

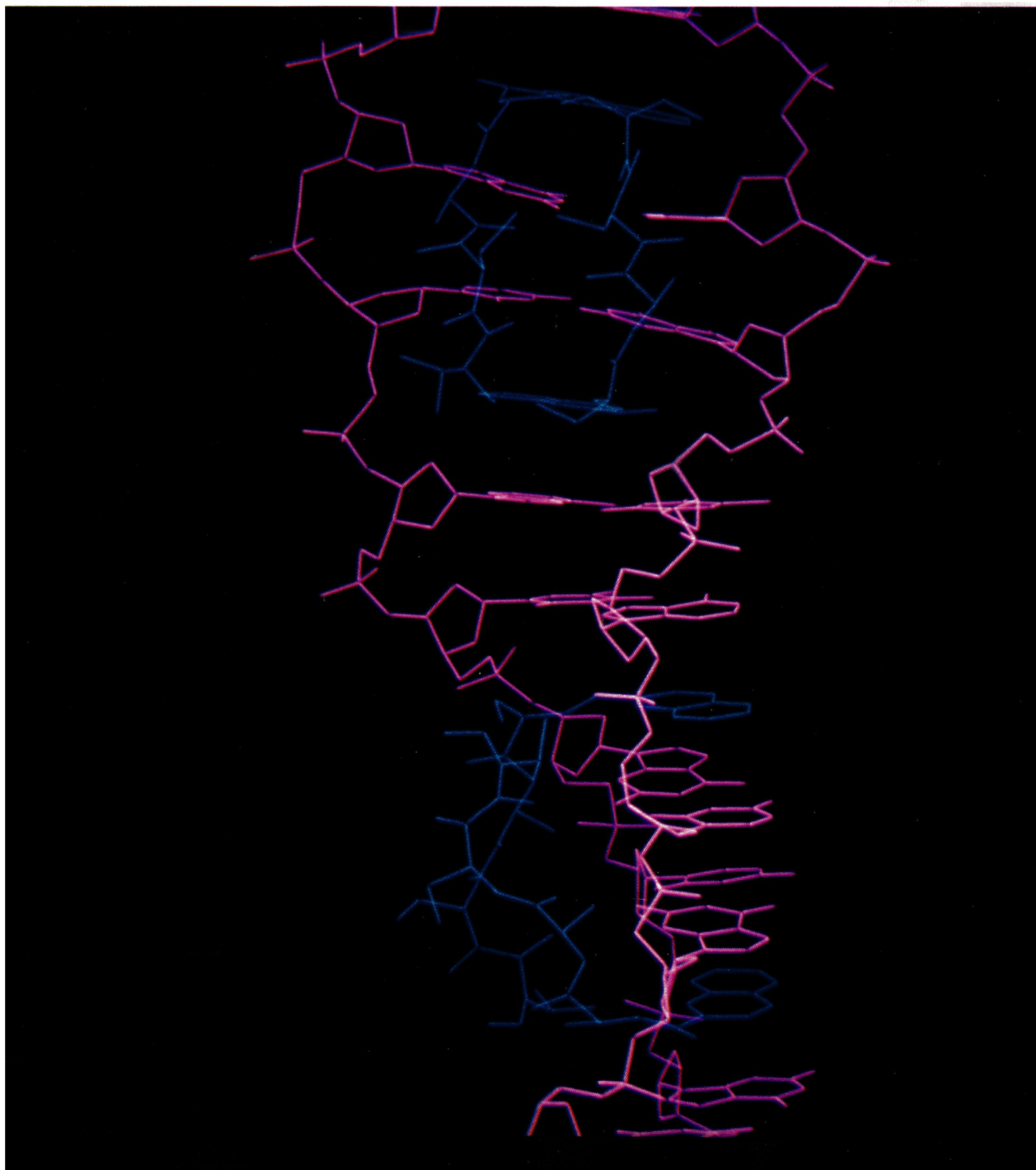
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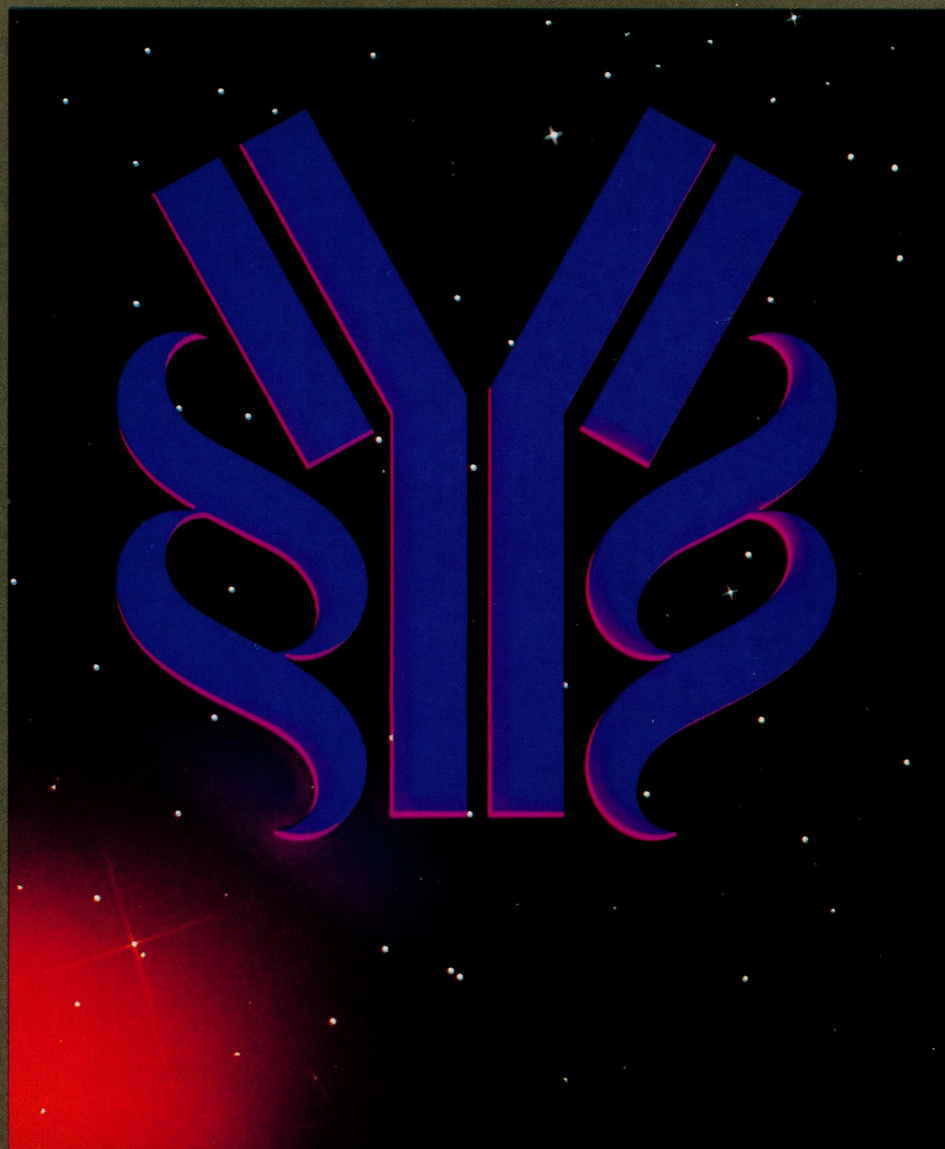
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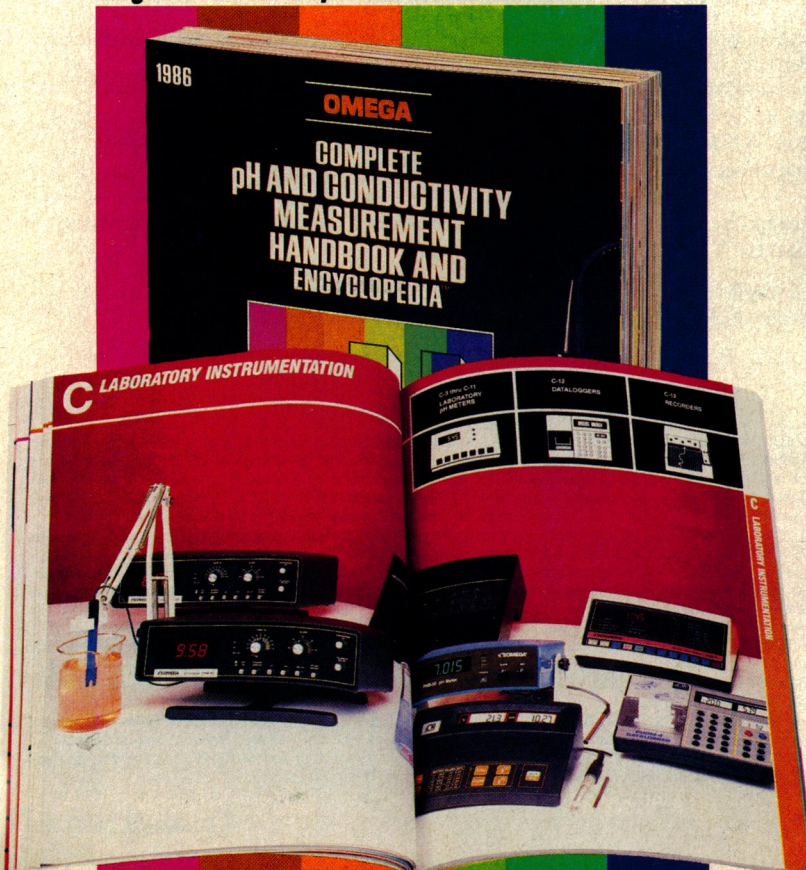
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COVER Skeleton drawing of the bis-intercalator drug triostin A (blue) binding to the DNA duplex d(GCGTACGC) (magenta). Two molecules of the drug bind to each duplex. See page 1255. [Picture by Gary L. Quigley and Christin A. Frederick (Biology Department, Massachusetts Institute of Technology, Cambridge, MA 02139) with assistance of Rob Campbell (Chemistry Department, MIT) using the program FRODO by Alwynn Jones on an Evens and Sutherland PS300 graphics system]

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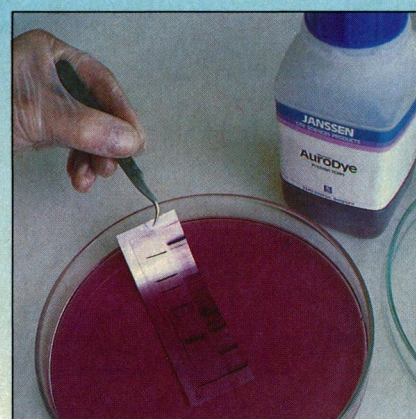
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This Week in SCIENCE

Caffeine stimulates the cell cycle

CAFFEINE induces cells that are arrested in the S phase of their cell cycle (a phase for replicating DNA) into a mitotic phase (page 1264). It causes premature chromosome condensation, the breakdown of the nuclear envelope, the "rounding up" of the cell, and synthesis of mitosis-specific phosphoproteins; these are all events associated with cell division that typically do not occur in cells until S phase is completed. Schlegel and Pardee found that caffeine effects occurred within a few hours. First, DNA synthesis had to be strongly suppressed. Then, upon exposure, mammalian cells in culture began synthesizing new proteins needed for mitotic events. (The RNA needed for mitosis had already accumulated in the cell during the S-phase arrest.) Caffeine either induces translation of this mitosis-related RNA into protein or stabilizes its protein products. Caffeine's effectiveness in uncoupling mitotic events of the cell cycle from the normal completion of DNA replication makes it a valuable reagent for studying biochemical events that stimulate mitosis in cells.

Pertussis vaccine

THE vaccine for whooping cough, while effective, can sometimes produce harmful side effects (page 1258). One component that apparently contributes to both the vaccine's protective and negative effects is the pertussis toxin. If, through genetic and molecular manipulations, the protective and toxic properties of the toxin could be separated, a safer vaccine might be developed. To this end, Loch and Keith have determined the complete nucleotide sequence of the pertussis toxin gene, have deduced from it the primary amino acid sequence of the toxin, and have defined other features of the molecular organization of gene and protein. Protective regions of the molecule can now be mapped and peptides resembling them synthesized; mutations can be made that might modify

the toxin gene and its product so that toxic properties would be removed but protective ones would remain.

Distinctive K/T iridium anomaly

IN a long core of clay from a region of the Pacific ocean floor east of Hawaii where windblown dust from Asia and North America was deposited between 33 and 67 million years ago, only one peak of the element iridium stands out; that is the peak at the Cretaceous/Tertiary (K/T) boundary (page 1225). Detection of excess iridium several years ago in clay samples from the K/T boundary led to the theory that the mass extinction at the end of the Cretaceous period (that included the extinction of the dinosaurs) was caused by impact of a meteorite. Extraterrestrial dust and meteorites are considered to be sources of most of the iridium in deep sea cores (with minor terrestrial sources being weathering and volcanism). Kyte and Wasson measured iridium in 149 samples from the core by neutron-activation analysis. Iridium was 10 to 40 times higher at the K/T boundary than at other times, suggesting that a major accretionary event took place at the end of the Cretaceous. Apart from this anomaly, iridium entry to earth since the Cretaceous has been fairly stable. A calculation of the amount of iridium expected from periodic cometary showers yielded a much higher iridium value than was found at either the K/T or the Eocene/Oligocene boundary, making unlikely the possibility that such showers have been responsible for periodic extinctions.

Male-killing spiroplasmas cultivated

THE females of four species of fruit flies, when infected with spiroplasmas, produce only female progeny, because males are killed early in embryogenesis (page 1253). The spiroplasmas, called sex-ratio organisms (SRO's) because they alter the sex ratio of progeny fruit flies, are wall-less

microorganisms that reside in the female's hemolymph. SRO's have been difficult to study because conditions for growing them outside their *Drosophila* hosts could not be found. Hackett *et al.* report the successful establishment of SRO's in tissue culture medium supplemented with an insect cell line; eventually the spiroplasmas could be cultivated in medium without added cells. When injected into female flies, cultivated spiroplasmas continued to be lethal for male progeny. Characteristics of the organisms can now be evaluated and their effects on the host and her progeny analyzed in more detail. In addition, similar cell-enriched systems may be adapted for growing other fastidious organisms.

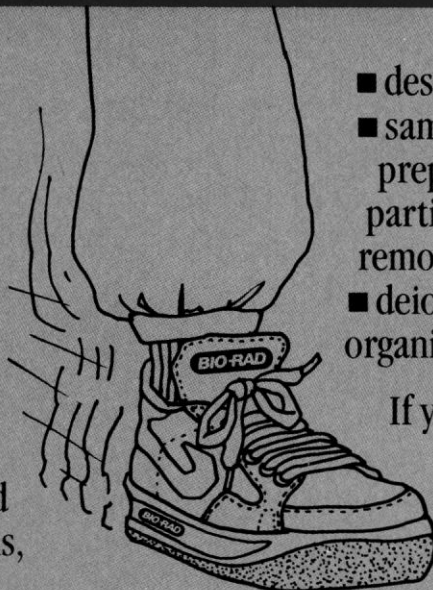
Gene deletion in familial hypercholesterolemia

A patient and model rabbits with the disease familial hypercholesterolemia (FH) (atherosclerosis and elevated serum cholesterol) have similar molecular defects in their genes for LDL (low density lipoprotein) receptors (page 1230). LDL receptors are responsible for transporting cholesterol-rich LDL into cells. In diseased rabbits and humans having a certain FH mutation, the receptors move at greatly reduced rates from their sites of synthesis in the cell to the surface, and most never reach the surface. Yamamoto *et al.* found that alleles (alternative genes) for the LDL receptor had a small deletion (12 bases in the rabbit, 21 to 36 bases in the patient). This gene region codes for a region of the protein that is rich in disulfide-bonded cysteines. Although cysteines were not among the amino acids deleted in the rabbit receptors, disulfide bonding would be impaired if the altered receptors folded improperly; cysteines would then be available to bond with cysteines of other proteins—perhaps a "gatekeeper" protein—along the route to the surface. Such a mechanism could prevent non-functional molecules from becoming positioned at the cell surface where they might elicit harmful immune responses.

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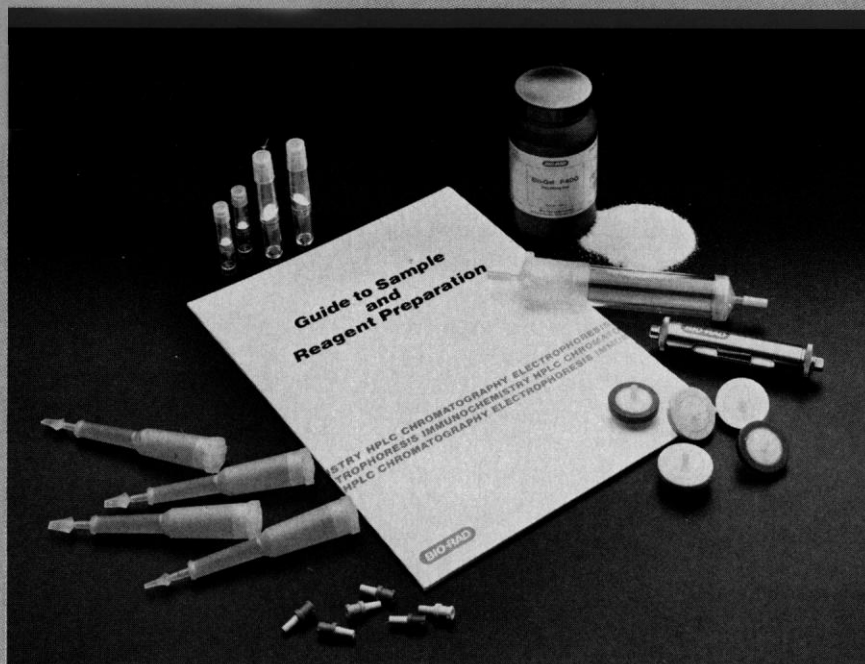
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Global Manufacturing Competition

The United States has been experiencing enormous trade deficits, largely due to inability to compete in the production of high-quality, low-cost durable goods. The situation will not be quickly remedied, but emerging new technology and better management practices hold the promise of better days. A crucial determinant in the outcome of global competition will be activities occurring in Michigan, the leading manufacturing state.

Until the late 1970's, a smug arrogance was the dominant mood in the automobile industry. To a major degree, the research laboratories of the big three automobile manufacturers were merely window dressing. In 1979, when a Japanese engineer described at a symposium his painstaking analysis of stresses in the shell of a Honda, he was an object of derision. The industry had little contact with universities except to hire some of the graduates. The state government's principal actions were to pile taxes and regulations on the industry while cutting back support for engineering at the universities.

The oil crisis, demand for high-quality small cars, and a recession that brought Michigan unemployment in 1981 to 17 percent had the effect of that of a two-by-four on a mule. The state government, industry, universities, and citizens in general recognized the need for change as well as to learn some lessons from the Japanese.

On a recent visit to Ann Arbor and Detroit, I noted evidence of changes that have occurred in the intervening years. The state government has provided \$70 million for construction at the University of Michigan of new buildings for engineering. It has substantially increased its support for the engineering faculty and their research. The state is assisting in the financing of start-up companies such as those in robotics and machine vision.

The automobile industry is in the midst of change in the use of electronics, robots, machine vision, and new materials, as well as in supplier and employee relations. A new Buick-Oldsmobile-Cadillac plant at Hamtramck has 260 robots and many new computer-controlled features. To meet the needs for robots of various kinds and for machine vision, a large number of new small companies have become active in southeast Michigan. They bring an excitement reminiscent of that of an early Silicon Valley.

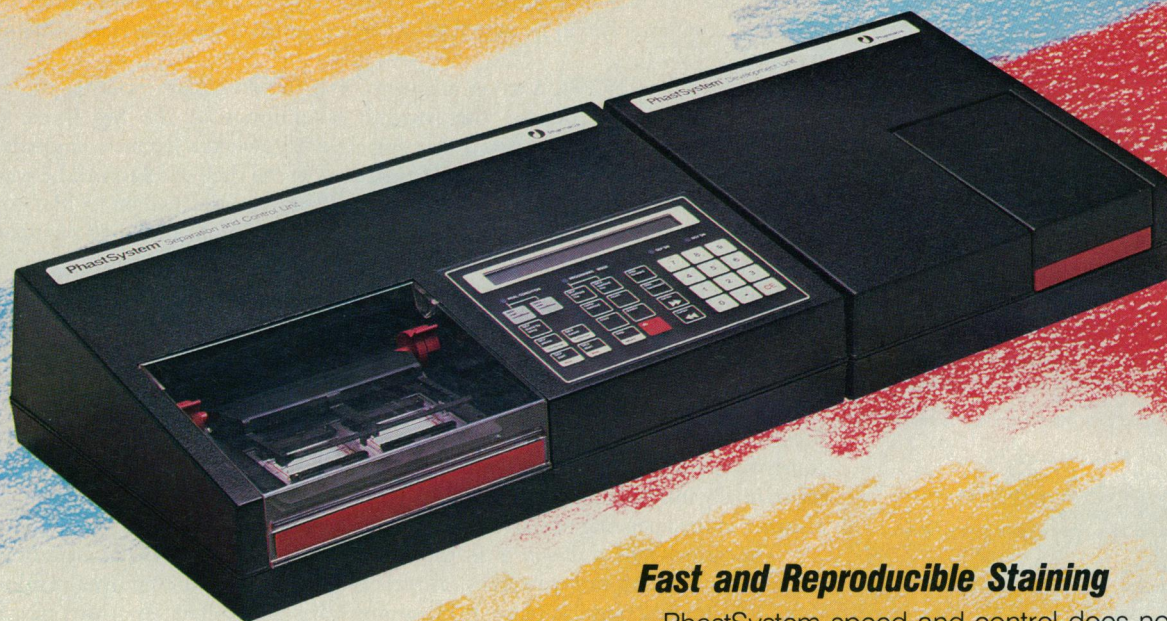
Two nonprofit institutes in Ann Arbor have impressive leadership and roles of increasing importance. The Environmental Research Institute of Michigan has some of the world's best experts in remote sensing. They have produced robots with good shape discrimination, devices for very accurate measurements of features of automobiles, and a device for inspecting the complete exterior of an automobile for proper trim, taillights, and other features. The machine vision is fast, cheap, and capable. They have also developed a computer with parallel processing especially suitable for processing the complex data related to machine vision.

The Industrial Technology Institute has activities that include a flexible machining group looking at machine tools, sensors, materials handling, and automated design for manufacturability. It is a robotic evaluation center. The institute is helping to write the specifications for a manufacturing automation protocol. This will provide a common computer and control language that will allow robots and other equipment to communicate no matter who makes them.

The University of Michigan has been positioning itself to interact with these institutes and with companies large and small. In turn, auto companies now welcome professors and their students and permit them to use assembly plants as laboratories. One of the aims at the university is to achieve interaction of experts in robotics, machine cognition, machine vision, and machine action with experts in computer-aided design of systems involving those technologies and new and superior materials. A goal is to develop highly adaptable robots with large-scale computing capability and expanded artificial intelligence.

One can encounter a great deal of enthusiasm and a climate of can-do in Ann Arbor. A new culture seems to be evolving there. If the rate of evolution continues, something will be created that will have impact beyond Michigan.—PHILIP H. ABELSON

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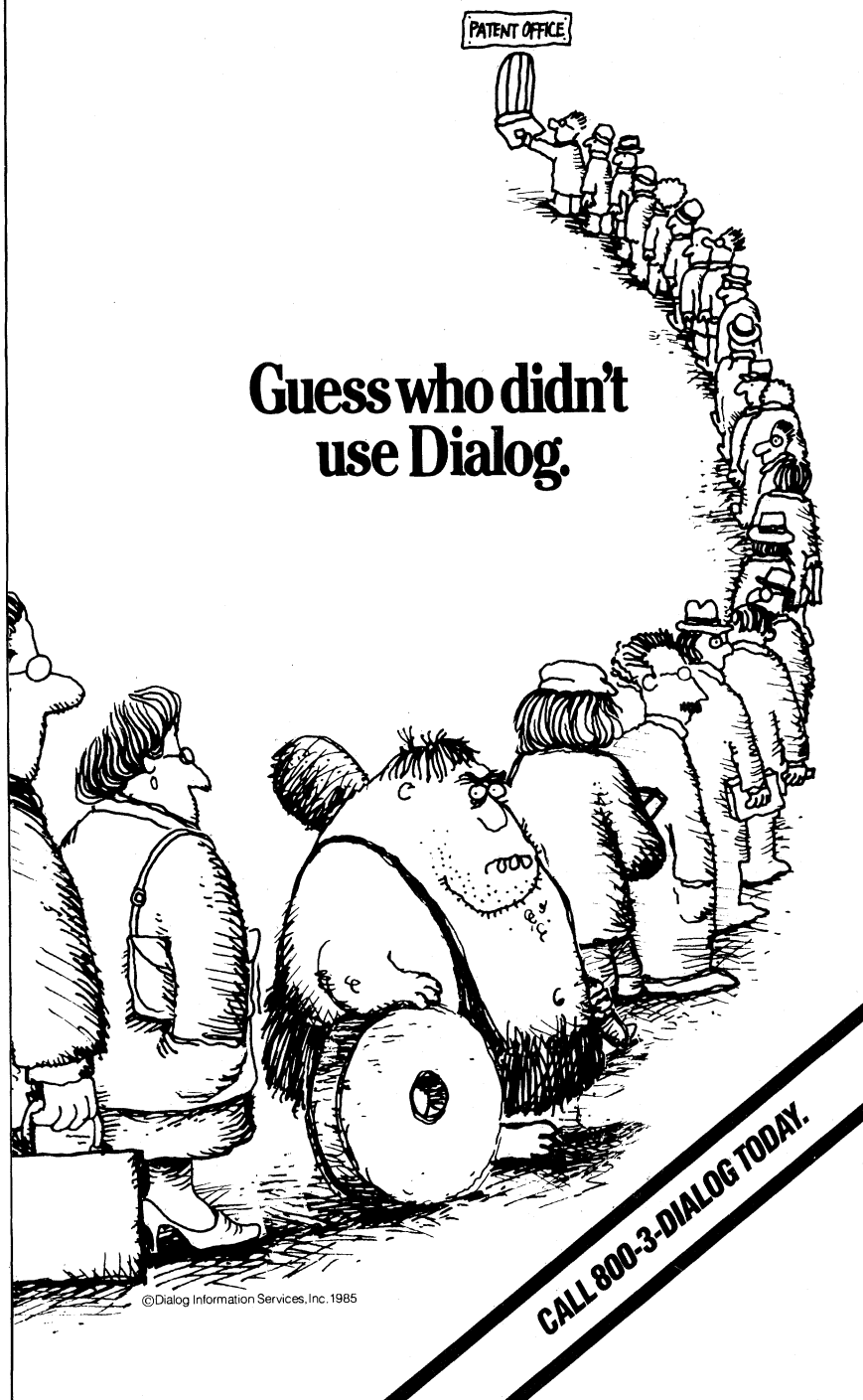
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ric defending the SSC. If the AAU has drawn up such a list and compared it to the benefits of committing the same \$1 billion per year to, say, 100 new university-government-industry centers, paying full overhead, revitalizing science education from first grade to graduate school, and so forth, it has surely kept it secret. If not, such rhetorical claims mislead both the public and the engineering and science community on the most important policy issue of our time—"science or engineering." The Department of Defense recently received some 900 proposals for a total of \$7 billion in its University Research Initiative program. And by some unbelievable value structure, only \$75 million is allocated to this program by the same nation that wants to put \$1 billion into the SSC. Most incredible of all, the victims of this discrimination have not learned that they can stop it with a few hundred well-placed letters to Congress. An AAU spokesperson also is quoted indirectly as saying that the "nation will need more, not fewer, Ph.D.'s." Agreed. How will the SSC contribute to this need? By sidetracking even more Ph.D.'s into the societally irrelevant SSC. Are scientists not citizens, and have they no responsibility to help reduce the budget deficit in their own area? A minimal contribution must surely be to shelve the SSC until appropriate international arrangements can be made to advance the field collectively. Without such a policy posture, which I believe has the support not only of the vast majority of most other scientists but of the physics community itself (1), no American scientist can complain about any cuts in any of our programs which save less than the SSC cost.

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*Materials Research Laboratory,
Pennsylvania State University,
University Park, PA 16802*

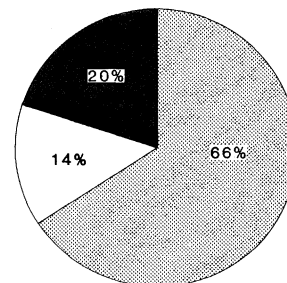
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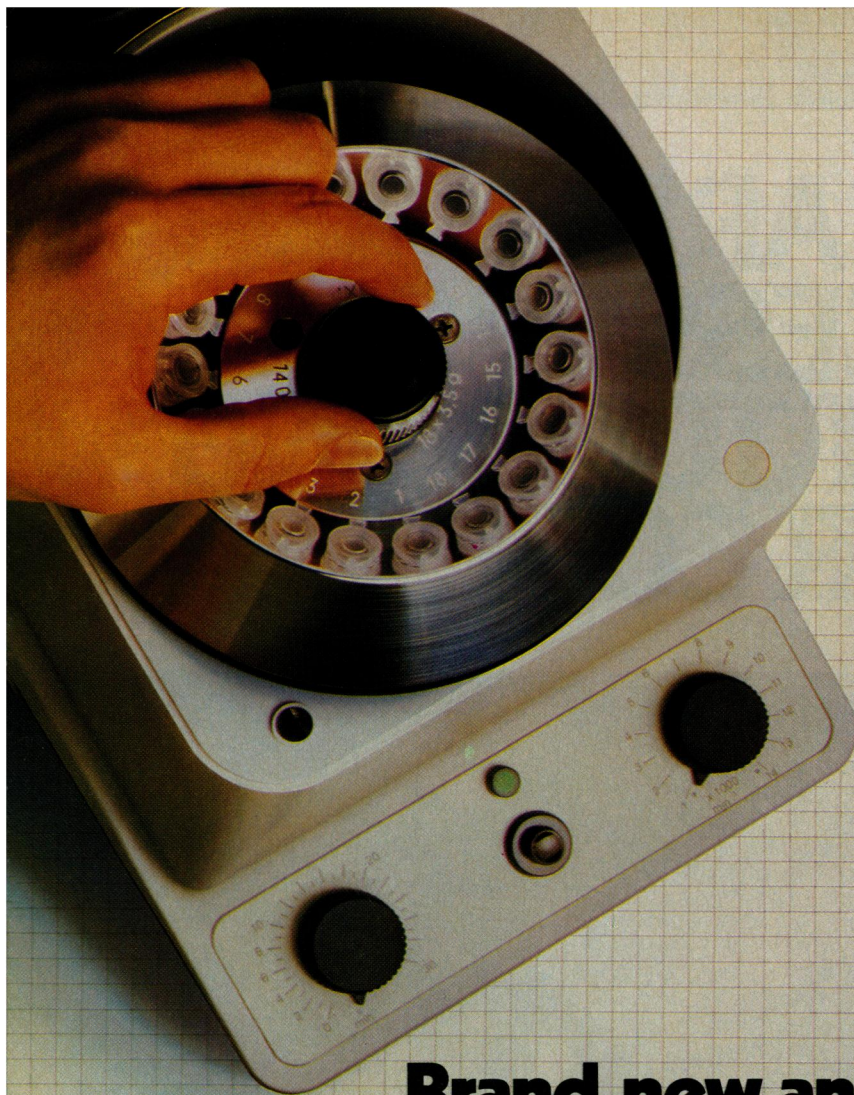
1. Letters, *Phys. Today* 39, 11 (April 1986).

Erratum: In the article "Bloch prepares NSF for lean years" by John Walsh (News & Comment, 25 Apr., p. 440), the labels for "Coordinated research" and "Large projects" were inadvertently reversed in a chart depicting the breakdown of the fiscal year 1986 National Science Foundation budget. Coordinated research accounts for 14% of total research, and large projects account for 20%. A corrected chart is shown below.

FY 86

- Individual research projects
- Large projects
- Coordinated research





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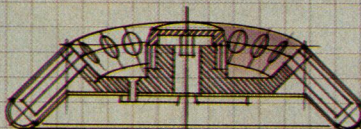
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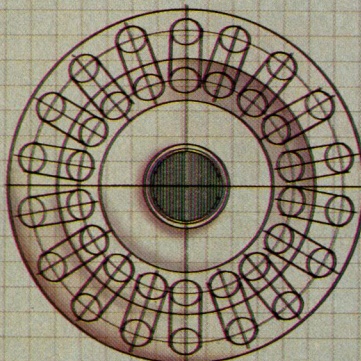
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| | |
|---------------------------------|-------------------|
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| Dimensions (L x W x H) | 28 x 21 x 28.5 cm |

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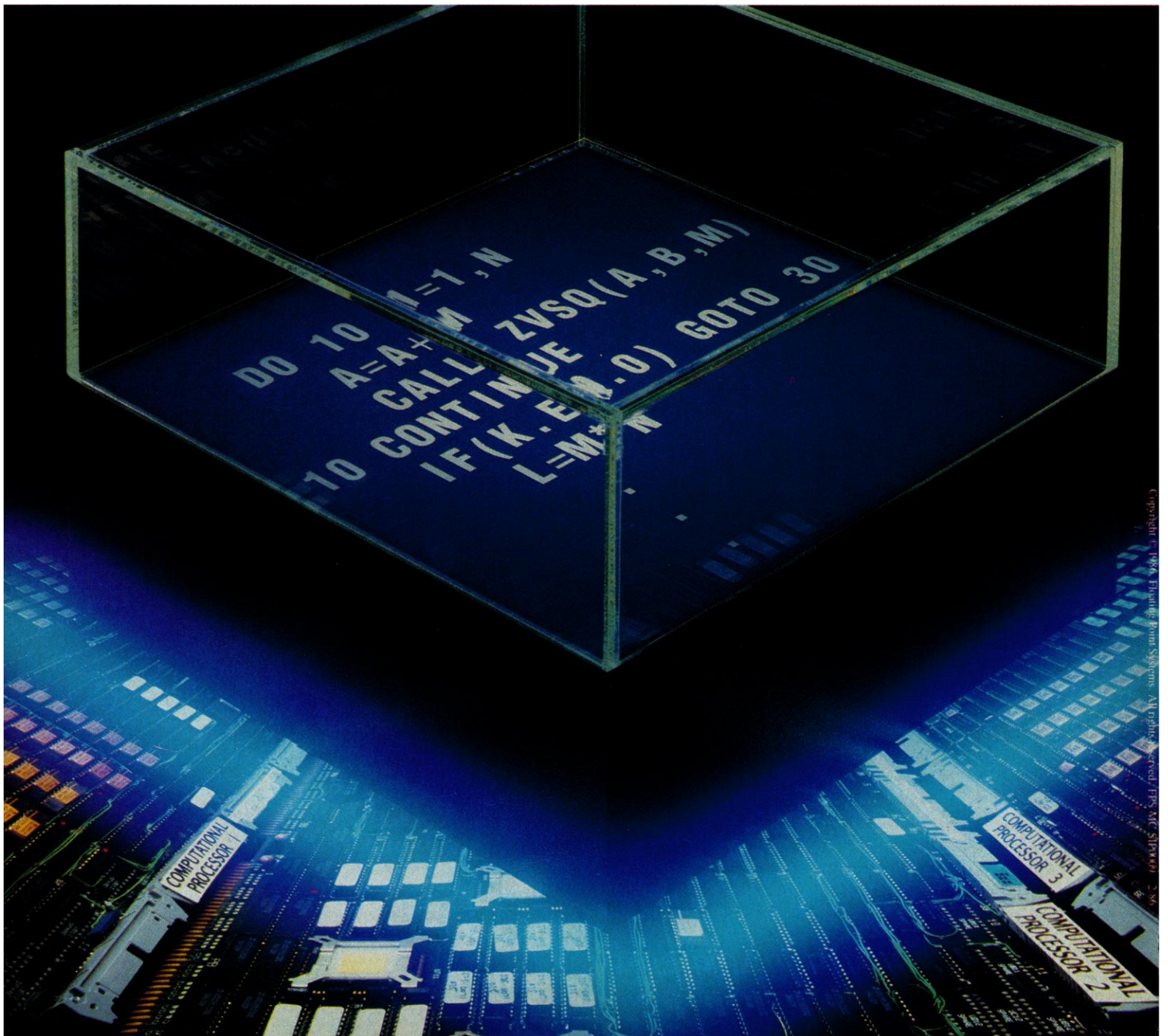
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| | | 2 | 0.207 | 21.5 |
| | | 3 | 0.161 | 27.6 |
| | 512 × 512 | 1 | 1.269 | 16.5 |
| | | 2 | 0.646 | 32.4 |
| | | 3 | 0.498 | 42.1 |
| | 1024 × 1024 | 1 | 5.304 | 16.8 |
| | | 2 | 2.664 | 33.4 |
| | | 3 | 1.880 | 47.3 |
| 2D Convolution (14 × 14-point operator) | 512 × 512 | 1 | 8.449 | 12.1 |
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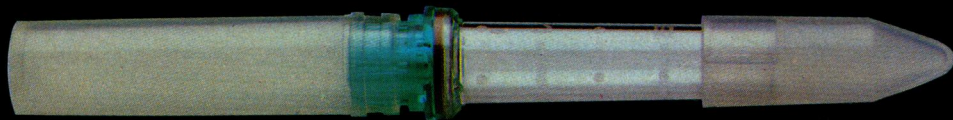
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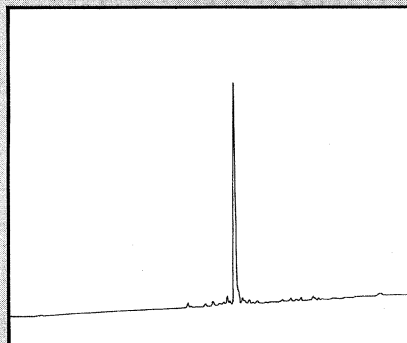
Coupling failures are eliminated or greatly reduced resulting in fewer double couplings. Both *t*-BOC and Fmoc chemistries can be accommodated.

4 It Produces Superb Short Peptides

Step Yield (% Coupled) Standard ABI *t*-boc cycles, version 1.0

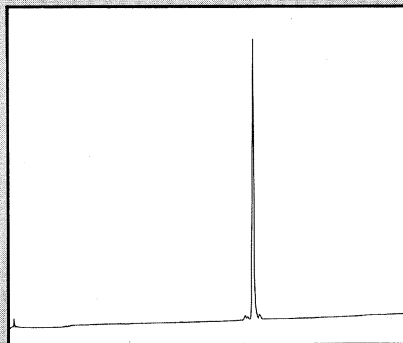
| PEPTIDE SEQUENCE | LEU | HIS | PHE | PRO | HIS | ILE | TYR | VAL | ARG | ASP | AVG. STP. YIELD % |
|---------------------------|-----|------|------|------|-------|------|------|------|------|------|-------------------|
| Ninhydrin Analysis | • | 96.7 | 99.7 | 99.7 | *99.6 | 98.9 | 99.5 | 98.3 | 99.5 | 99.4 | 99.0 |
| Preview Sequence Analysis | • | • | • | 99.5 | 99.2 | 94.9 | 96.6 | 96.5 | 97.1 | 97.9 | 97.4 |
| RESIDUE NUMBER | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |

*Ninhydrin values for amino acids coupled to proline are not quantitative.



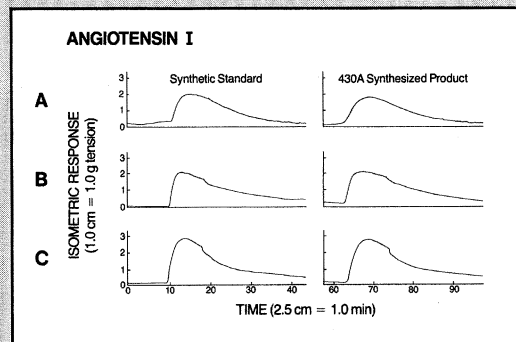
Angiotensin I, Crude

mobile phase 0.1% TFA/CH₃CN
gradient 0 to 60% in 60 minutes
flow rate 1.0 mL/min
detector 216 nm
column Brownlee, C-8, 300Å, 10µm
4.6 mm x 250 mm



Angiotensin I, HPLC Purified

mobile phase 0.1% TFA/CH₃CN
gradient 0 to 60% in 60 minutes
flow rate 1.0 mL/min
detector 216 nm
column Brownlee, C-8, 300Å, 10µm
4.6 mm x 250 mm



Panels A, B and C are isometric responses of two different Ile⁵-Angiotensin I—a synthetic standard and the 430A-produced, purified peptide—on three separate rabbit aortic strips. The responses produced by the Applied Biosystems Ile⁵-Angiotensin I were not significantly different than those of the standard. Sample concentrations were: in panel A, 564 ng/mL; in panels B and C, 500 ng/mL.

These response data were furnished by Drs. M. C. Khosla and A. Husein of the Cleveland Clinic Foundation.

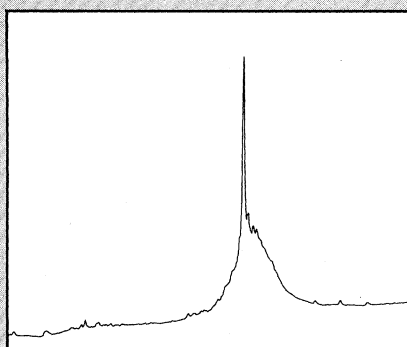
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5 It Produces Superb Long Peptides

Step Yield (% Coupled) Standard ABI t-boc cycles, version 1.0

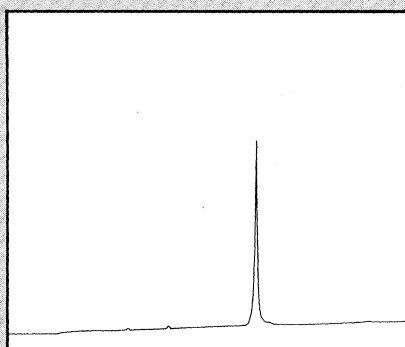
| PEPTIDE SEQUENCE | | | | | | | | | | | | | | | | | | GLY | GLY | LYS | GLU | SER | ARG | GLY | GLN | GLN | VAL | PRO | PRO | GLY | ASP | ARG | GLN | ALA | GLU | VAL | LEU |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Ninhydrin Analysis | | | | | | | | | | | | | | | | | | 99.7 | 99.8 | 99.5 | 99.4 | 99.2 | 99.6 | 99.4 | 99.6 | 99.2 | 98.0 | 97.0 | 99.8 | 99.1 | 98.9 | 99.0 | 99.1 | 98.7 | 98.6 | 98.5 | 98.5 |
| Preview Sequence Analysis | | | | | | | | | | | | | | | | | | • | • | 99.6 | 99.6 | 99.5 | 99.6 | 99.5 | • | • | 99.1 | • | 1 | 98.9 | 99.0 | 99.0 | 98.6 | 98.7 | 98.6 | 98.5 | 98.4 |
| RESIDUE NUMBER | | | | | | | | | | | | | | | | | | 67 | 66 | 65 | 64 | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 |
| → | LYS | SER | TYR | ASP | PHE | SER | ASP | GLY | SER | GLU | GLU | TYR | GLU | ALA | ASN | LEU | GLU | ALA | ASP | LEU | THR | THR | GLN | ALA | LEU | | | | | | | | | | | | |
| | 95.8 | 97.4 | 97.2 | 97.8 | 98.3 | 98.3 | 97.9 | 96.9 | 98.5 | 98.3 | 98.0 | 97.1 | 97.2 | 98.2 | 96.9 | 98.1 | 97.7 | 98.0 | 98.0 | 98.2 | 97.6 | 95.0 | 82.7 | 96.0 | 96.1 | | | | | | | | | | | | |
| | 98.5 | 98.5 | 98.5 | 98.5 | 98.8 | 97.9 | 98.0 | 97.8 | 97.0 | • | • | 98.8 | • | 99.3 | 99.3 | 99.3 | 98.9 | 99.1 | 98.9 | 93.9 | • | • | 98.4 | 99.0 | 98.1 | | | | | | | | | | | | |
| → | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | | | | | | | | | | | | |
| → | VAL | ARG | ALA | GLN | SER | SER | GLN | ARG | ASN | ARG | SER | SER | SER | SER | ALA | PRO | ARG | SER | SER | SER | NET | AVG. STP. YIELD % | | | | | | | | | | | | | | | |
| | 96.1 | 94.9 | 95.2 | 94.6 | 95.5 | 95.5 | 96.4 | 92.5 | 92.2 | 91.7 | 93.9 | 95.0 | 96.7 | 96.2 | 94.5 | 94.8 | 94.4 | 95.0 | 97.2 | • | 95.9 | 96.5 | 96.9 | | | | | | | | | | | | | | |
| | 98.3 | 98.5 | 98.0 | 96.8 | • | • | • | 97.9 | • | • | • | • | • | • | • | 95.2 | 95.1 | 97.2 | • | • | • | • | 98.9 | | | | | | | | | | | | | | |
| → | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | | | | | | | | | | | | | |

These are amino acid resin samples from the first coupling of the HOBT ester double couple cycles used for the Arg, Asn and Gln couplings. The calculation of the average step yield excludes these () residues. *Ninhydrin values for amino acids coupled to proline are not quantitative.



M-67-G (CONH₂), Crude

mobile phase 0.1% TFA/CH₃CN
gradient 0 to 60% in 60 minutes
flow rate 1.0 mL/min
detector 214 nm
column Brownlee, C-8, 300Å, 10 µm
4.6 mm x 100 mm



M-67-G (CONH₂), Purified

mobile phase 0.1% TFA/CH₃CN
gradient 0 to 60% in 60 minutes
flow rate 1.0 mL/min
detector 214 nm
column Brownlee, C-8, 300Å, 10 µm
4.6 mm x 250 mm

Met-67-Gly (CONH₂) is a 69-residue peptide that is part of a 124k-dalton plant protein, Avena Phytochrome. This peptide is from an area of the Phytochrome protein that has been shown to be essential for complete biological activity. Although sequence analysis suggests the purified product contains minor peptide impurities, initial experiments have shown good peptide binding activity to antibodies made against the native protein. Work is continuing with efforts to map the exact reading frame of these antibodies by using deprotected, resin-bound peptides directly in the antibody binding assays.

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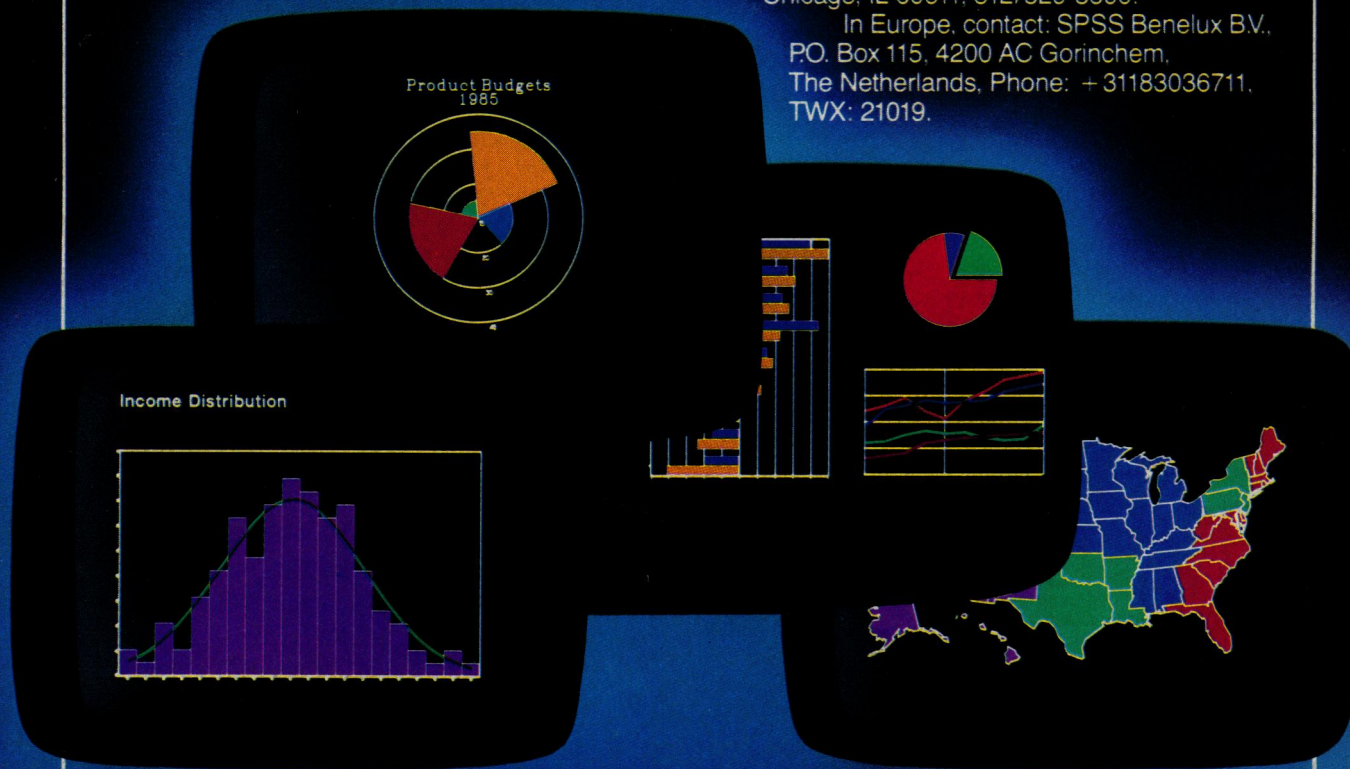
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Twenty years ago on June 1, Surveyor 1 made the first soft landing on the moon, giving scientists their first close-up look of the lunar surface and blazing a trail for the manned Apollo missions three years later. The three-legged spacecraft, built by Hughes Aircraft Company, landed one second ahead of the originally predicted time and just nine miles from the predicted target point after traveling 240,000 miles. In the following eight months, Surveyor televised 11,150 pictures, photographed the solar corona of the setting sun, made a color composite photo of the lunar surface, and measured the hardness of the lunar surface. By January 1968, four other Surveyors had made soft landings on the moon. They provided detailed scientific information about the physical and chemical character of lunar materials and added immeasurably to the understanding of the physical processes that shape the moon's surface.

Building blocks for what will become an electronics factory of the future are being set in place at Hughes to cut costs in manufacturing airborne radars and other avionics programs. Lasers, fiber optics, remote fiber fluorometry, and advanced optics play a part in an Industrial Modernization Incentive Program (IMIP) contract awarded by the U.S. Navy with Air Force participation. IMIP is a share-the-savings concept to reduce costs of the F-14, F-15, and F/A-18 Hornet Strike Fighter radar programs by more than \$10 million, while improving the quality and reliability of the systems. Three projects employing new manufacturing technology focus on solder joint inspection, metal fabrication inspection, and continuous chemical analysis of solutions used in electroplating printed wiring boards.

Military commanders at separate headquarters can share up-to-the-minute information, thanks to a new automated message processing system for Command and Control Information Systems (CCIS). The system, developed by Hughes, handles a wide range of formatted and unformatted messages as specified in the Joint US/NATO military reporting system. It will dramatically lessen the time needed to update planning, intelligence, and force status information in command and control systems. The system can receive messages over a variety of digital links. Messages can be drawn automatically from complex relational databases, or be used to update information automatically. Information can be displayed on screens in a variety of formats, and be modified by commanders.

An advanced binocular system turns night into day for military pilots flying nap-of-the-earth missions in helicopters. The Aviator's Night Vision Imaging System (ANVIS) is a helmet-mounted binocular that intensifies nighttime scenes illuminated only by faint moonlight or starlight. It uses advanced optics and molded mechanical components to offer high performance in a rugged, lightweight package. The optical system incorporates precision aspheric elements to provide high resolution and reduced complexity. Molded mechanical parts employ high-strength anti-friction plastics for smooth mechanical operation. Hughes Optical Products, a Hughes subsidiary, builds ANVIS for the U.S. Army.

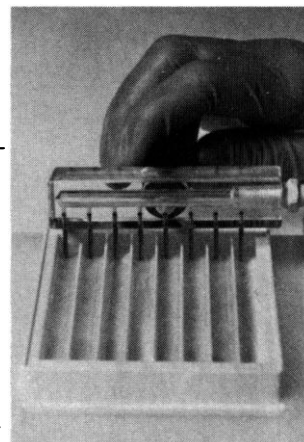
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AAAS Invites Applications

The American Association for the Advancement of Science invites applications for two Science, Arms Control, and National Security Fellowships. Fellows will select a term of either 8 months or 1 year to begin on January 1, 1987.

The Fellowship program will provide a unique opportunity for outstanding postdoctoral to mid-career scientists and engineers to participate directly in the policy-making process in the area of arms control and national security. Fellows will work in appropriate executive branch agencies of the federal government, congressional committees or support agencies, or nonprofit institutions in Washington, DC.

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For application requirements and additional information, contact:

Dr. W. Thomas Wander, Senior Program Associate
Science, Arms Control, and National Security Fellowships
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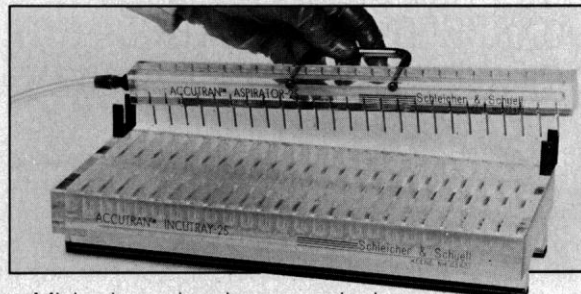
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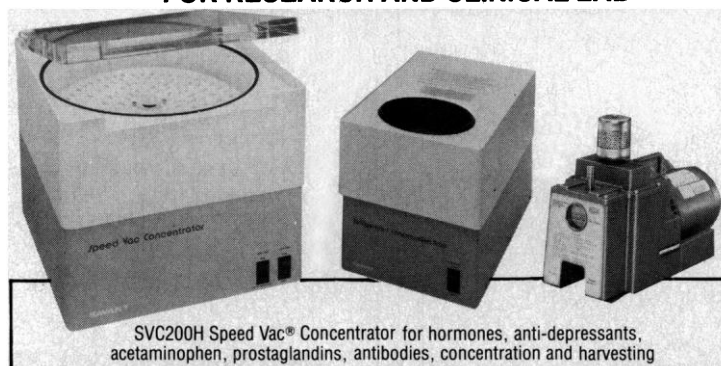
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NIH PROGRAM FOR DEVELOPING TREATMENTS FOR ACQUIRED IMMUNODEFICIENCY SYNDROME

The National Cancer Institute and the National Institute of Allergy and Infectious Diseases of the National Institutes of Health, Bethesda, MD, have jointly organized an AIDS Drug Selection Committee to review and facilitate the development (testing) of possible treatments for AIDS. This committee is constituted to review suggestions submitted for treatment of AIDS patients and, in certain cases, to recommend appropriate pre-clinical and clinical research or further development. Interested parties who have synthetic or natural substances known to inhibit the growth of the retrovirus known to cause AIDS, or which may preserve or augment the immune status of infected persons, are encouraged to share this information. The committee will hold information of a proprietary nature in the strictest confidence. Detailed proposals should contain the following information:

1. The precise nature and composition of the substance or, if proprietary, a willingness to reveal that information to a closed session of the AIDS Drug Selection Committee.
2. Data regarding the substance's or substances' known biological, chemical, physical or physiological properties.
3. Data regarding the *in vitro* activity of the substance or substances such as to suggest that it might be active against the virus associated with AIDS, or function as an immunomodulator.
4. Data from animal studies, if any, indicating its safety, tolerance, and efficacy in conditions possessing some similarities to AIDS.
5. Data from human studies, if any, indicating its safety and tolerance.
6. A statement of willingness, if any, by an organization to supply material or to cooperate in the preparation of adequate amounts of material for study purposes.

Proposals should be submitted in writing to:

Eddie Reed, M.D.
Executive Secretary
AIDS Drug Selection Committee
Bldg. 31, Room 3A49
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National Institutes of Health
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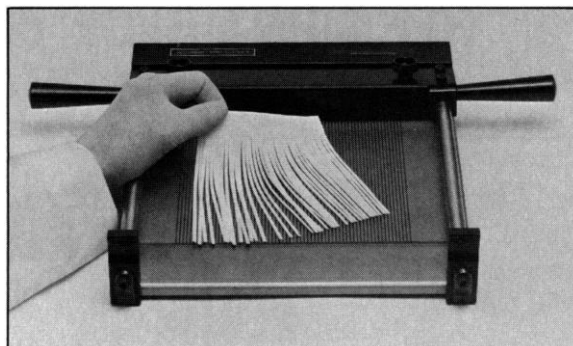
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Academic Research Enhancement Awards (AREAs) provide funding for feasibility studies, pilot studies and other small-scale research projects. Awards are made in amounts of up to \$50,000 in direct costs (plus applicable indirect costs) for periods not to exceed 24 months.

Eligibility Requirements

1. Applicant Institutions
 - (a) Must be a domestic institution offering baccalaureate or advanced degrees in the sciences related to health.
 - (b) Have received an NIH Biomedical Research Grant (BRSG) in no more than three of the six fiscal years from FY 1981 through FY 1986.
2. Applicant Principal Investigators
 - (a) Must not have active research grant support (including an AREA) from either NIH or the Alcohol, Drug Abuse and Mental Health Administration (ADAMHA) at the applicant institution at the time of award of an AREA grant.
 - (b) May not submit a regular NIH or ADAMHA research grant application for essentially the same project as a pending AREA application.
 - (c) Are expected to conduct the majority of their research at their own institution, although limited access to special facilities or equipment at another institution is permitted.
 - (d) May not be awarded more than one AREA grant.

Award Criteria

Funding decisions are based on the research project's scientific merit and relevance to NIH programs, and the institution's contribution to the undergraduate preparation of doctoral-level health professionals. Among projects of essentially equivalent scientific merit and program relevance, preference will be given to those submitted by institutions that have granted baccalaureate degrees to 25 or more individuals who, during the period 1977-1986, obtained academic or professional doctoral degrees in the health related sciences.

APPLICATION RECEIPT DATE

September 22, 1986

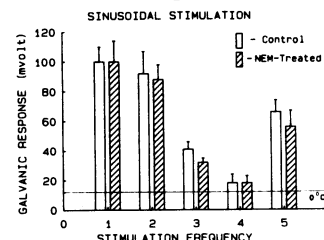
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Applications must be postmarked on or before August 15, 1986. Supporting documents must be received by September 1, 1986. Awards will be announced in early November 1986.

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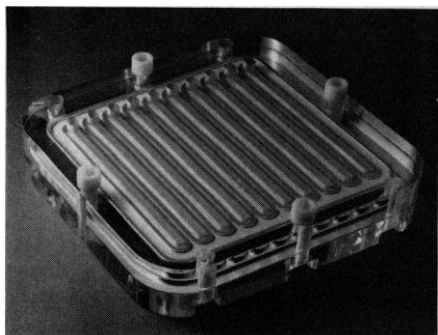
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To its line of vertical slab units and transfer units in both standard- and small-gel formats, Hoefer Scientific has added standard- and small-size incubation units for use with Western, Northern and Southern blots. These new units are designed to make membrane incubation as trouble-free as possible and to use minimal amounts of costly reagents.

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The precisely engineered Deca-Probe has a simple design. Two sturdy 19 x 19 cm acrylic plates fit together with a blotted membrane between them. Parallel troughs milled into one of the plates become individual incubation chambers when the plates are placed together and sealed. The 10 troughs match exactly the sample lanes of a special 10-well comb (PR 511) for use in Hoefer's standard-size vertical slab units. The Deca-Probe has double protection against leakage from one chamber to another: O-ring gaskets surround each chamber and a flat sheet of silicone rubber underlays the membrane. Another O-ring fits around the perimeter of the unit. Plastic Allen screws hold the unit's two plates together and seal all gaskets.

At the end of each of Deca-Probe's 10 chambers, a small oval port allows introduction and removal of reagents. All that's needed is just enough solution to wet the membrane and to allow for mixing when the unit is rocked—about 2-3 ml per chamber.

● **The PR 350 16-Well Incubation Tray** is an economical unit made of sturdy acrylic, for incubating strips from standard-size blotted membranes. To make the unit as

convenient as possible to fill, empty and wash, wells in the PR 350 are spaced to accept 8-channel pipette and washing accessories.

The PR 350's wells are 16 cm long by 7 mm wide and require only about 5 ml of solution each. To keep wet membrane strips from sticking to the bottoms of wells, bottoms are slightly rounded. And to facilitate removal of strips after incubation, the end of each well is tapered so that forceps can slip right in under the end of a strip. A plastic tray lid is available as an option.



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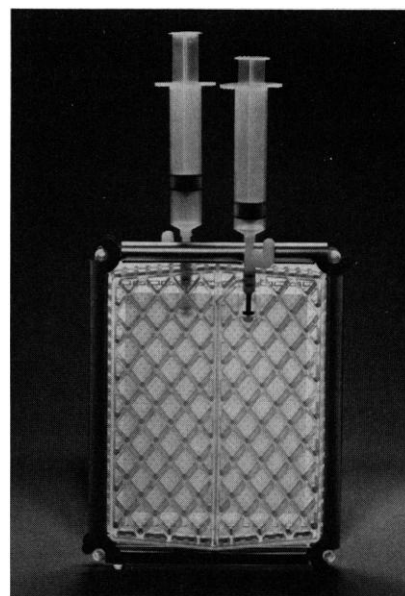
● **The PR 150 Mighty Small™ Deca-Probe** is an accessory in Hoefer's small-gel format line of products. Researchers running gels in the Hoefer Mighty Small I and II 7 x 8 cm vertical slab units and transferring to 8 x 8 cm membranes in the Mighty Small Transphor® will find the Mighty Small Deca-Probe ideal for incubating those membranes intact. A slotted silicone rubber gasket seals the unit's inner chambers and a flat silicone rubber sheet seals the perimeter.



Solutions in the Mighty Small Deca-Probe are easy to introduce and withdraw through the oval port at the end of each chamber. Reagent requirements are extremely low—as little as 0.50 ml per chamber.

● **The PR 800 Hybrid-Ease™** hybridization chamber is Hoefer's new unit for high-resolution Northern and Southern blot analysis. Once a blotted membrane is in place in the Hybrid-Ease and the unit is closed, it is possible to perform all steps of the hybridization process—prehybridization, hybridization, stringency washing—without opening the unit again. Solutions wash evenly over all parts of a membrane, resulting in membranes that are free from artifacts.

Molded of polysulfone, the Hybrid-Ease is a safe, sturdy, leakproof unit that uses small amounts of solutions introduced and withdrawn through syringes, to cut down on radioactive waste and risk of spills. Syringes make possible nearly quantitative recovery of probe.



● **The PR 50 Red Rocker** rocking platform (shown above), the PR 70 Red Rotor orbital shaker, pure nitrocellulose membranes, three types of nylon membranes and reagents for immunodetection and protein staining are also available from Hoefer.

● **Hoefer Scientific Instruments, P.O. Box 77387, San Francisco, CA 94107 USA. Phone: 800-227-4750; in California, 415-282-2307. Telefax: 415-821-1081. Telex: 470778.**

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