American Association for the Advancement of Science

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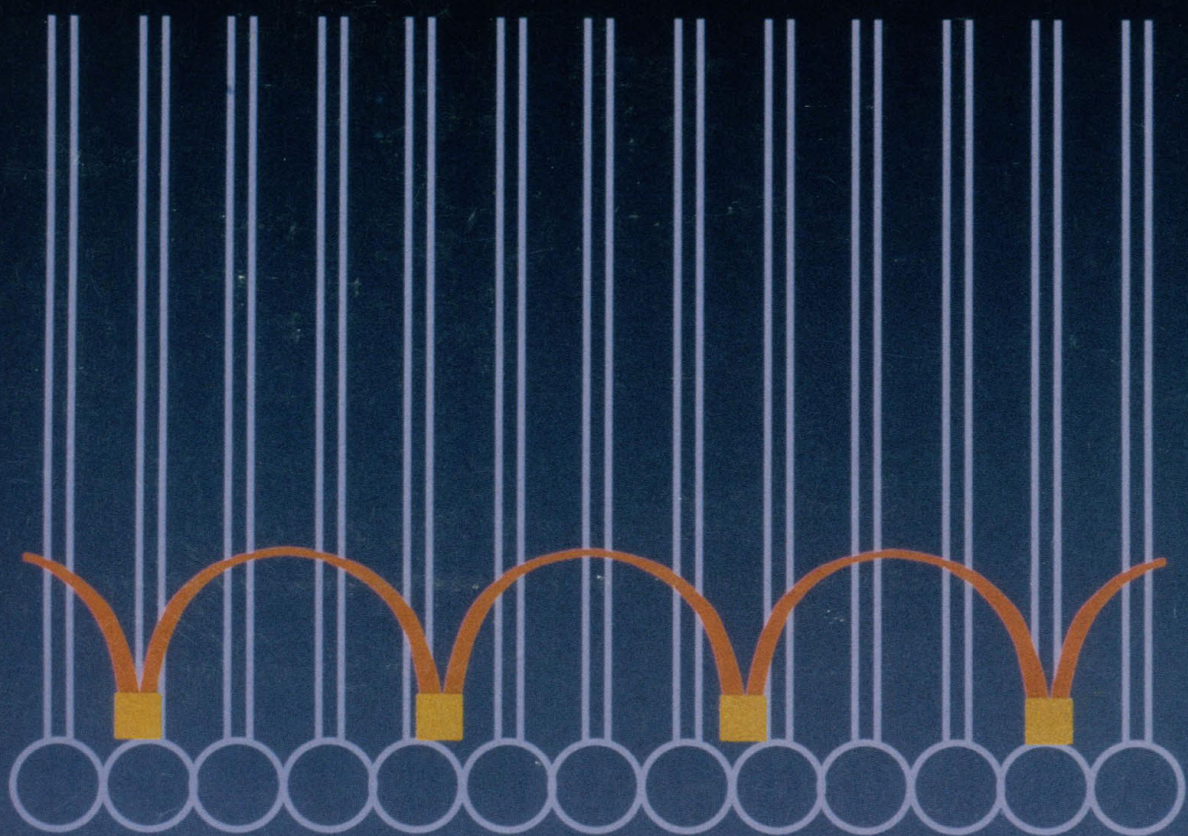

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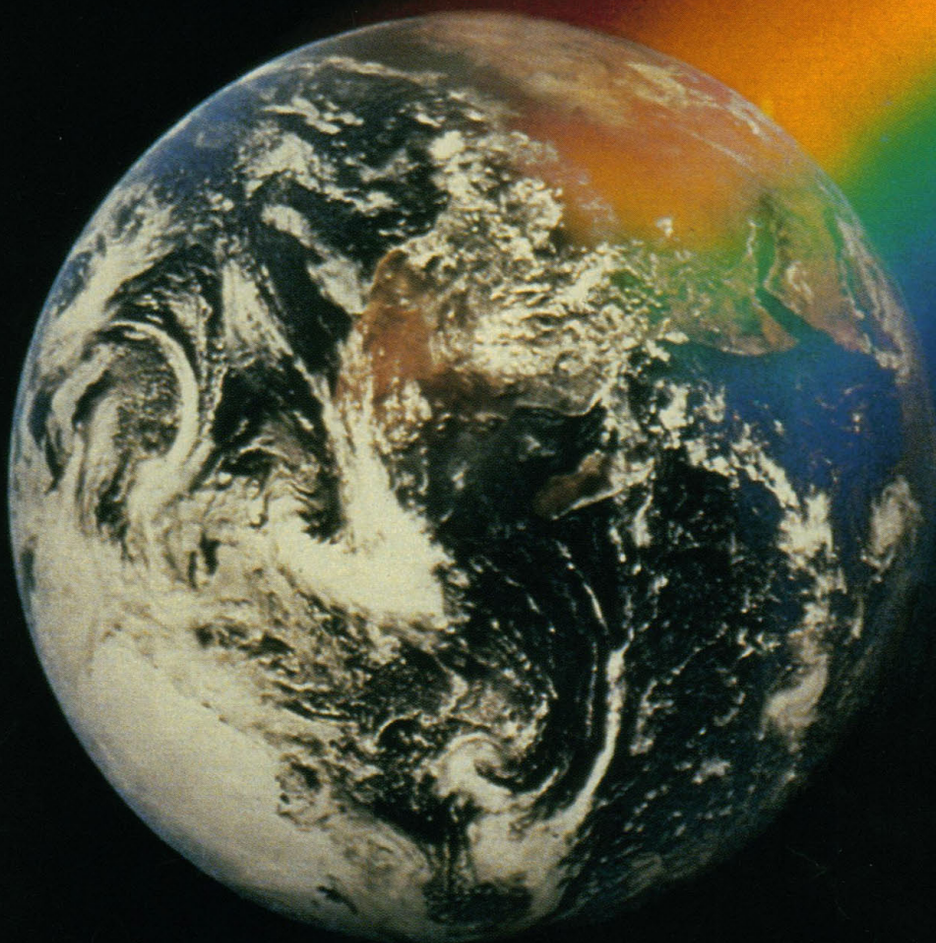

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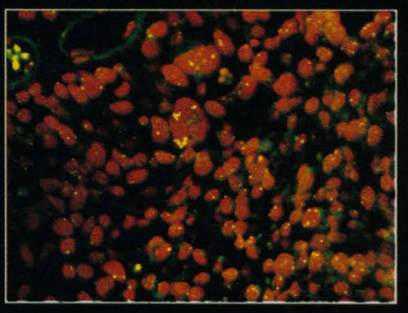
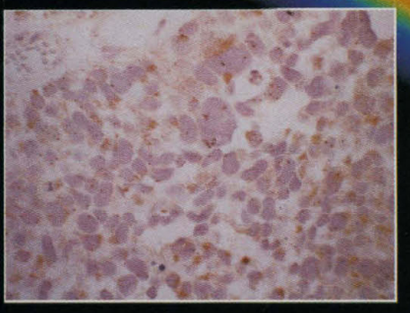


Human Male Bladder Carcinoma
Human X Alpha Satellite Probe



Human Male Bladder Carcinoma
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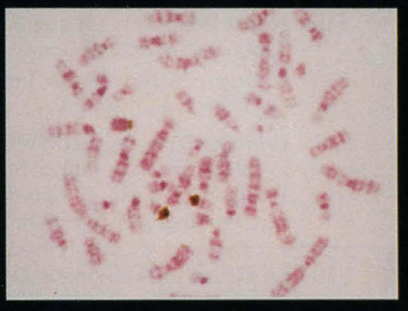

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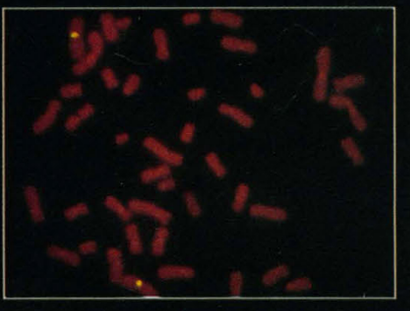

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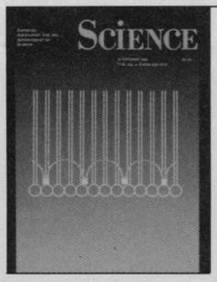

COVER Representation of the interaction of surfactant protein B (SP-B) with phospholipids in pulmonary surfactant. The hydrophilic domains of the protein (yellow squares) interact with the charges of the phospholipid polar head groups (circles), and the hydrophobic stretches of the protein (orange arches) interact with the acyl side chains of the phospholipids (vertical lines). These interactions provide the basis of pulmonary surfactant function in resisting surface tension and collapse of alveoli. See page 566. [Image from C. G. Cochrane and S. D. Revak]

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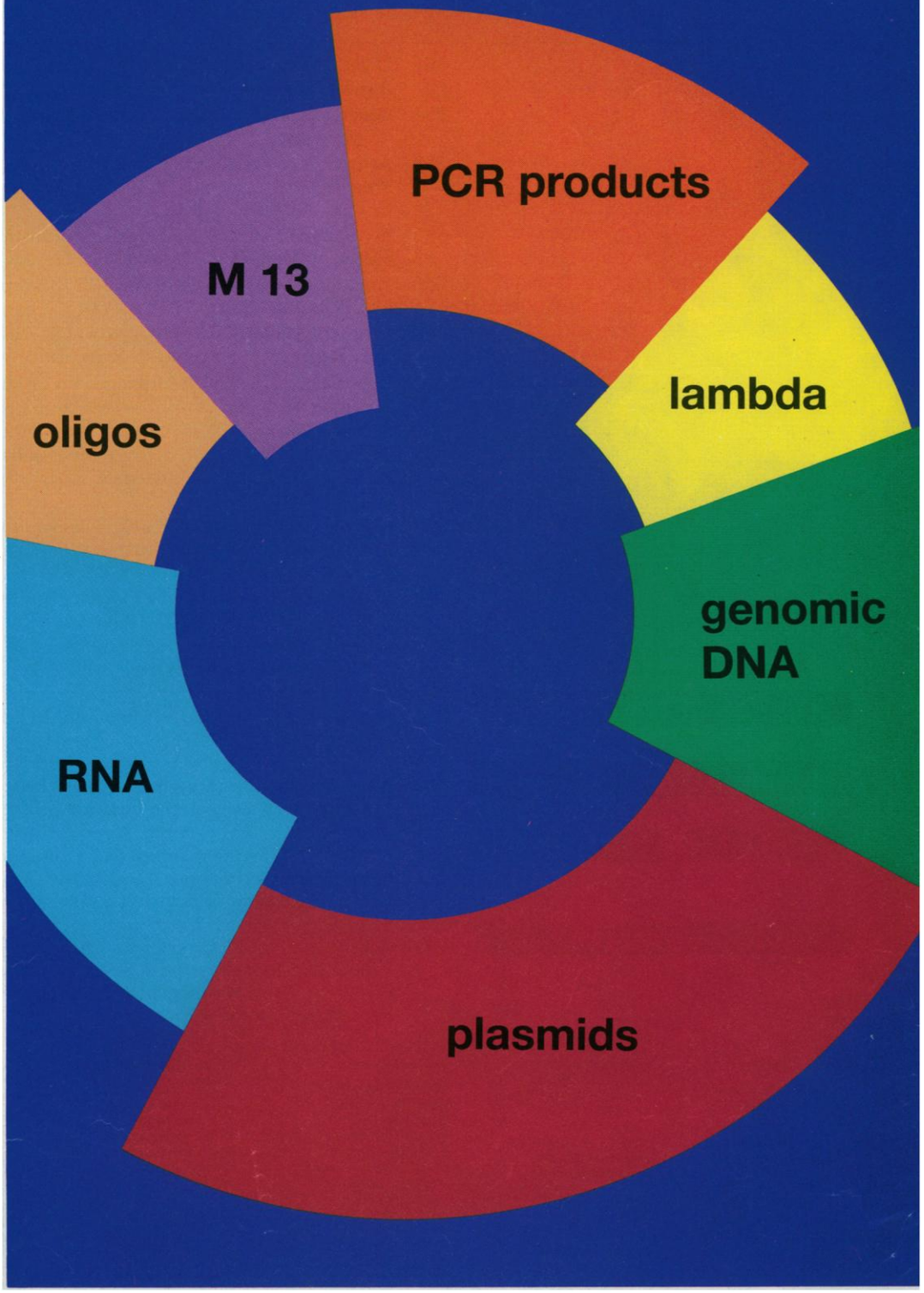

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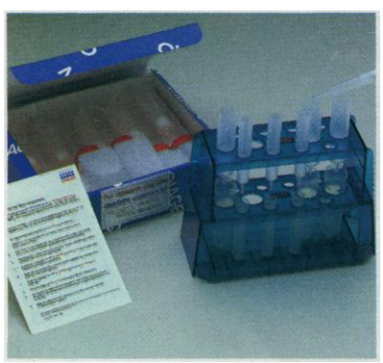

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This Week in
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Buckyball-metal phases

Materials scientists anticipate that buckyballs (C_{60}) containing alkali metals such as rubidium will have many interesting properties and probably some novel ones. What sorts of configurations are possible for these large carbon matrices and their metal constituents? Four phases of Rb_xC_{60} compounds, in which x has a value of 6 or less, have been identified. Zhu *et al.* report that two of these are line compounds, compounds for which only one value of x is possible—the superconducting face-centered cubic phase where $x = 3$ and the body-centered tetragonal phase where $x = 4$ (page 545). The saturated body-centered cubic phase occurs for $x = 6$. In addition, in the face-centered cubic phase, x can vary over a finite small range between 0 and 1, and a stable sub-stoichiometric body-centered cubic phase can exist for x in a range around 5. These relations are illustrated in a diagram in which the authors propose what phases will exist for different conditions of temperature and doping.

Phylogenetic relationships

Many techniques have been developed for estimating the phylogenetic relationships among organisms. How faithfully do they reflect the historical relationships of the organisms? Atchley and Fitch have used inbred strains of mice to examine this issue, because much is known about the genealogies of inbred strains of mice and about many of their genetic loci (page 554). Some of the commonly used inbred strains of mice are derived from other inbred strains; some are completely independently derived; all are developed by mating brothers and sisters for 20 or more generations. Phylogenetic trees drawn from divergence patterns of 144 homozygous loci found in 24 strains accurately reflected genealogic relations deduced from records of how the strains were developed. Genetic loci that encode proteins produced much more accurate trees than did loci that encoded viral constituents or molecules of the immune system. The authors and Hillis and Bull in a Perspective on page 528 discuss strengths and weaknesses of the inbred mouse system not only for testing the concordance of data obtained with different methods but also for evaluating evolutionary processes and theories.

Controlling differentiation

One of the most intriguing aspects of differentiation is how, from a single cell, daughter cells can arise that pursue different developmental pathways. A comparatively simple process, the formation of a spore during the life cycle of the bacterium *Bacillus subtilis*, has served as a model system in which to study differentiation and to identify molecular events that control, drive, or participate in development (page 562). This bacterial system is not only manipulable genetically but has been well characterized biochemically. During spore formation, a partition (septum) forms in the developing cell (the sporangium), and two daughter cells—the forespore and the mother cell—are produced. Eventually the forespore becomes the spore, and the mother cell lyses. Margolis *et al.* found that a transcription factor important to the maturation of the forespore is present in the sporangium, but that the factor, called σ^F, does not become active until it is in the forespore. A model is presented for how the activation of σ^F comes about and how σ^F later interacts with other σ factors that regulate gene expression in forespore and mother cell.

Kidney morphogen

Nerve growth factors (NGF) are vital not only for the development of nerves and nervous system tissue but also for the development of the kidney (page 571). Sariola *et al.* have found that when the expression of receptors for nerve morphogens is blocked in developing kidneys, so is kidney differentiation. Kidney cells in culture were exposed to antisense oligonucleotides that interact with the messenger RNA molecules that lead to synthesis of NGF receptors; the normal differentiation of the kidney tubules and the growth of the ureter from the ureter bud stopped. If the antisense oligonucleotides were then removed, the differentiation process proceeded. The authors point out that this is likely to be just the first of many nonneural systems whose differentiation is dependent on the NGF system, because NGF receptors have recently been identified in diverse embryonic tissues derived from all of the germ layers.

Sugar metabolism during a fast

How is the level of glucose in the blood maintained in fasting individuals? Two processes play a part—gluconeogenesis, which is the synthesis of glucose from amino acids and other noncarbohydrate starting materials, and glycogenolysis, which is the release and breakdown of glycogen (long-chain forms of glucose) from storage sites in the liver. Rothman *et al.* have assessed the contribution of each of these processes to glucose maintenance in seven people who had eaten a standard high-carbohydrate diet for 3 days and then fasted for 68 hours (page 573). Glycogenolysis was monitored with a noninvasive procedure—nuclear magnetic resonance spectroscopy—and total glucose production was also recorded; the rate of gluconeogenesis was calculated from the two measurements. During the first 22 hours of the fast, the content of glycogen in the liver decreased linearly, but glycogenolysis accounted for only 36% of the total glucose production. Throughout the fast, gluconeogenesis was the more important process for maintaining blood glucose levels, and, by 42 hours, all of the blood glucose was being produced in this way. ■ RUTH LEVY GUYER

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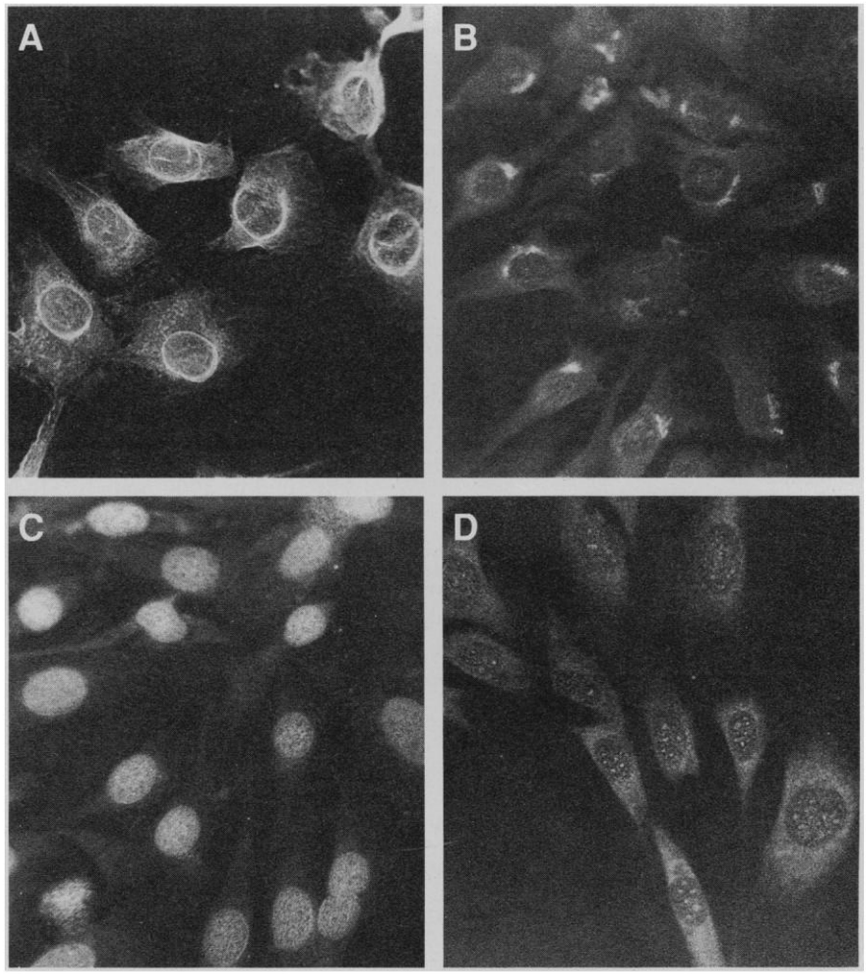

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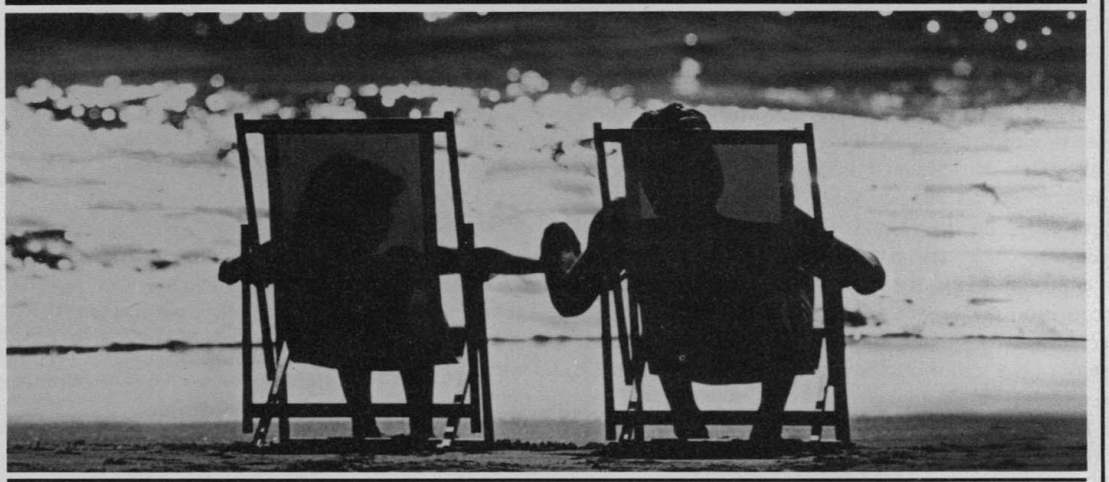

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S25

Which RNA Sample Contains The Highest Percentage Of PolyA+?

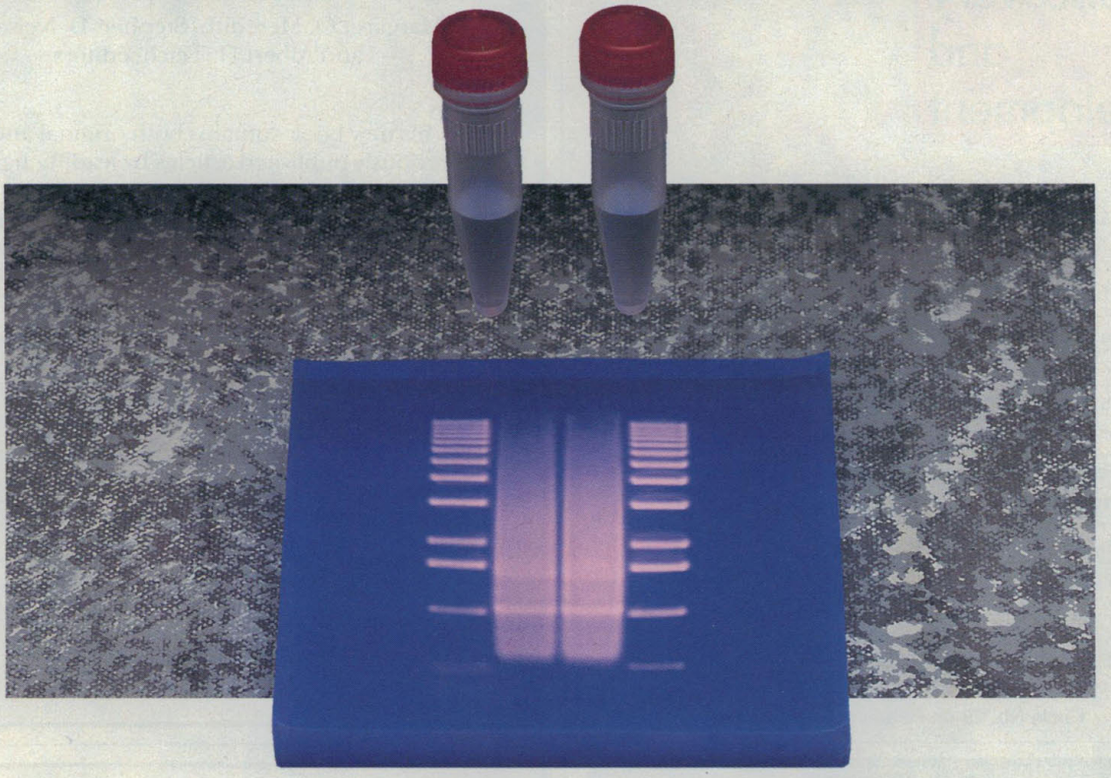

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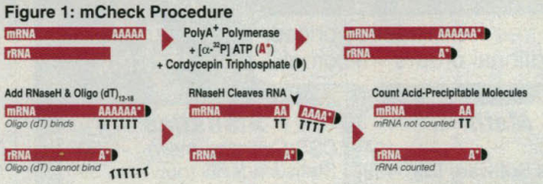
Figure 1: mCheck Procedure



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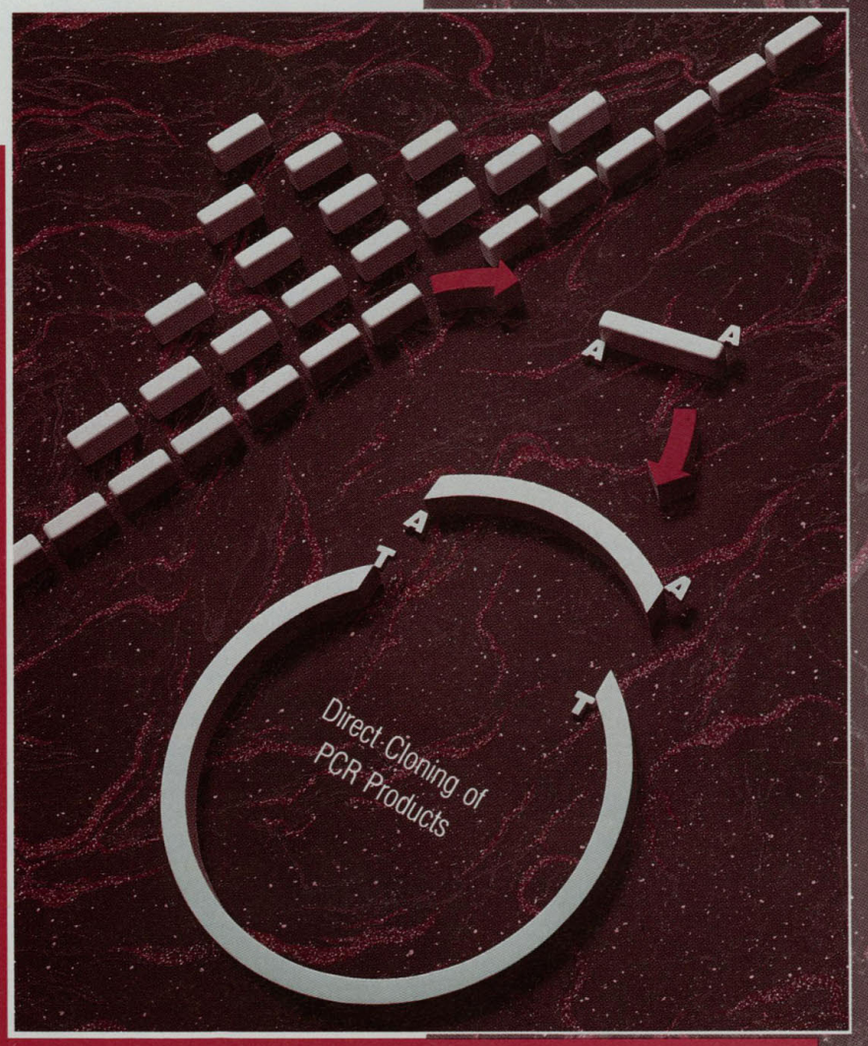

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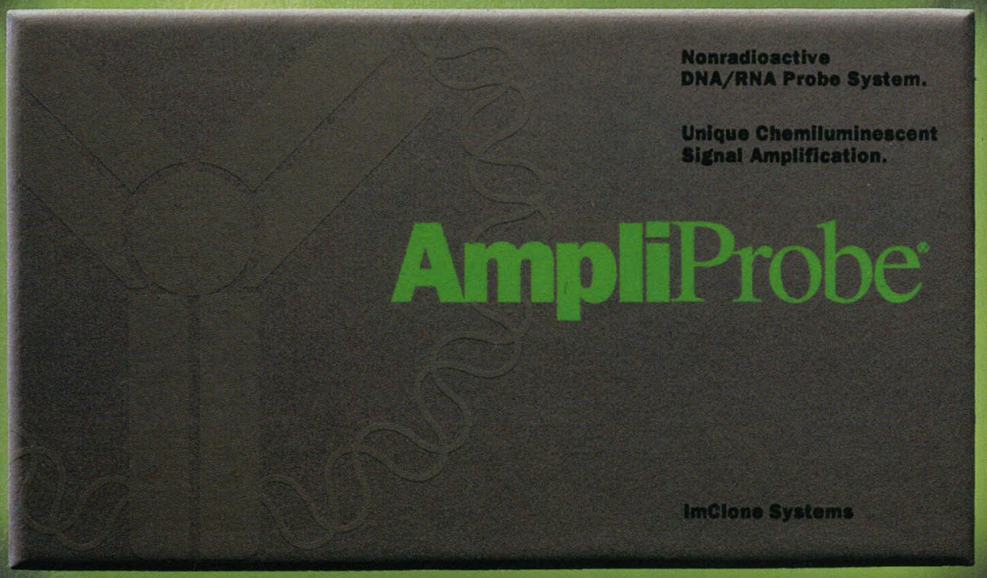

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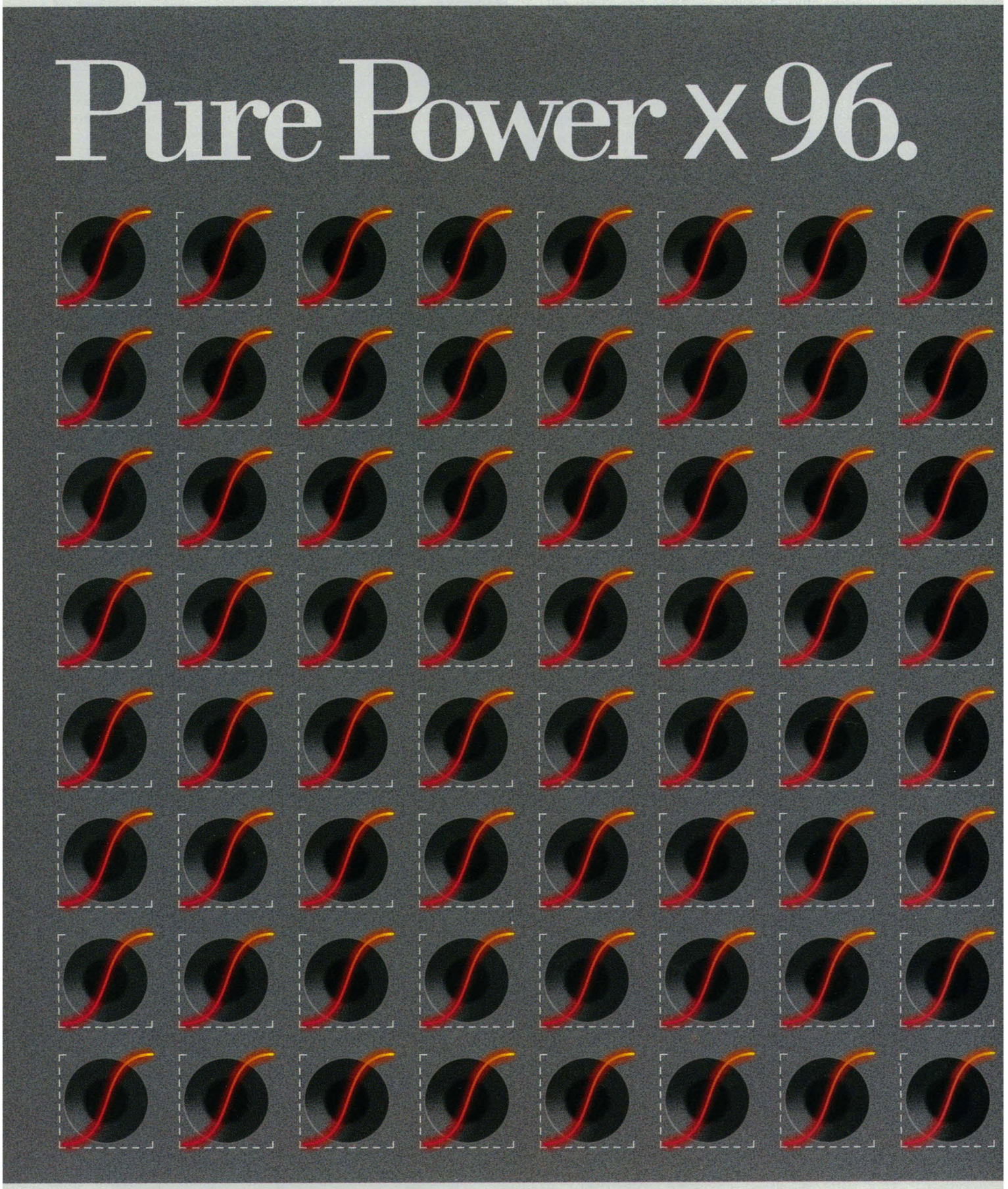

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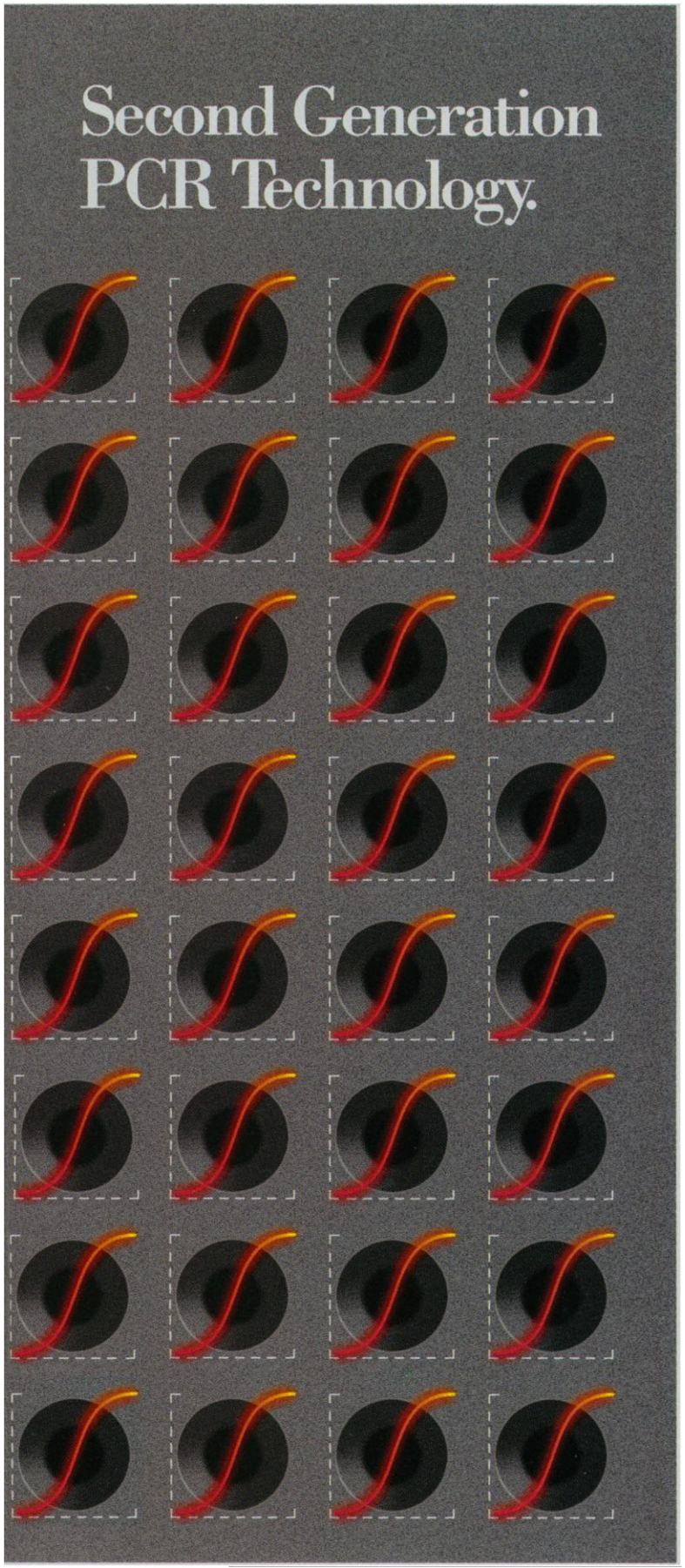

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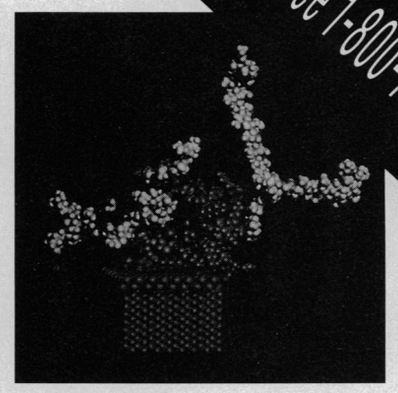

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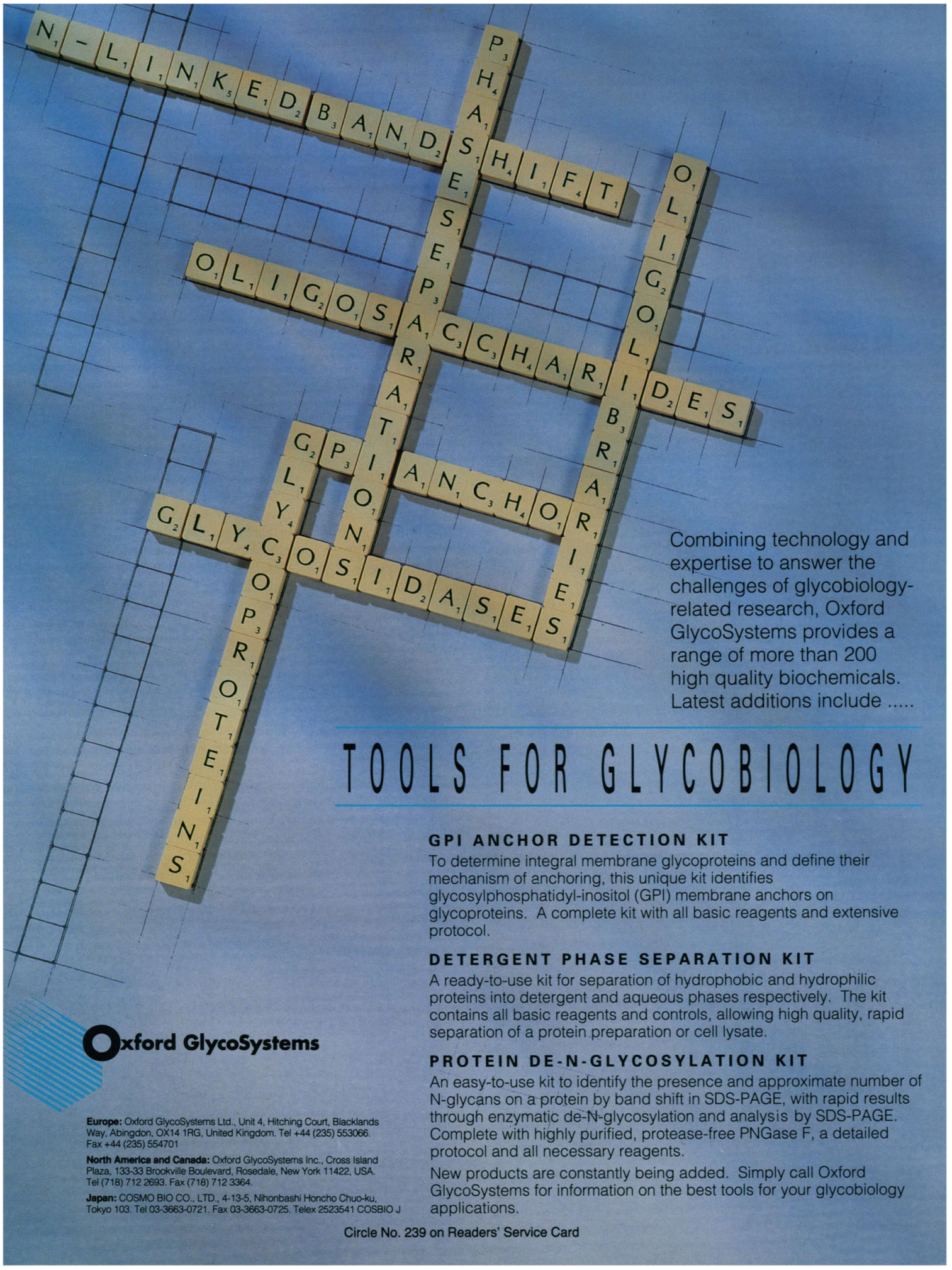

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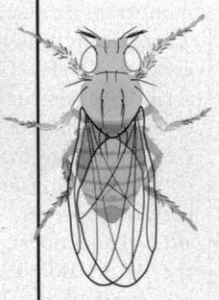

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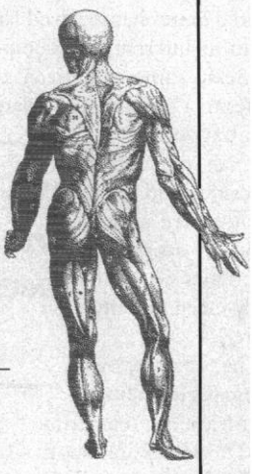

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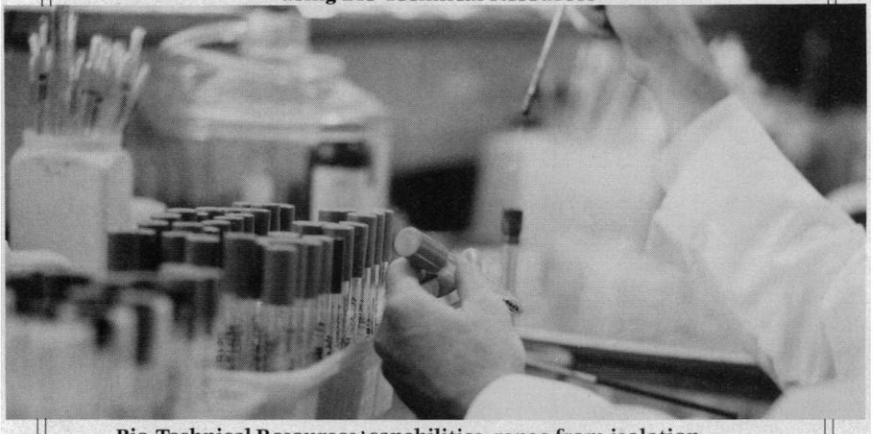

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SCIENCE CAREERS

143rd YEAR 1991 NO. EE03

AAAS ANNOUNCES EXPANSION OF EMPLOYMENT EXCHANGE '92

During 1992, the Employment Exchange will be held at three annual AAAS-sponsored meetings:

AAAS Annual Meeting
February 7-10, at the Hyatt Regency Hotel, Chicago, Illinois

AAAS Pacific Division Annual Meeting
June 21-24, at the University of California, Santa Barbara campus

Science Innovation '92
July 21-24, at the Moscone Center, San Francisco, California

EMPLOYER BENEFITS

- Hundreds of top-notch candidates. Access to all résumés cross-referenced by discipline.
- On-site interview facilities and scheduling services at no extra charge.
- Unlimited position postings.
- Special rates for AAAS Meetings exhibitors and nonprofit organizations.
- Free admittance to Plenary Lectures and Exhibition Hall without meeting registration fee.

EMPLOYER ENROLLMENT INSTRUCTIONS

- Complete the Employer enrollment form including which days you will be interviewing.
- Prepare your Position Available Description(s) on the form provided or on an 8"x11" page (using same format). Be sure to complete all sections.
- Indicate the names and phone numbers of the recruiters who will be participating at the Exchange.
- Submit appropriate payment (check or original purchase order) with completed enrollment form and position descriptions to the address listed below.
- NOTE: If you wish to attend sessions, seminars, or symposia, you must register for the meeting(s).

CANDIDATE BENEFITS

- Free enrollment for AAAS members who apply by the appropriate advance enrollment date (see below). Low $10 fee for nonmembers and on-site registrants.
- Hundreds of current position openings in a variety of disciplines and experience levels.
- On-site interview facilities, including on-the-spot interviews.
- Enrollment includes availability of your forms at all AAAS-sponsored annual meetings in 1992.
- Access to full descriptions of all available positions.

CANDIDATE ENROLLMENT INSTRUCTIONS

- Candidate Data forms must be complete and typed. Many employers will not consider incomplete or handwritten forms.
- Candidates may submit supplemental copies of a detailed C.V. with the completed Candidate Data form only.
- All candidates using the on-site facilities at the meeting(s) **must register for meeting attendance** as well as enrolling with the Employment Exchange.
- The AAAS Employment Exchange is a free service to AAAS members enrolled by the advance enrollment deadline dates: January 6, 1992 for AAAS Annual Meeting, Chicago; and June 5, 1992 for AAAS Pacific Division Annual Meeting, Santa Barbara, and Science Innovation '92, San Francisco.

Please forward completed forms and payments to: Jacquelyn Roberts, Manager, AAAS Employment Exchange, 1333 H Street, NW, Suite 1163, Washington, DC 20005 USA. Phone: 202/326-6737

Call for Nominations

AAAS Mentor Award

The Board of Directors of the American Association for the Advancement of Science has established an award, to be given annually, to honor AAAS members who, during their careers demonstrated extraordinary leadership in efforts above and beyond their duties to increase the participation of women, minorities, and people with disabilities in science and engineering.

The award, consisting of a plaque and $5,000, will be presented for the first time at the 1992 Annual Meeting. The award will honor individuals who have affected the climate of a department, college, or institution in such a way as to significantly increase the ethnic diversity of students pursuing and completing doctoral studies, and who have mentored and guided to the completion of doctoral studies significant numbers of minority, female, and disabled students.

Nominees would have assisted students in many if not all of the following: encouraged and helped them find an appropriate graduate school; accompanied the students on their initial meetings with their major professors; introduced the students to the graduate environment, and socially to the professionals; helped them find financial support; provided psychological support and encouragement; helped the students to present and publish their work; provided career guidance and assistance in placement in a meaningful post-doctoral position and employment; continued interest in the individual's professional advancement.

Nominators should send a narrative statement about the mentor, the nominee's curriculum vita, and sufficient documentation to show evidence that the nominee meets the criteria, such as support letters from students and colleagues. A sample citation of no more than 50 words should also accompany the nomination.

Materials should be sent by November 20 to: AAAS Mentor Award, c/o Yolanda S. George, Directorate for Education and Human Resources Programs, AAAS, 1333 H Street NW, Washington, DC 20005, Fax (202) 371-9849.

Applications will be reviewed and award recommendation made by the AAAS Committee on Opportunities in Science. The awardee will be notified by December 15 and will be expected to participate in the February award ceremony. Expenses associated with attending this ceremony will be borne by AAAS.