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SCIENCE

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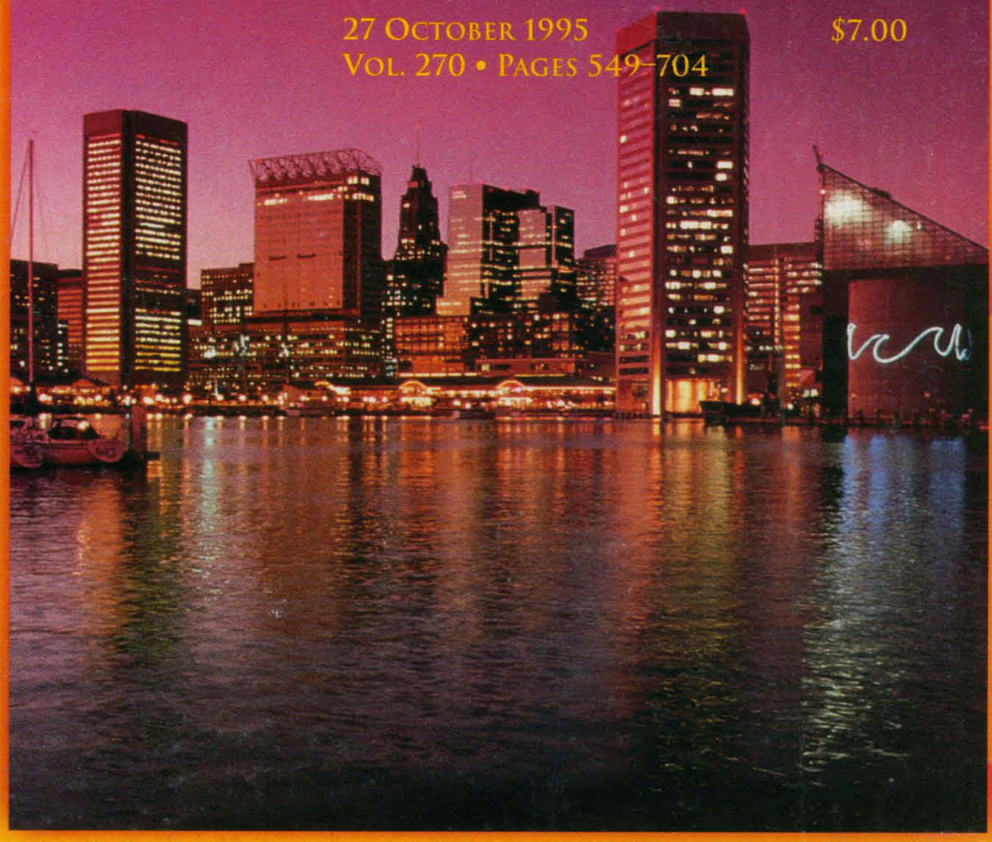

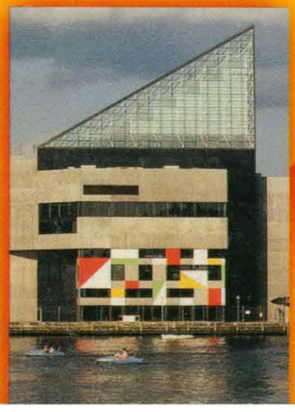

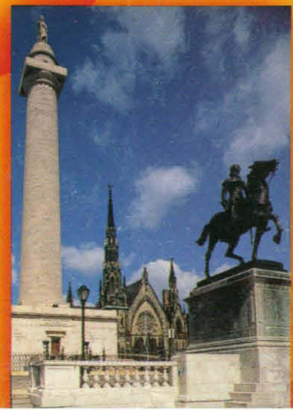

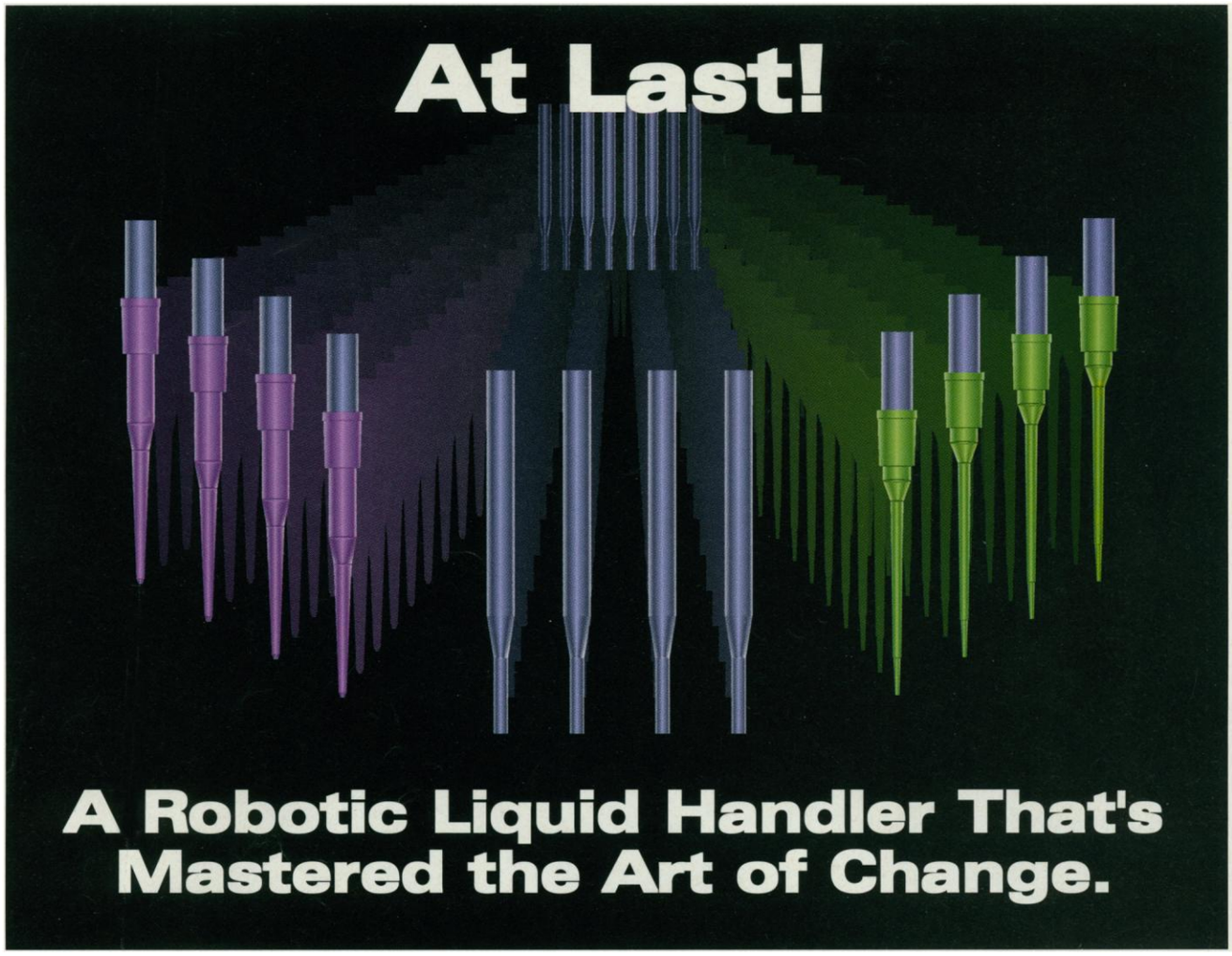

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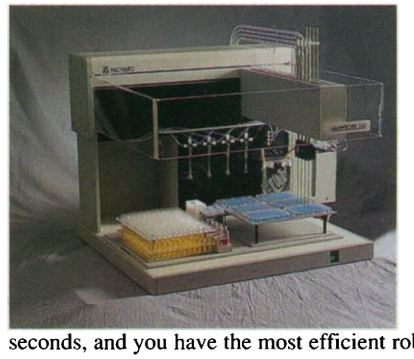

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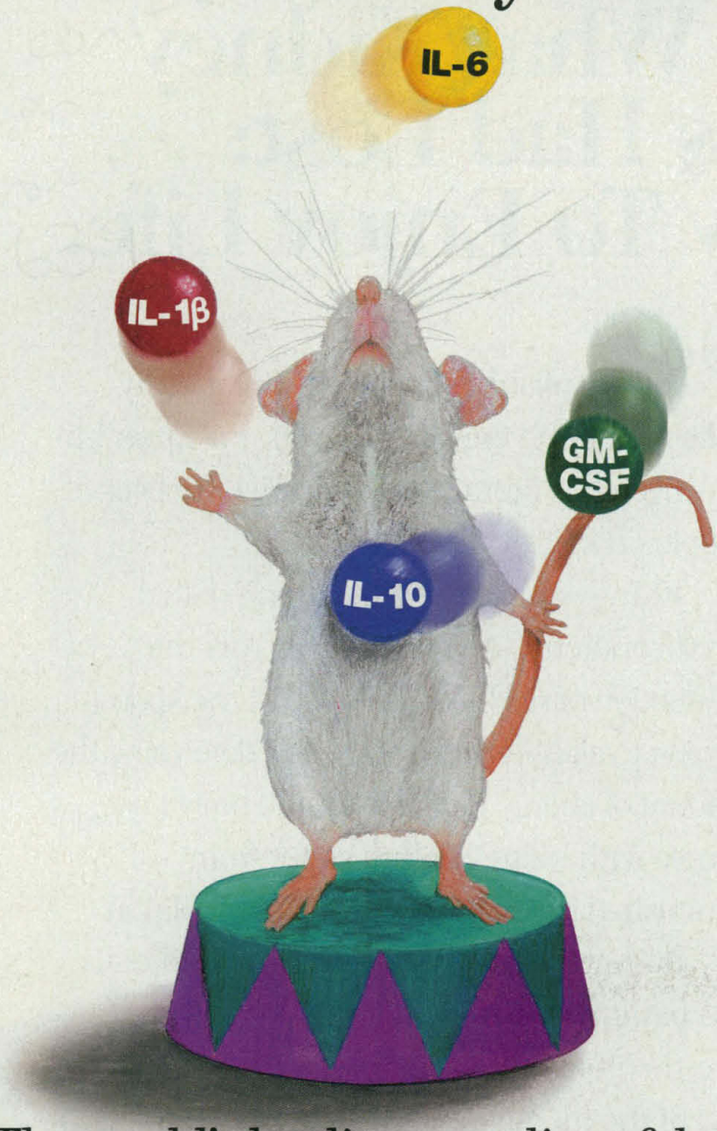

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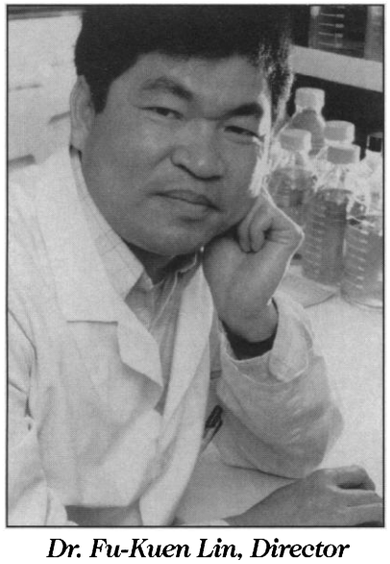
1995 Discoverers Award

This Man's Discovery Restored What Kidney Patients Had Lost: The Energy To Enjoy Life.



Dr. Fu-Kuen Lin, Director Biomedical Sciences, Amgen

Accomplishing one of the great early feats of genetic engineering, Dr. Fu-Kuen Lin of Amgen has literally transformed the lives of people on kidney dialysis.

Kidneys produce a hormone called Erythropoietin, or EPO. It controls the production of red blood cells which transport oxygen to all cells of the body, and determine the amount of energy available for the body's use. People with kidney failure suffer from diminished production of EPO – a condition which dialysis does not correct. This lowers the output of red blood cells, reduces oxygen, and can leave patients chronically fatigued.

Dr. Lin was able to clone the gene that produces EPO, making possible the production of the medicine, EPOGEN® (Epoetin alfa).

It has vastly improved the quality of life for people on kidney dialysis – some two hundred thousand Americans. Many can now return to their daily routine and enjoy their families more actively.

For his work, Dr. Lin has been named recipient of the 1995 Discoverer's Award, which honors the outstanding contributions of scientists from America's pharmaceutical research companies.

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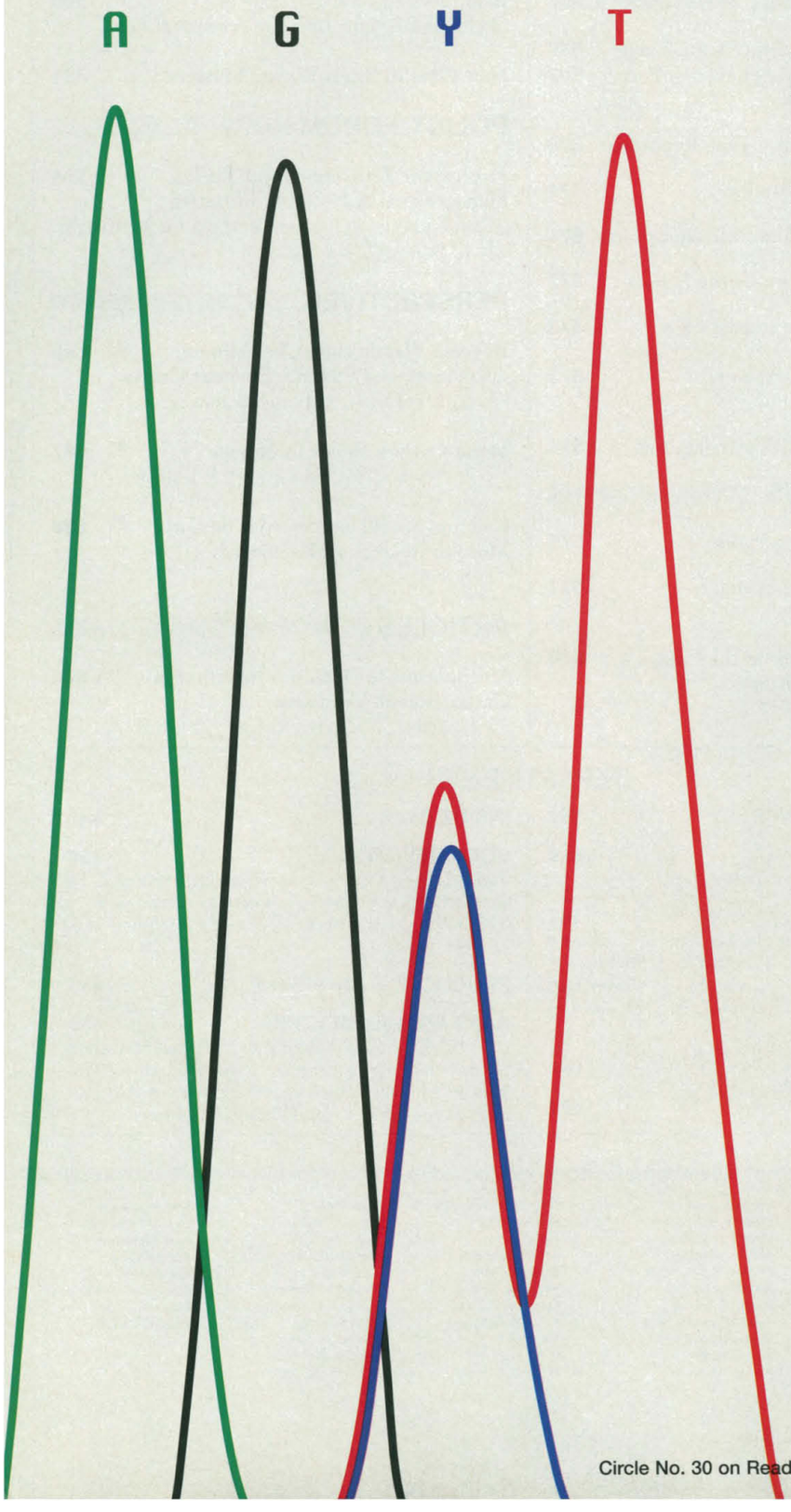
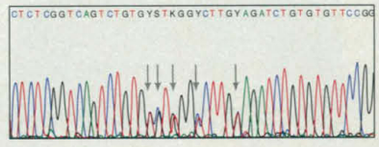


Good news for genetic disease researchers. A breakthrough in enzyme design just took mutation detection to new levels of convenience and performance.



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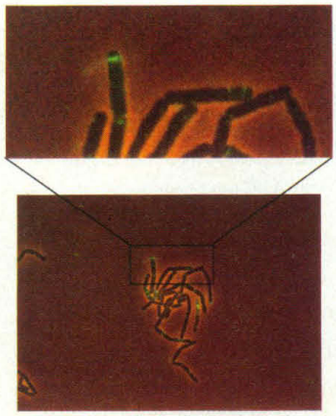
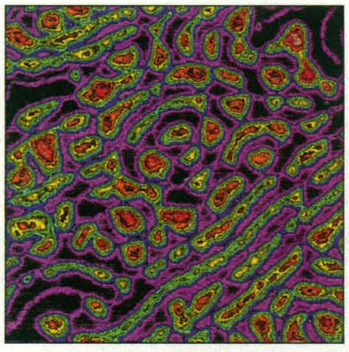


578, 637 & 641
Dividing line of cell fate



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Probing membranes with near-field optics

NEWS & COMMENT

RESEARCH NEWS

POLICY FORUM

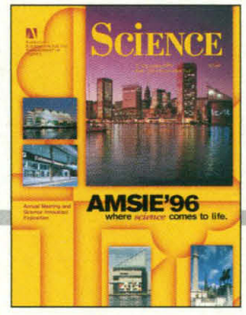
PERSPECTIVES

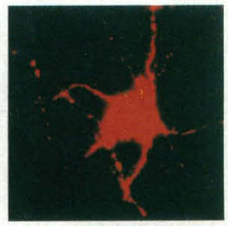
ARTICLES

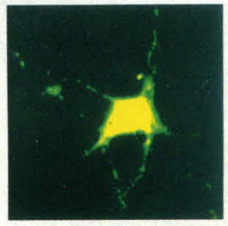
DEPARTMENTS

COVER

"Where Science Comes to Life" is the theme for the 1996 AAAS Annual Meeting and Science Innovation Exposition in Baltimore from 8 to 13 February. Researchers from diverse disciplines will discuss new knowledge and what is to come, not only scientifically but with regard to the relation of science and society. See page 655 for a complete program with registration and hotel forms. [Cover design: James B. Hicks III. Photos (clockwise from main image): R. Miller, M. Evans, R. Miller, BACVA, and J. Rettaliata]







593

Neurotrophins on the move

Indicates accompanying feature

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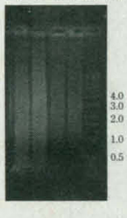
Figure 1.



mRNA isolated from 8 x 10^7 HeLa cells. Each pellet was resuspended in 50 µl RNase-free H_2O. 5 µl was loaded onto a 1% agarose gel. Lanes 1 and 2: FastTrack® 2.0 Lanes 3 and 4: Magnetic Beads

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edited by PHIL SZUROMI

Shedding light on membranes

Lipid monolayers are used to construct two-dimensional arrays and as a model for biological membranes. These monolayers exhibit domain structure that can vary as a function of chemical composition, pressure, and temperature; however, information on the detailed domain structure has been difficult to obtain. Hwang *et al.* (p. 610) have used near-field scanning optical microscopy to image domain boundaries, to measure chemical composition, and to follow the partitioning of a probe material into the different phases. Such features were not visible in far-field epifluorescence microscopy.

■

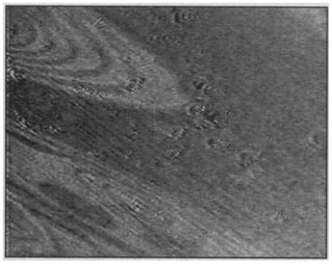
Arc melting

Subduction of oceanic crust fuels melting in the overlying mantle, which produces volcanic arcs. In theory, the composition of volcanic rocks sampled across a magmatic arc might be expected to reflect in some way the effect of the systematic dehydration of the subducted slab on the mantle. Ryan *et al.* (p. 625) examined the variation of several elements that should reflect changes in fluid composition in lavas from the Kurile arc. Elements with strong affinities for water decreased in abundance with distance from the subduction zone.

■

Coming up to air

Surface reactions are important in many catalytic processes, and their kinetics are the focus of intensive research. One of the problems in these studies is that many of the techniques used require high vacuum, so reaction conditions, especially pressure,



are often unrealistic. Rotermund *et al.* (p. 608) have developed optical techniques that allow the real-time observation of reaction kinetics of carbon monoxide oxidation on a platinum surface from high vacuum to atmospheric pressures. They also observed new phenomena in pattern formation.

■

Mountains in high relief

What determines the relief of mountains? Locally it would seem that the intact strength of rocks allows weathering to produce steep cliffs. Schmidt and Montgomery (p. 617), however, propose that on the larger scale of mountains, topography is controlled by mountain-scale material strength and bedrock landsliding. Strength at these scales would reflect the strength of the weakest rock units. The authors compared the slope profiles in the Cascades and Santa Cruz mountains of the western United States with models of slope stability and experimental data on rock strength.

■

Multicellular origins

The timing of the appearance of multicellular organisms in the Precambrian is uncertain; one problem has been that fossils of these organisms, which lacked hard parts, are scarce. Shixing and Huineng (p. 620) describe fossils resembling multicellular algae from the Tuanshanzi Formation in the Jixian area, north China, dated at approximately 1700 million years ago. The fossils range up to about 1 centimeter in length.

■

What mother will tolerate

Because of paternal inheritance, the fetus is usually not a histocompatible match to its mother. Why, then, if they are in contact, does the immune system of the mother not attack the fetus? Tafuri *et al.* (p. 630) show that during pregnancy, maternal T cells reactive to the father's alloantigens are tolerized. This tolerance is lost after birth, and may explain why in some cases autoimmune diseases go into remission during pregnancy.

Springing forth together

The radiation of life near the end of the Precambrian has been thought to have involved roughly an initial emergence of large soft-bodied animals in the Vendian followed by the appearance of shelly faunas in the Cambrian. Grotzinger *et al.* (p. 598; see news story by Kerr, p. 580) dated volcanic rocks interbedded with sedimentary rocks in Namibia that bracket these events. The dates and comparison of other geochemical and biostratigraphic data with other rock sections suggest that the Vendian faunas were extant from 549 to as young as 543 million years ago, which is essentially the age of the Precambrian-Cambrian boundary. There does not seem to be a great temporal hiatus between the two faunas.

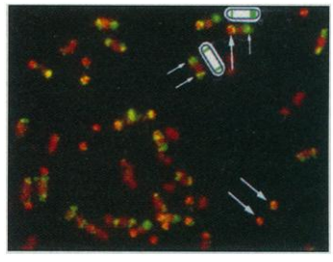
Working under stress

In response to stress, such as prey recognizing a predator, the sympathetic nervous system increases cardiovascular activity and releases the hormone epinephrine. Jansen *et al.* (p. 644) now show, as hypothesized by Cannon years ago, that a set of neurons controls both of these functions. Heart and adrenal gland neurons in rats were injected with two different types of attenuated virus. These viral labels could be traced back to a common set of neurons in the hypothalamus and brainstem.

■

Separated and unequal

How cells become specialized is a central question in developmental biology. Two reports examine the mechanism by which an asymmetric cell division in the bacteria *Bacillus subtilis* generates two progeny cells with different fates, the mother cell and the forespore (see news story



by Roush, p. 578). Arigoni *et al.* (p. 637) have studied the localization of SpoIIE, a protein required to activate spore-specific gene expression during spore formation. SpoIIE is asymmetrically localized during division at the polar septum and resides at the division site when division is complete. Duncan *et al.* (p. 641) found that SpoIIE is a serine phosphatase. Localized SpoIIE functions to overcome the inhibition of the spore-specific transcription factor σ^F.

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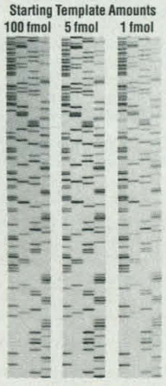

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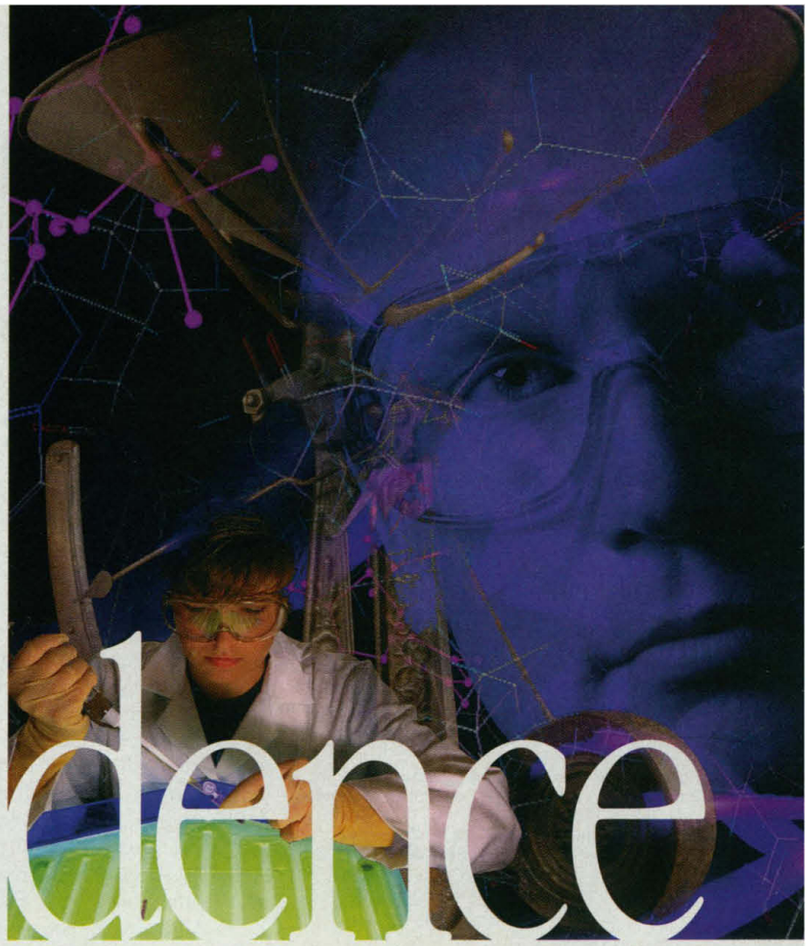

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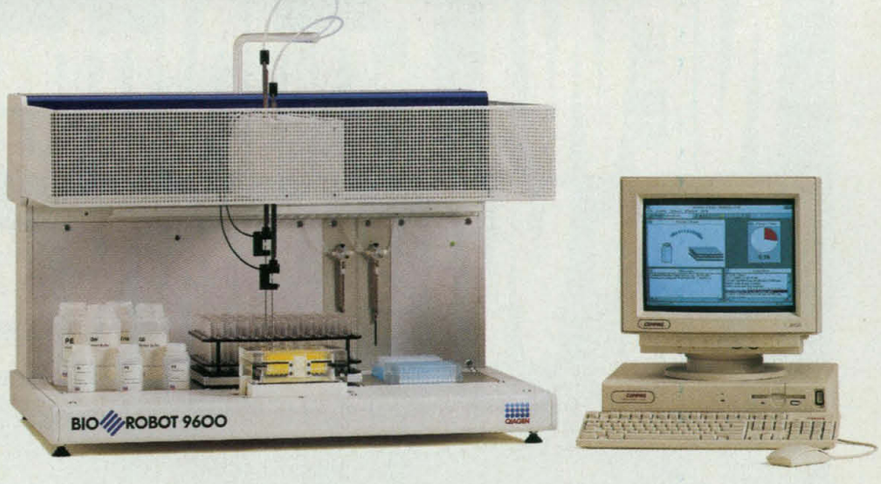
...automate with the BioRobot 9600

Whatever your reasons for considering automation — saving time and money, increasing productivity, improving consistency and quality, or just escaping endless minipreps — the QIAGEN BioRobot™ 9600 is just what you need.



The BioRobot 9600 means:

- state-of-the-art robotics
- renowned QIAGEN purification technologies
- 96 preps every 2 hours, with just 5 minutes of hands-on time
- user-friendly, Windows®-based software

The BioRobot 9600 is ideal for automated preparation of ultrapure DNA for sensitive applications such as sequencing, transfection, or microinjection, yet versatile enough to handle a multitude of other general laboratory procedures. Simple point-and-click software makes adapting the BioRobot 9600 to other applications fast and easy.

For more information or to set up a demonstration in your lab, call QIAGEN today — and see how the BioRobot 9600 will save you time, money, and days full of minipreps.

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