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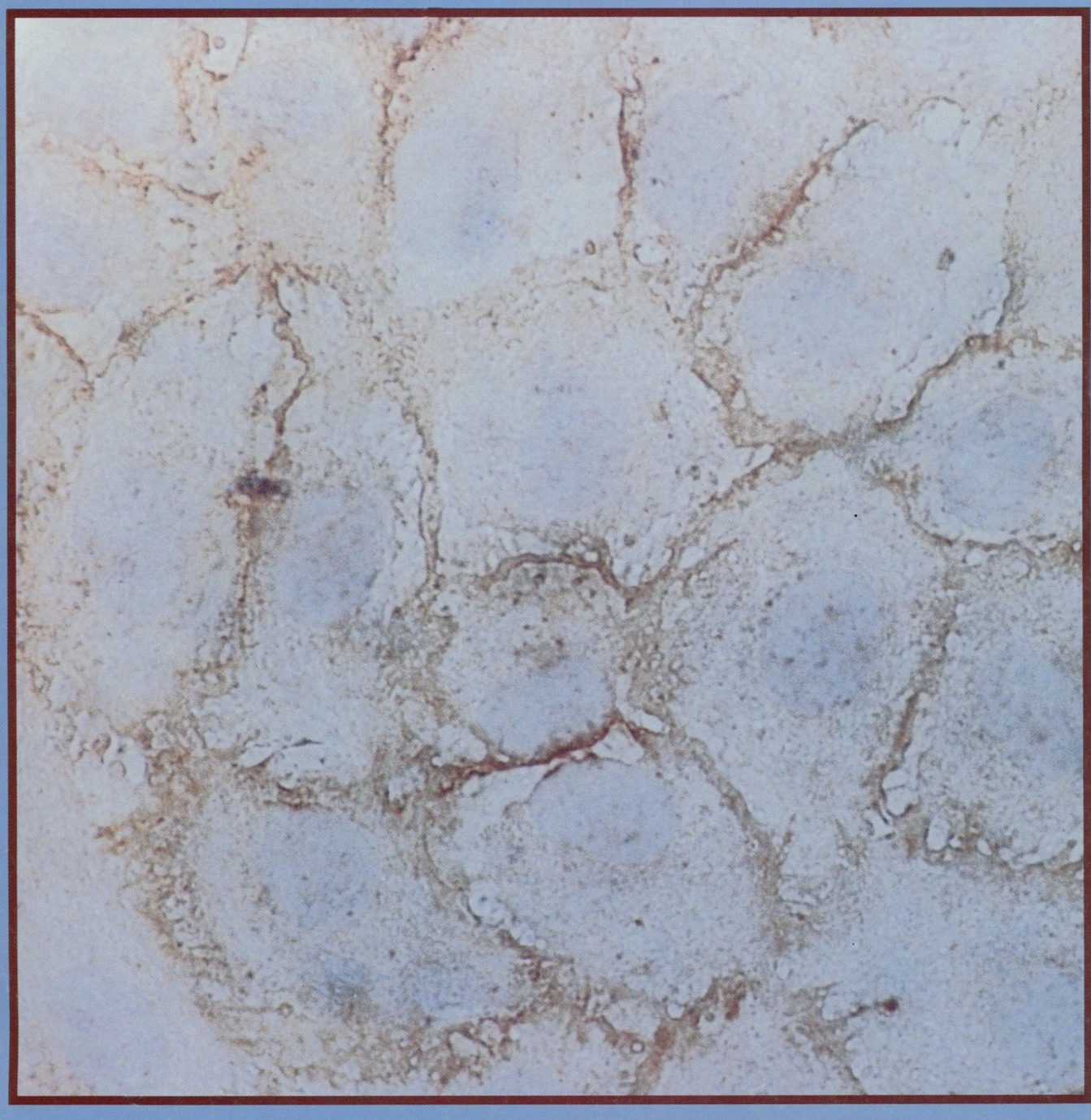

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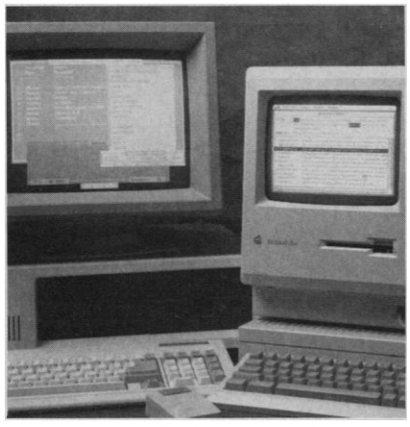

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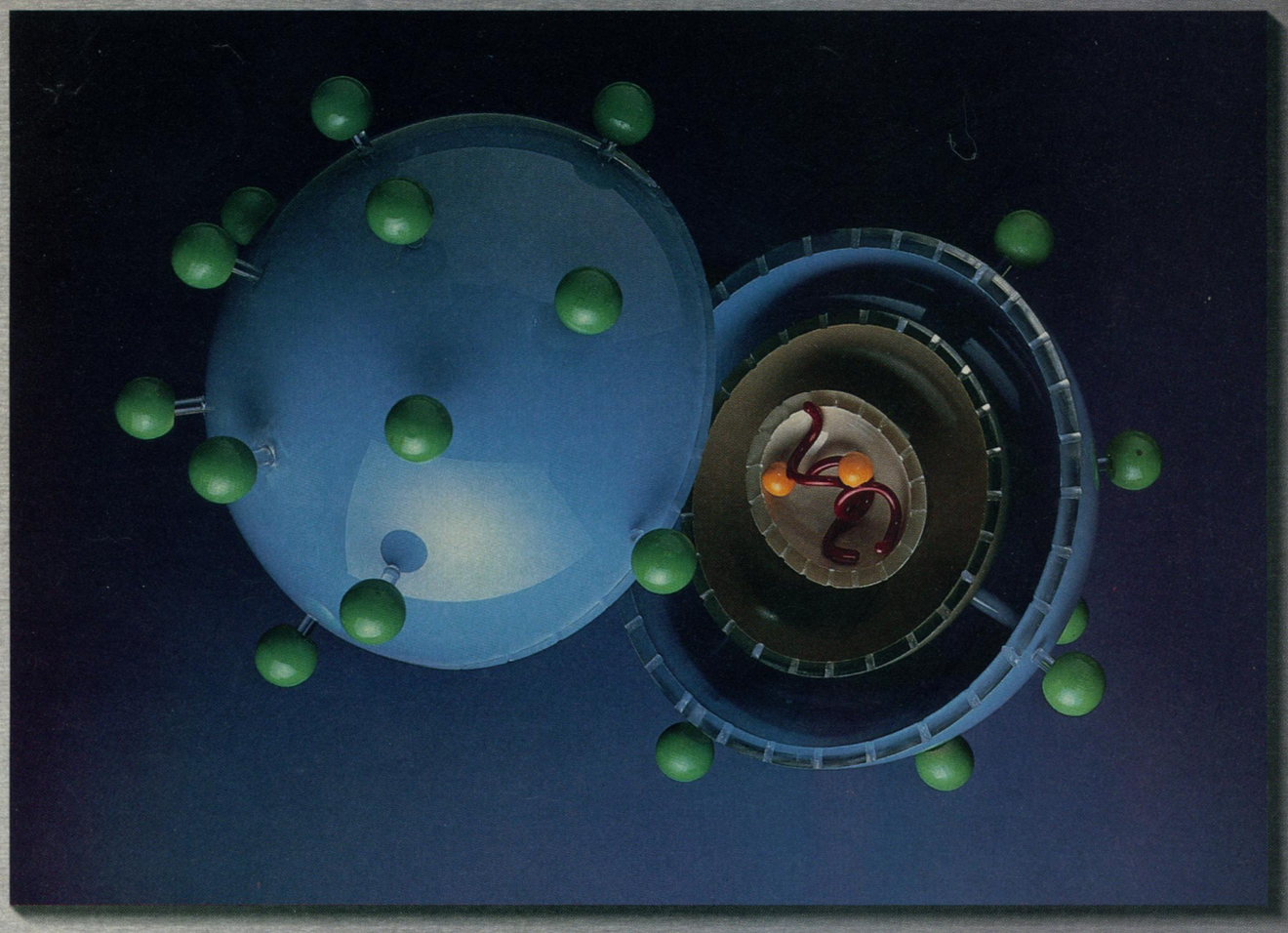
COVER Platelet–endothelial cell adhesion molecule–1 (PECAM-1) immunolocalized to the intercellular borders of human endothelial cells with the peroxidase–anti-peroxidase method. Molecular cloning revealed that PECAM-1 belongs to the cell adhesion molecule subfamily of the immunoglobulin gene superfamily. PECAM-1 is related to or identical to the CD31 antigen present on human platelets and some myeloid cells and may participate in surface recognition events. See page 1219. [Photograph courtesy of William A. Muller and Peter J. Newman]

Book Reviews

Products & Materials

New HIV p24 Core Profile ELISA... unsurpassed sensitivity *and* specificity



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Venus and Earth

MANY of the essential features of Venus and Earth are very different despite the fact that these two planets are similar in size and composition. Venus is dry and mostly rocky like Earth with a crust of variable thickness and uncertain volume; it rotates in slow retrograde motion, has no moon, and no magnetic field; it retains its thick primordial insulating atmosphere, which prevents volatiles from recycling to the mantle and keeps both internal and surface temperatures high (surface temperature is 730 K). Which of the original features and what evolutionary processes acting on Venus and Earth have contributed to the current differences between these two planets? Kaula describes the planet Venus and speculates on how atmospheric conditions, tectonic and volcanic processes, and mantle convection could have contributed to its current state (page 1191). Some of the speculation will soon be put to the test: Venus will be closely scrutinized by the Magellan spacecraft, which will arrive there in August and begin orbiting the planet. Detailed contour maps of most of the planet will be made that may help to clarify the planet's tectonic style and history, and answers may be found to such questions as how the crust is recycled and how the water is kept deep within the mantle.

Ribozymes for AIDS therapy

RIBOZYMES are under consideration for use in treating AIDS and other types of viral and malignant diseases. Ribozymes are enzymatic RNA molecules that can specifically cleave other RNA molecules; the enzyme and the substrate come together and form a hammerhead (with three stems and a catalytic center) or hairpin configuration, and the target RNA molecule is cut at a defined three-base site. Sarver *et al.* introduced into human cells a gene for a catalytic RNA molecule that cuts its substrate—RNA of the AIDS virus—through use of a hammerhead motif (page 1222). The cells were subsequently infected by the AIDS virus, the viral RNA was cleaved as predicted, and the viral protein (p24) that is encoded by the target RNA was produced in greatly diminished amounts. By blocking the activity of viral genetic material, ribozyme actions could ultimately block viral replication and in this way be valuable therapeutic agents.

Regulation of nested genes

GENES that encode the T cell antigen receptor (TCR) δ molecule are "nested" inside those encoding the TCR α molecule. Expression of each type of TCR requires that physically separate gene regions—the variable, constant, diversity, and joining segments—be rearranged on the chromosome; enhancer and promoter elements participate in the eventual expression of the rearranged genes. Why α and δ genes are physically associated is not immediately obvious, because these genes give rise to different cell lineages, αβ cells and γδ cells. Redondo *et al.* have begun to characterize the complicated process by which the embedded δ gene is expressed (page 1225). A transcriptional enhancer for δ was identified in a 250-base-pair segment of the chromosome. This region contained sites for nuclear protein binding; deletion of the sites caused enhancer activity to fall. The TCRδ enhancer was distinct from the α enhancer, indicating that different regulators control the production of these two TCRs.

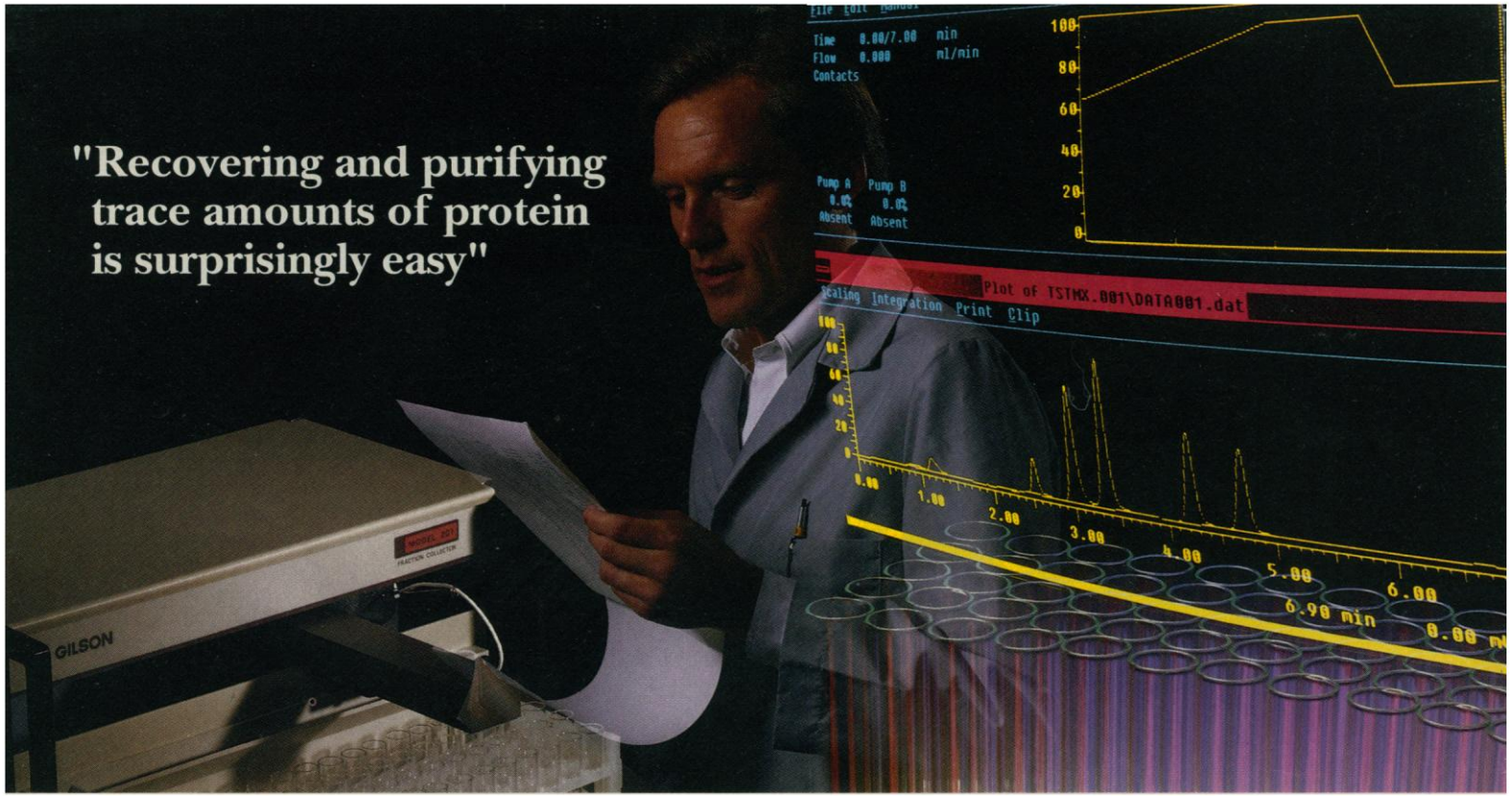
Lipids and cellular locomotion

WHAT happens to the lipids in cell membranes when a cell moves? Lee *et al.* tagged lipids in the surface bilayer of fast-moving human leukocytes and compared the movement of the cell with progression of the marker (page 1229). The "tag" was made by incorporating fluorescent lipid analogs into the membrane, bleaching a marker line into the lipid layer with a pulse of light from a laser (this destroys the fluorescence), and recording cellular images by digitized video microscopy for several seconds until the molecules mixed with other fluorescent ones in the membrane and the line faded. The applicability of this technique to analyzing locomotion relied on the cells' ability to move fast, because the bleached lines are visible for less than 5 seconds. The line on the lipid bilayer moved forward at the same velocity as did the whole cell. This finding was evaluated with respect to three possible modes of cell movement and was most concordant with a "unit movement of membrane" model. According to this model, the lipids on both the dorsal and the ventral surfaces of the cell move forward as a unit along with the forward extension of the cell's leading edge and the retraction of the rear of the cell.

Channel biophysics and selectivity

MEMBRANE channels that normally transport anions can be altered to transport cations (page 1233). Specific bases in channel genes were mutated such that certain charged amino acids of the channel were replaced by other amino acids of opposite charge. The channel studied—VDAC—is present in the phospholipid bilayers of eukaryotic mitochondria. VDAC channels of yeast were studied because, in this relatively simple system, sophisticated mutagenesis procedures can be carried out. Cloned and mutagenized VDAC genes were inserted into yeast that lacked endogenous VDAC channels. A complete shift in the selectivity of the channels—from anions to cations—occurred when certain positively charged amino acids had been replaced by negative ones. On the basis of these results and primary sequence data, Blachly-Dyson *et al.* propose that these critical amino acids line the open channel; they suggest a likely three-dimensional structure for the channel protein molecule.

■ RUTH LEVY GUYER



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"Upgrading to gradient analysis was easy"

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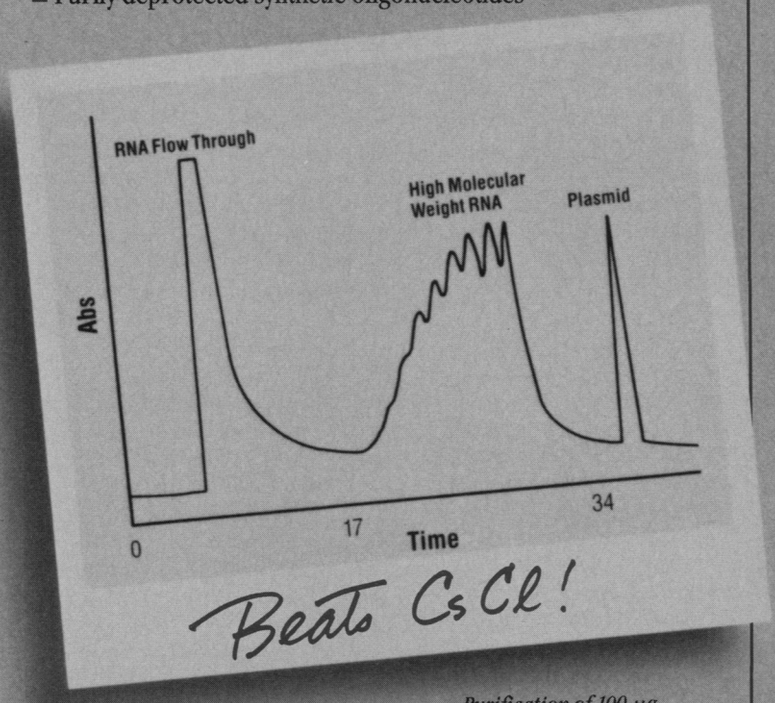

Purification of 100 μg pUC 18 on the HRLC MA7 plasmid column (7.8 x 50 mm). Plasmid was prepared by alkaline lysis, with no RNase treatment.

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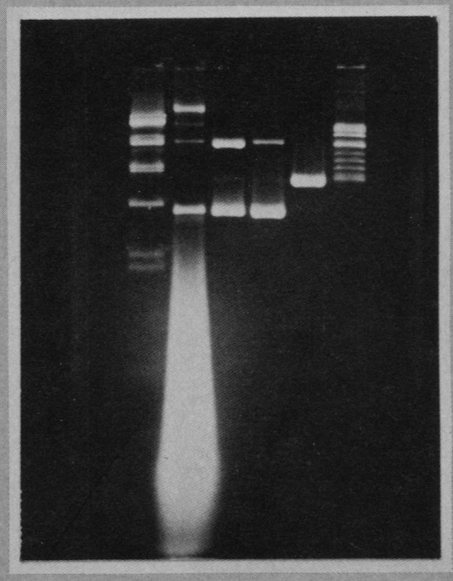

Agarose gel (1%) electrophoresis of pBR322 DNA prepared by the cleared lysate method showing the efficiency of the Prep-A-Gene DNA purification matrix. ***Lane 1:*** *Lambda DNA/Hind III digest;* ***Lane 2:*** *crude cell lysate prior to purification;* ***Lane 3:*** *pBR322 after banding on a CsCl gradient;* ***Lane 4:*** *pBR322 after purification with the Prep-A-Gene DNA purification matrix;* ***Lane 5:*** *BamH1 digested pBR322 from lane 4;* ***Lane 6:*** *ligated pBR322 from lane 5.*

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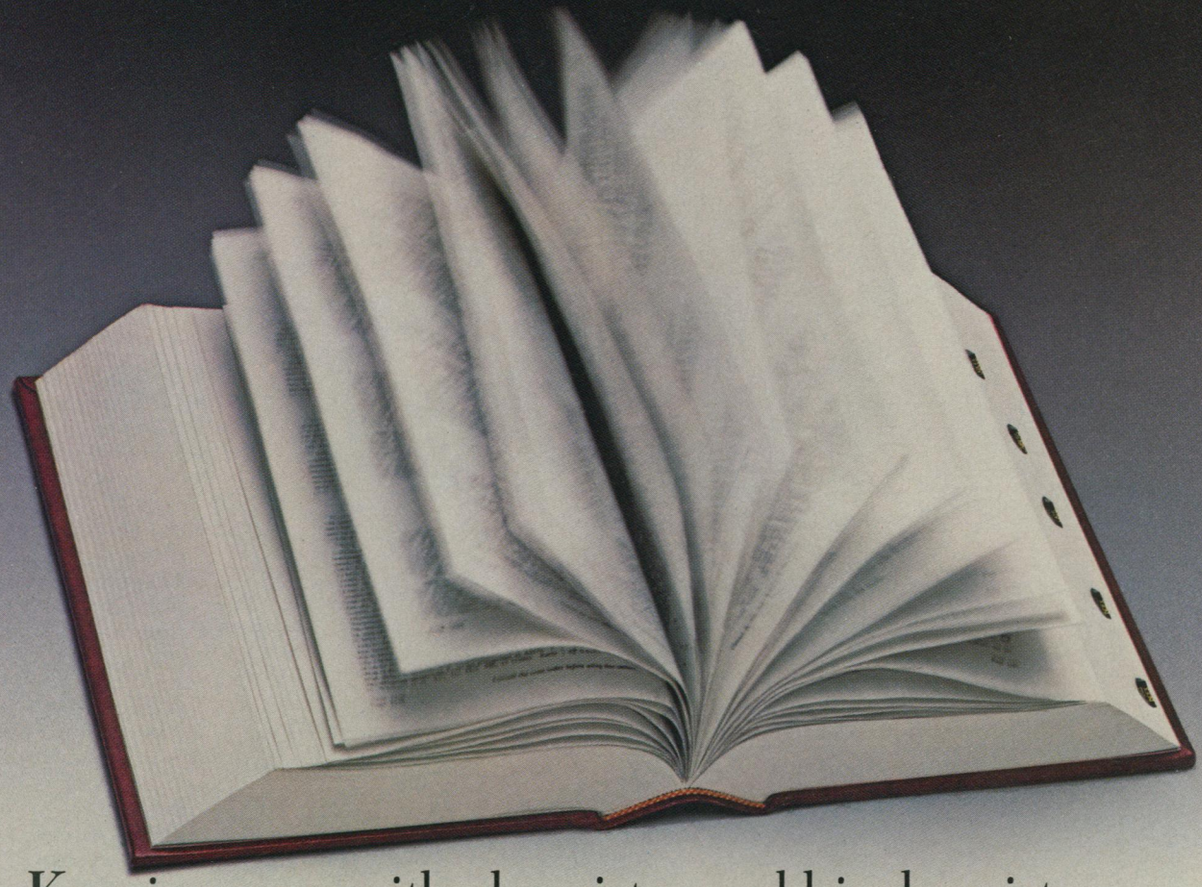

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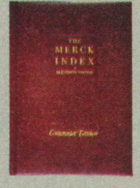

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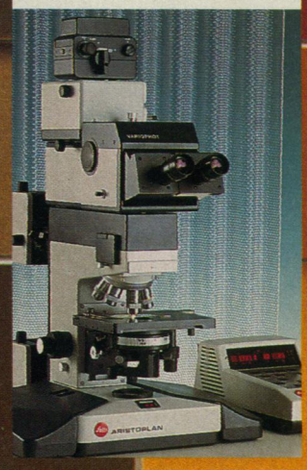

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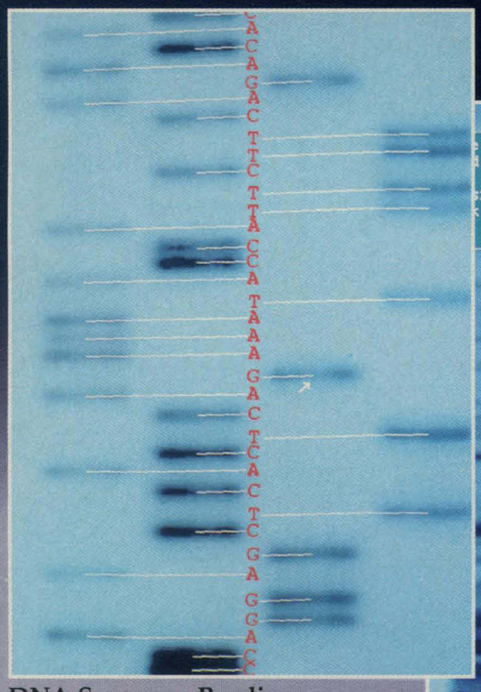

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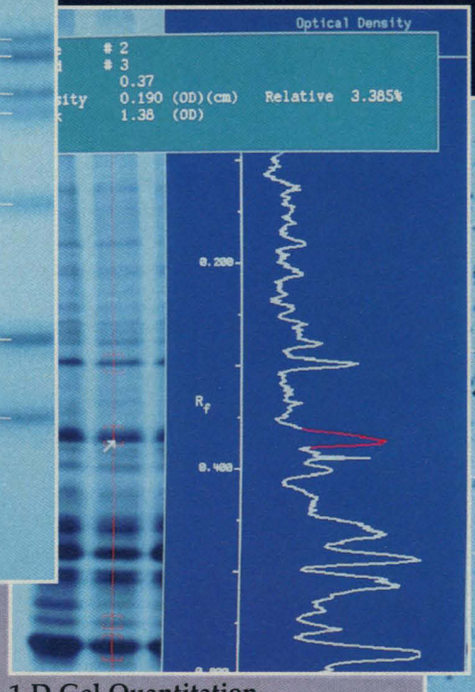

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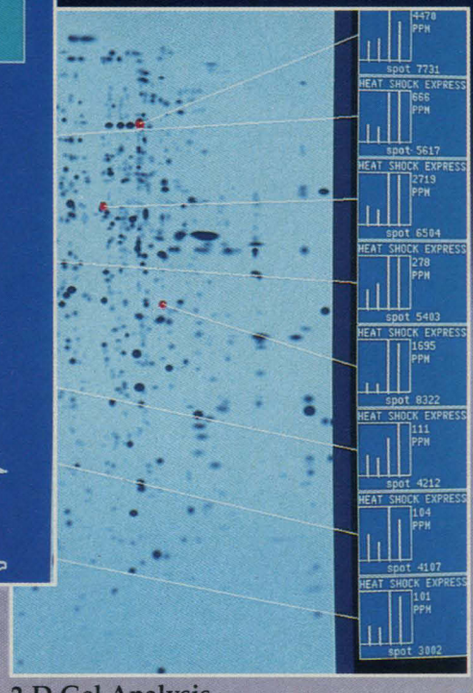

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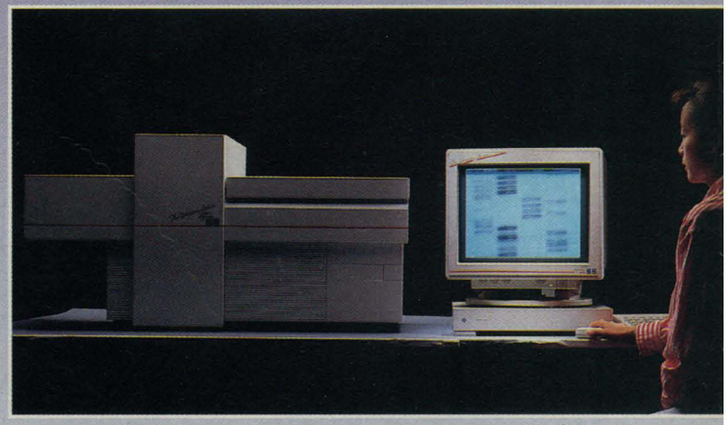

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The ability to listen. The technology to respond.

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FastTrack™

The highest quality mRNA...

without the wait.

FastTrack is the only system available for the isolation of high quality, intact messenger RNA directly from cells or tissue in four hours or less with double the yield of conventional protocols. The entire procedure can be completed without ultracentrifugation, cesium chloride, toxic chemicals or total RNA isolation.

FastTrack guarantees:

- Higher yields of full length transcripts
- Lower ribosomal contamination
- No need for total RNA isolation
- Speed and simplicity

FastTrack has been designed to provide consistent and improved results during **cDNA synthesis** by eliminating guanidine and phenol which inhibit reverse transcriptase activity, and for **Northern blotting** by removing ribosomal contaminants and providing stronger signals (see fig. 1).

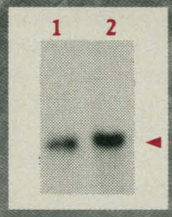

Figure 1.
Lane 1. mRNA isolated using guanidinium, CsCl centrifugation and oligo dT column selection. (30 hrs).

Lane 2. mRNA isolated directly from cells with FastTrack (3 hrs).

For high quality mRNA without the wait, *get the message* with FastTrack.

Call Invitrogen at **1-800-544-4684**

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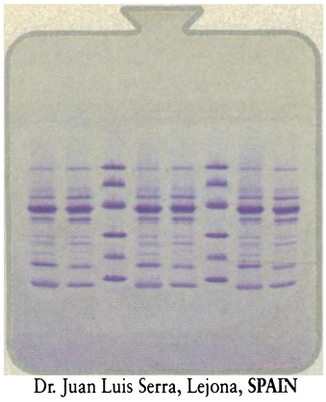
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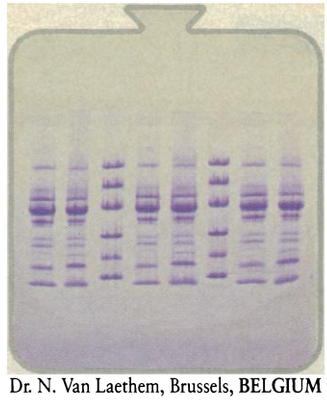
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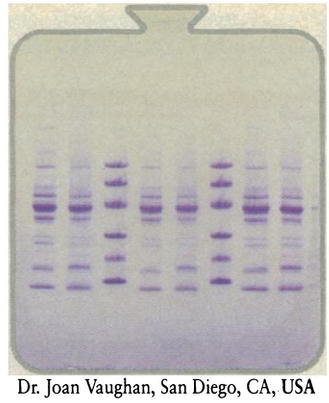
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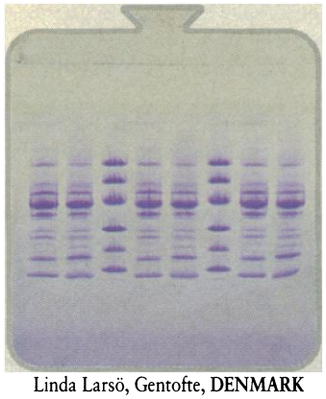
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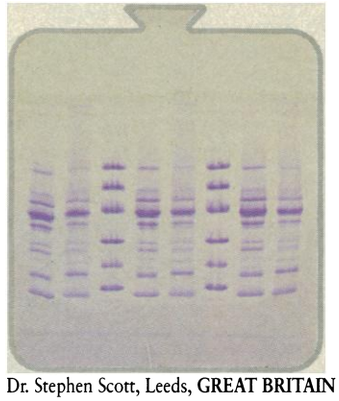
Dr. J. Heukeshoven, Hamburg, **GERMANY**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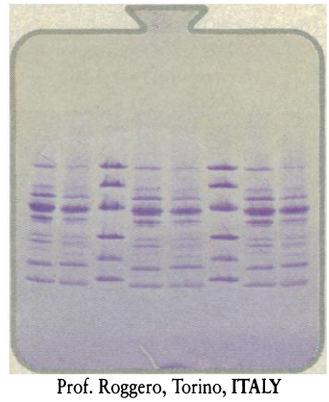
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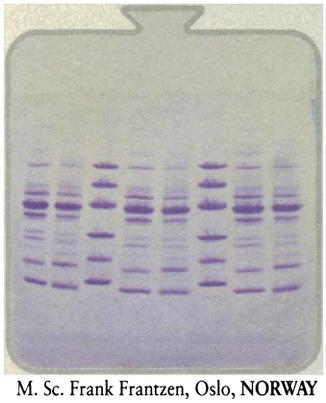
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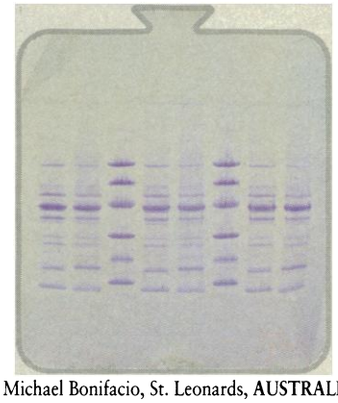
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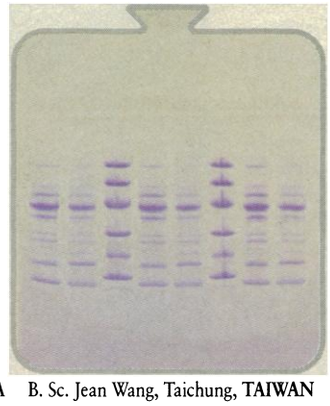
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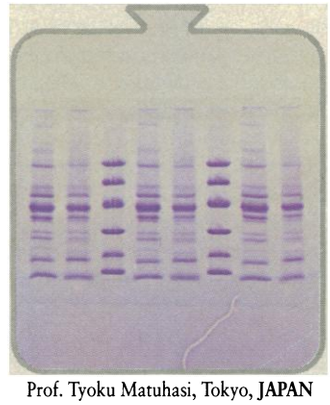
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