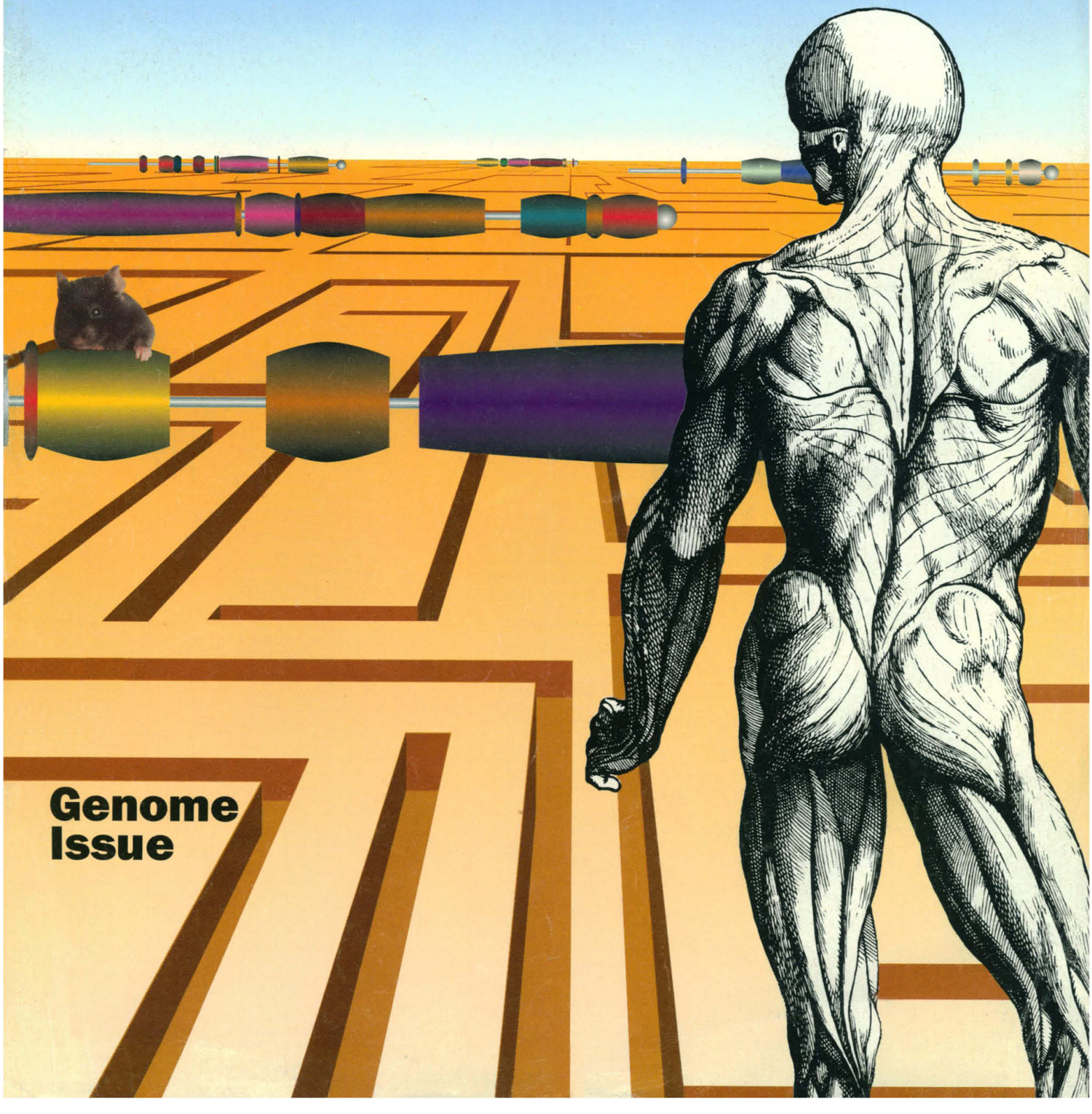
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

1 OCTOBER 1993 $6.00
VOL. 262 • PAGES 1–148



Genome Issue

- **Reduce your cycling times by 30%**
- **Well-to-well temperature uniformity of +/- 0.1°C**

The RoboCycler™ 40 Temperature Cycler takes the most innovative approach ever to thermal cycling. While conventional systems ramp the temperature of a single block, the four-block RoboCycler 40 Temperature cycler uses a robotic arm to quickly move samples from one block to another. The results? A dramatic 30% reduction in cycle times. And unmatched well-to-well temperature uniformity of +/- 0.1°C.

The RoboCycler 40 Temperature Cycler completely avoids the problem of temperature nonuniformity. Single-block cycler blocks develop hot spots because of the need to quickly ramp temperature. In contrast, temperatures of the RoboCycler 40 temperature cycler-well blocks remain constant throughout a cycling program. And upon completion, the samples are safely stored in the cold block.

The system's user-friendly interface simplifies programming. The hot blocks can be programmed from 25° to 99°C, the cold block from 6° to 20°C. Program information and run status are displayed on the LCD or printed to an optional serial printer.

The RoboCycler 40 Temperature Cycler...The answer when speed and consistency are critical.

Please contact Stratagene for the distributor nearest you.

Circle No. 24 on Readers' Service Card

STRATAGENE®

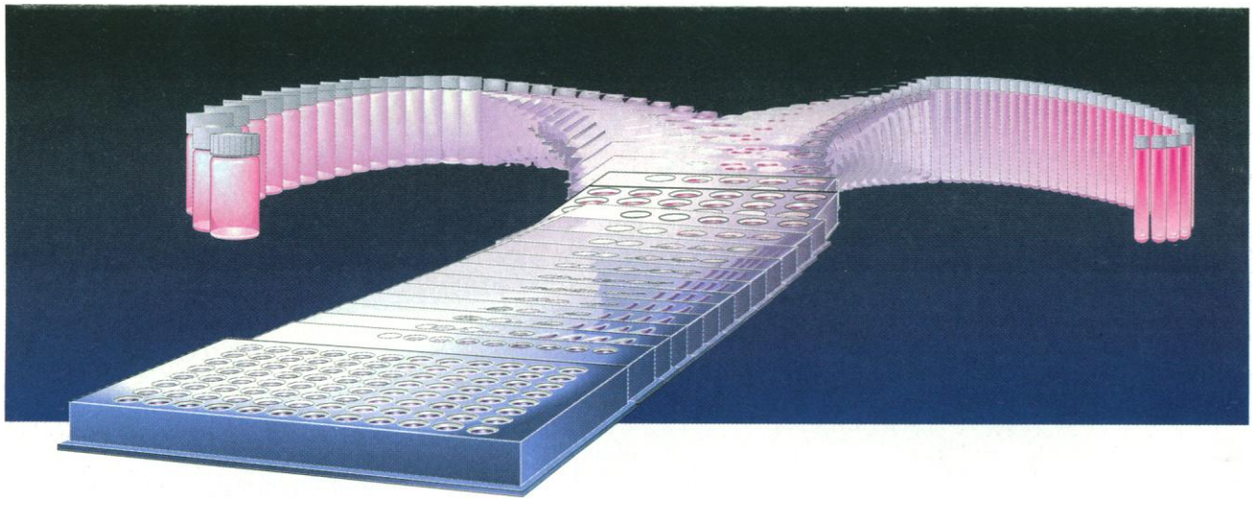
USA:
Corporate Headquarters
Telephone: 800-424-5444
Fax: 619-535-0034

Germany:
Stratagene GmbH
Telephone: (06221) 40 06 34
Telefax: (06221) 40 06 39

United Kingdom:
Stratagene Ltd.
Telephone: (0223) 42 09 55
Telefax: (0223) 42 02 34

France:
Stratagene France
Telephone: (0590) 72 36
Telefax: (1) 44 28 19 00

Switzerland:
Stratagene GmbH
Telephone: 01-3641106
Telefax: 01-3657707



TopCount Combines the Power of Radioisotopic and Luminescence Technology into One Microplate System

TopCount Microplate Scintillation and Luminescence Counter

Beta, gamma or luminescence labeling? Why have three instruments when TopCount can count all three labels? It's the only system that measures liquid scintillation, solid scintillation and luminescent samples in microplates.

The Convenience of Microplates with the Performance of Scintillation Counting

TopCount can measure radioisotopes in 96- and 24-well microplates, up to 12 wells simultaneously. Reflective optics and proprietary counting technology prevents optical crosstalk and maintains high counting efficiency. TopCount is the first microplate system to offer true LSC performance, including dual label DPM with external standardization.

Step into the Future with Luminescence

The same technology that gives TopCount unsurpassed performance in microplate LSC brings low backgrounds and fast photon counting to luminescence measurements Now you can count glow and enhanced flash luminescence with a dynamic range of 10^6. In addition, exclusive features such as dual detectors, a plate stacker and a bar code reader provide you with a combination unmatched by any luminometer or LSC.

A Solution for Every Application

TopCount will revolutionize the way you run your assays. You can harvest 96 samples at once, and count them without ever touching a filter. You can prepare and analyze samples in the same plate for in-plate binding and adherent cell assays. And for liquid samples, there is even a better way — you can count them dry, without cocktail, in solid scintillator plates.

For a solution to your microplate application, just call Packard and ask about TopCount.

PACKARD
A Canberra Company

Packard Instrument Company, 800 Research Parkway, Meriden, CT 06450 U.S.A.
Tel: 203-238-2351 Toll Free: 1-800-323-1891 TX: 643251 FAX: 203-235-1347

Packard Instrument Co. SYSTEM CERTIFIED ISO 9001

Packard International Offices:

Australia, Mt Waverley 61-3-543-4266; **Austria**, Vienna 43-1-302504-0; **Belgium**, Brussels 32-2-4668210; **Canada**, Ontario 1-800-387-9559; **Denmark**, Greve 45-42909023; **France**, Rungis (33) 1 46.86.27.75; **Germany**, Frankfurt (49-69) 663010; **Italy**, Milano 39-2-33910796/7/8; **Japan**, Tokyo 81-3-3866-5850; **Netherlands**, Groningen 31-50-413360; Tilburg (013) 423900; **Russia**, Moscow, 7-095-238-7335; **Sweden**, Uppsala 46-18 556900; **Switzerland**, Zurich (01) 481 69 44; **United Kingdom**, Pangbourne, Berks (44) 0734 844981.

Circle No. 23 on Readers' Service Card

With our new range of options, monitoring your animals electronically is as easy as...

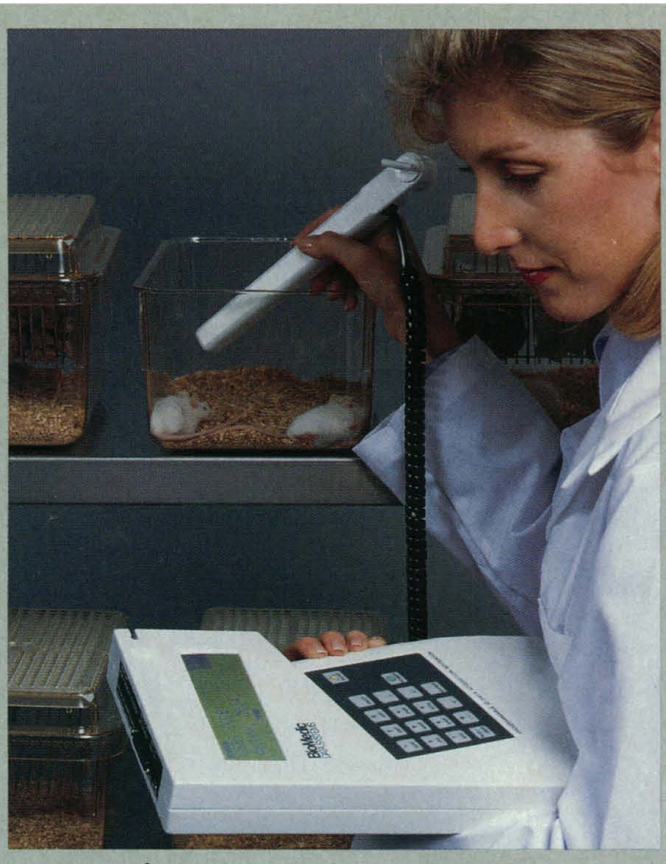
one

THE POCKET SCANNER

Introducing the world's smallest, fully integrated Pocket Scanner, the DAS-4004. It offers the simplest way to convert from the obsolete and unreliable methods of animal identification to our proven technology of pre-encoded microchip transponders that are carried on board the animal.

Direct and fool proof positive identification from cage to computer is easily facilitated with this unique Pocket Scanner. The unit is powered by a 9 volt replaceable battery and comes equipped with a communications port for downloading stored data to your own computer or printer.

Now you can enter the world of electronic monitoring at entry level, single-handed. Also available is the DAS-4004 EM with extended memory.



two

THE NOTEBOOK

The DAS-4002 Portable Programmable Data Acquisition Notebook, with rechargeable battery, is easy to use.

The unit is simple to address with a menu driven system, allowing you to identify your animals using your own codes or numbers. At the time of the scan, the unit can record Date and Time, Weight and clinical observation data related to each animal. You can then transfer the recorded data to your own computer system.

This easy-to-use, state-of-the-art product improves data accuracy and efficiency in your animal research.

three

THE BENCH-TOP

The DAS-4001 is a bench-top, line powered Programmable ID Data Acquisition System that can be fully integrated with the host computer. It can directly link the information gathered at a work station, such as weight, clinical observations and dosing, to your own on-line terminal based system.

Bio Medic Data Systems is the only company that offers animal monitoring systems that allow you to use your own identification codes.

There is simply no justification any longer for continuing primitive animal identification methods (tattooing, clipping, tagging) and accepting the additional errors in recording and transferring monitored information mechanically. Today's research is too costly and errors are too expensive. Our Electronic Lab Animal Monitoring System (ELAMS™) is economical and easily integrated with your existing methodologies. We are the only company in the industry with proven, task-oriented systems solutions, training, service and long-term R & D. Bio Medic Data Systems has tomorrow's answer to today's problems. Please call us and let's talk.

A permanently encoded microchip (shown 1.5x) is the focus of the unique ELAMS system.

BioMedic
DATA SYSTEMS
a bioMedic company

Bio Medic Data Systems, Inc.
255 West Spring Valley Ave.,
Maywood, N.J. 07607
Phone: 201-587-8300

Toll free: 1-800-526-2637
Fax: 201-843-8816

Circle No. 47 on Readers' Service Card

ISSN 0036-8075
1 OCTOBER 1993
VOLUME 262
NUMBER 5130

SCIENCE

AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

29 & 117
Experimental gene therapy for hemophilia B

110
Optical mapping of chromosomes

NEWS & COMMENT

RESEARCH NEWS

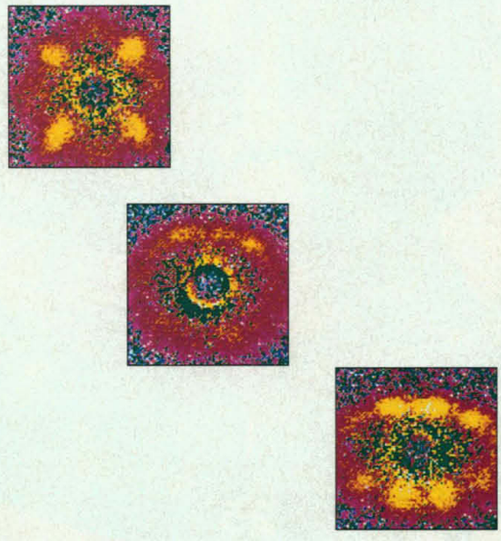
GENOME ISSUE

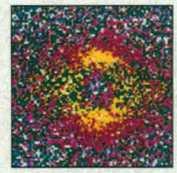
DEPARTMENTS

COVER

As humans and mice look at each other through the eyes of the Human Genome Project, their similarities, which make the mouse a key model system, are more important than their differences. In this issue, a chart highlighting the similarity between the two genomes and showing the fusion of two mouse genome maps is presented on page 67, along with an accompanying Article (page 57); a Policy Forum, Perspectives, and a News report indicate future challenges for the Genome Project. [Illustration: Susan Nowoslawski, Washington, DC]

REPORTS





83

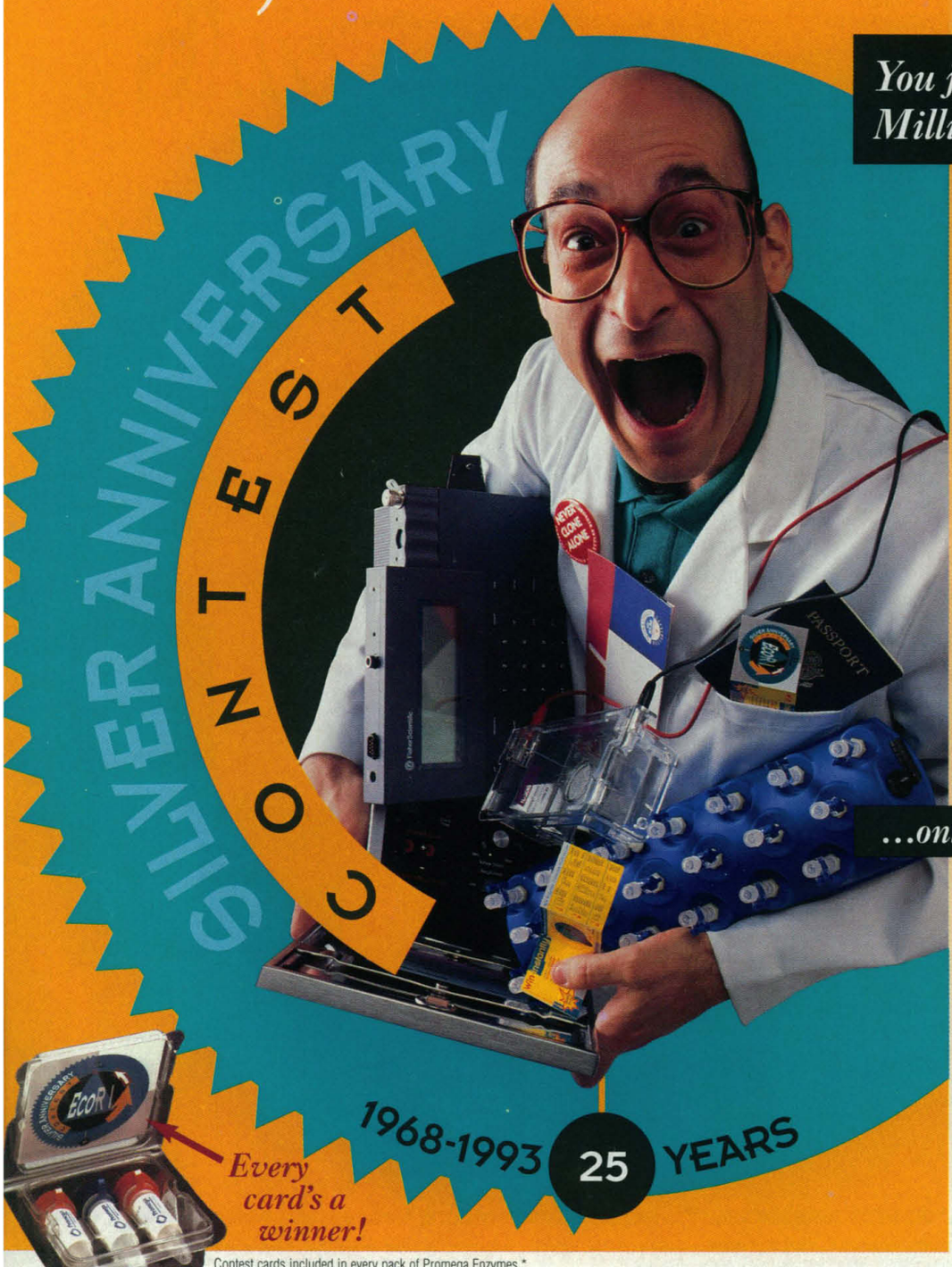
Superconductor vortices revealed

AAS Board of Directors

Indicates accompanying feature

■ **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. Copyright © 1993 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): $87 ($47 allocated to subscription). Domestic institutional subscription (51 issues): $205. Foreign postage extra: Mexico, Caribbean (surface mail) $50; other countries (air assist delivery) $95. First class, airmail, student and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. **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 2033, Marion, OH 43305-2033. **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, MA 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.

Cut, scratch and win!



You just can't lose in our Million Dollar Contest!

Have fun, play this contest and help us celebrate the 25th Anniversary of the Purification of the First Restriction Enzyme. Collect bonus points for free valuable Promega Enzymes.

Grand Prize – a trip for two to a scientific meeting anywhere in the world.

Revco Ultima™ Freezer, the most advanced freezer in the world.

AB-250D Analytical Balance from Denver Instruments with motorized doors and more.

...only from Promega.

Extra Value in Promega Restriction Enzymes:

Blue/White Cloning Assay
- Performance is cloning assured

Genome-Qualified Cloning Assay
- Genomic analysis assured performance

Minimal Star Activity
- Improved cutting performance

MULTI-CORE and 4-CORE Buffer Systems
- Extra convenience for the user

Every card's a winner!

Contest cards included in every pack of Promega Enzymes.*

Promega Corporation · 2800 Woods Hollow Road · Madison, Wisconsin · 53711-5399 · Toll Free 800–356-9526 · Fax 800–356-1970

For Direct Sales in USA: Promega products may also be purchased from Fisher Scientific · Toll Free 800–766-7000 · Fax 800–926-1166

Worldwide Distribution:									
Argentina	1 381 7962	Denmark	44 94 88 22	India	11 684 6565	New Zealand	9 570 3200	Sweden	0346 83050
Australia	008 225 123	Finland	90 708 0900	Ireland	01 8426644	P.R. of China	1 256 3159	Switzerland	01 830 70 37
Austria	1 80105 324	France	05 48 79 99	Israel	03 69 79 875	Portugal	(see Spain)	Taiwan	02 733 6877
Belgium	(see Netherlands)	Germany	06221 502122	Italy	055 5001871	Russia	095 135 43 07	Thailand	02 733 6877
Brazil	031 275 12 40	Greece	01 643 6138	Luxembourg	(see Netherlands)	Singapore	2929783	United Kingdom	0800 378994
Canada	800 267 7424	Hong Kong	751 9488	Malaysia	3 735 1559	South Africa	11 886 4710	Venezuela	2 261 66256
		Iceland	(see Sweden)	Netherlands	071 21 71 21	Spain	93 404 52 14		

*No purchase necessary. See sales flyer FL016 for details.

Promega
In USA Call
800-356-9526
Fax 800-356-1970 or
FisherScientific
800-766-7000

Circle No. 37 on Readers' Service Card

edited by PHIL SZUROMI

Superconductor vortices and twins

Neutron scattering can provide a sensitive measure of the vortex structure of a superconductor throughout its bulk structure. Keimer *et al.* (p. 83) studied a single crystal of $YBa_2Cu_3O_7$ in a 0.5-tesla magnetic field that was varied over angles of 0° to 80° with respect to the crystal's *c* axis. They find that twin planes lock in the vortex lattice orientation up to a surprisingly high inclination angle of 70°; for larger angles, a chain state is observed. Such strong flux pinning by twin planes should prove useful for maintaining high critical currents in applications.

■

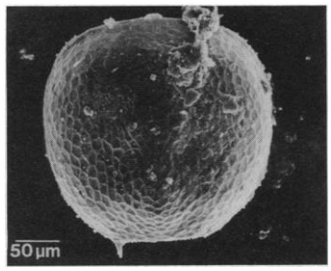
A difference approach to protein sequencing

Protein sequencing is almost synonymous with the Edman degradation, in which the sequence is determined by removing one residue at a time. Chait *et al.* (p. 89) have developed a method that has the promise of high sample throughput and low cost. The protein is subjected to numerous cycles of a rapid Edman degradation in which a terminating agent is used. This process generates a series of peptide fragments that differ from the next by one residue. The mass spectrum of this mixture reveals parent peaks whose mass differences yield the protein sequence. Posttranslationally modified and nonnatural amino acids are readily determined.

■

Ostracode ontogeny

Most extant and fossil ostracodes, which are small crustaceans, are bivalved and have bivalved instars. Zhang and Pratt (p. 93), however, describe fossils from Lower Cambrian rocks in China indicating that some of the earliest ostracodes had univalved instars that later developed into bivalved instars and adults. The recognition of this transition during ontogeny



implies that a bivalved capacity evolved before the appearance of mineralized skeletons in the Cambrian.

■

Higher temperature superconductors

One way to increase the transition temperature (T_c) of copper oxide superconductors is to squeeze them. Nuñez-Reguerio *et al.* (p. 97) found that the T_c of the homologous series $HgBa_2Ca_{n-1}Cu_nO_{2n+2+\delta}$ increased continuously with applied pressure. At atmospheric pressure, T_c is 133 kelvin; it increased to 157 kelvin, the highest-yet observed for any material, at an applied pressure of 23.5 gigapascals. No saturation effects were observed; thus, modifying the solid in a way that mimics the effects of compression might result yield higher T_c's at ambient pressure. See also a News story by Amato (p. 31).

■

More rapid ribozymes

To increase the specificity of ribozyme function, a long recognition sequence is required. Although they increase the binding of the substrate, paradoxically such long recognition sequences reduce the rate of product release and also reduce the specificity of the ribozyme. Tsuchihashi *et al.* (p. 99) report on the use of a derivative of the p7 nucleocapsid (NC) protein of HIV-1, a nonspecific RNA binding protein, in ribozyme reactions. The NC protein enhanced both the cleavage rate and the specificity of a hammerhead ribozyme possibly as a result of the strand exchange activity of NC.

■

Joining splicing

Although yeasts utilize fewer proteins in their splicing machinery than mammals, multiple approaches have shown that elements of the splicing machinery have been conserved through evolution. The assembly of the prespliceosome in mammals requires the splicing factor, SF3a. Brosi *et al.* (p. 102) show that SF3a is composed of three proteins, one is homologous to yeast PRP9, and all three are part of the U2 snRNP. Bennett and Reed (p. 105) isolated a mammalian spliceosome component (another of the SF3a proteins) and found that it is homologous to yeast PRP11 splicing factor. Legrain and Chapon (p. 108) show that PRP9 and PRP11 are also complexed in yeast.

■

Restriction maps under the microscope

A direct optical approach has been developed for determining the physical map of restriction enzyme cutting sites from small amounts of genomic DNA. Schwartz *et al.* (p. 110) imaged large fluorescently stained DNA molecules (0.2 to 1.0 megabases) that were elongated under flow conditions and then fixed in agarose gel. Restriction enzyme cutting releases the flow-induced tension along the molecule. The tips of nascent ends curl up to form bright balls that are easily observed under the microscope. The fragments can then be sized by length or overall intensity. Maps for several yeast chromosomes were in good agreement with those determined from pulsed-field gel electrophoresis.

■

Mouse map

The focus of this year's special genome issue is the mouse, one of the classic biological model systems (see Editorial, p. 11, for a synopsis). As for earlier issues on the human and *Drosophila* genomes and the X chromosome, a chart highlights areas of recent progress, intense scrutiny, and remaining gaps.

Lighting up the bar

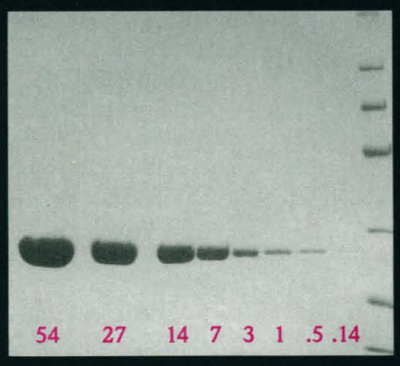
Neutral atomic and molecular gas is one of the major components of the galactic interstellar medium but has been difficult to study because the neutral gas clouds have low surface brightness and emit and absorb primarily at infrared wavelengths. Tielens *et al.* (p. 86) conducted high-sensitivity, high-resolution observations of the Orion Bar, a prominent front of emission associated with nearby ionized gas features. By separately mapping emission from hydrogen, carbon monoxide, and polycyclic aromatic hydrocarbons, they could track the penetration of ionizing ultraviolet radiation into the neutral gas and show that the emission is due to external ionization and not, as had been proposed, a shock wave.

THE VALUE IS CRYSTAL CLEAR

RECOMBINANT ENZYMES FROM NEW ENGLAND BIOLABS

At New England Biolabs, we're cloning for the future. Our enzyme production is linked to the cloning and overexpression of restriction endonucleases. This means you can be assured of unmatched affordability, pure product and unsurpassed scientific expertise.

And, because our high quality recombinant enzymes are produced in larger lots, you get greater product consistency.



SDS-PAGE of recombinant BamH I restriction endonuclease demonstrating purity of enzyme preparation from the cloned BamH I gene. Lanes represent a 2-fold dilution from 54 to 0.14 µg BamH I per lane. Lane 9 contains molecular weight standards. Molecular weight of BamH I protein = 24,570 daltons. This preparation was used to grow BamH I crystals which led to solving its three-dimensional structure. (A. Aggarwal, personal communication)

62 Recombinant Restriction Endonucleases

Aat II	BspE I	Hind III	Not I
Acc I	BspH I	Hinf I	Pst I
Afl II	Dde I	HinP1 I	Pvu II
Afl III	Dpn I	Hpa I	Sac II
Alu I	Dpn II	Hpa II	Sal I
Ase I	Eag I	Kas I	Sau96 I
Ava I	EcoO109 I	Mbo II	Sfi I
Ava II	EcoR I	Msc I	Sma I
Avr II	EcoR V	Msp I	Sph I
BamH I	Fok I	Mwo I	Sty I
Ban I	Fsp I	Nae I	Taq$^{\alpha}$ I
Bbv I	Hae II	Nco I	Xba I
Bcg I	Hae III	Nde I	Xho I
Bgl I	Hga I	NgoM I	Xma I
Bgl II	Hha I	Nla III	
BsaA I	Hinc II	Nla IV	

Recombinant Modifying Enzymes

Vent$_R$® DNA Polymerase
Vent$_R$® (exo$^-$) DNA Polymerase
Deep Vent$_R$® DNA Polymerase
Deep Vent$_R$® (exo$^-$) DNA Polymerase
M-MuLV Reverse Transcriptase
T7 DNA Polymerase
T4 DNA Polymerase
T7 RNA Polymerase
T4 DNA Ligase
Taq DNA Ligase
T4 RNA Ligase
T4 Polynucleotide Kinase
Exonuclease III

NEW Recombinant Enzymes for Protein Modification

PNGase F
Endo H
Endo H$_f$
Neuraminidase
N-Acetyl-β-D-Hexosaminidase$_f$
LAR$_R$ Phosphatase
YOP$_R$ Phosphatase
T-Cell$_R$ Phosphatase
Lambda Phosphatase

For crystal clear value and purity, call New England Biolabs, 1-800-NEB-LABS.

NEW ENGLAND BioLabs®

☐ **New England Biolabs Inc.**
32 Tozer Road, Beverly, MA 01915 USA
1-800-NEB-LABS
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, Federal Republic of Germany**
Tel. (06196) 3031 Fax (06196) 83639

DISTRIBUTORS: Australia (075) 94-0299; Brazil (011) 66-3565; Denmark (31) 56 20 00; Finland (90) 420-8077; France (1) 34 60 24 24; Greece (01) 5226547; India (542) 311473; Israel (03) 535-1205; Italy (02) 38103171; Japan (03) 3272-0671; Korea (02) 5560311; Mexico (5) 519-3463; The Netherlands (033) 95 00 94; New Zealand (09) 418-3039; Norway 22 22 04 11; People's Republic Of China (1) 2544399; Portugal (01) 858 15 64; Singapore 775-7284; Spain (01) 594 0806; Sweden (08) 734 8300; Switzerland (061) 481 47 13; Taiwan (02) 8964437; UK 0462 420616

FINALLY,

an Electroporator

WITH ALL

THE FEATURES YOU NEED

And None *you* Don't.

Too many electroporation devices come with a long list of fancy features and a shocking price. Now, the new Electroporator II from Invitrogen gives you all the versatile electroporation capability you need without the high cost.

YOU'VE GOT *the* POWER.

The easy-to-use Electroporator II uses standard electrophoresis power supplies, so you don't pay for an extra power supply you don't need. But the compact, durable Electroporator II still delivers all the power you *do* need, including pulse lengths from 1 to 25 ms.

BACTERIA, YEAST *and* MAMMALIAN CELLS WELCOME.

With the Electroporator II, it's easy to optimize field strength and pulse length for maximum transformation efficiency, no matter what cell type. And because it works with 0.1, 0.2 and 0.4 cm cuvettes, electroporation of bacteria, yeast or mammalian cells is no problem.

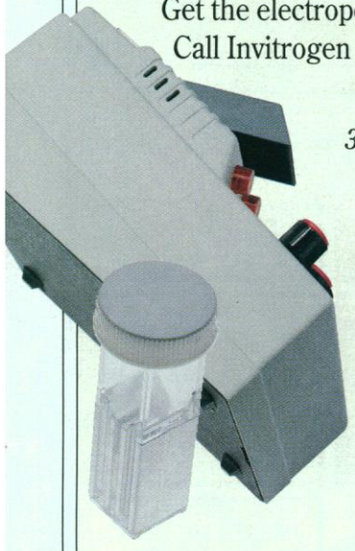
Get the electroporation device that delivers everything you need without the sticker shock.

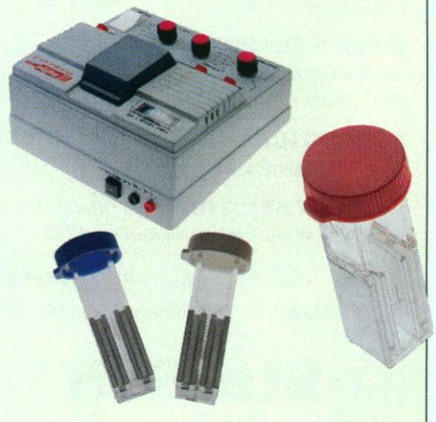
Call Invitrogen today to order the Electroporator II (catalog no. S1670-01).

(800) 955-6288 or Fax (619) 597-6201

Invitrogen®

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





European Headquarters:
Invitrogen *BV*
De Schelp 26, 9351 NV Leek
The Netherlands
Tel: (0) 5945-15175
Fax: (0) 5945-15312

Toll free Telephone Numbers
The Netherlands 06-02208848
Belgium 078-111173
Germany 0130 8100 43
Switzerland 155-1966
Austria 0660-8127

UK Tel: (0865) 781045 Fax: (0235) 533420
France 05 90 72 49
Sweden 020 793149
Norway 050 11033
Denmark 80 01 85 92

R&D SYSTEMS

CELBIO
Italy
Tel: 39-238103171
Fax: 39-238101465

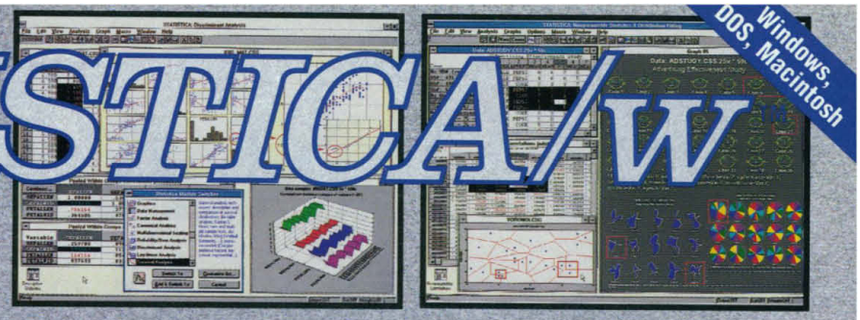
Japan
Tel: 81-356841622
Fax 81-356841633

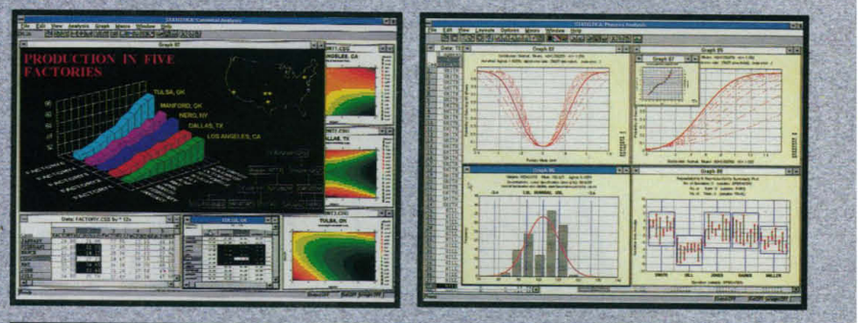
Austria 43-1-8891819 Australia 61-38089077 Finland 35-804208077 India 33-594127 Israel 972-8472563 Spain 34-14091251 or 34-3-4560607 Singapore 65-779-1919 Germany/Switzerland 62-21303907

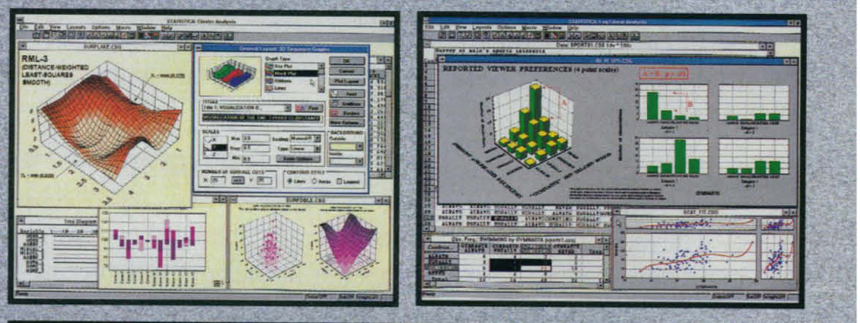
Circle No. 44 on Readers' Service Card

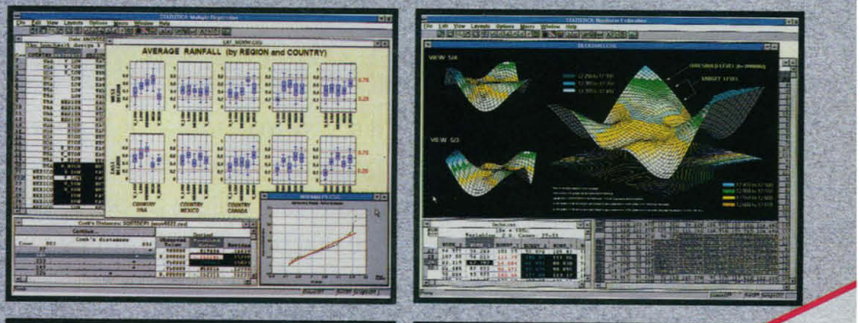
STATISTICA/w

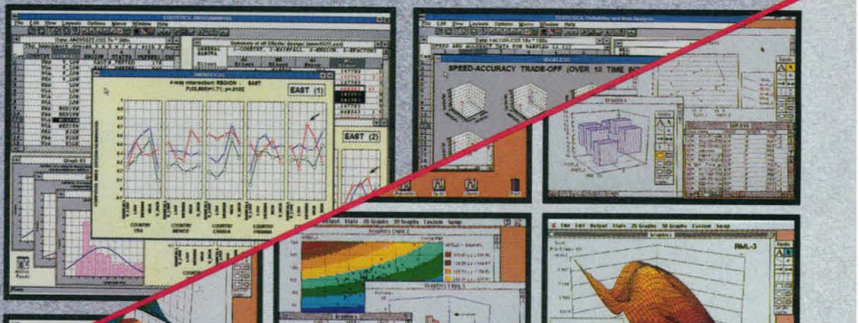
Windows, DOS, Macintosh











STATISTICA/w™ (for Windows) Complete Statistical System with thousands of on-screen customizable, presentation-quality graphs fully integrated with all procedures ■ Complete Windows 3.1 support, DDE, OLE, TT-fonts, multiple toolbars, right mouse button support ■ Unlimited numbers of data-, results-, and graph-windows ■ Inter-window integration: data, results, and graphs can be treated as objects and converted into one another in a number of ways ■ The largest selection of statistics and graphs in a single system; comprehensive implementations of: Exploratory techniques; multiway tables with banners (presentation-quality reports); nonparametrics; distribution fitting; multiple regression; general nonlinear estimation; stepwise logit/probit; general ANCOVA/MANCOVA; stepwise discriminant analysis; log-linear analysis; factor analysis; cluster analysis; multidimensional scaling; canonical correlation; item analysis/reliability; survival analysis; time series modeling; forecasting; lags analysis; quality control; process analysis; experimental design (with Taguchi); and much more ■ Manuals with comprehensive introductions to each procedure and examples ■ Hypertext-based Stats Advisor expert system ■ Extensive data management facilities (spreadsheet with long formulas, block operations, advanced Clipboard support, DDE hot links, relational merge, data verification, powerful programming language) ■ Batch command language and macros also supported, "turn-key system" options ■ All output displayed in Scrollsheets™ (dynamic, customizable, presentation-quality tables with toolbars, pop-up windows, and instant 2D, 3D and multiple graphs) ■ Extremely large analysis designs (e.g., correlation matrices up to 32,000x32,000, unlimited ANOVA designs) ■ Megafile Manager with up to 32,000 variables (8 Mb) per record ■ Unlimited size of files; extended ("quadruple") precision; unmatched speed ■ Exchanges data and graphs with other applications via DDE or an extensive selection of file import/export facilities ■ Hundreds of types of graphs, including categorized multiple 2D and 3D graphs, matrix plots, icons, and unique multivariate (e.g., 4D) graphs ■ Facilities to custom design new graphs and add them permanently to menu ■ On-screen graph customization with advanced drawing tools, interactive stretching and resizing of complex objects, interactive embedding of graphs and artwork, special effects, icons, maps, multi-graphics management, page layout control for slides and printouts; unmatched speed of graph redraw ■ Interactive rotation, perspective and cross-sections of all 3D and 4D graphs ■ Extensive selection of tools for graphical exploration of data: fitting, smoothing, overlaying, spectral planes, projections, layered compressions, marked subsets ■ Price **$995**.

Quick STATISTICA/w™ (for Windows) A comprehensive selection of basic statistics and the full graphics capabilities of STATISTICA/w ■ Price **$495**.

STATISTICA/DOS™ (for DOS) A STATISTICA/w-compatible data analysis system ■ Price **$795**.

Quick STATISTICA/DOS™ (for DOS) A subset of STATISTICA/DOS statistics and graphics ■ Price **$295**.

Domestic sh/h $10 per product; 14-day money back guarantee.

Circle No. 7 on Readers' Service Card

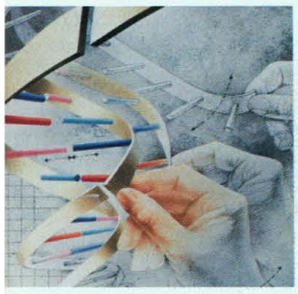
StatSoft™

2325 E. 13th St. • Tulsa, OK 74104 • (918) 583-4149
Fax: (918) 583-4376

Overseas Offices: Statsoft of Europe (Hamburg, FRG), ph: 040/4200347, fax: 040/4911310; **StatSoft UK** (London, UK), ph: 0462/482822, fax: 0462/482855; **StatSoft Pacific** (Melbourne, Australia), ph: (03) 663 6580, fax: (03) 663 6117; **StatSoft Canada-CCO** (Ontario), ph: 416-849-0737, fax: 416-849-0918. Available From: CORPORATE SOFTWARE and other Authorized Representatives Worldwide: Holland: MAB Julsing, 071-230410; France: Version US (1) 40590913; Sweden: AkademiData 018-240035; Hungary: Dagent Kft 186-5782; Belgium: TEXMA 10 61 16 28; South Africa: Osiris 12 663-4500; Japan (Macintosh): Three's Company, Inc., 03-3770-7600; Japan (DOS and Windows): Design Technologies, Inc., 03-3667-1110.

STATISTICA/Mac™ (for Macintosh) A STATISTICA/w-compatible, comprehensive data analysis and graphics system designed for the Macintosh ■ Large selection of statistical methods fully integrated with presentation-quality graphics (incl. EDA, multiplots, a wide selection of interactively rotatable 3D graphs; MacDraw-style tools) ■ Unlimited size of files ■ Full support for System 7, incl. "Publish and Subscribe" ■ Price **$695.**

Quick STATISTICA/Mac™ (for Macintosh) A subset of STATISTICA/Mac: a comprehensive selection of basic statistics and the full graphics capabilities of STATISTICA/Mac ■ Price **$395.**



ONE-HOUR DNA

NEW UltraFAST DNA Synthesis Technology

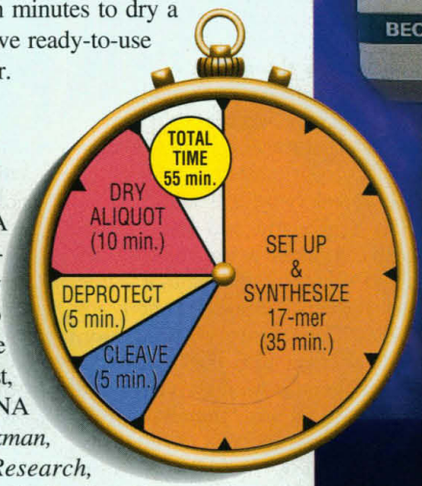
Why wait hours or days for your oligonucleotides when you can have them in less than one hour? Beckman now offers you a way to remove the oligo bottleneck and increase your laboratory efficiency with Ultra*FAST* DNA Synthesis.

FAST, EASY DNA SYNTHESIS

All you need for Ultra*FAST* DNA Synthesis is our Oligo 1000 DNA Synthesizer running new *FAST* synthesis methods (2-minute cycle time for a 30 nmole scale and 2.25 minutes for a 200 nmole scale) and our unique acetyl-protected deoxyC phosphoramidite*. Then use our new Ultra*FAST* Cleavage & Deprotection Kit* which completely processes your DNA in ten minutes. Take another ten minutes to dry a useful aliquot and you have ready-to-use DNA in less than one hour.

BECKMAN MAKES IT SIMPLE

With our *FAST* DNA synthesis methods for two-minute cycle times and new DNA chemistries, the Oligo 1000 DNA Synthesizer is the instrument of choice for fast, easy and economical DNA synthesis. *Dr. Len Packman, Assistant Director of Research, Cambridge Centre for Molecular Recognition, Cambridge University, U.K. comments,* ***"The Oligo 1000 has consistently produced high quality oligonucleotides and has impressed me with both its ease of use and its speed of synthesis. It would be a valuable addition to any laboratory needing a fast and regular supply of primers and probes."***



DNA in less than an hour!
Think of the possibilities.

THE BECKMAN PLUS

Beckman provides the science, support and solutions to help you in your important gene research. Call your local Beckman representative to get ***free*** technical information on how you can increase your laboratory efficiency with the new Ultra*FAST* DNA synthesis technology from Beckman.

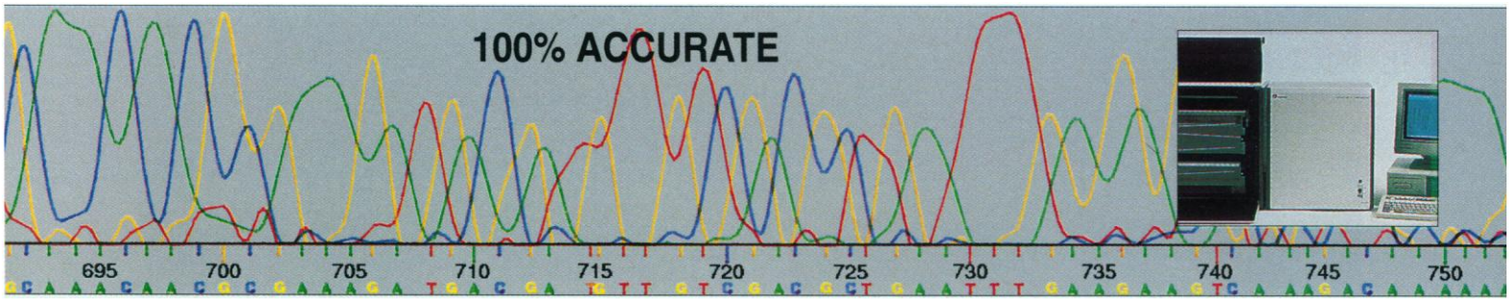
*Patents Pending.

BECKMAN

Worldwide Offices: Africa, Middle East, Eastern Europe (Switzerland) (22) 994 07 07. **Australia** (61) 02816-5288. **Austria** (2243) 85656-0. **Canada** (905) 387-6799. **China** (861) 5051241-2. **France** (33) 1 43 01 70 00. **Germany** (49) 89-38871. **Hong Kong** (852) 814 7431. **Italy** (39) 2-953921. **Japan** 3-3221-5831. **Mexico** 525 575 5200, 525 575 3511. **Netherlands** 02979-85651. **Poland** 408822, 408833. **Singapore** (65) 339 3633. **South Africa** (27) 11-805-2014/5. **Spain** (1) 358-0051. **Sweden** (8) 98-5320. **Switzerland** (22) 994 07 07. **Taiwan** (886) 02 378-3456. **U.K.** (0494) 441181. **U.S.A.** 1-800-742-2345.

Circle No. 20 on Readers' Service Card

P H A R M A C I A B I O T E C H



The longer your DNA sequence, the more you need ALF™ DNA Sequencer.

It's no longer in doubt. ALF™ DNA Sequencer is the most accurate sequencing instrument available today. Totally error-free runs of 740 base pairs are not uncommon and well over 99% accuracy is routinely obtained from much longer nucleotide sequences (1).

Recently published studies (2-5) also confirm the sequencing supremacy of ALF.

For example, when ALF and two other instruments were assessed for sequencing precision (2,3), the high accuracy of ALF could not be matched by either of its rivals, who displayed sequencing errors of 5-10% in the 200-300 base pair range.

In another study (4), the leading competitor's DNA sequence error as a function of length increased rapidly from 1% in the 0-350 nucleotide range to about 17% at 500 nucleotides, reaching a plateau of 25% error at 560 nucleotides. Furthermore, to get reliable data, this instrument required a redundancy of 8.4 reads per nucleotide.

In contrast, a standard ALF DNA Sequencer was more than 99% accurate over 500 base pairs and sequenced with a low overall redundancy of 2.8 (one third of the rival sequencer) in the course of the European Community *Saccharomyces cerevisiae* genome sequencing project (5).

1. Data supplied by M. Uhlén and T. Hultman from routine sequencing run at the Royal Institute of Technology, Stockholm, Sweden.

2. Comparison of three non-isotopic aotomated DNA sequence analysis systems. Poster presentation at the *San Diego Conference on Nucleic acids, Nov. 20-22, 1991.* Van Ranst, M., Fiten, P., Voet, M., Volckaert, G., Opdenakker, G.

3. Uniform scoring system for the assessment of DNA sequencing accuracy. *Meth. Mol. Cell. Biol. 3 (1992) 243-245,* Van Ranst, M., Fiten, P., Voet, M., Volckaert, G., Opdenakker, G.

4. Sequence length and error analysis of Sequenase and automated Taq cycle sequencing methods. *BioTechniques 14 (1993) 442-447,* Koop, B.F., Rowan, L., Chen, W.-Q., Deshpande, P., Lee, H., Hood, L.

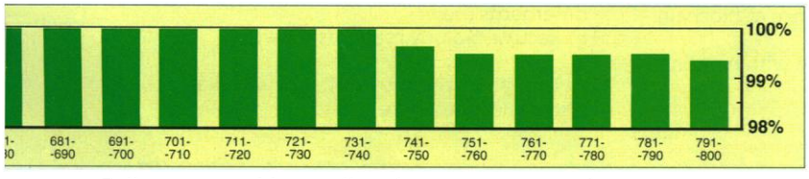
5. An efficient low redundancy large scale DNA sequencing strategy: Primer walking on plasmid and cosmid DNA using *T7 DNA polymerase* and fluorescein-15*-dATP as internal label. Submitted for publication in *BioTechniques*, Voss, H., Wiemann, S., Zimmermann, J., Grothues, D. Sensen, C., Schwager, C., Stegemann, J., Erfle, H., Rupp, T., Sproat, B., Ansorge, W.

ALF - the most accurate DNA sequencer available today.

That's 100% certain.

Ask for more information.

Circle No. 54 on Readers' Service Card



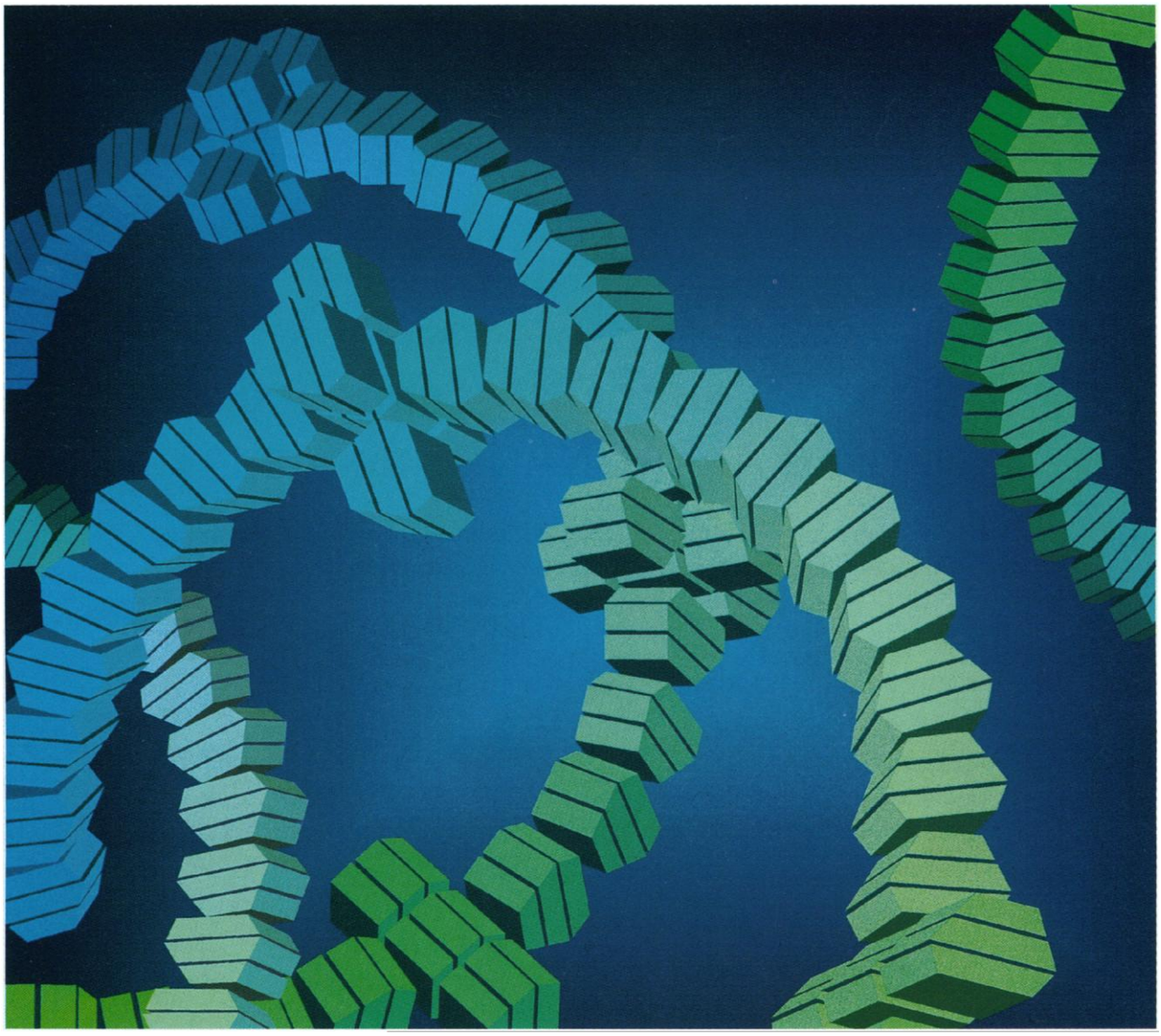
Fully automated base calling from a routine 800 base sequencing run. ALF was 100% accurate up to 740 base pairs (1).

1143

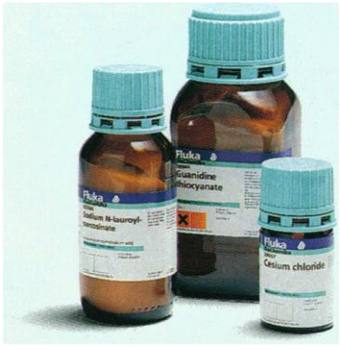
Pharmacia

Head office Sweden 46 (0)18 16 50 00 **Australia** 02 367 4200 **Austria** 01 68 66 25 **Belgium** 02 727 43 51 **Brazil** 011 872 68 33 **Canada** 800 463 5800 **Denmark** 48 14 10 00 **Finland** 90 5021 077 **France** 130 64 34 00 **Germany** 0761 49 030 **Great Britain** 0908 60 30 65 **Hong Kong** 811 86 93 **Holland** 03480 77911 **India** 812 26 76 30 **Italy** 02 273 221 **Japan** 03 34 92 94 99 **Malaysia** 03 735 3972 **Norway** 63 89 23 10 **People's Republic of China** 01 25 65 603 **Portugal** 01 417 24 72 **Republic of Korea** 02 511 0801 **Spain** 93 589 07 01 **Sweden** 08 623 85 00 **Switzerland** 01 821 1816 **Taiwan** 02 831 5310 **United States** 800 526 3593 **Eastern Europe** + 43-(0)1 982 38 26 **Far East** 852 811 8693 **Latin America** 55-11 872 68 33 **Middle East** 30 -(0)1 96 27 396 **Other countries** 46 (0)18 16 50 00

(9306)



MicroSelect – The Unsurpassed Quality for Biochemistry and Molecular Biology



Basics for Life Sciences
The product line MicroSelect has been specially developed for applications in modern biochemistry and molecular biology. Its unique quality meets perfectly the increasing demand of life science for high purity basic reagents.

A Unique Quality Label
Rigorous analytical tests guarantee that only top quality products earn the MicroSelect label. The MicroSelect tests include:
- solubility and homogeneity tests
- filter test: filtration of a test solution through a Millipore ® 0.45 µm filter; no residue allowed
- UV test: limited UV absorbance at biochemically relevant wave-lengths
- pH test: pH of a test solution within defined limits

Products with the new label **MicroSelect for molecular biology** are assayed in addition for the absence of RNases, DNases, phosphatases and proteases.

A Broad Product Range
The MicroSelect programme includes:
- amino acids
- biological buffers
- chelators
- denaturation reagents
- precipitation reagents
- salts (NH_4, Ca, Cs, Li, Mg, K, Na)
- density gradient centrifugation chemicals
- detergents (new)
- molecular biology reagents (new)

Ask for your free copy of the new Fluka MicroSelect brochure.

Fluka

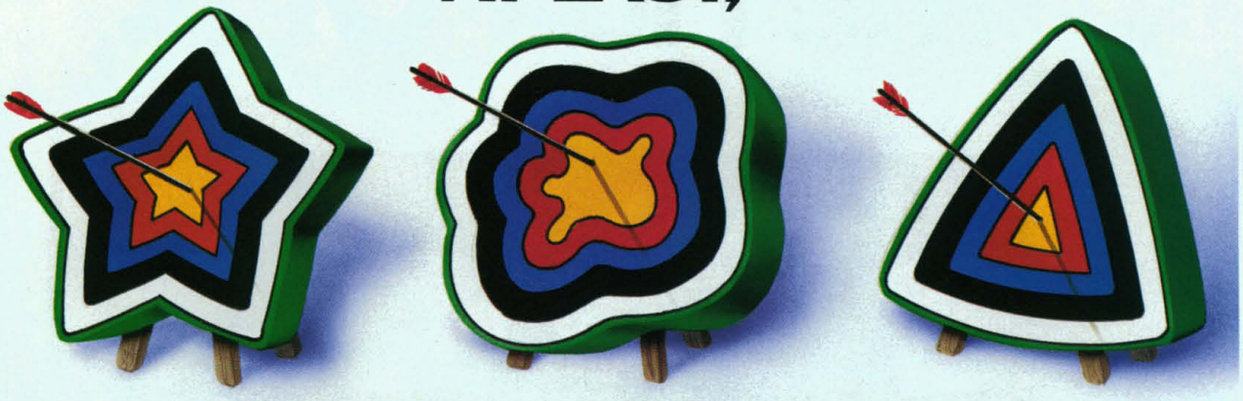
Chemika-BioChemika

Switzerland: Fluka Chemie AG, Industriestrasse 25, CH-9470 Buchs/Switzerland, Telephone 081 755 25 11, Telex 855 282, Fax 081 756 54 49

Benelux: Fluka Chemie, B-2880 Bornem, Tel. (03) 899 13 01 France: Fluka S.a.r.l., F-38297 St.Quentin Fallavier, Tél. 74 82 28 00
Germany: Fluka Feinchemikalien GmbH, D-89231 Neu-Ulm, Tel. (0731) 7 29 67-0 Great Britain: Fluka Chemicals Ltd, Gillingham, Tel. (0747) 82 30 97
Italy: Fluka Chimica, I-20151 Milano, Tel. (02) 33417-310 Japan: Fluka Fine Chemical, Chiyoda-Ku, Tokyo, Tel. 81-03-3255-4787
Spain: Fluka Química, E-28100 Alcobendas, Tel. (91) 661 99 77 USA: Fluka Chemical Corp., Ronkonkoma, N.Y., Tel. 516-467-0980

Circle No. 14 on Readers' Service Card

AT LAST,



A PCR DETECTION ASSAY

THAT ADAPTS TO ANY TARGET.

Universal detection capability is one reason why Digene's SHARP Signal™ System hits the mark with so many labs. Because the same protocol can detect a variety of targets, it's cost-effective. It uses no radioactive isotopes, so there are no disposal costs to consider. It's so sensitive, it can detect positive PCR specimens that start with as few as 10 input molecules. Assay results are available in just a few hours. And, it won't detect PCR artifacts such as primer dimers – only the target of interest is detected. Best of all, it's a standardized strip-well microplate format that gives both qualitative and quantitative colorimetric results. All considered, Digene's SHARP Signal System is one PCR detection assay that's right on target.

To order your kit or for more information, call 1-800-DIGENE-1. International inquiries, call 301-470-6500 or fax 301-680-0696.

DIGENE
DIAGNOSTICS, INC.

Digene SHARP Signal System Probe/Primer Sets are available to detect HIV, HBV, HCV, CMV, Mtb, and other infectious disease targets.

For research use only. The Polymerase Chain Reaction (PCR) process is covered by U.S. patents owned by Hoffman-LaRoche.

Circle No. 22 on Readers' Service Card

Half-Day DNA. And That's Just The Half Of It.

Synthesizing primers, probes, linkers, or gene fragments? Cut your time — and your reagent use — in half with the Millipore Expedite™ Nucleic Acid Synthesis System.

For instance, a pair of 20-mer PCR primers can be synthesized in about an hour and worked up in about two, so you can start using your new DNA by noon.

How's that possible? Because no matter how many columns you're running — 1, 2, 3, or 4 — the total cycle time is under 4 minutes. The Expedite system's exclusive alternating phase synthesis allows columns to act independently, so each is always synthesizing.

Expedite reagents speed things along further. Oligonucleotides made with Expedite brand chemistry can be deprotected in only 15 minutes at 55°C or 2 hours at room temperature.

But speed is just half the story. The Expedite system's patented microfluidics plate provides for extremely low internal volume. Reagent delivery to the column is cut by as much as 50% over other systems. So, you get more couplings per chemistry changeout; more DNA synthesized per dollar.

Now you've got the whole picture. So how about an Expedite video demo? Just give us a call and we'll send it to you, expeditiously. 1-800-872-0071.

MILLIPORE

Circle No. 32 on Readers' Service Card

For genomic library construction, the difference is clear.

Novagen's powerful λ*lox* system now has been adapted for cloning genomic DNA. Our new λ replacement vector, λBlueSTAR, provides the unique combination of blue/clear screening, *loxP* autosubcloning, and stable maintenance of large inserts. Kits include ligation-ready vector arms (either *Xho* I partially filled arms or *Bam*H I arms), recombination/mcr deficient host strain, and a complete set of protocols. These features make λBlueSTAR a unique tool for rapid construction and analysis of your genomic library.

λBlueSTAR™ System

Convenient

- Simply plate on X-gal to identify non-recombinant phage
- *lacZ* gene present in 13.2kbp stuffer fragment; no possibility of clone contamination by small fragments
- High-efficiency, low background arms eliminate need for *Spi* selection

Cloning Capacity 7–20kbp

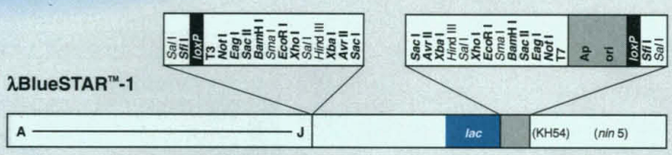
- T7, T3 promoters, wide choice of restriction sites flank inserts
- Derived from proven EMBL vector backbone

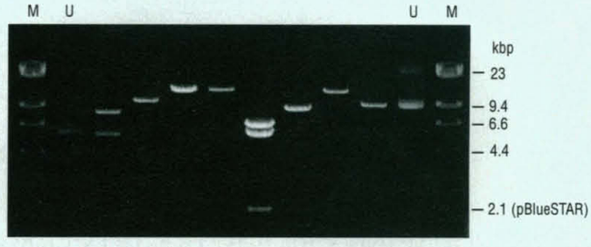
Cre-*loxP* Autosubcloning

- Built-in plasmid origin and ampicillin resistance marker
- Reliable conversion of phage to plasmid by cre recombinase
- Choice of *in vivo* and *in vitro* methods (purified cre available for *in vitro* conversion)
- No single-stranded intermediates

Protected Genomic DNA

- *mcrA*, Δ(*mcrB hsdRMS mrr*), *recD* host strain prevents restriction, stablilizes insert DNA





Not I digestion of miniprep plasmid subclones from randomly picked λBlueSTAR library recombinants. M = λ*Hin*d III markers, U = uncut controls.

Custom Library Production Available

Come to our Booth and Workshop at the December Cell Biology Meeting in New Orleans

Novagen

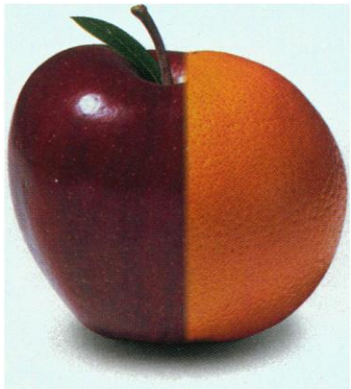
Novagen, Inc.
597 Science Dr.
Madison, WI 53711

800-526-7319
Fax: 608-238-1388

Australia	Medos Co. Pty. Ltd. 03-808-9077
Benelux	SanverTech 32(0) 3-454 0066
Canada	Inter Medico 800-387-9643
France	Integra Biosciences 1-39-59-84-42
Germany	AGS Applied Genetechnology Systems 06221-831023 Integra Biosciences 06404-809-0
Italy	Prodotti Gianni 02-5097-1
Japan	Takara Shuzo Co., Ltd. 0775-43-7247
Korea	LRS Laboratories, Inc. 02-924-8697
Singapore	Singapore Biotech Pte. Ltd. 779-1919
Sweden	AMS Biotechnology 08-620-02-32
Switzerland	Integra Biosciences 01-830-22-77
Taiwan	Interlab Co., Ltd. 02-736-7100
United Kingdom	AMS Biotechnology 0993-706500 Integra Biosciences 0670-732992

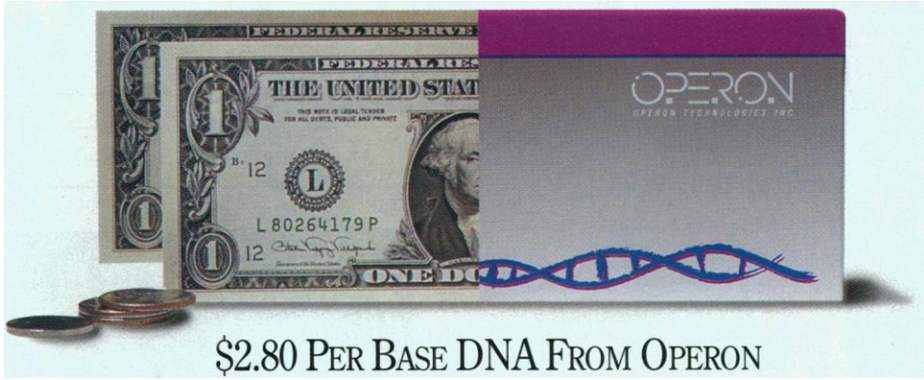
Circle No. 25 on Readers' Service Card

At $2.80 *per base,* OPERON'S DNA makes *anything* POSSIBLE.



THE APPLORANGE

THE ZUCCHANA



$2.80 PER BASE DNA FROM OPERON

ANNOUNCING PRICE REDUCTIONS FROM THE WORLD'S LEADING SUPPLIER OF DNA.

Operon's price reductions present a whole new world of possibilities. Our custom DNA is now available for just $2.80 per base with a $20 set-up fee per sequence. So you can afford to do more experiments and get more results.

Operon consistently delivers precisely the product you need. On time. With unsurpassed purity. Backed by an unconditional guarantee. And, as you can see, at an extremely competitive price. We ship our custom-made sequences in two working days, on average. And that includes large orders and orders placed late in the day.

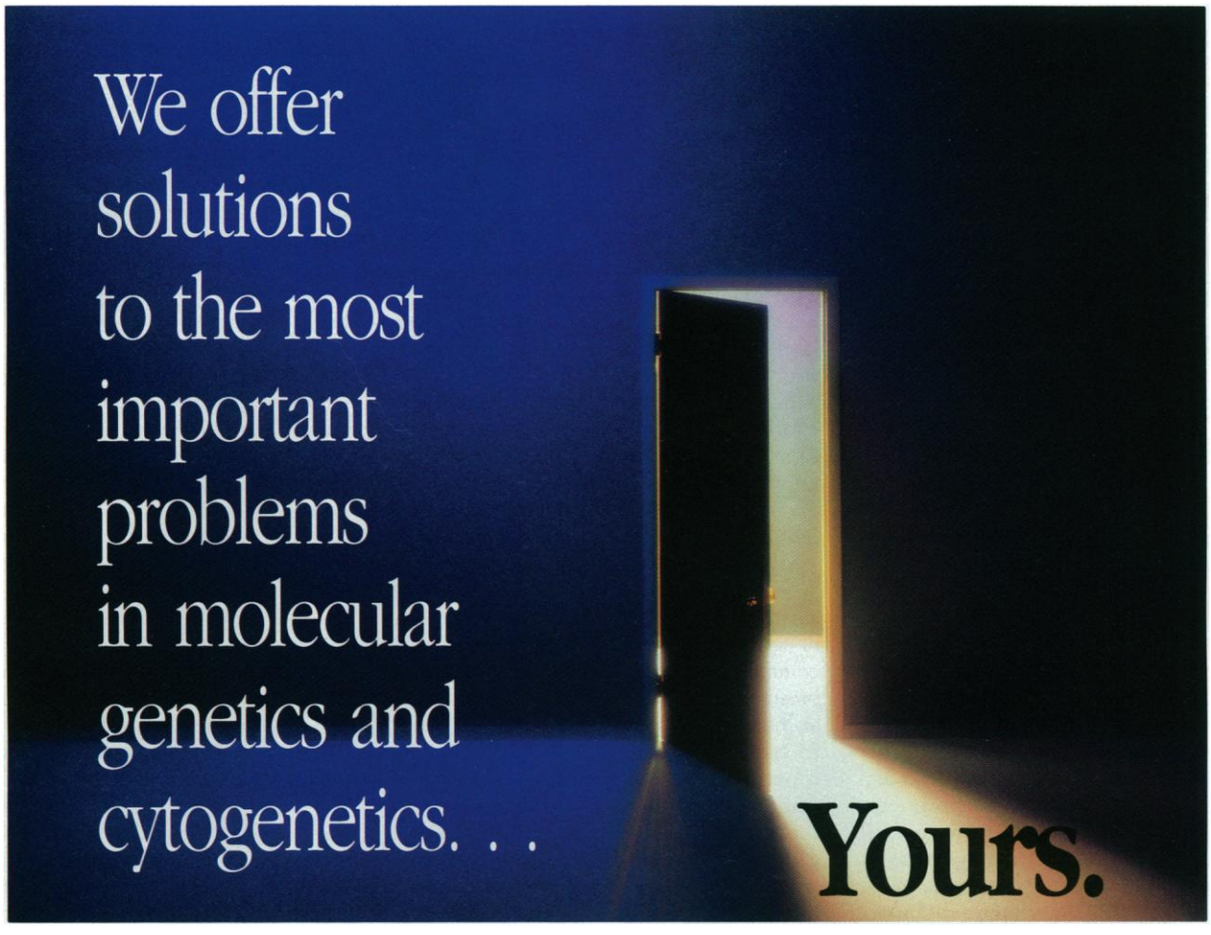
So don't let your budget limit your thinking. Call Operon, the company that makes anything possible. In terms of speed, purity, and savings, there are no bases for comparison.

CALL 1-800-688-2248 TODAY.

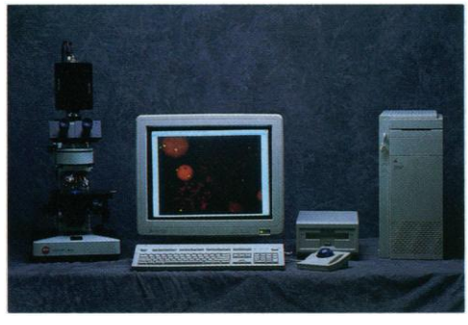
OPERON

WORLD'S LEADING SUPPLIER OF SYNTHETIC DNA

Circle No. 9 on Readers' Service Card



Our competitors talk about how big they are, and their historical achievements. We prefer to talk about the needs of your laboratory and how our products can help you today!



Imaging Solutions For The Genetics Laboratory. With a comprehensive range of imaging systems we can meet your automation needs. Based on a powerful modular concept, our easy-to-use Genetiscan™ systems can be used alone or in networked configurations to cover the range of functions necessary for today's genetic laboratory. Our products provide laboratory data management, automatic metaphase finding and relocation, automatic karyotyping and color probe (FISH) image processing and measurement. These systems can be configured or expanded to meet the specific needs of your laboratory, large or small.

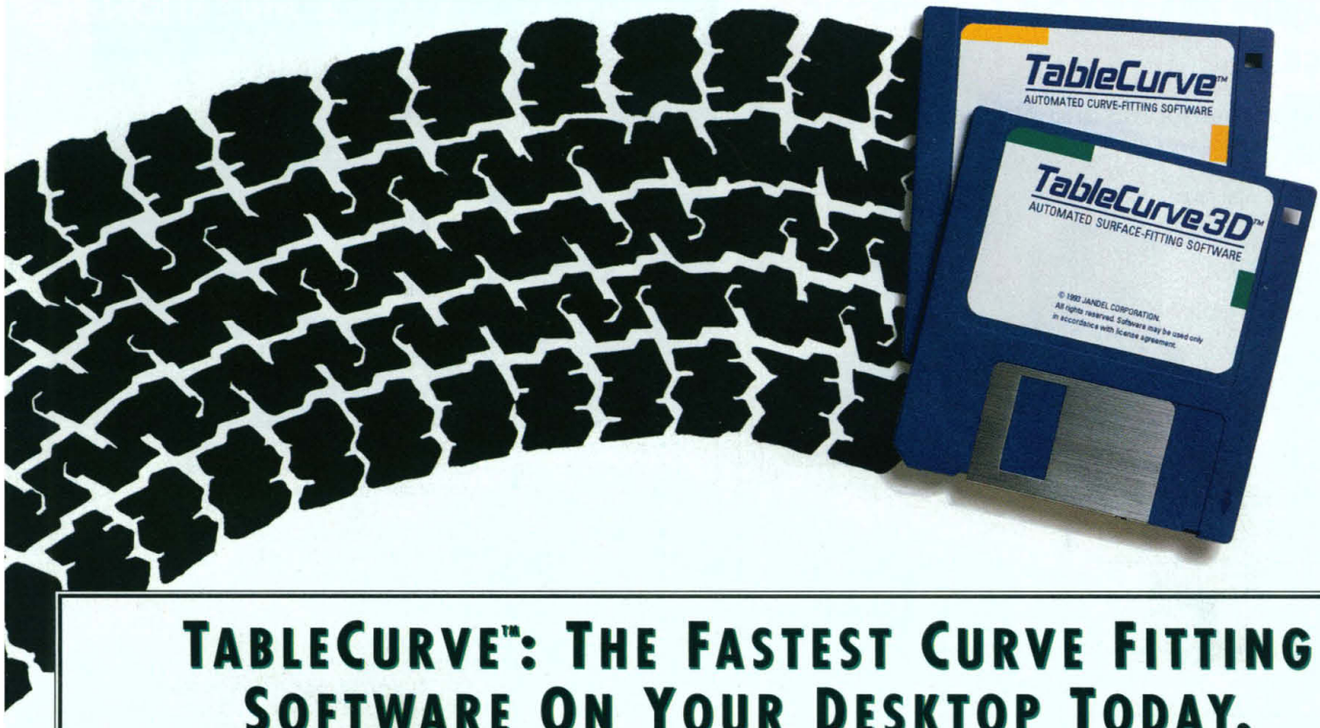
Expert Consultation And Personalized Support Services. Our experienced professionals are available to discuss your specific laboratory requirements, and provide effective solutions. All of our products are backed by a comprehensive team of installation, training and product support specialists, to help ensure rapid laboratory integration and effective product utilization by your staff.

Become More Perceptive. Choose digital imaging systems from Perceptive Scientific. Whether your requirements are simple or complex, we have affordable solutions to meet your needs. For more information, contact the office nearest you. We are ready to be of help and service.

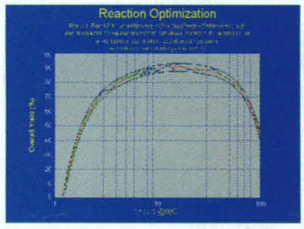
psi Scientific Systems

Perceptive Scientific International Ltd.
Halladale, Lakeside
Chester Business Park
Wrexham Road
Chester CH4 9QT United Kingdom
Phone: 44 (0) 244 682288
Fax: 44 (0) 244 681555

Perceptive Scientific Instruments, Inc.
2525 South Shore Boulevard
League City, Texas 77573 USA
Phone: (713) 334-3027
Fax: (713) 334-3116



TABLECURVE™: THE FASTEST CURVE FITTING SOFTWARE ON YOUR DESKTOP TODAY.



TableCurve automatically created this graph from a best-fit equation representing a chemical reaction optimizing yield over time.

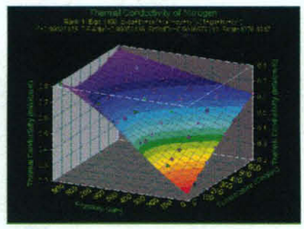
TableCurve for Windows: From one click to the perfect X, Y curve fit in 24.2 seconds flat.

TableCurve for Windows fits and ranks 3,318 built-in equations to your 100-point data set in less than 30 seconds–and easily finds the "perfect" equation for difficult data sets that stump other software. Within moments, you'll transform raw data into compelling graphs.

In one swift, automated step, TableCurve does the tedious work of curve fitting. But ***you*** make the final decision. As you step through the fitted equations, TableCurve does what no other software can do: it simultaneously presents each equation for graphical review–revealing potential flaws not visible in any other form.

And, with the power of Windows, you can quickly print superior graphs just as they appear on screen, send files to SigmaPlot or Lotus 1-2-3, or generate code in FORTRAN, C, Pascal, or BASIC. Yet TableCurve is easier to use than ever–with simple menus and commands at every step.

TableCurve 3D for Windows: Powerful, ultra-fast X, Y, Z surface fitting in 168 seconds.



TableCurve 3D rendered this surface fit of the thermal conductivity of nitrogen using data on temperature and pressure as independant variables.

If you need to fit data with two independent variables, there's nothing as powerful as TableCurve 3D. TableCurve 3D automatically selects from 453,697,195 linear and non-linear equations–then fits and ranks up to 37,231 to your X, Y, Z data.

Choose the right equation based on best-fit criteria ***you*** select. You'll have superlative surface fits, residual graphs, and numeric summaries in just seconds. To accelerate the fit, choose any of nine pre-defined equation sets or customize your own. You can even include two user defined functions (compiled to process up to ***ten times faster*** than UDFs in other programs).

Next, review your fit with Animate, which automatically rotates your 3D graph. When you've got the best possible fit, print graphs, export data to Excel, SigmaPlot, or Lotus, or generate program code.

For a FREE brochure on Jandel's ultra-fast data fitting software products, call 800-874-1888 (in the U.S.) or 415-453-6700.

"The speed of fitting is fantastic! Both TableCurve products are highly functional, high performance programs."
–Paul Bertetti
Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute, San Antonio, TX

TableCurve for Windows	
Hardware	486 CPU/33MHz
No. of data points	100
No. of equations	3,318
Time to fit	24.2 seconds

TableCurve 3D for Windows	
Hardware	486 CPU/33MHz
No. of data points	100
No. of equations	37,231
Time to fit	168 seconds

Jandel
SCIENTIFIC
"Microcomputer Tools for the Scientist"

2591 Kerner Blvd., San Rafael, CA 94901 Phone: (800) 874-1888, (415) 453-6700 Fax: (415) 453-7769

In Europe: Jandel Scientific, Schimmelbuschstrasse 25, 40699 Erkrath, Germany 02104/36098 02104/33110 (FAX)
For international dealers call: Australia 2 958 2688, Belgium 0106 11628, Canada 519 767 1061, France 146 97 21 65, Italy 027 202 1937, Japan 3 3590 2311, Switzerland 61712 16 16, Taiwan 2 785 3202, UK 582 502 388

Circle No. 46 on Readers' Service Card

The Division of Cancer Etiology

National Cancer Institute

Announces to the Scientific Community the Availability of the Following Resources/Services for Cancer Related Research As Noted Below:

Biological Resources

■ Cell Culture Identification Service. Using Isozyme Analysis, Immunofluorescence and Karyotypic Analysis (Chromosome Banding).

Contact: Dr. Joseph Kaplan
Children's Hospital of Michigan
3901 Beaubien Boulevard
Detroit, MI 48201
(313) 745-5570

Citing Contract #N01-CP-33063

Cost: Reasonable; inquire with specific requests.

■ Goat Antisera Against: Avian, Bovine, Feline, Murine, and Primate Intact Viruses and Viral Proteins; Antibodies to Immunoglobulins for a number of species. Preimmune Sera available for some Virus Antisera.

Contact: Alice K. Robison, Ph.D.
BCB Repository
Quality Biotech, Inc.
1667 Davis Street
Camden, NJ 08104
(609) 966-8000
(609) 342-8078 FAX

Citing Contract #N01-CP-15665

Cost: $75.00/5 ml. (Antisera)
25.00/5 ml. (Preimmune Sera)
65.00/100 ml. (Immunoglobulins)
(Frozen Material)

■ Viruses: Avian, Feline, Murine, and Primate Viruses Produced in vivo and in vitro.

Contact: Alice K. Robison, Ph.D.
BCB Repository
Quality Biotech, Inc.
1667 Davis Street
Camden, NJ 08104
(609) 966-8000
(609) 342-8078 FAX

Citing Contract #N01-CP-15665

Cost: Reasonable; inquire with specific requests.

■ Monoclonal Antibodies are available with specificities for synthetic peptides representing the amino acid sequences of the left end, right end and active site of the oncogene products of avian and mammalian retroviruses. Blocking peptides are also available, as are a limited number of cell lines producing the monoclonal antibodies.

Contact: Alice K. Robison, Ph.D.
BCB Repository
Quality Biotech, Inc.
1667 Davis Street
Camden, NJ 08104
(609) 966-8000
(609) 342-8078 FAX

Citing Contract #N01-CP-15665

Cost: Peptides —$25.00/mg.
Ascites Fluid — 45.00/ml.
Cell Culture —100.00/culture.

(Plus Shipping and Handling)

■ Human sera from donors with various malignancies (including nasopharyngeal carcinoma), non-malignant disorders, and from normal individuals.

Contact: Program Director, Research Resources, Biological Carcinogenesis Branch, DCE, NCI, NIH
Executive Plaza North, Room 540
Bethesda, MD 20892
(301) 496-1951
(301) 496-2025 FAX

Cost: Shipping and handling charges only.

■ The Division of Cancer Etiology's Registry of Experimental Cancers announces the availability of 16 different study sets containing histologic slides of rodent tumors. The study sets, with accompanying syllabi, illustrate a variety of spontaneous and induced tumors, chiefly of rats, mice, and mastomys. Each set is available to cancer investigators worldwide, without charge, for up to two months. Requests or inquiries should be addressed to:

Contact: Registry of Experimental Cancers
National Cancer Institute
Building 41, Room D311
NIH, Bethesda, MD 20892
USA

Environmental Cancer

■ NCI's Chemical Carcinogenesis Research Information System (CCRIS) is available online through the National Library of Medicine's Toxicology Data Network (TOXNET) system. Through an interagency agreement between NCI and NLM, the CCRIS database has been built and will be maintained and updated as one of TOXNET's sponsored databases in the broad areas of chemistry, toxicology, and hazardous waste information. The CCRIS database contains evaluated data and information on carcinogens, mutagens, tumor promotors, cocarcinogens, metabolites of carcinogens, and carcinogen inhibitors derived from published review articles, ongoing current awareness survey of primary literature, NCI/NTP's short- and long-term bioassay studies, the IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man, and special studies and reports.

Contact: Dr. Thomas P. Cameron
Office of the Director
Division of Cancer Etiology
National Cancer Institute
Executive Plaza North, Room 712
Bethesda, MD 20892
(301) 496-1625

Cost: Inquire

■ The Special Assistant for Environmental Cancer, Office of the Director, announces the availability of a limited number of copies of the following publications, which have been prepared under contract to NCI:

Survey of Compounds Which Have Been Tested for Carcinogenic Activity, PHS-149, 1987-1988 and 1989-1990.

Contact: Dr. Thomas P. Cameron
Office of the Director
Division of Cancer Etiology
National Cancer Institute
Executive Plaza North, Room 712
Bethesda, MD 20892
(301) 496-1625

Cost: Inquire

■ The National Cancer Institute, along with the National Institute of Environmental Health Sciences, the Centers for Disease Control, and the Food and Drug Administration, has, for many years, supported a study by the Michigan Department of Public Health dealing with an accidental exposure to polybrominated biphenyls.

The Michigan Long Term PBB Study is a well-maintained longitudinal database on 4,000 participants from rural farms in Michigan. This group was exposed to polybrominated biphenyls through consumption of contaminated farm animals and food products. The cohort was enrolled and characterized in 1975-76, establishing a database containing demographic, health history, medical condition, reproductive history, blood and tissue analyses, and chemical/environmental exposure information. Major life events—birth, death, cancer and major illnesses have been confirmed and updated annually. The project is currently completing a detailed recharacterization of all cohort members and their children. This longitudinal database is available for collaborative research investigating biological and human health outcomes from halogenated biphenyl exposure.

Contact: Dr. Harold E. B. Humphrey
Michigan Department of Public Health
Division of Health Risk Assessment
3423 North Logan, P.O. Box 30195
Lansing, MI 48909
(517) 335-8350

Cost: Free to qualified investigators.

Epidemiology Resources

■ The Tumor Virus Epidemiology Repository (TVER) contains sera and other biological samples from more than 13,000 patients and controls obtained in 12 countries. The TVER was established primarily to support collaborative research on the role of Epstein-Barr virus (EBV) in Burkitt's lymphoma and related diseases. Sera characterized for human herpes virus 6 (HHV) antibodies are also available. The TVER collection is available for new collaborative studies and some independent research. The most extensive collections are serum samples from patients with Burkitt's lymphoma.

Contact: Dr. Paul H. Levine
Viral Epidemiology Branch
DCE, NCI, NIH
Executive Plaza North, Room 434
Bethesda, MD 20892
(301) 496-8115

Cost: Free to Collaborating Investigators; Others: Dependent on Processing Time

---

■ The National Cancer Institute has available the Animal Morbidity/Mortality Survey of Colleges of Veterinary Medicine in North America (also known as the Veterinary Medical Data Program). This registry of veterinary medical information represents patient data on animals seen at collaborating veterinary teaching facilities; 3 million hospital episodes have been abstracted and computerized in a standardized record format. Disease information is coded using the scheme of the Standard Nomenclature of Veterinary Disease and Operations. The computer tapes will be made available upon request.

Contact: Dr. Howard M. Hayes
Environmental Epidemiology Branch
EPB, DCE, NCI, NIH
Executive Plaza North, Room 443
Bethesda, MD 20892
(301) 496-1691

Cost: Inquire

■ Human fibroblast cultures from individuals at high risk of cancer, selected members of cancer-prone families, and some normal family members are available. The collection is historical with unknown viability and contamination status. Catalog of cell lines unavailable and followup on many individuals is unavailable. Information requests should include potential use of cultures.

Contact: Chief, Genetic Epidemiology Branch
DCE, NCI, NIH
Executive Plaza North, Room 439
Bethesda, MD 20892
(301) 496-4375

Cost: Free to collaborating investigators. Others: $70/cell line.

■ The National Institute of Allergy and Infectious Diseases and the National Cancer Institute have developed a repository of biological specimens from homosexual men. The specimens were collected through cooperative agreements with five major U.S. universities for studies of the natural history of acquired immune deficiency syndrome (AIDS). Information about applying for collaborative use of these specimens is available from the NIAID Project Officer or the NCI Co-Project Officer.

Contact: Chief, Epidemiology Branch, AIDS Program, NIAID
CDC Bldg., Room 240
National Institutes of Health
Bethesda, MD 20892

or to Chief
Extramural Programs Branch, EBP,
Division of Cancer Etiology, NCI
Executive Plaza North, Room 535
Bethesda, MD 20892

■ The Epidemiology and Biostatistics Program of the National Cancer Institute has developed the Observed versus Expected (O/E) software system which calculates: (1) the number of observed events (e.g. cancer cases or deaths) in a study group at risk; (2) the number of expected events in a study group based on the rate of occurrence in some standard or referent population; (3) the ratio of observed to expected events; and (4) the significance of this ratio. The system is user friendly and capable of executing a series of calculations by different variables such as age, time group, date of exposure, age at date of exposure, duration of exposure, year relative to entry and cause of event. The O/E System provides tables by race, sex and user defined variables, allows user defined latency intervals and accepts standard or user prepared rates. O/E is written in COBOL and is exportable to most mainframes.

Contact: Ruth Wolfson
Epidemiology and Biostatistics Program, DCE, NCI, NIH
Executive Plaza North, Room 443
Bethesda, MD 20892
(301) 496-1691

Cost: Free to investigators interested in epidemiologic research.

■ The Epidemiology and Biostatistics Program of the National Cancer Institute (NCI) has developed an Occupational Mortality Analysis software system which calculates Proportionate Mortality Ratios, Proportionate Cancer Mortality Ratios, or Mortality Odds Ratios using occupational information on the death certificates from 24 states for 1984-1989. The data were assembled through a collaborative effort involving the National Center for Health Statistics, the National Institute for Occupational Safety and Health and NCI. The program is user friendly and allows analysis of data by (1) occupation, industry, or occupational/industry combinations; (2) age group; (3) states or geographic regions; (4) race groups, (black and white); (5) sex, and (6) underlying causes of death. The program is written in Wylbur Command Procedures and is exportable to most mainframes.

Contact: (To obtain the program and relate information):

Mustafa Dosemeci, Ph.D.
Occupational Studies Section
EBP, DCE, NCI, NIH
Executive Plaza North, Room 418
Bethesda, MD 20892
Phone: (301) 496-9093
Fax: (301) 402-1819

(For questions concerning the nature and source of the occupational mortality data):

Jeff Maurer, M.S.
Mortality Statistics Branch
Division of Vital Statistics, NCHS
6525 Belcrest Rd., Room 840
Hyattsville, MD 20782
Phone: (301) 436-8884
Fax: (301) 436-7066

Cost: Free to investigators interested in occupational epidemiologic research.

■ The Epidemiology and Biostatistics Program of the National Cancer Institute (NCI) has developed a computer-aided occupational and industrial code searching program (CODESEARCH) which allows the code assigner to select appropriate codes from existing classification systems for job or industrial titles from work histories of the study subjects. The program is user friendly and allows searches from four occupational Classification Systems (1977 Standard Occupational Classification Manual [SOC]; 1980 SOC; 1970 Bureau of Census Occupational Classification System [BOCOC]; and 1980 BOCOC, and four industrial classification systems (1972 Standard Industrial Classification System [SIC]; 1987 SIC; 1970 Bureau of Census Industrial Classification System [BOCIC]; and 1980 BOCIC). The program is written using PC-Clipper software and is exportable to most 486 PCs.

Contact: Mustafa Dosemeci, Ph.D.
Occupational Studies Section
EBP, DCE, NCI, NIH
Executive Plaza North, Room 418
Bethesda, MD 20892
Phone: (301) 496-9093
Fax: (301) 402-1819

Cost: Free to investigators interested in assignment of occupational and industrial titles from work history data.

Chemical Resources

■ Analytical support for the collection, separation, and elucidation of environmental carcinogens including combustion and smoking-related exposures. A contractor with experience in the development of analytical methods for the determination of constituents of cigarette smoke and cigarette smoke condensates, and of specialty instrumentation for inhalation toxicology is available to assist qualified investigators with particular interest in human and animal model exposure to environmental and sidestream smoke. An extensive chemical data base on smoke and smoke condensate components is available.

Contact: Harold E. Seifried, Ph.D.
Chemical and Physical Carcinogenesis Branch, DCE, NCI
Executive Plaza North, Room 700
Bethesda, MD 20892
(301) 496-5471
(301) 496-1040 FAX

Cost: Inquire

■ Chemical Carcinogen Reference Standard Repository: Reference quantities of over 750 compounds are available. The newest additions are dilute aqueous standards of PAH deoxyguanosine-3'-monophosphates for Randerath ^{32}P post labelling assays. Other classes of available compounds are: fecapentaenes, food mutagens, polynuclear aromatic hydrocarbons (PAH), PAH metabolites, radiolabeled PAH metabolites, nitrogen heterocycles, nitrosamines/nitrosamides, aromatic amines, aromatic amine metabolites, azo/azoxy aromatics, inorganics, nitroaromatics, pesticides, pharmaceuticals, natural products, dyes, dioxins and chlorinated aliphatics. A number of radiolabeled PAH metabolites and nitrosamines are also available. Data Sheets provided with the compounds include chemical and physical properties, analytical data, hazards, storage, and handling information. Catalog available upon request.

Contact: Manager, NCI Chemical Carcinogen Repository
Midwest Research Institute
425 Volker Boulevard
Kansas City, MO 64110
(816) 753-7600, Ext. 523
(816) 753-3664 FAX

Manager, NCI Radiolabeled Chemical Repository
CHEMSYN Science Laboratories
13605 W. 96th Terrace
Lexena, KS 66215
(913) 541-0525
(913) 888-3582 FAX

Cost: Subject to chemical class code and quantity (see catalog) includes handling and shipping charges

Introducing The Revolutionary New FluorImager™ 575 From Molecular Dynamics.

Fluorescence Imaging

Moves into the Fast Lane

There's a new detection technology that makes fluorescence analysis as accurate as autoradiography. And a lot faster than chemiluminescence.

The Molecular Dynamics FluorImager 575.

The FluorImager 575 directly scans samples up to 20x25 cm in less than 5 minutes. That's because there are no drying, exposure or film development steps – or radioactive materials – to slow you down.

In fact, with dual-wavelength, two-color scanning, the FluorImager 575 can run samples and standards in the same lane. So you can get twice as much done in a fraction of the time it used to take.

Even more important, you get better results.

From gels, blots, TLC and microtitre plates, the FluorImager 575 delivers 100 times the sensitivity of traditional fluorescence methods, and up to 4 orders of magnitude linear dynamic range. That means you can quantitate faint and dark bands without re-running samples.

Specially developed FluorKit™ reagents and standard protocols ensure reproducibility. And ImageQuaNT™, Molecular Dynamics' proven analysis software, simplifies quantitation and makes it easy to transfer data to your favorite Windows and Macintosh programs.

So, if you're looking for a faster way to get quantitative results, move to the FluorImager 575. And leave the rest behind.

...

Call today for a copy of our new FluorImager 575 brochure. In the U.S., call 1-800-788-0634. In Europe, call 44 732 762565. In Australia, call (03) 810-9572. In Japan, call (03) 3976-9692.

Molecular Dynamics

Molecular Dynamics, 880 East Arques Ave., Sunnyvale, CA 94086 Ph: 408-773-1222 Fax: 408-773-8343

Circle No. 30 on Readers' Service Card

SCIENCE

presents

GENOME MAPS IV

SCIENCE COORDINATOR: **Barbara R. Jasny**

AUTHORS

Neal G. Copeland, Debra J. Gilbert, and Nancy A. Jenkins
ABL - Basic Research Program, National Cancer Institute, Frederick, MD.

Joseph H. Nadeau, Janan T. Eppig, and Lois J. Maltais
The Jackson Laboratory, Bar Harbor, ME.

Joyce C. Miller, William F Dietrich, Robert G. Steen, Stephen E. Lincoln, Alix Weaver, Diane C. Joyce, Mark Merchant, Michael Wessel, Hillary Katz, Lincoln D. Stein, Mary Pat Reeve, Mark J. Daly, Robert D. Dredge, Andre Marquis, Nathan Goodman, and Eric S. Lander
Whitehead Institute/MIT Center for Genome Research, Cambridge, MA.

REVIEWERS

Stephen D.M. Brown, St. Mary's Hospital, London, U.K.
Jean Louis Guénet, Institut Pasteur, Paris, France.
Christine Kozak, National Institutes of Health, Bethesda, MD.
Mary F. Lyon, Medical Research Council, Oxford, U.K.
Peter L. Pearson, Johns Hopkins Medical School, Baltimore, MD.
Michael F. Seldin, Duke University Medical Center, Durham, NC.

GRAPHIC ARTIST: **Susan Nowoslawski**
PHOTOGRAPHER: **Stan Short**

sponsored by

LIFE TECHNOLOGIES

Life Technologies 1993-1994 Catalogue Contents Summary

For over 25 years, Life Technologies has been supplying researchers around the globe with GIBCO BRL products. From traditional lab standards to the cutting edge, the GIBCO BRL brand name means quality, selection, and reliability.