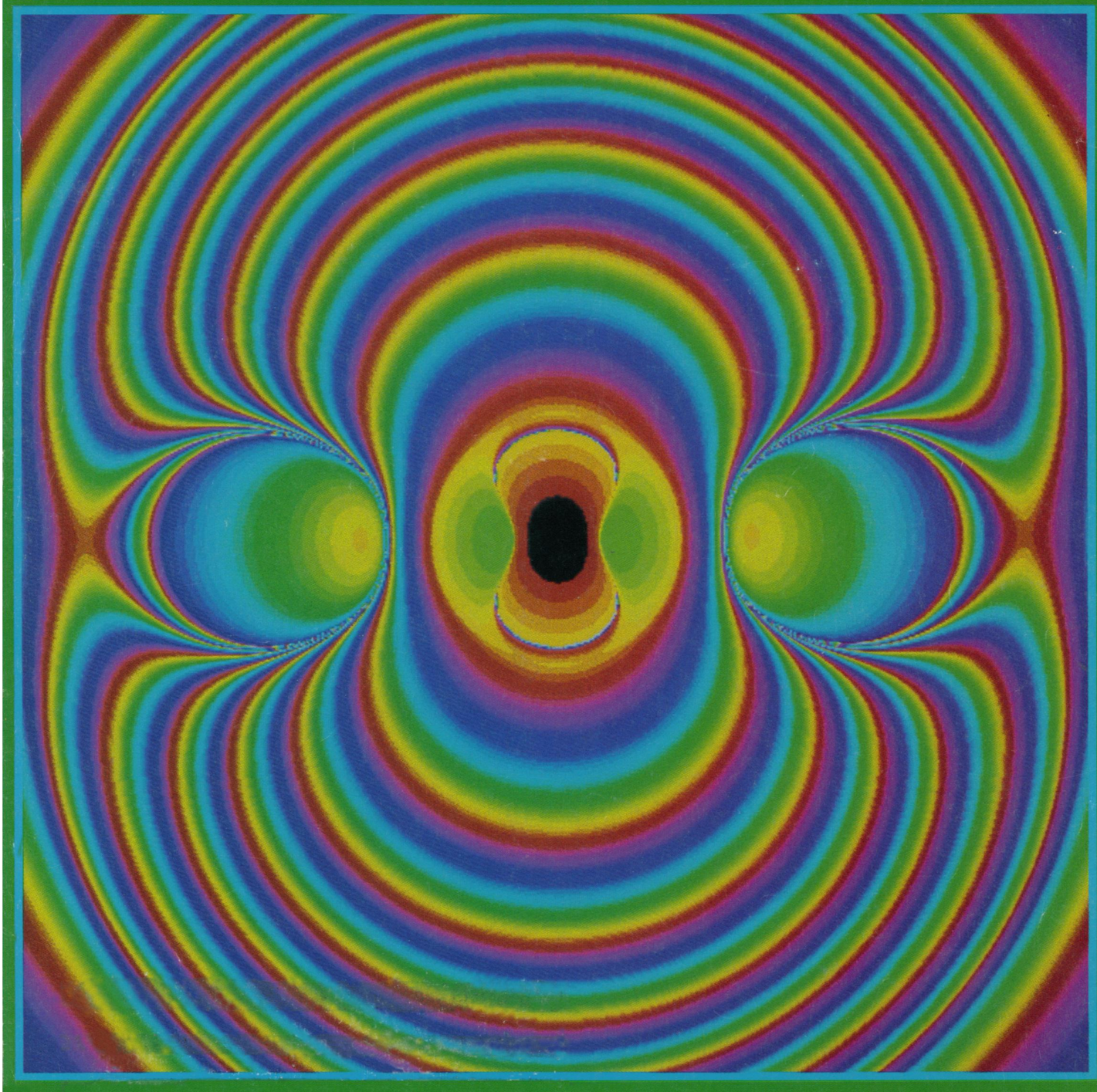
American Association for the Advancement of Science

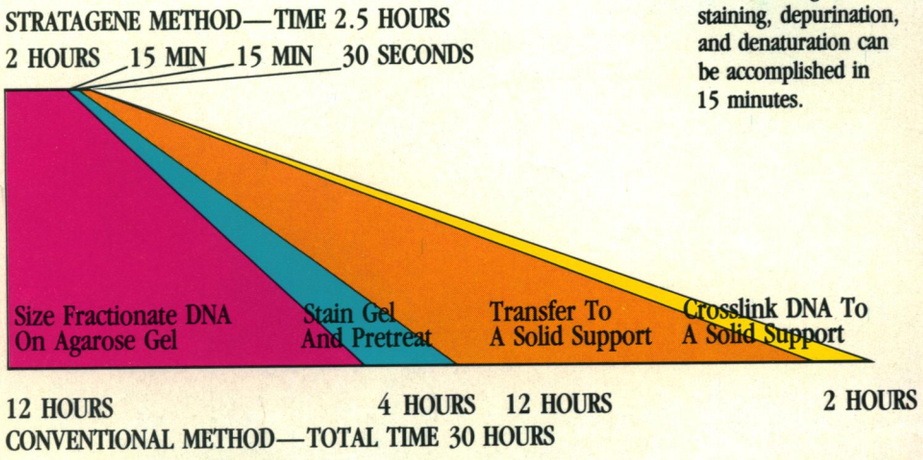
SCIENCE

16 February 1990 $3.50
Vol. 247 ■ Pages 769–892



Southerns/Northerns: Electrophoresis, Blotting, and Crosslinking in 2.5 Hours Instead of 30.

Stratagene has streamlined agarose gel electrophoresis and blotting. The system decreases the time required, from sample loading to prehybridization ten fold.



VAGE™ System

The VAGE™ vertical agarose/acrylamide gel electrophoresis system allows the casting of agarose or acrylamide gels in the unit. Nucleic acids can be electrophoresed through a 3 mm, 0.8% vertical agarose gel in less than two hours with excellent resolution (Figure 1). Because the gels are thin, staining, depurination, and denaturation can be accomplished in 15 minutes.

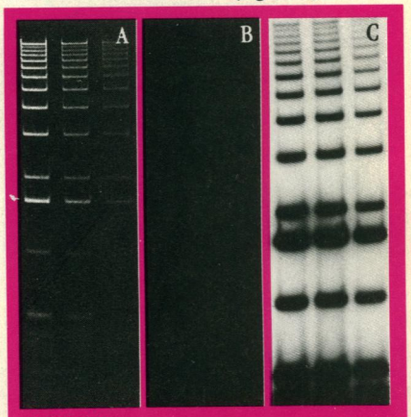
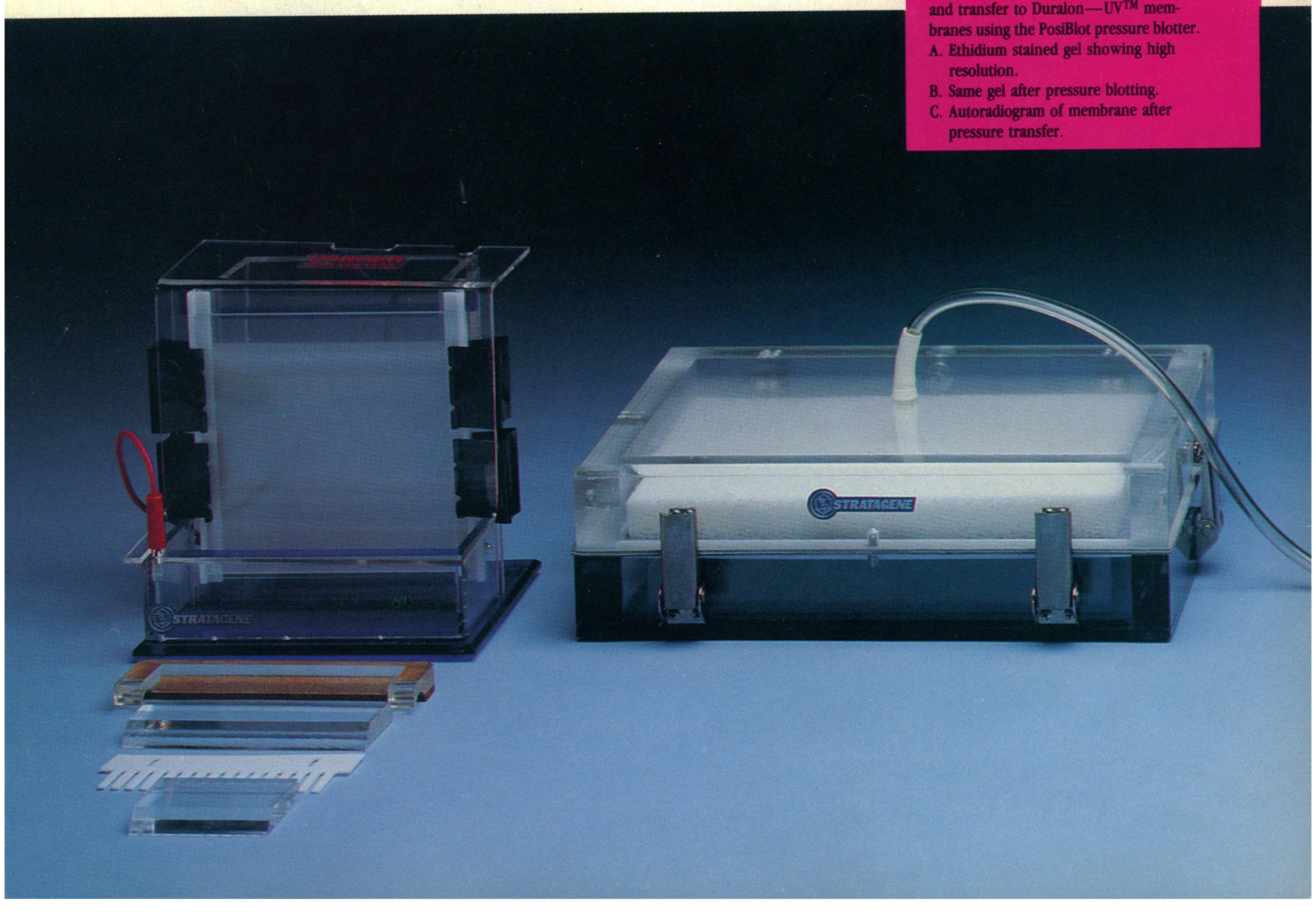


FIGURE 1:
Figure Legend: Fractionation of end labeled DNA markers on 3mm thick 0.8% agarose by the VAGE apparatus and transfer to Duralon—UV™ membranes using the PosiBlot pressure blotter.
A. Ethidium stained gel showing high resolution.
B. Same gel after pressure blotting.
C. Autoradiogram of membrane after pressure transfer.



PosiBlot™ * Pressure Blotter

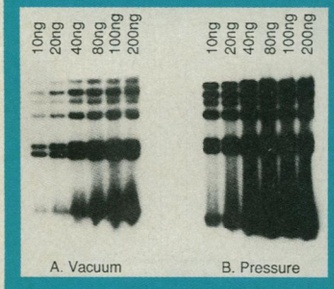


FIGURE 2:
Figure Lengend: ^{32}P end-labeled lambda Hind III markers were electrophoresed in 0.8% agarose. The DNA was then transferred to a nylon membrane with a vacuum blotter at 30mm Hg below atmospheric or with the PosiBlot pressure blotter at 100mm Hg above atmospheric. Both transfers were carried out for 15 minutes. As can be seen, pressure blotting transferred significantly more DNA in the same period of time, especially in the higher molecular weight range (largest band is 23 kilobases).

The PosiBlot™ positive pressure blotter permits the transfer of nucleic acids in 1/3 the time of vacuum blotters and 1/50 the time of capillary blotting (Figure 2). Pressure blotting does not dehydrate gels as do other methods. This allows the use of substantially higher pressure differentials, compared with vacuum blotting, without gel collapse. The PosiBlot apparatus reduces blotting time to 15 minutes.

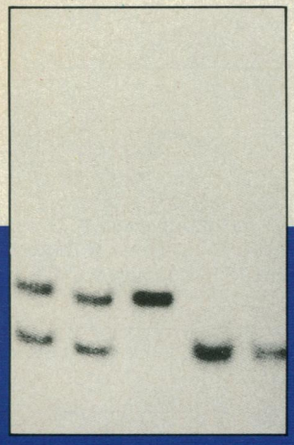


FIGURE 3:
Figure Legend: Autoradiogram showing the resolution of 2.8 and 1.3 Kb Msp I RFLP alleles revealed by a cystic fibrosis human DNA probe using the VAGE, PosiBlot and Stratalinker all in 2.5 hours.

Stratalinker™ * UV Crosslinker

The Stratalinker™ UV Crosslinker fixes nucleic acids to solid supports such as nitrocellulose or nylon membranes, in less than one minute. This compares favorably to vacuum baking, which requires 2 hours. The Stratalinker actually monitors the ultra violet energy flux and deactivates the light source upon reaching the user-programmed energy level (Figure 4). Figure 3 shows an autoradiogram of a human genomic Southern blot performed using the VAGE, PosiBlot and Stratalinker all in 2.5 hours.

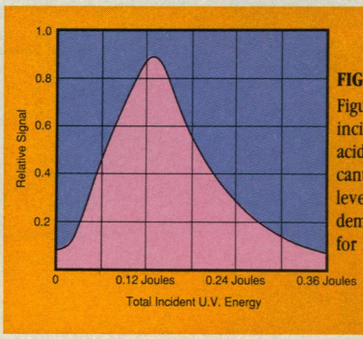


FIGURE 4:
Figure Legend: The effects of altering the incident energy for crosslinking nucleic acids to nylon membranes. The significant drop in signal intensity at energy levels below and above 0.12 Joules demonstrates the limited optimal range for UV treatment.

Stratagene offers a full selection of nitrocellulose, reinforced nitrocellulose and nylon membranes. Each membrane is stringently lot tested to ensure consistency when performing Northern and Southern blotting. Please call Technical Services for detailed information on Stratagene's time saving blotting systems and membranes.

STRATAGENE®
Where Satisfaction Multiplies

Corporate Headquarters:
11099 North Torrey Pines Rd.
La Jolla, CA 92037
Ordering: 800-288-7713
Tech. Services: 800-876-6702
FAX: 619-535-5430
TELEX: 9103809841

Stratagene GmbH
Postfach 105466
D-6990 Heidelberg
(Federal Republic of Germany)
Telephone: (06221) 40 06 34
Telefax: (06221) 40 06 39

Stratagene Ltd.
Cambridge Innovation Centre
Cambridge Science Park
Milton Road
Cambridge CB4 4GF
Telephone: (0223) 420955
Telefax: (0223) 420234
Telex: 81417 INNCEN G

Please contact Stratagene for a distributor near you.

* Patent Pending

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

ISSN 0036-8075
16 FEBRUARY 1990
VOLUME 247
NUMBER 4944

■ **SCIENCE is published weekly on Friday, except the last week in December, and with a supplement in March by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005.** Second-class Non-profit postage (publication No. 484460) paid at Washington, DC, and at an additional entry. Domestic individual membership and subscription (51 issues): $75. Domestic institutional subscription (51 issues): $120. Foreign postage extra: Canada $46, other (surface mail) $46, air mail via Amsterdam $85. First class, airmail, school-year, and student rates on request. **Single copy sales:** Current issue, $3.50; back issues, $5.00; Biotechnology issue, $6.00 (for postage and handling, add per copy $0.50 U.S., $1.00 all foreign); Guide to Biotechnology Products and Instruments, $18 (for postage and handling add per copy $1.00 U.S., $1.50 Canada, $2.00 other foreign). 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. **Change of address:** allow 6 weeks, giving old and new addresses and 11-digit account number. **Postmaster:** Send Form 3579 to *Science*, P.O. Box 1723, Riverton, NJ 08077. *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 Graphical representation of the motion of satellite orbits in phase space (the space whose dimensions are position and momentum). Each point fixes the orbital eccentricity and argument of perigee; color bands correspond to constant energy levels. Rendered by contour "painting" on a massively parallel processor, the plot reveals a startling configuration of equilibria spawned by pitchfork and saddle node bifurcations. See page 833. [Computer graphics generated on a Thinking Machines Corporation CM-2 by Etienne Deprit and Liam Healy, Naval Research Laboratory, Washington, DC; photographic image by Mark Stucky]

Master 96 wells with two simple instruments.

One pipettes...

The Brinkmann Transferpette™ 8/12 fits comfortably in your hand while you are performing 8- and 12-channel sample transfers and serial dilutions.

The other repeats...

The Eppendorf Repeater Plus/8™ reduces the fatigue of routinely filling 96-well plates by rapidly dispensing up to 48 times without refilling.

And Brinkmann has both.

Both instruments have unique features to help you master your laboratory procedures.

Call 800-645-3050; in New York, 516-334-7500. Or write Brinkmann Instruments, Inc., Cantiague Road, Westbury, NY 11590. (In Canada: 416-675-7911; 50 Galaxy Blvd., Rexdale, Ont. M9W 4Y5)

SEE US AT THE PITTSBURGH CONFERENCE — AISLE 3400, SEMINAR ROOM 330.

Shaping the future with **Brinkmann**

BRK-5588

For information circle reader service number 107
For demonstration circle reader service number 108

Black holes

It is possible that most galaxies harbor a massive black hole (page 817). But proof of a black hole's existence is tricky: with its greatly compressed mass and total absorption of light, a black hole is only really detectable through its effects on nearby stars and gases. Flares from disrupted stars that are being sucked into black holes may be the best diagnostic signs of a black hole's presence, but, if the hole's mass is much greater than 10^8 solar masses, some stars could be swallowed whole without releasing telltale gaseous debris. Rees reviews the evidence favoring black holes as end points in the evolution of active galactic nuclei and also assesses less attractive alternatives. Two to three billion years after the Big Bang, quasar activity peaked in galactic centers; now dead quasars may be at the centers of most galaxies. In part, then, galactic aging involves collapse of much of the galaxy's mass onto the black hole. Mergers of galaxies may be accompanied by hole mergers. And, in the very oldest quiescent galaxies, black holes may be so fuel-depleted that, though present at the galactic center, they will lurk undetected.

Philadelphia chromosome effects

The Philadelphia chromosome is found in tumor cells of virtually all patients with chronic myelogenous leukemia (CML). This chromosome is a hybrid of chromosomes 9 and 22; the fusion of these two chromosomes produces a new gene that encodes a new protein, $P210^{bcr/abl}$, which is suspected of inducing CML. Daley *et al.* report that when $P210^{bcr/abl}$ is inserted (on a retrovirus vector) into mouse bone marrow cells and the cells are transplanted into recipient mice, a disease is induced in some of the animals that exhibits features of human CML (page 824). The most characteristic changes observed in the diseased animals were enlarged spleens and granulocyte-rich blood. This system affords opportunites for studying the cellular origins of $P210^{bcr/abl}$-induced tumors, for following the stages of disease progression, and for evaluating new therapies for CML.

Hominid scanning

Two parameters used for inferring evolutionary relations among early hominids are brain size and cranial circulation pattern. With computed tomography (CT) technology, Conroy *et al.* studied the cranial anatomy of a specimen of the early hominid *Australopithecus africanus* (page 838). The CT scans indicated that the venous outflow pattern of specimen MLD 37/38 was like cranial circulation patterns of other *Australopithecus africanus* specimens and those of early *Homo*; accommodation was apparently being made for bipedalism and an upright body posture. The circulation pattern differed from what was characteristic of *Australopithecus robustus* and *Australopithecus afarensis*, two species that probably were not in the direct line to modern humans. The imaging technology allowed for "reconstruction" of a missing portion of the cranium of specimen MLD 37/38, and, from the reconstruction, the cranial capacity was calculated at 425 cubic centimeters, which is smaller than previous estimates. For comparison, modern human brains have capacities in the range of 1400 cubic centimeters.

Primacy of secondary structure

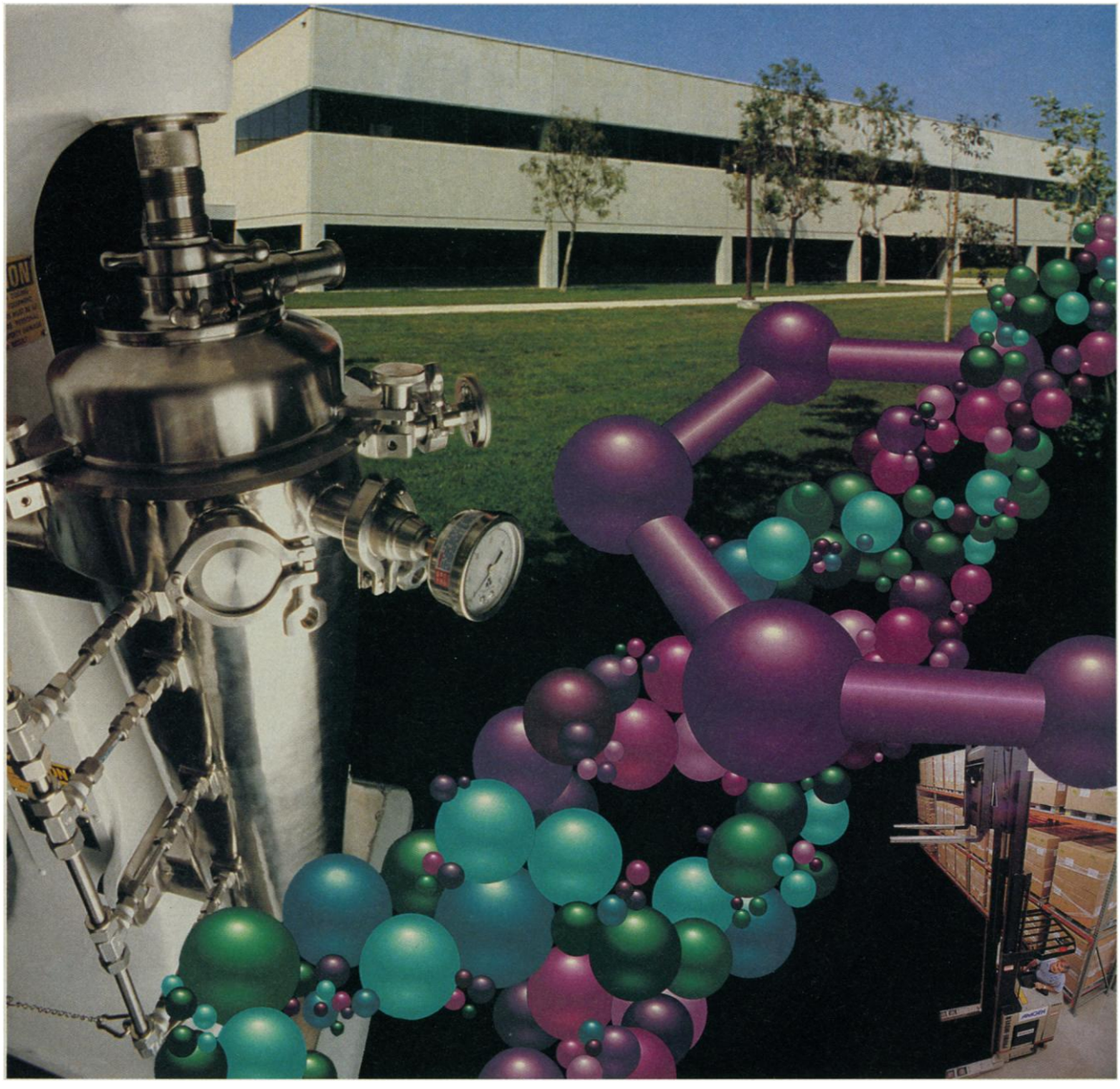
One of the regulatory genes of the AIDS virus is *rev*; it encodes the Rev protein, which facilitates the movement of messenger RNA molecules from the nucleus to the cytoplasm. Rev is essential for HIV replication and, therefore, might be a target for therapeutic intervention if its mechanism of action or structural requirements could be understood. Rev interacts with a region called RRE on messenger RNA molecules; RRE folds into a complicated flower-like structure. Olsen *et al.* show that the interaction between RRE and Rev is not altered when mutations are made in the nucleotide sequence of RRE's "stem structure" (page 845). In contrast, destruction of the stem abolishes the interaction of Rev and RRE; a second compensatory mutation that restores the secondary structure restores Rev-RRE binding and function, even though the RRE loop ends up with an entirely different sequence. While maintenance of secondary structure is key to the interaction of Rev with RRE, other protein-RNA interactions depend on the integrity of both primary and secondary structures and certain protein-DNA interactions depend only on intact primary structures.

Phenotypically mixed AIDS viruses

A warning flag is being raised regarding the suitability of certain model systems for realistic assessments of the normal behavior of the AIDS virus HIV-1 (page 848). Lusso *et al.* report that when HIV-1 is grown in human tumor cells that are also infected (as a result of passage through a mouse) with a murine leukemia virus, the time courses for HIV-1 infection, for antigen expression, and for evidence of the viruses' cytopathic effects are accelerated compared with time courses in cells not hosting the mouse virus. Although specific changes in the DNA and proteins of the two viruses could not be identified, phenotypically mixed viruses were apparently produced, and the "chimeric" HIV-1 viruses were able to infect a number of cell types that are not their natural hosts. Spurious conclusions about the biologic properties of HIV-1 could be drawn from experiments in which phenotypic mixing has occurred; furthermore, dangerous outcomes of such experiments could include production of more virulent organisms or organisms with expanded host ranges. The implications of these data are further discussed by Marx (page 809).

■ RUTH LEVY GUYER

CLONED, EXPRESSED, & PURIFIED BY AMGEN
MARKETED BY AMGEN BIOLOGICALS



QUALITY ENSURED BY AMGEN BIOLOGICALS

INTERLEUKINS
IMMUNE RESPONSE MODIFIERS
ANTIBODIES
GROWTH FACTORS
HEMATOPOIETIC FACTORS
ASSAY SYSTEMS
DNA PROBES
SPECIALTY CHEMICALS

AMGEN
BIOLOGICALS

For additional information please call
Amgen Biologicals
1-800-343-7475
In California 1-805-499-5725 x 4071
Circle No. 160 on Readers' Service Card

Successful amino acid analysis.

It begins over a cup of coffee or tea. Because first we need to talk. But not about model numbers and purchase orders.

We need to talk about what you want and need. About how you prefer to run your laboratory — philosophies, methodologies and procedures.

At first, you'll do most of the talking, while we listen. And learn. Then — and not until then — we'll recommend the best answer for your particular analysis needs.

You may need the superior quantitation and reproducibility of the classical ion exchange technique. Or the speed and sensitivity of reversed phase. We offer them both.

For the flexibility of HPLC, we offer System Gold,™ the Personal™ Chromatograph. And the System 6300 dedicated ion exchange analyzer for physiological and diagnostic applications.

Whichever your choice, we provide proven methods, too. Complete and *guaranteed.*

You see, we've been involved in automated amino acid analysis since Moore, Stein and Spackman pioneered it in 1958. So you can rely on us for in-depth applications and technical support. Anytime. All the time.

That's why you can trust our recommendation. But we won't recommend a thing until we sit down and talk. And listen.

Take the first step in successful amino acid analysis. Contact your local Beckman office in major cities worldwide. In the US, call 800/742-2345.

Beckman Instruments, Inc., Altex Division, 2350 Camino Ramon, P.O. Box 5101, San Ramon, California 94583.

Send Representative and Literature Circle No. 165
Send Literature only circle No. 166

BECKMAN

Pittsburgh Conference March 5–8, New York City Booth 5005-5106

PHARMACIA LKB BIOTECHNOLOGY

The new age of SDS-PAGE

ExcelGel™ SDS, gradient 8–18 precast gels and ExcelGel SDS buffer strips now herald the new age of SDS-PAGE. Giving you fast, convenient and totally reliable, horizontal SDS electrophoresis. On your Multiphor® or other comparable flat-bed system. With the kind of consistent performance that's only possible by using precast products of predetermined quality. Guaranteed by the world's leading manufacturer of gel media. To let you separate SDS-denatured proteins in the MW range 6,500–300,000 in as little as 75 minutes.

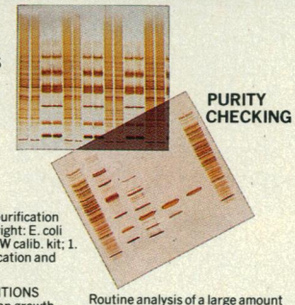
High resolution

Because you're running a thin gel with high voltage and efficient cooling, you'll get sharp bands and high resolution. In minimum time. And loading up to 52 samples on each gel saves you even more time. With the same high resolution.

Runs within minutes

SDS-PAGE has never been easier. Your new gels are simply stacked where you need them. On the shelf. And from shelf to cooling plate, it's only a matter of seconds. Position the buffer strips, apply your sample and start the run. All it takes is a few minutes.

ExcelGel SDS precast products pay you big dividends. Boosting productivity. Improving efficiency. Keeping ahead. Large returns for a small investment. Order a pack from your nearest Pharmacia LKB office. You'll be moving into the new age of SDS-PAGE. With results you can be proud of.



Purity checking of a purification process, from left to right: E. coli starting material, LMW calib. kit; 1. purification, 2. purification and final purification.

SEPARATION CONDITIONS

Sample:	Human growth hormone (kindly donated by KABI, Sweden). Samples are reduced and iodoacetamide treated.
Concentration:	0.1 mg/ml.
Application:	5 µl, as a droplet.
Conditions:	600 V, 50 mA, 30 W, 15 °C, time, 80 min.
Detection:	Silver staining, according to the J. Heukeshoven and R. Dernick method, with slight modifications.

Routine analysis of a large amount of samples, from left to right: Repeatedly: E. coli, HMW calib. kit; LMW calib. kit.

SEPARATION CONDITIONS

Sample:	E.coli
Concentration:	0.1—0.2 mg/ml.
Application:	5 µl, with a sample applicator.
Conditions:	600 V, 50 mA, 30 W, 15 °C, time, 80 min.
Detection:	Silver staining, according to the J. Heukeshoven and R. Dernick method, with slight modifications.

2106

Pharmacia

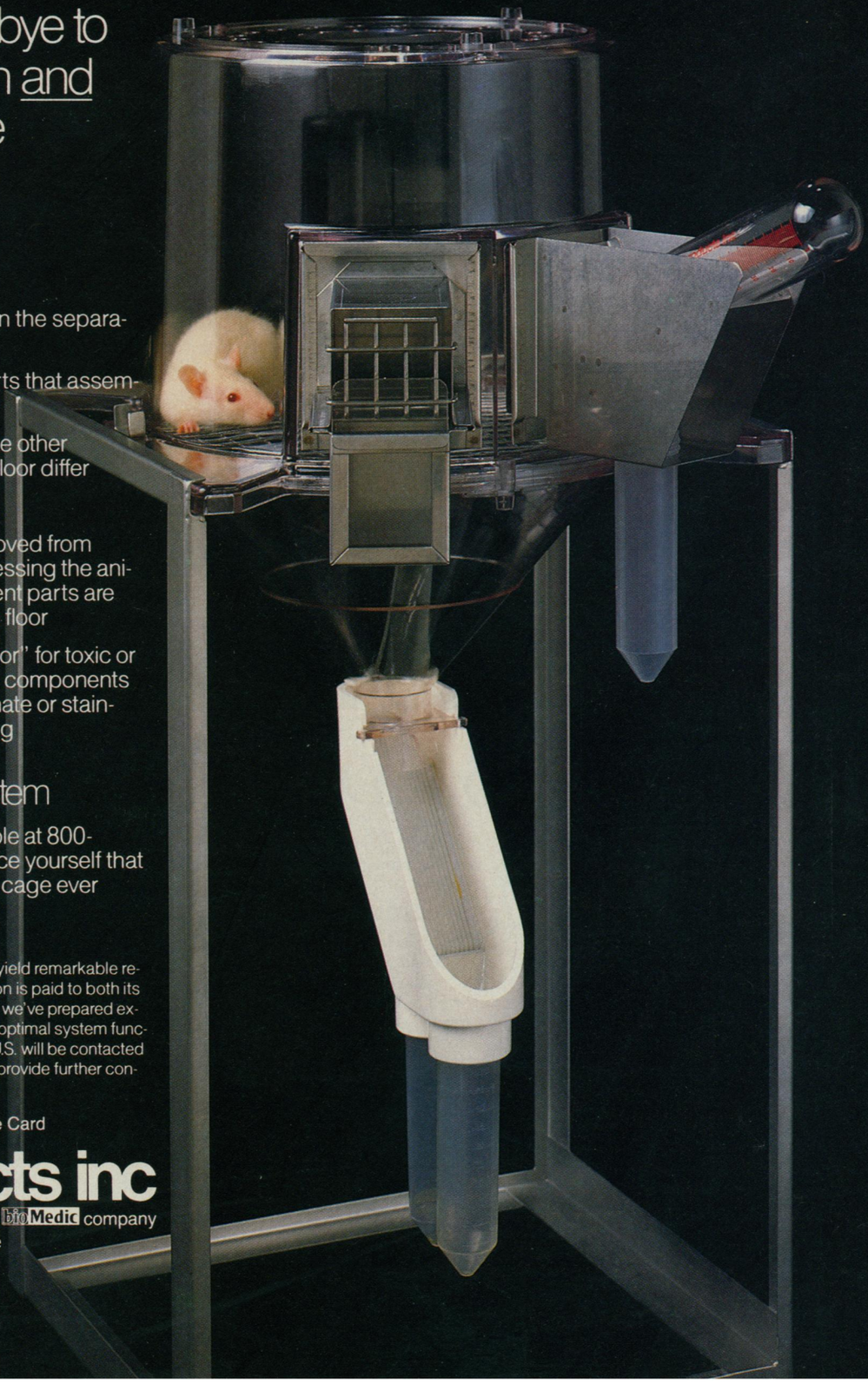
Pharmacia LKB Biotechnology

Head office Sweden Tel 46 (018) 16 30 00. **Australia** Tel (02) 888 36 22. **Austria** Tel (0222) 68 66 25 0. **Belgium** Tel (02) 242 4660. **Brazil** Tel 55-11 284 5815/289 8967. **Canada** Tel (514) 457 6661. **Denmark** Tel (02) 26 52 00. **East Europe** Tel 43 (0222) 92 16 07. **Federal Republic of Germany** Tel (0761) 490 30. **Finland** Tel (90) 502 1077. **France** Tel (01) 30 64 34 00. **Great Britain** Tel (0908) 66 11 01. **Holland** Tel (031) 348 07 911. **India** Tel (0812) 29 634. **Italy** Tel (02) 25 32 844/26 700 475. **Japan** Tel (03) 492 9181. **Norway** Tel (02) 54 90 95. **Soviet Union** Tel 46 (08) 799 80 00. **Spain** Tel (34)-3 675 44 11. **Sweden** Tel (08) 799 80 00. **Switzerland** Tel (01) 821 18 16. **United States** Tel (201) 457 8000. **Far East** Tel 852 (5) 814 8421. **Middle East** Tel 30 (1) 894 73 96. **Other countries** Tel 46 (08) 799 80 00. *(8904)*

Circle No. 121 on Readers' Service Card

Lab Products revolutionizes metabolic caging.

Now say goodbye to poor separation and frustrating cage complexity.



The Product

- remarkable 99% efficiency in the separation of feces and urine*
- 15 completely integrated parts that assemble quickly and easily
- same unit can accommodate other species…only feeders and floor differ
- meets ILAR requirements
- collected waste can be removed from below cage floor without stressing the animal. All separation component parts are accessible from below cage floor
- disposable styrene "separator" for toxic or radioactive studies. All other components are autoclavable polycarbonate or stainless steel…no glass handling

How to order this system

Call Customer Service people at 800-526-0469 today and convince yourself that this is the finest metabolism cage ever designed.

*This metabolic system does indeed yield remarkable results if, but only if, meticulous attention is paid to both its assembly and operation. Accordingly, we've prepared explicit instructions that will help ensure optimal system functioning. In addition, customers in the U.S. will be contacted by a technical sales representative to provide further consultation as required.

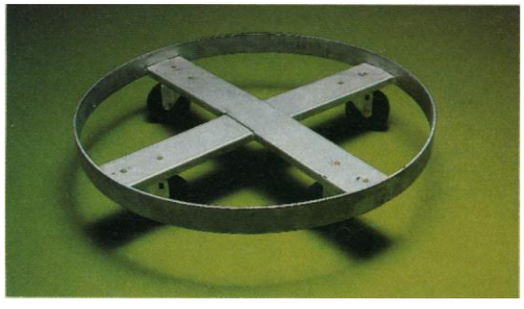
Circle No. 127 on Readers' Service Card

lab products inc

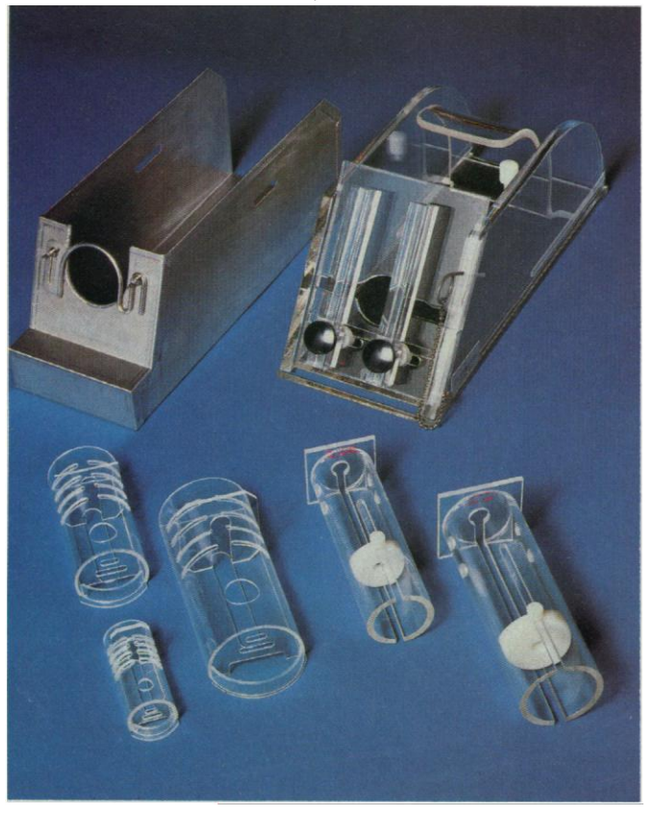
a bioMedic company

255 West Spring Valley Avenue
Maywood, New Jersey 07607

Utility cart

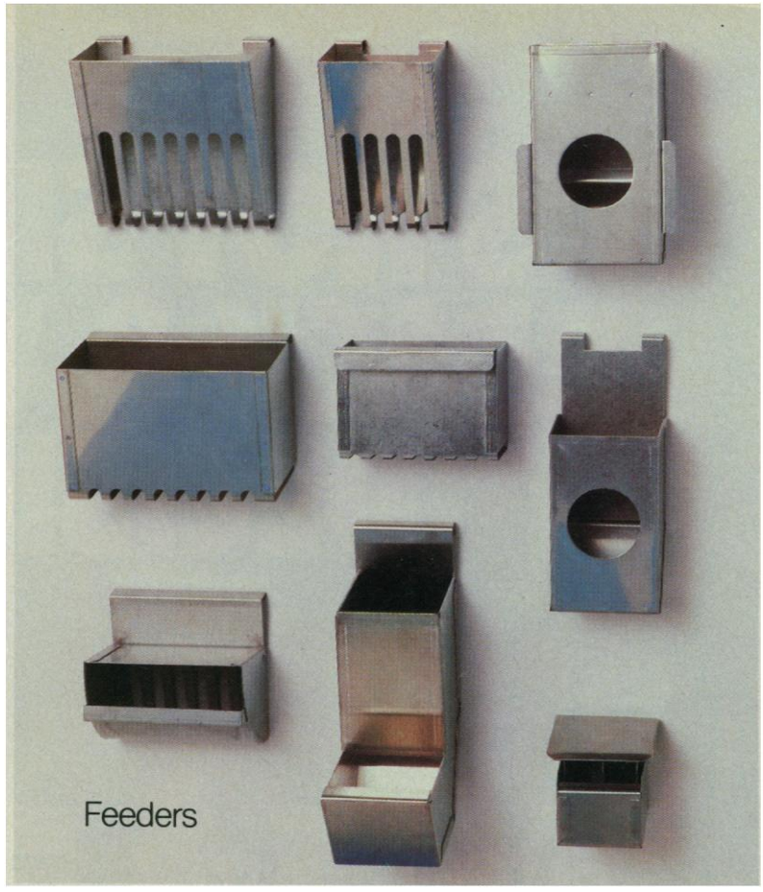


Can dolly



Restraining cages

Circle No. 125 on Readers' Service Card



lab products inc

a BioMedic company

255 W. Spring Valley Ave., Maywood, NJ 07607
Phone: 201/843-4600

Please send me your catalog

Lab Products Inc.
255 W. Spring Valley Ave.
Maywood, NJ 07607

Name_____ Title_____

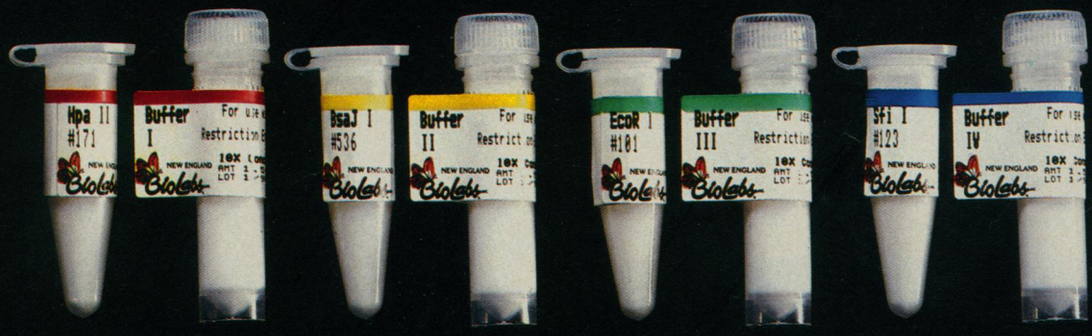
Organization_____

Address_____

_____
zip

Phone_____
area code number extension

IT'S NOT SIMPLY A BLACK & WHITE DECISION



INTRODUCING NEB'S NEW COLOR CODED BUFFER SYSTEM

- Simplified four buffer system
- Guaranteed 100% activity
- Same consistent quality
- Buffers shipped free with every enzyme

NEW ENGLAND BioLabs®

32 Tozer Road, Beverly, MA 01915 USA Tel. 800-NEB-LABS or (508) 927-5054 FAX (508) 921-1350

THE SPECIALISTS IN RESTRICTION ENDONUCLEASES

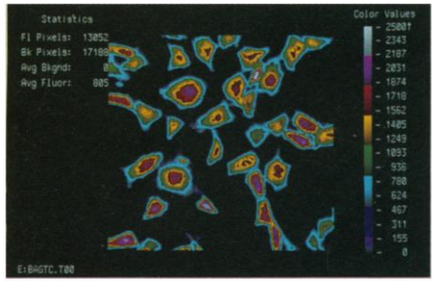
NEW

DISTRIBUTORS: **Australia** GENESEARCH PTY LTD Tel. (075) 37 5499 / **Canada** NEW ENGLAND BIOLABS LTD., Tel. 416-672-3370 / **Federal Republic of Germany, West Berlin, Austria and Switzerland** NEW ENGLAND BIOLABS GmbH (Federal Republic of Germany) Tel. (06196) 3031 / **Finland, Sweden, Denmark, USSR** FINNZYMES OY (Finland) Tel. (0) 437-5312 / **France** OZYME S.A.R.L. Tel. (1) 30 57 0025 / **Italy** GRUPPO FLOW S.p.A. Tel. (02) 57.60.10.41 / **Israel** GAMIDOR LTD. Tel. (03) 342 202 / **Japan** DAIICHI PURE CHEMICALS CO. LTD. Tel. (03) 272-0671 / **The Netherlands** WESTBURG B.V. Tel. (033) 95 00 94 / **People's Republic of China** CHINA UNITED BIOTECHNOLOGY CORP. Tel. (1)2565677 / **Spain** LANDERDIAGNOSTICO S.A. Tel. (01) 441 10 66 / **United Kingdom** CP LABORATORIES Tel. (0279) 758200

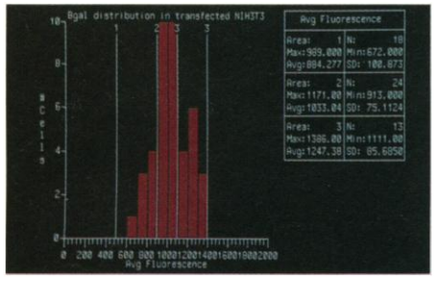
Circle No. 156 on Readers' Service Card

Reason #7 "Cutting-Edge" Technology for Clonal Selection

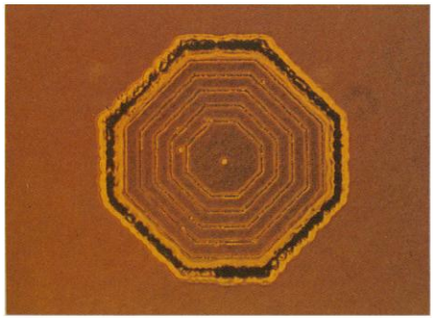
ACAS 570 Interactive Laser Cytometer... The Cytometer For All Reasons



Two-dimensional, pseudo-color fluorescence image of FDG-labeled, lacZ+, NIH3T3 cells.



Histogram display of ß-galactosidase positive, NIH3T3 cells.



An example of ACAS cell sorting using the "Cookie-Cutter"™ technique to isolate single cells in culture while preserving their normal anchorage dependent growth state.

The ACAS is *the* pioneer instrument for Interactive Laser Cytometry, giving you new techniques for quantitative fluorescence analysis and adherent cell sorting.

It is the only instrument you can use for the automated selection and cloning of adherent cells in culture. With the ACAS you can:

- Screen cells,
- Sort cells in culture based on physical and biochemical measurements,
- Select mutant cells at frequencies of one in a million,
- Clone cells without altering morphology, phenotype, or viability,
- Isolate sub-populations of cells for quantitative fluorescence analysis and,
- Automatically store cell locations for repeated scans of the same cells over time.

Meridian Instruments Inc., introduces a major breakthrough in cloning transfected cells with the ACAS 570. The ACAS was used for the screening, selection, and cloning of transfected mammalian cells carrying the E.coli *lacZ* gene.[1] The product of expression of the *lacZ* gene, ß-galactosidase, was measured using the fluorescent probe fluorescein di-ß-D-galactopyranoside (FDG).[2] Selected cells were easily isolated and cloned using the patented ACAS "Cookie-Cutter"™ technique. The ACAS provided quantitative criteria to select *lacZ*+ and *lacZ*- cells, and to distinguish between high and low expressers for cloning.

You can use this powerful interactive technique for the automated sorting and cloning of:

- Mutant cells
- Transfected cells
- Hybridomas
- Rare cells

In addition, you get *all* these reasons that make the ACAS 570 *the* cytometer for cell and molecular biology research:

#1 - Interactive Laser Cytometry
#2 - Quantitative Fluorescence Measurements
#3 - Sensitive Fluorescence Measurements
#4 - Comprehensive Interactive Software
#5 - Versatile Integrated Instrumentation
#6 - Quantitative Confocal Microscopy

Only the ACAS 570 brings the methods of cell sorting and analysis to your cells in culture. These are a few of the many reasons why the ACAS 570 is **The Cytometer For All Reasons.** Call us now at 800/247-8084, or in Michigan 517/349-7200, to discover your reasons.

"See a demonstration of the ACAS at the SAC meeting, booths #11 and #12, and the FASEB meeting, booths #1747 and #1749."

Meridian Instruments Europe, Inc.
Industriepark — West 75
B-2700 St. Niklaas BELGIUM
Phone: 011-32-3-7781760
Fax: 011-32-3-7781727

Japan Scientific Instrument Co., Ltd.
6-7-5 Higashi Kasai
Edogawa ku Tokyo, 134
Phone: 011-81-3-877-8111
Fax: 011-81-3-877-9236

MERIDIAN™
Instruments, Inc.
Bringing Analytical Power to the Cell in Culture

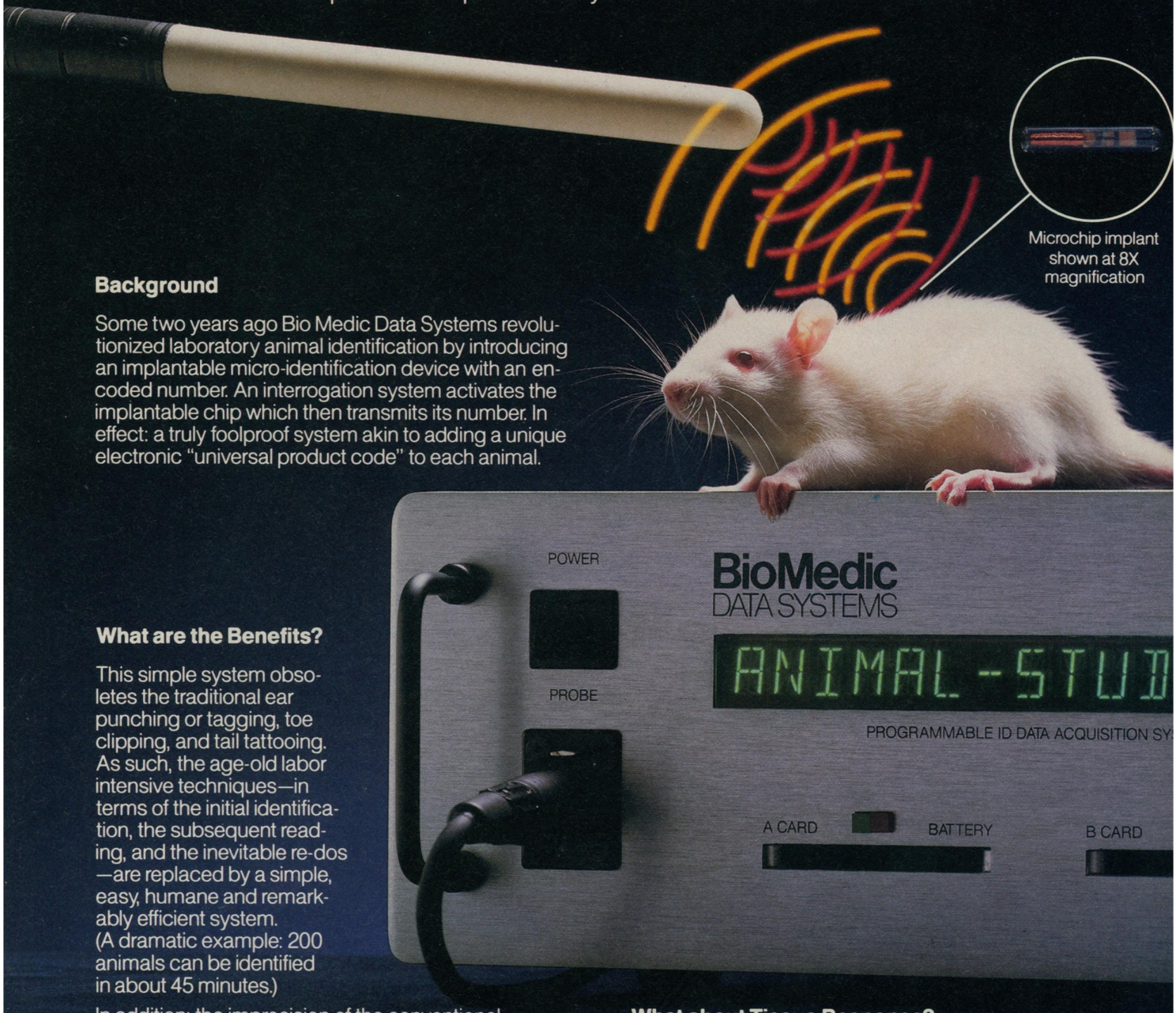
2310 Science Parkway
Okemos, Michigan 48864
Phone: 800-247-8084
517-349-7200
Fax: 517-349-5967

[1] Courtesy of James M. Wilson, Howard Hughes Medical Institute, University of Michigan, and Asmina H. Jiwa, Meridian Instruments, Inc.
[2] Molecular Probes, Inc.

Circle No. 97 on Readers' Service Card

ANNOUNCING THE DAWN OF A NEW ERA IN LABORATORY ANIMAL IDENTIFICATION

Simplicity itself: a programmable stand-alone system that doesn't require a computer hookup and uses *your* animal identification number.



Background

Some two years ago Bio Medic Data Systems revolutionized laboratory animal identification by introducing an implantable micro-identification device with an encoded number. An interrogation system activates the implantable chip which then transmits its number. In effect: a truly foolproof system akin to adding a unique electronic "universal product code" to each animal.

What are the Benefits?

This simple system obsoletes the traditional ear punching or tagging, toe clipping, and tail tattooing. As such, the age-old labor intensive techniques—in terms of the initial identification, the subsequent reading, and the inevitable re-dos—are replaced by a simple, easy, humane and remarkably efficient system. (A dramatic example: 200 animals can be identified in about 45 minutes.)

In addition: the imprecision of the conventional methods is replaced by *positive animal identification.* Animal misidentification or infection can indeed be catastrophic should they delay, impede, or destroy a crucial investigation. This simple foolproof system now converts ear punching or tagging, toe clipping, and tail tattooing into unacceptable risks ... and who needs that when a positive animal identification system is now available!

What about Tissue Response?

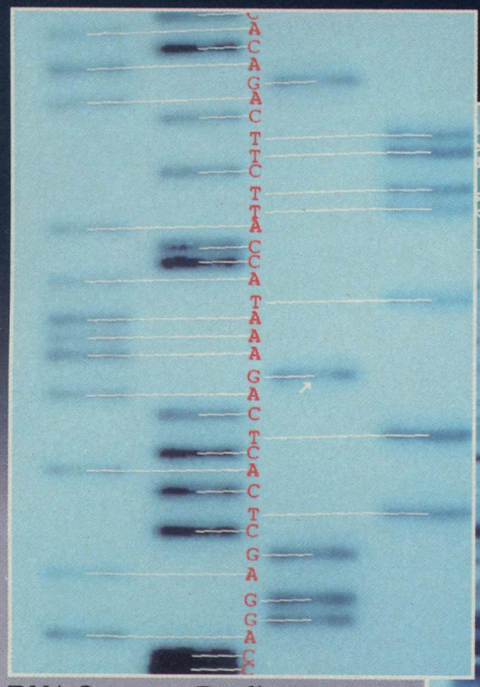
As a result of a 105-week subchronic evaluation in rats and mice, there have been:

- no significant effects on normal body weights.
- no palpable masses observed.
- no visible tissue reaction.

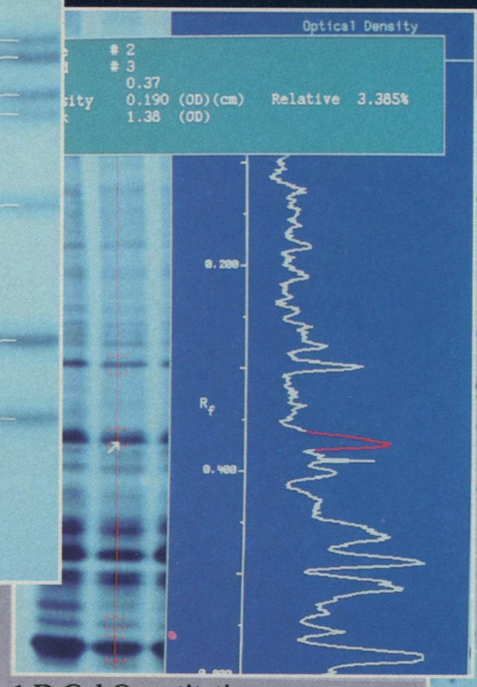
The tissue response to the implanted microchips is considered to be completely non-adverse.

Now, if it's DNA Sequencing, 1-D gels, Dot Blots, or 2-D gels, it's...

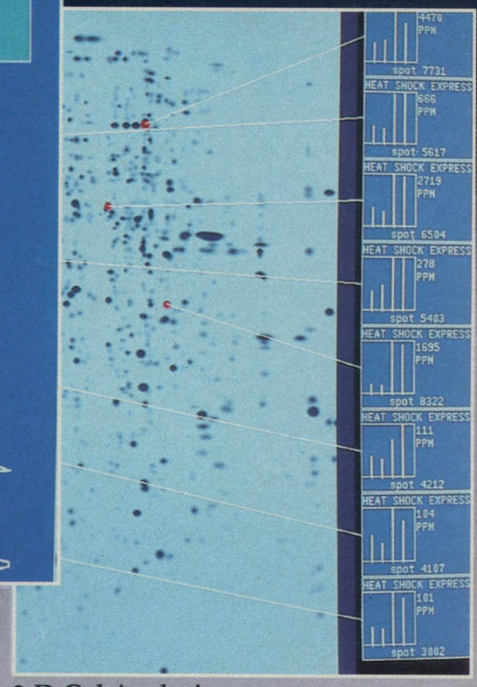
The Discovery Series™



DNA Sequence Reading



1-D Gel Quantitation



2-D Gel Analysis

Discover More

The Discovery Series™ is a system of analysis software packages integrating laser scanning and UNIX® based computing technologies. It's as easy to use as a rule and pencil—only *faster* and more *accurate*!

Produce Results; Don't Just Analyze Data

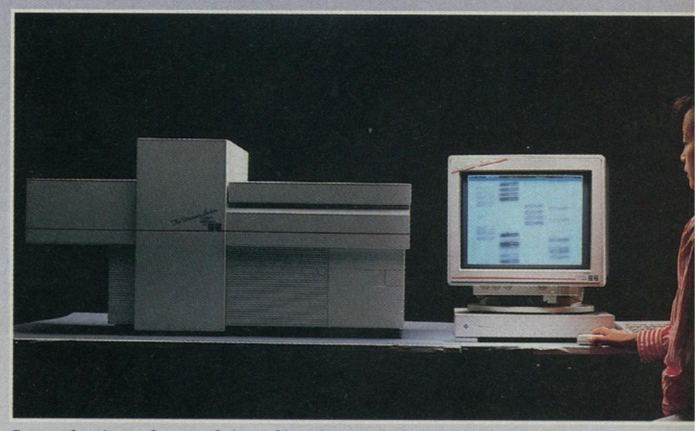
Lay your film, gel or blot on the scanner, pop-up the correct menu on our consistent, logical, user-friendly interface and click your mouse. Whether it's a DNA sequence, quantification of a 1-D gel or making sense out of multiple 2-D gel patterns, The Discovery Series scans the film or gel, analyzes the data and gives you results.

The Software Packages of The Discovery Series

DNA Code™ — For automated, fast and 95% accurate DNA Sequence reading.

Quantity One™ — For quantitative analysis of all types of 1-D gels and Blots.

PDQUEST™ — The world standard for analysis and databasing of 2-D gels.



Introducing the multiapplication software packages of The Discovery Series from Protein Databases, Inc.

Just Picture it...Time to Think

The software performs thousands of tedious analysis tasks and calculations. The routine decisions are automatically done for you; the difficult ones are brought to your attention so that you can make the right decision, quickly. You are thinking about the results, not just analyzing data.

protein databases inc.

Start on the Road to Discoveries

Call Protein Databases, Inc. today for more information. Over 100 papers have now been published using the power of The Discovery Series. Let's work together to make your paper a standout in the next round of significant publications.

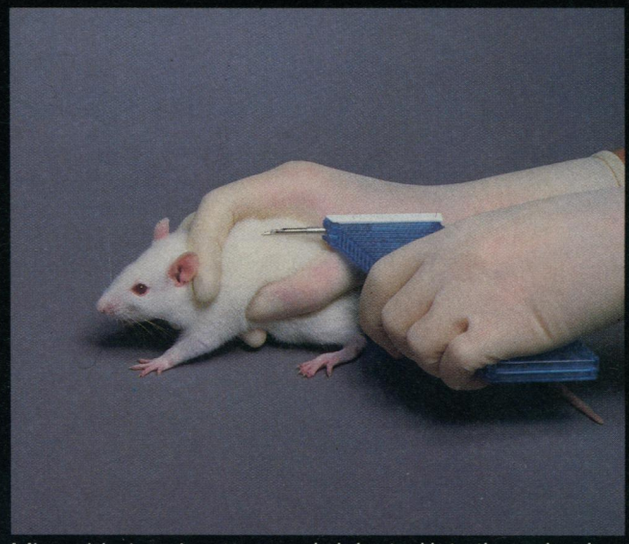
405 Oakwood Road, Huntington Station, NY 11746, 1-800-777-6834, 516-673-3939, Fax: 516-673-4502

Circle No. 201 on Readers' Service Card

Announcing the Dawn of a New Era in Laboratory Animal Identification

You are now looking at the complete ELAMS™ (Electronic Laboratory Animal Monitoring System): the injection handle with 10 implantable microchips, the scanning wand that interrogates the chips, and the Programmable ID Data Acquisition System. Simplicity itself: Implant this chip, interrogate it, and key in *your* number. This stand-alone system does *not* require coupling to a computer. Nor does this system ask you to abandon *your* animal identification numbers; when an animal is identified, *your animal code is always subsequently displayed.*

Further: Since this system is not tied in to a computer, it can be used anywhere, even in hostile environments. However, should you choose, it can *easily* be coupled to a computer or a printer. For your additional protection, a back-up record can always be created in seconds. And this system works with *any* animal species.



Microchip is subcutaneously injected into the animal.

What about GLP Compliance?

ELAMS™ meets and exceeds the GLP guidelines providing a positive animal identification method that is cost effective and accurate.

To Learn More about the ELAMS™

We invite you to learn more about this new user-friendly (i.e., to both animals and people), state-of-the art system. Just call our toll free number or drop us a line at …

BioMedic
DATA SYSTEMS
a bioMedic company

Bio Medic Data Systems, Inc.
255 West Spring Valley Avenue
Maywood, New Jersey 07607
Phone: 201/587-8300, Fax: 201/843-8816
Toll free number: 1-800-526-BMDS

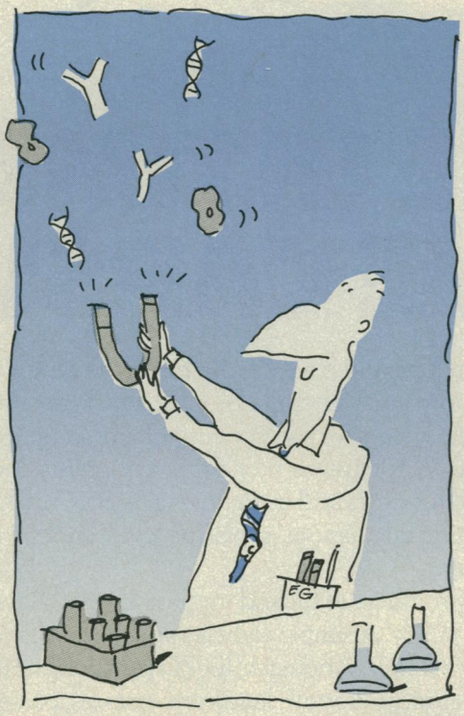
European Distributor: UNO bv
P.O. Box 15, 6900 AA Zevenaar, Holland
Marconistraat 31, 6942 PX Zevenaar
Phone: 08360-24451, Fax: 08360-23785

Japanese Distributor:
Yuasa Shoji Co., Ltd.
13-10 Nihombashi-Odemmacho
Chuo-Ku, Tokyo 103, Japan
Phone: 03-665-6742, Fax: 03-665-6994

Who is Using Bio Medic Data Systems' Implantable Micro Identification (IMI™)?

More than 45 organizations now have the Bio Medic Data Systems Implantable Micro Identification including Sandoz Research Institute, Schering Plough, C.I.I.T., General Motors, N.S.I. Technical Services, Stanford University, University of Miami, M.I.T. (Note that the Sandoz Research Institute has submitted the results of the first year of a two-year study for publication.)

NO MORE SEPARATION ANXIETY.



BioMag® magnetic separation performs better.

If you're anxious to find a fast separation system that saves you money, solves difficult separation problems, and increases the quality of your results, BioMag® magnetic separation is the answer.

BioMag particles stay in suspension to maximize binding, then rapidly separate within a magnetic field. You don't need expensive equipment or even a power source to perform magnetic separation.

It's convenient and ready-to-use. Select from more than 40 different compounds that come already linked with BioMag particles. Or, attach a wide range of biological molecules to BioMag particles yourself.

BioMag separation is a proven technology, used extensively in a wide range of research and clinical diagnostic products.

And here are just a few areas where BioMag separation improves both productivity and results.

IN CELL SORTING.

Nontoxic BioMag particles linked to a specific antibody allow you to either negatively or positively select cell types right in your lab. And for the first time, you are able to sort large numbers of cells with a high degree of specificity and purity — at very low cost. To speed up FACS handling, you can enrich for small populations of cells before selection.

IN DNA PROBE ASSAYS.

BioMag separation gives you the convenience of test tubes, enabling you to run more tests at the same time. You save on x-ray film and get more exact, quantitative results because samples are counted.

IN IMMUNOASSAYS.

Do all your assays one way — with BioMag solid phase separation. It works equally well with enzyme or radioactive tracers, and gives you the flexibility to choose the best format and configuration.

As for speed, it can cut separation time by two-thirds. There's no centrifugation, and BioMag assays are easily automated. And they'll give you highest technical performance, with low CV's, high sensitivity and low mid-point.

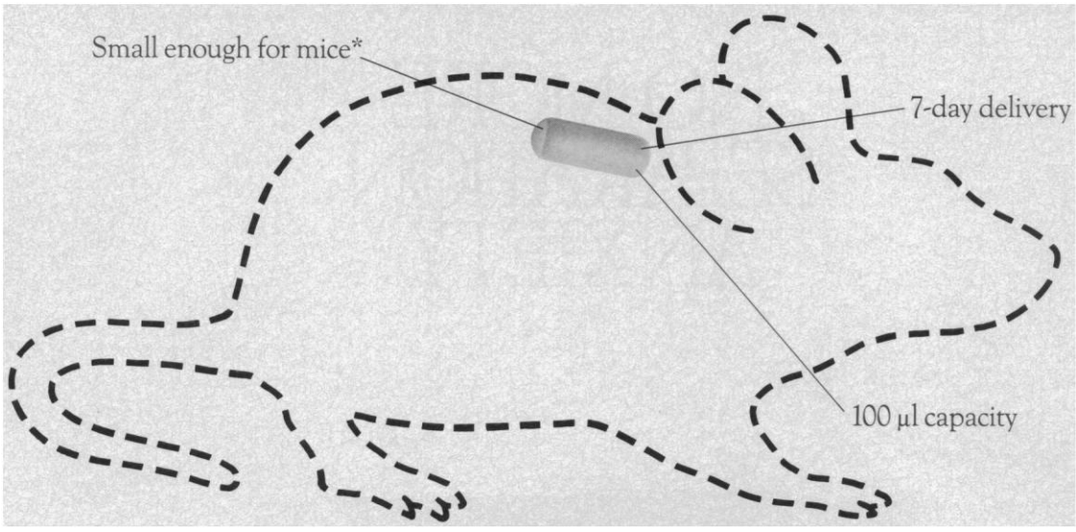
PRACTICAL PARTICLES.

Advanced Magnetics has the largest variety of magnetic particles for biomedical applications in the world. Send for our catalog, or ask us today about how BioMag separation can help you in your specific application.

BIOMAG® SEPARATION SYSTEM.

Advanced Magnetics, Inc.
61 Mooney Street
Cambridge, MA 02138
617-497-2070
1-800-RIA-KITS
1-800-343-1346
FAX 617-497-6927

Cell biology products are also available from Collaborative Research, Inc., Two Oak Park, Bedford, MA 01730 800-343-2035 617-275-0004
For research only. Not for use in human clinical diagnosis.



THE ULTIMATE TIME CAPSULE.

Only 17 mm long and 6 mm in diameter, the Model 1007D is the first implantable pump small enough for mice, but with a long enough duration to make it ideal for use in neuroscience, cancer and immunology research. The 1007D delivers a broad range of agents, such as peptides, cytokines, growth factors and inorganic salts, at 0.5 µl/hr for an entire week—eliminating fluctuations in plasma levels and the need for frequent animal handling.

It takes only minutes to fill and implant the 1007D, and operation is completely automatic. A simple catheter attachment can be used to target delivery to specific sites. And each 1007D pump comes with ALZA's unparalleled technical support, literature updates, presentation materials and customized bibliography searches.

To date, more than 4,000 studies have shown that ALZET pumps reliably deliver biological agents without disrupting normal animal growth, feeding or reproductive behavior.

Put time on your side. Make the 1007D micro-osmotic pump the cornerstone of your next research program. For complete information on all ALZET pumps, call **800-692-2990.** From Canada call **800-654-2990.**

alzet®
OSMOTIC PUMPS

ALZA Corporation • P.O. Box 10950
950 Page Mill Road • Palo Alto, CA 94303

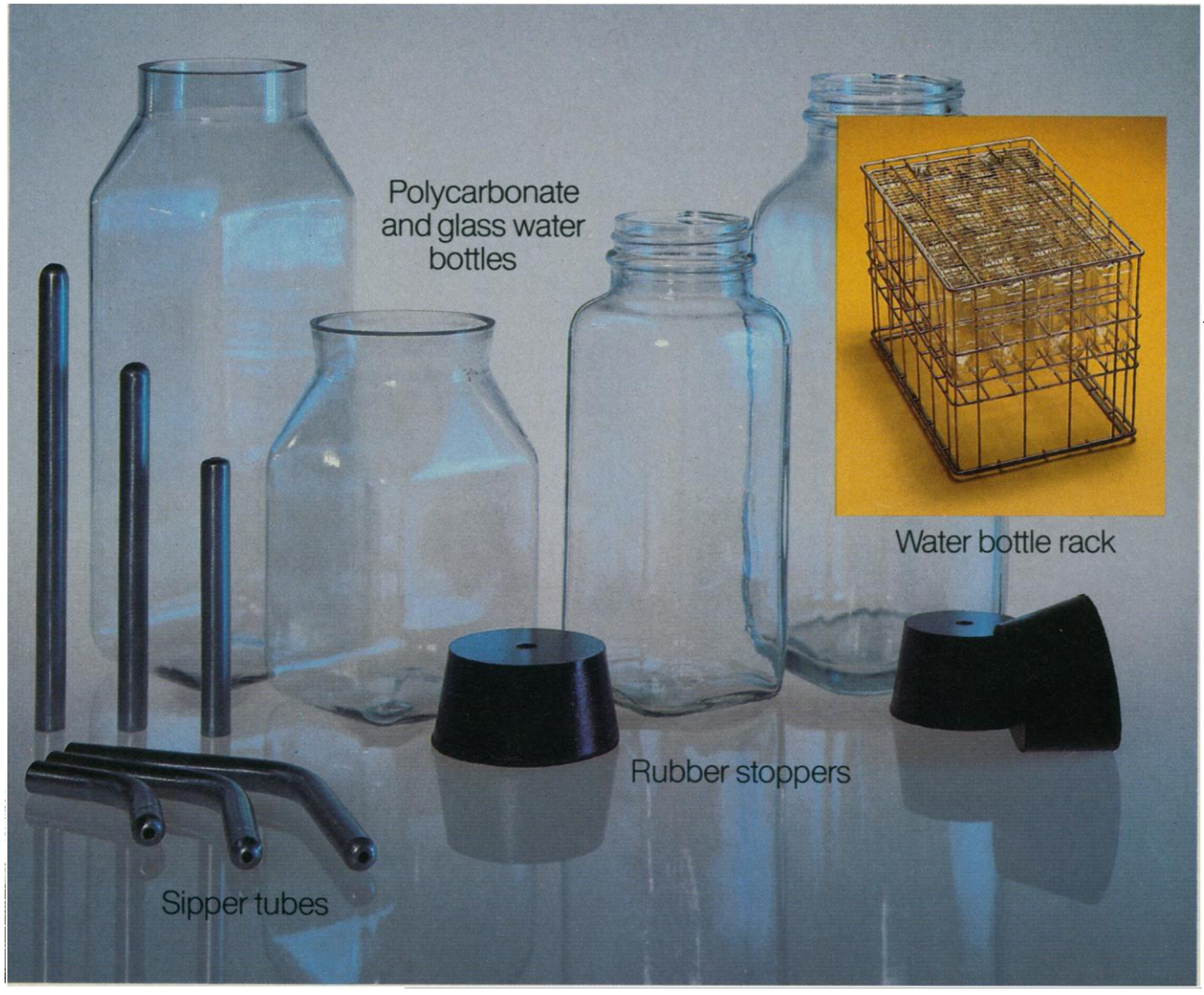
In ***Sweden, Finland, Denmark and Norway,*** contact ALAB Laboratorietjanst, Sollentuna, Tel. 8 754 00 65, FAX 8 754 19 84 • In the ***United Kingdom,*** contact Charles River U.K., Ltd., Kent, Tel. 0843 823575, FAX 0843 823497 • In ***France, Belgium and Switzerland,*** contact Charles River France, Cleon, Tel. 35 77 48 77, FAX 35 77 09 99 • In ***Italy,*** contact Charles River Italia, Calco, Tel. 39 50 99 15, FAX 39 50 82 19 • In ***Spain and Portugal,*** contact Charles River Spain, Barcelona, Tel. 33 30 90 13, FAX 34 11 29 36 • In ***West Germany, Austria and The Netherlands,*** contact Charles River Wiga, Kisslegg, Tel. 075 63 80 41, FAX 075 63 87 64 • In ***Japan,*** contact Muromachi Kikai Co., Ltd., Tokyo, Tel. (03) 241-2444, FAX (03) 241-2940 • In the ***United States and other countries,*** please contact ALZA Corporation at (800) 227-9953 or (415) 494-5067, FAX (415) 494-5151

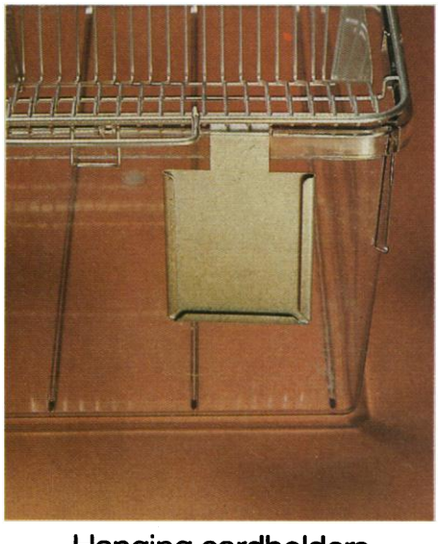
*Pump shown actual size.

Circle No. 141 on Readers' Service Card

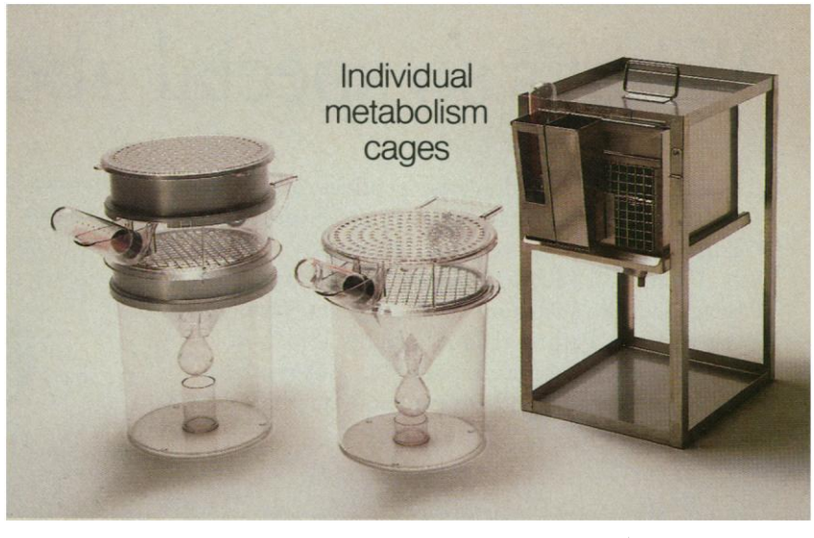
Just a sampling of our animal care accessories.

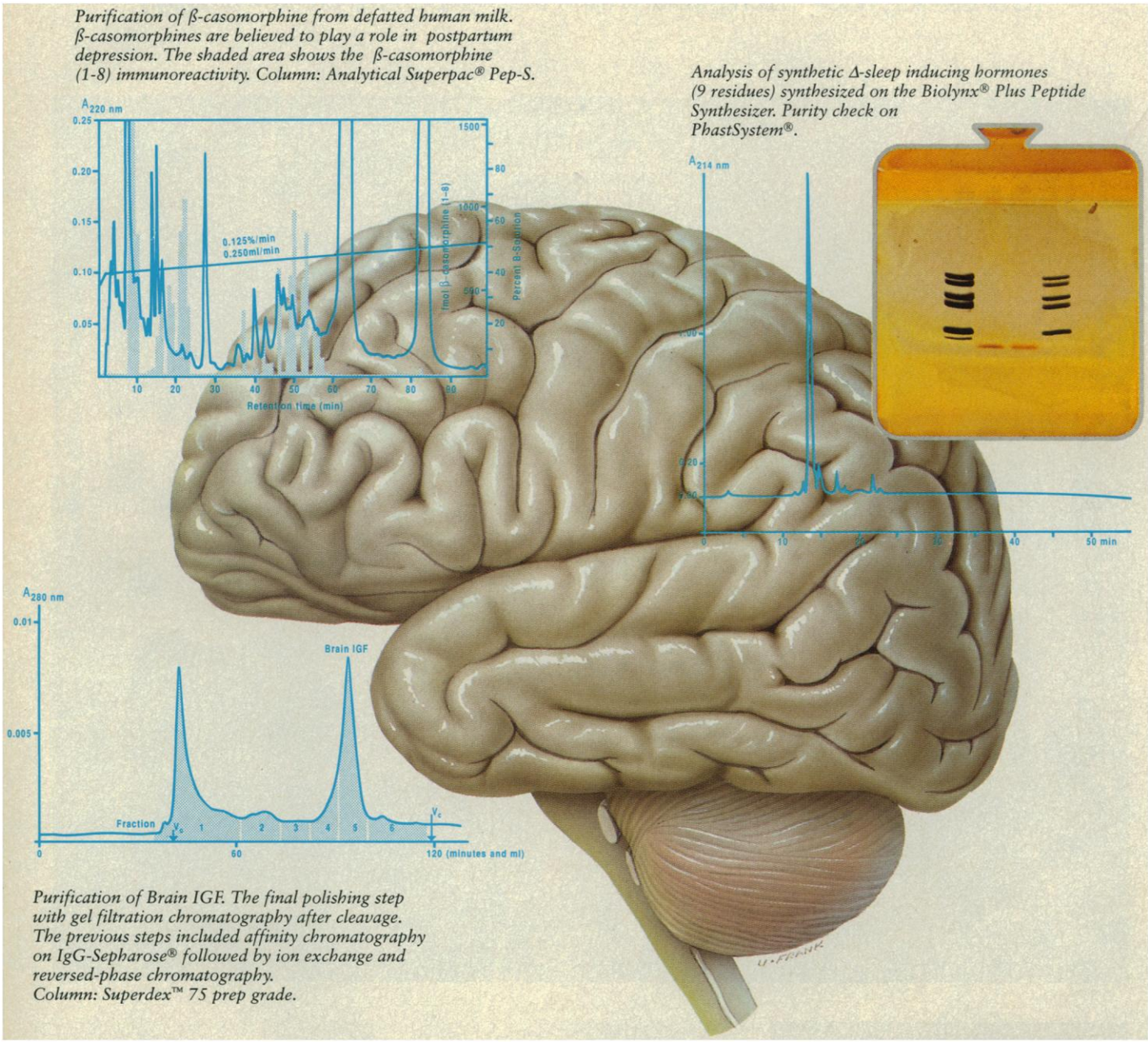
(Our catalog goes much further . . . and that coupon will provide a copy.)





Hanging cardholders





Purification of ß-casomorphine from defatted human milk. ß-casomorphines are believed to play a role in postpartum depression. The shaded area shows the ß-casomorphine (1-8) immunoreactivity. Column: Analytical Superpac® Pep-S.

Analysis of synthetic Δ-sleep inducing hormones (9 residues) synthesized on the Biolynx® Plus Peptide Synthesizer. Purity check on PhastSystem®.

Purification of Brain IGF. The final polishing step with gel filtration chromatography after cleavage. The previous steps included affinity chromatography on IgG-Sepharose® followed by ion exchange and reversed-phase chromatography. Column: Superdex™ 75 prep grade.

What's so special about peptides?

A lot. Peptides wouldn't be peptides otherwise. The fact is that the vast majority are *biologically active* messengers of very special events.

Pharmacia LKB have been isolating and purifying peptides for more than 30 years. Over the years, we've gained unique insights into how to optimize their separation, analysis and synthesis. We maintain updated information on the latest techniques, applications and instrument systems for peptide work. That's one of our specialties. Why not contact us to make it one of yours too?

We help you manage biomolecules

Pharmacia

Pharmacia LKB Biotechnology

Head office Sweden Tel 46 (018) 163000. **Australia** Tel (02) 8883622. **Austria** Tel (0222) 6866250. **Belgium** Tel (02) 2424660. **Brazil** Tel 55-11 284 5815/289 8967. **Canada** Tel (514) 4576661. **Denmark** Tel (02) 265200. **East Europe** Tel 43 (0222) 921607. **Federal Republic of Germany** Tel (0761) 49030. **Finland** Tel (90) 5021077. **France** Tel (01) 3064 3400. **Great Britain** Tel (0908) 661101. **Holland** Tel (031) 348077911. **India** Tel (0812) 29634. **Italy** Tel (02) 2532844/26700475. **Japan** Tel (03) 4929181. **Norway** Tel (02) 549095. **Soviet Union** Tel 46 (08) 799 8000. **Spain** Tel (34)-3675 44 11. **Sweden** Tel 46 (08) 799 80 00. **Switzerland** Tel (01) 821 18 16. **United States** Tel (201) 457 8000. **Far East** Tel 852 (5) 814 8421. **Middle East** Tel 30 (1) 894 7396. **Other countries** Tel 46 (08) 799 8000. *(8904) 1129*

Circle No. 144 on Readers' Service Card

BIOTECHNOLOGY: FUTURE DIRECTIONS, FUTURE POLICIES

Public Policy Program — Conference
The College of William and Mary
March 29-31, 1990
Williamsburg, Virginia

The "Biotechnologic Revolution" is well underway, but seems to have paused. Early successes have been impressive, but new knowledge and products are slower to emerge. This pause offers an opportunity to assess past progress and current directions to gain perspective on biotechnological developments, their uses, and the policy issues they raise. Session topics include: (1) Biotechnology in 1990: Looking Back, Looking Ahead; (2) Commercial Prospects: The Entrepreneurial Role; (3) Optimal Public Policy: Balancing the Promotion and Regulation of Biotechnological Progress; (4) The Mapping of the Human Genome: Implications For Health, Ethics, and Law.

Participants include: Lori B. Andrews, Am. Bar Foundation; Keith C. Boone, Denison U.; Samuel Broder, Natl. Cancer Inst.; Nancy L. Buc, Weil, Gotshal & Manges, OTA Adv. Panel; Frank Bullock, Schering-Plough Corp.; Steven Burrill, Ernst & Young; George deStevens, Drew U.; Bernard N. Fields, Harvard U. Med. School & Cambridge Bioscience; Robert A. Fildes, Cetus Corp.; Richard D. Godown, Ind. Biotech. Assoc.; Henry Hubbard, Biotech. Practice Group, Hill & Knowlton; Bruce F. Mackler, Mackler, Cooper, & Gibbs, PC, Gen. Council, Assoc. of Biotech. Cos.; Margaret Mellon, Biotech. Policy Inst., Natl. Wildlife Fed.; Stephen A. Merrill, Natl. Acad. of Sci.; Amal Kumar Naj, Wall St. J.; Richard J. Roberts, Cold Spring Harbor Lab.; Leonard G. Schifrin, Col. of Wm. & Mary; Frank Young, Dept. of HHS; Norton Zinder, Rockefeller U.

For information contact **David Finifter, Dir., Public Policy Prog., or Karen Dolan, Conf. Admin., Col. of Wm. & Mary, Williamsburg, VA 23185 (804) 221-2369.** Cutoff for guaranteed hotel reservations is March 2.

Conference support by CIBA-GEIGY Pharmaceuticals, Sandoz Corp. and Schering-Plough Foundation.