNOLOGY GMBH, GERMANY – TEL: 06221-303907 • KEBO LABS AB, SWEDEN – TEL: 46-86213400 • MEDOS COMPANY PTY LTD, AUSTRALIA – TEL: 61-38089077

Circle No. 128 on Readers' Service Card

Introducing the Most Important Invention in PFGE Since the Invention of PFGE



Left to right: Asymmetric voltage FIGE, 5-50 kb; *S. pombe* 24 hrs, 106° angle; 8kb - 2.2 mb;2-D separation of linear and supercoiled DNA; 8 state high resolution separation of *S. cerevisiae*.



Pulsed field electrophoresis (PFGE[1]) is the most powerful method ever developed for genome and small DNA mapping. And the CHEF Mapper™ system is the ultimate PFGE tool. Its incredible PACE[2] architecture lets you simulate any PFGE technique. Or create any technique you want using 0-360° angles, multi-state vectors, asymmetric voltages, rapid switching, and other unique capabilities.

You don't need to be a PFGE expert to get fast, high resolution separations. A built-in algorithm based on 5 man-years of PFGE expertise automatically selects optimum conditions for the fragments in your sample and gives you results at the push of a button. The interactive CHEF Mapper system also lets you program 11 key variables to suit your specific separations.

The possibilities are unlimited.

1. D. C. Schwartz and C. R. Cantor. *Cell*, **67** (1984).
2. Programmed Autonomously Controlled Electrodes. See S. M. Clark, E. Lai, B. W. Birren and L. Hood. *Science*, **241**, 1203 (1988).

1-800-4BIORAD
CALL TODAY OR FAX 1-800-950-4BIO FOR CHEF MAPPER BROCHURE.

BIO-RAD

Chemical Division

U.S. (800) 4BIORAD • California • Ph. (415) 232-7000 • Fx. (415) 232-4257; New York • Ph. (516) 756-2575 • Fx. (516) 756-2594; Canada • Ph. (416) 624-0713 • Fx. (416) 624-3019; Australia • Ph. 61-2-805-5000 • Fx. 61-2-805-1920; Austria • Ph. 43/222/82 89 010 • Fx. 43/222/82 85 629; Belgium • Ph. 32/2/91 85 55 11• Fx. 32/2/91 82 65 54; France • Ph. 33/1/49 60 68 34 • Fx. 33/1/46 71 24 67; Germany • Ph. 49/89/31 88 40 • Fx. 49/89/31 88 41 00; Kowloon • Ph. 852/789/3300 • Fx. 852/789/1257; Italy • Ph. 39/2/213 87 51 • Fx. 39/2/213 90 32; Spain • Ph. 34/1/661 7085 • Fx. 34/1/661 9698; Japan • Ph. 81-3-534-7240 • Fx. 81-3-534-8037; The Netherlands • Ph. 31/8385-40666 • Fx. 31/8385-42216; Switzerland • Ph. 41/1/810 16 77 • Fx. 41/1/810 19 33; England • Ph. 44/442/23 25 52 • Fx. 44/442/59118; New Zealand • Ph. 64/9/443/3099 • Fx. 64/9/443/3097

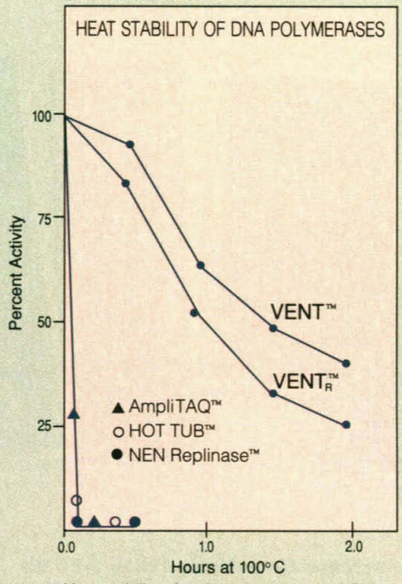
Circle No. 76 on Readers' Service Card

There's always been a choice. But now the choice is obvious.

Vent™ DNA Polymerase from New England Biolabs

Vent™ DNA Polymerase allows experimental approaches you never thought possible... now cloned at New England Biolabs and available at 1/3 the previous cost.

STABILITY



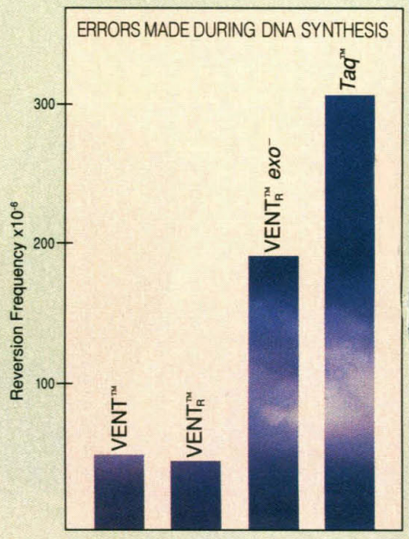
Heat stability of various thermal stable DNA polymerases including recombinant and native forms of Vent$_R$™ DNA Polymerase. All were incubated at 100° C under standard assay conditions. AmpliTAQ™- product of Perkin-Elmer Cetus - Lot #4084. HOT TUB™ - product of Amersham Corp - Lot #00623. NEN Replinase™ - product of DuPont - Lot #WFP1810

■ For unsurpassed thermal stability, choose new recombinant Vent$_R$™ DNA Polymerase from New England Biolabs.

Vent$_R$™ DNA Polymerase provides exceptional performance over a wide temperature range and enables primer extension of up to 13 kb in length.

Originally purified from the extreme thermophile *Thermococcus litoralis* which grows at temperatures up to 98°C in thermal vents on the ocean floor, Vent$_R$™ DNA Polymerase remains active for over two hours at 100°C.

FIDELITY



Reversion frequency reflects error rate for a single round of gap-filling DNA synthesis. Base substitution fidelity was measured by the opal codon reversion assay of Kunkel et al. (1987) Proc. Natl. Acad. Sci. USA 84, 4865–4869.

■ Choose new recombinant Vent$_R$™ DNA Polymerase because it is the only commercially available thermal stable DNA polymerase with a 3′→5′ proofreading exonuclease function.

You get fewer errors when synthesizing DNA. This is of critical importance if the synthesized DNA is to be cloned.

In base substitution studies, Vent$_R$™ outperforms Taq, resulting in a 6-fold greater fidelity of base incorporation. New England Biolabs Vent$_R$™ DNA Polymerase exhibits far superior fidelity due to its 3′→5′ exonuclease function as shown by the loss of proofreading activity in an engineered exonuclease minus Vent$_R$™ (Vent$_R$™ exo–).

☐ New England Biolabs Inc. 32 Tozer Road, Beverly, MA 01915 USA 800-NEB LABS (US and MA) Tel. (508) 927-5054 Fax (508) 921-1350
☐ New England Biolabs Ltd., Canada Tel. (800) 387-1095 (416) 672-3370 Fax (416) 672-3414
☐ New England Biolabs GmbH, Germany Tel. 49 (06196) 3031 Fax (06196) 83639

DISTRIBUTORS: AUSTRALIA GENESEARCH Tel. (075) 37 5499 / **FINLAND, SWEDEN, DENMARK, USSR** FINNZYMES (Finland) Tel. (0) 437-5312 / **FRANCE** OZYME Tel. (1) 30 57 0025 / **INDIA** BIOTECH INDIA Tel. (542) 311473 / **ITALY** C.A.M.Bio S.R.L. Tel. (02) 487 06070 / **ISRAEL** GAMIDOR LTD. Tel. (03) 535-1205 / **JAPAN** DAIICHI PURE CHEMICALS CO. LTD. Tel. (03) 3272-0671 / **KOREA** KORAM BIOTECH CORP. Tel. (02) 556-0311 / **THE NETHERLANDS** WESTBURG B.V. Tel. (033) 95 00 94 / **NEW ZEALAND** BIOLAB SCIENTIFIC Tel. (09) 418-3039 / **NORWAY** ING. F. HEIDENREICH Tel. (02) 22 04 11 / **PEOPLE'S REPUBLIC OF CHINA** CHINA UNITED BIOTECH. CORP. Tel. (1) 256 1627 / **PORTUGAL** ISODER LDA. Tel. (01) 363-8788 / **SPAIN** LANDERDIAGNOSTICO S.A. Tel. (01) 594 08 06, (03) 256 9706 / **SWITZERLAND** FLOW LABORATORIES AG Tel. (061) 634713 / **TAIWAN** LONG CHAIN INTERNATIONAL CORP. Tel. (02) 565-2605 / **UK** CP LABORATORIES Tel. (0279) 758200

NEW ENGLAND BioLabs®

Circle No. 126 on Readers' Service Card

Who says techies don't

digital™

have power lunches?

No power suits or power ties.

You're just hungry for all the real power you can get.

Now you can get more than ever before.

Introducing Digital's DECstation™ 5000 workstation – the most powerful UNIX®-based RISC workstation we've ever offered.

COME AND GET IT. IT'S HOT.

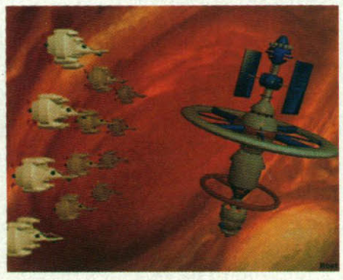
Everything about the DECstation 5000 Model 200 workstation says speed, power and leadership performance.

For starters, it's driven by the MIPS R3000 CPU chip which supports 8-120 MB of

memory – that's more than you get on any other desktop workstation.

Looking for spectacularly hot graphics? Take a good look at the DECstation 5000 Model 200 workstation.

You can choose from a wide array of upgradeable graphics



options. From simple frame buffers to high-speed accelerators for visualization – just what you need for 2-D, 3-D, imaging and high-compute tasks. And if you want to run with even more power, we offer still more options. Like the incredibly fast FDDI fiber optic link. Or the industry's fastest open bus, the 100 MB/sec TURBOchannel,™ introduced first on DECstation 5000 Model 200 workstation.

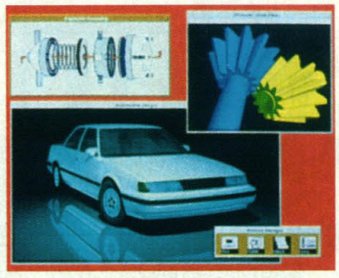
One more powerful incentive: it's very competitively priced.

If you get the idea the DECstation 5000 Model 200 workstation gives you the power you've only dreamed of right at your desk, you're getting the picture.

OPEN FOR BUSINESS.

Besides providing the power you want, the DECstation 5000 Model 200 workstation provides you with a host of other things you need. The most important of which is a truly open environment to operate in.

It comes with a choice of open, industry-standard buses: SCSI and VME. It supports key workstation standards for operating systems, graphics interfaces and network communications. And, of course, it's compatible with all other systems from Digital regardless of size or operating system. Just the things you'd expect from Digital, the leader in promoting standards for truly open computing.



Adherence to standards, plus speed and performance that's anything but standard. Digital's UNIX-based RISC DECstation 5000 Model 200 workstation.

For more information, call 1-800-343-4040 ext. 295.

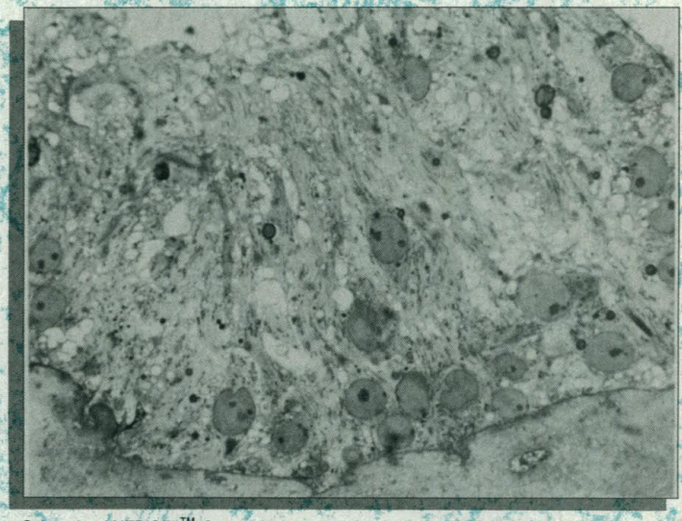
We suggest you do it at lunch.

Digital has it now.

BioCoat™ Cultureware

Adds a New Dimension to your cell cultures...

With BioCoat, *In Vitro* cell cultures look like this...



Cultured on MATRIGEL™, Sertoli cells are similar in appearance to Sertoli cells *In Vivo*, forming polarized monolayers about 40-60μm in height with oval basal nuclei.

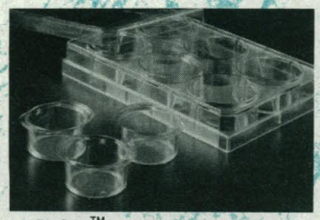
...instead of like this

Sertoli cells cultured on top of **uncoated plastic** are very low and squamous, about 2μm in height with flattened nuclei.

BioCoat, the unique, ECM-coated cultureware from Collaborative, can significantly broaden the scope of your In Vitro cell studies. With BioCoat:

- Cells attach and grow more efficiently
- Cells polarize readily into apical and basolateral regions
- Cells differentiate and exhibit true physiologic function

A variety of extracellular matrix proteins (Matrigel™, Laminin, Fibronectin and Collagens), pre-coated on tissue culture plates, membrane inserts and coverslips, offer the researcher a convenient, reliable, ready-to-use means of accurately simulating *In Vivo* cell environments. Correlation and reproducibility of results are enhanced by the consistency and uniformity of the coatings, which are applied by a specially-developed, proprietary process.



BioCoat™ Matrix-Coated Cultureware exclusively from Collaborative Research

Collaborative's BioCoat can add new dimensions to your work in:

■ Cell Differentiation ■ Cell-Matrix Interaction ■ *In Vitro* Toxicology ■ *In Vitro* Carcinogenesis ■ Primary Cell Culture ■ Neural Cell Culture ■ Tumor Invasion ■ Polarization Studies ■ Gene Expression

Exclusively from Collaborative Research Incorporated.
Your Source of Innovative Cell Culture Products.

Write or call today for complete information on Collaborative Research BioCoat Cultureware.

Biomedical Products Division

Collaborative Research Incorporated

Circle No. 52 on Readers' Service Card

2 Oak Park, Bedford, MA 01730 • (617) 275-0004 • (800) 343-2035