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Frontiers in Biology
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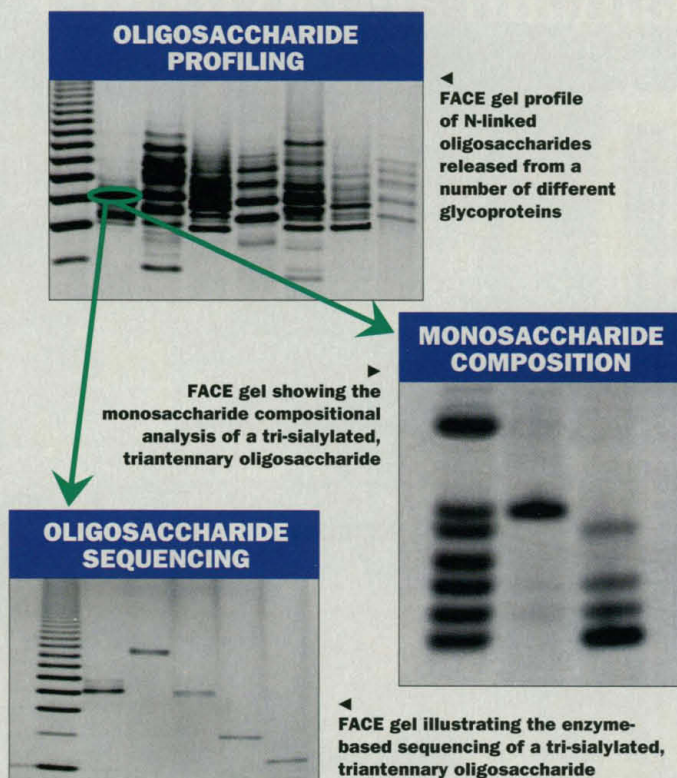
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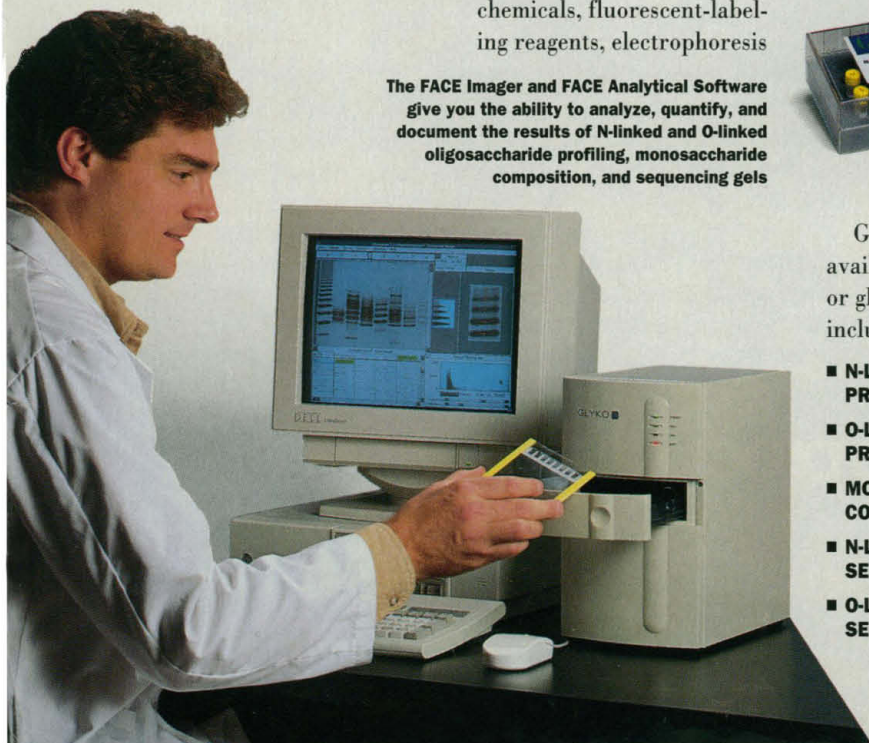
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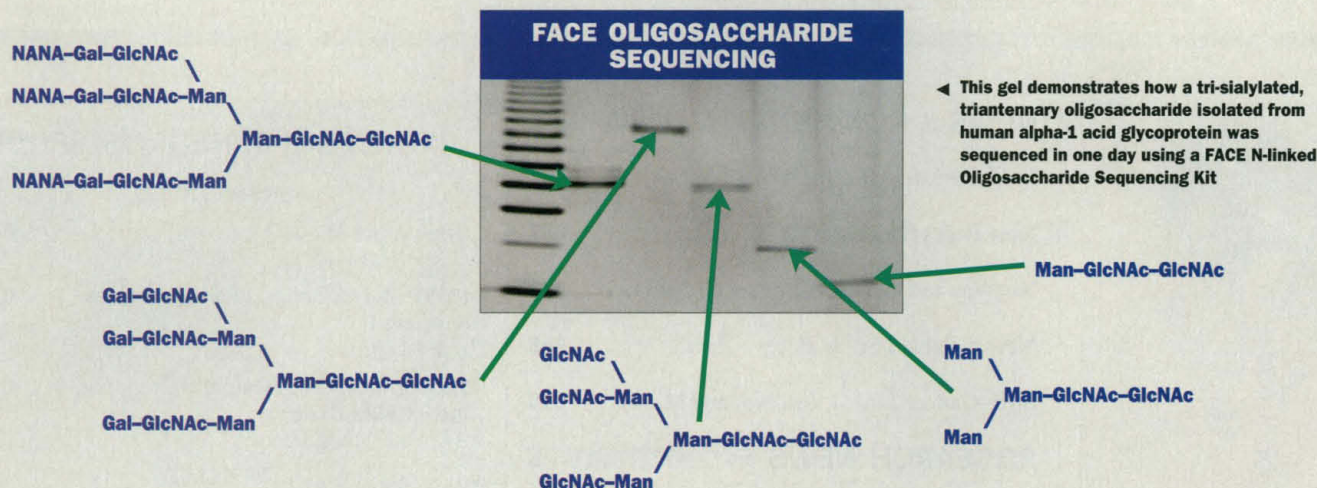
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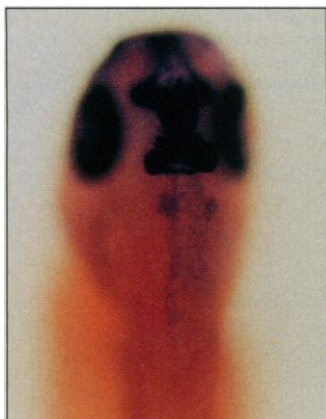
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Glyko scientists continue to discover and clone new glycosidases





653 & 713
Noggin protein,
identified as a
neural inducer

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Salvador Dalí's *Raphaelesque Head Breaking* (1951) portrays the logarithmic spirals of the rhinoceros horn, the dome of the Pantheon, and the contemplative Madonna. Scientists are pushing the frontiers of neuroscience in all directions and may even enter into the realms of mathematics, architecture, and faith. This

special issue samples the variety in neuroscience. See the Editorial, the News story on page 653, the Research Article on page 713, and the section of Perspectives and Articles beginning on page 673. [Transparency: Bridgeman/Art Resources, NY. Reproduced with permission from Artists Rights Society, NY]



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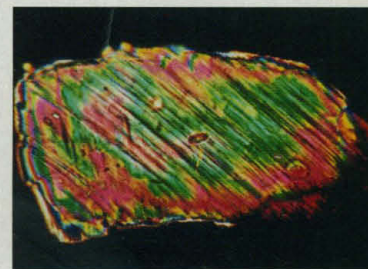
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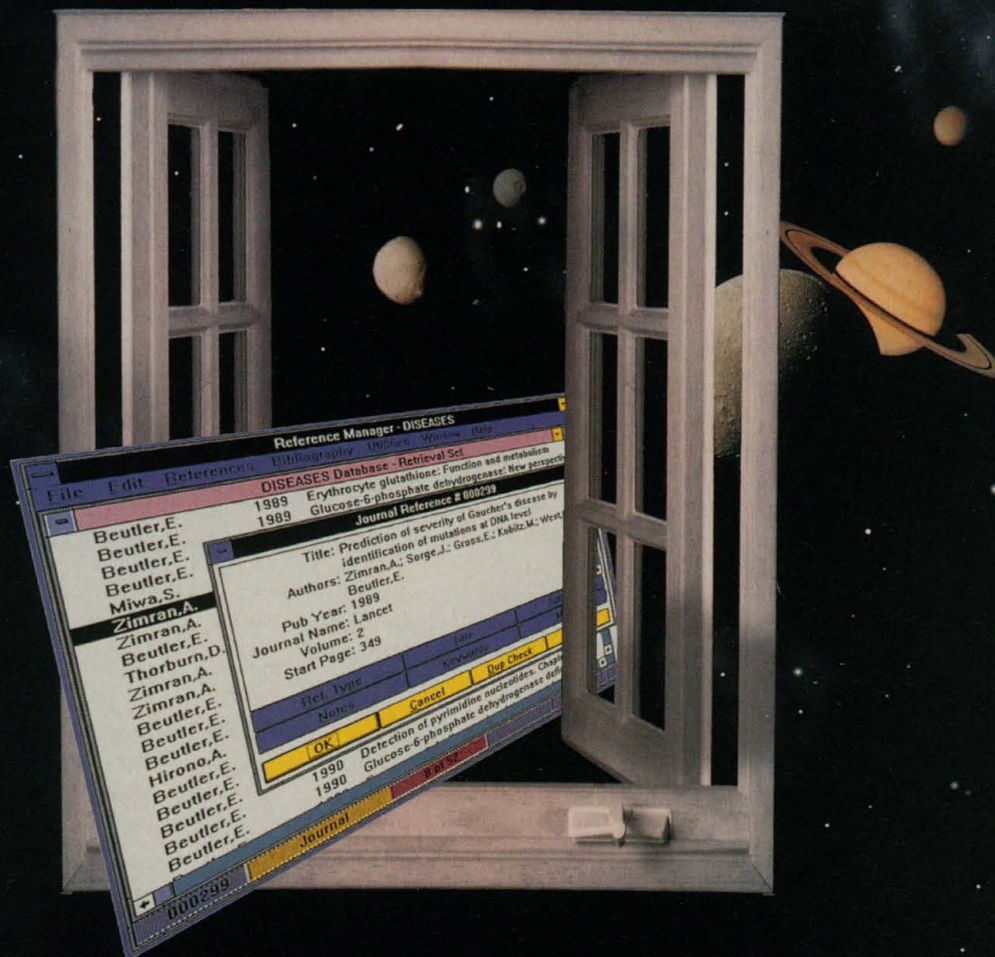
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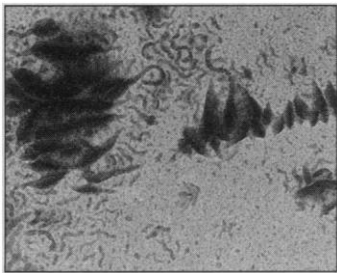
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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Growing polymer films by laser ablation

One method for growing oriented monolayer films of inorganic materials is laser ablation; the material is desorbed into the gas phase by heating it with a laser and is then deposited onto a substrate surface. Extending this method to polymers could



lead to a number of applications, such as in the fabrication of molecular devices. Blanchet *et al.* (p. 719) show that high-quality thin films of an organic polymer, polytetrafluoroethylene, can be deposited on a variety of substrates by laser ablation. Analysis of the ablation plume suggests that the polymer decomposes through pyrolysis to form the monomer and repolymerizes on the substrate surface. The films are composed of both amorphous and crystalline regions.

Through thick and thin

Geophysical studies are revealing the dynamics of spreading at oceanic ridges. One characteristic of the mid-Atlantic ridge, a so-called "slow spreading" ridge, are bull's-eye-shaped lows in gravity data along ridge segments. These features suggest that there is an uncompensated mass deficit at depth, produced for example by hot upwelling mantle, or thick low-density crust, or both. Tolstoy *et al.* (p. 726) investigated the structure of one of these fea-

Neural induction by noggin

In *Xenopus*, the transplantation of dorsal mesoderm to the ventral side of a gastrula-stage embryo can act as an organizer that not only causes the formation of a twinned embryo but also recruits tissue originally fated to become skin to form the secondary nervous system. Noggin is a secreted protein found in the Spemann organizer that can dorsalize ventral tissue. Lamb *et al.* (p. 713; see news story by Barinaga, p. 653) now show that noggin can directly induce neural tissue in the absence of dorsal mesoderm and that neural induction occurs at the appropriate time, during gastrulation. The concentrations of noggin required to neuralize tissue are much greater than those needed for dorsalization, suggesting that noggin may act in concert with other neural-inducing factors.

tures in a seismic refraction study. The data imply that the crust is thick at the center of a spreading segment and thins toward the ends at the fracture zones. Magmatic accretion, which forms the crust, is thus focused within the segment.

Not the K-T crater

The Manson impact structure in Iowa had been suggested to mark an asteroid impact at the Cretaceous-Tertiary (K-T) boundary (about 65 million years ago) on the basis of argon-argon age spectra on shocked minerals. Although too small (35 kilometers across) to account for the global debris at the boundary, the crater has been interpreted as evidence for a multiple impact. Izett *et al.* (p. 729; see news story by Kerr, p. 659), however, have now measured a considerably older age of 73.8 million years ago on melt rocks obtained from recent drilling into the structure. Furthermore, examination of the Pierre Shale in South Dakota revealed shocked minerals and a sand layer with rip-up clasts at the coeval biostratigraphic horizon for this new age. The size of the sand grains and shocked minerals decrease away from the Manson structure.

Fossils too young

Major metamorphism in the southern Appalachians was generally thought to have occurred in the Devonian (400 to 360 million years ago), coincident with the well-known Acadian orogeny in the northern Appalachians. A key area for resolving age relations of metamorphism in the southern Appalachians is the Talladega Slate belt in Alabama. In these rocks, Gastaldo *et al.* (p. 732) found in situ specimens of Mississippian (360 to 320 million years ago) plant fossils. These fossils suggest that similar fossils that were found in the early 1900s and were thought to be exotic are also from these rocks and that the metamorphism in the southern Appalachians is much younger than previously thought.

Calcium release and heartbeats

Contraction of the heart depends on release of Ca^{2+} from the sarcoplasmic reticulum through the ryanodine receptor Ca^{2+} channel. Cheng *et al.* (p. 740) have used laser scanning confocal microscopy to observe small, localized increases in the concentration of intracellular Ca^{2+} . These events appear to

correspond to the fundamental process that mediates excitation-contraction coupling in the heart—the release of Ca^{2+} from a single channel on the sarcoplasmic reticulum. Release of Ca^{2+} occurred spontaneously at a low rate in resting heart cells. Under certain conditions, release from a single site triggered a propagating wave of increased concentration of Ca^{2+} .

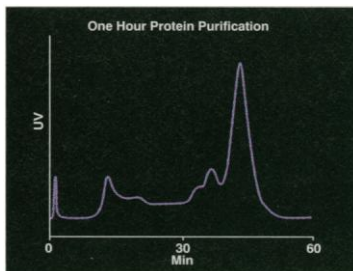
Altered zinc finger gene in lymphoma

Diffuse large-cell lymphoma (DLCL) is the most common and most lethal form of non-Hodgkin lymphoma. Patients with DLCL often display cytogenetic aberrations at chromosome 3q27. Ye *et al.* (p. 747) have localized the genetic lesion at this site to *BCL-6*, a gene encoding a protein with sequence characteristics of zinc finger-transcription factors. Alterations in *BCL-6* were found in about one-third of DLCL samples and were restricted to the 5' region of the gene.

Close the gate, close the channel

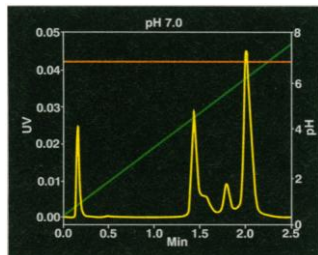
The NH_2 -terminus of the Shaker K^+ channel participates in a process called gating that spontaneously closes the channel after it is opened in response to a depolarizing stimulus. MacKinnon *et al.* (p. 757) describe experiments that determine the contribution of each of the four channel subunits to such inactivation. They found that a single inactivation gate from one of the four subunits was sufficient to close the channel. The four gates appear to move independently of one another, but only one gate can be closed at a time.

WHILE YOU SPENT ONE HOUR DOING THIS,

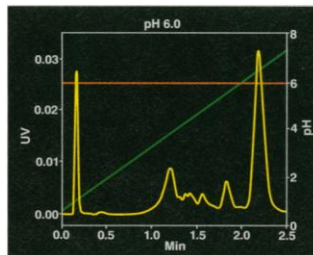


Anion exchange separation of recombinant protein with conventional LC column and instrumentation.

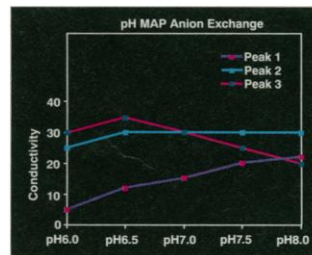
LOOK AT ALL WE'VE BEEN UP TO.



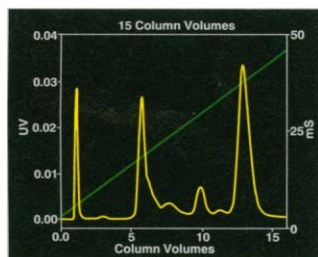
We began by running the separation at several pHs.



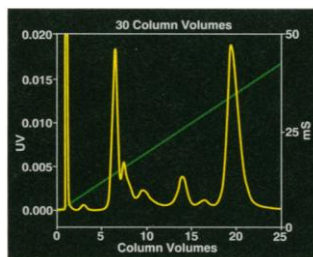
Confirmed the optimum pH at 6.0.



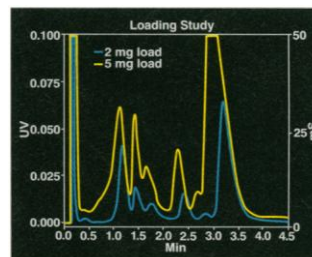
Plotted results from built-in spreadsheet.



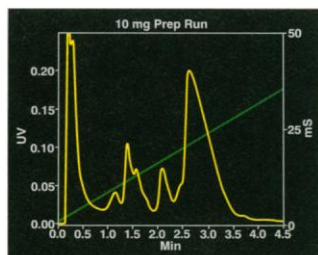
Tested gradient slopes for improved resolution.



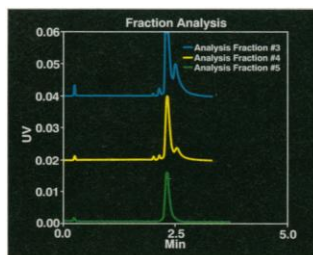
Selected 30 column volume gradient as optimum.



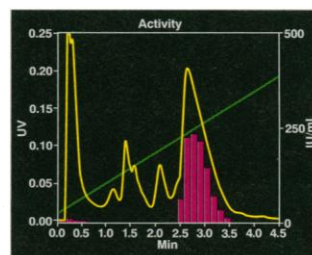
Studied the effect of loading at 2 mg and 5 mg.



Ran a 10 mg prep. Collected fractions.



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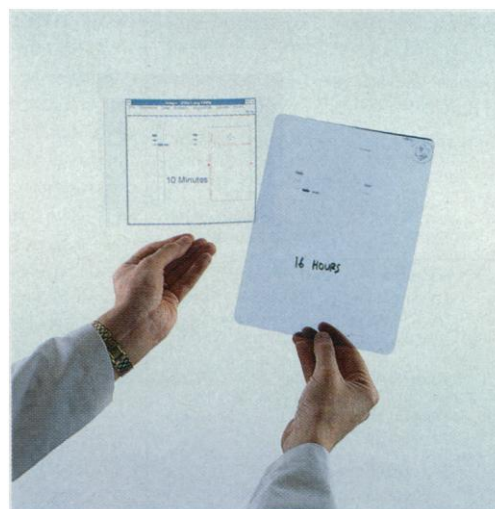
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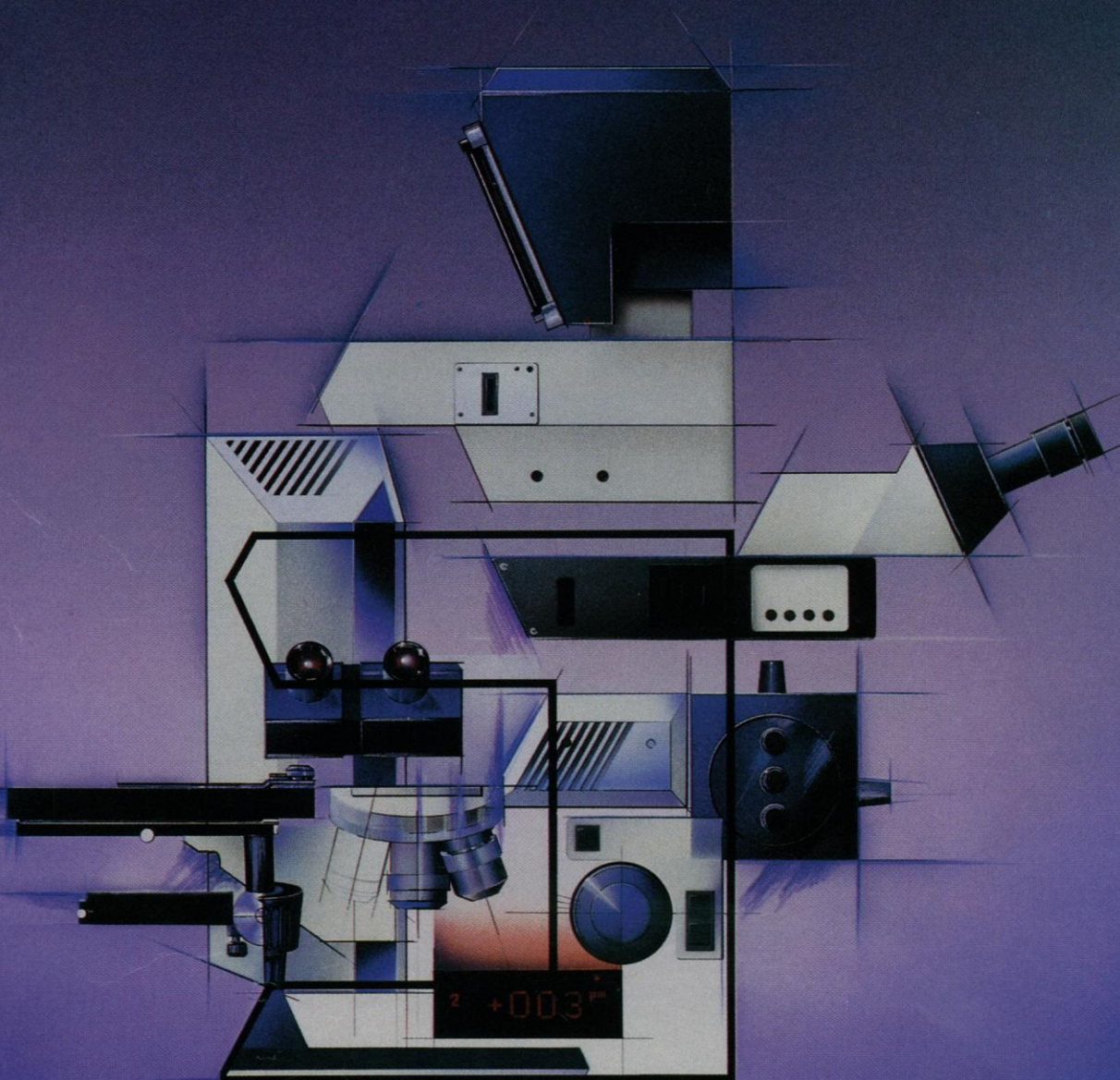
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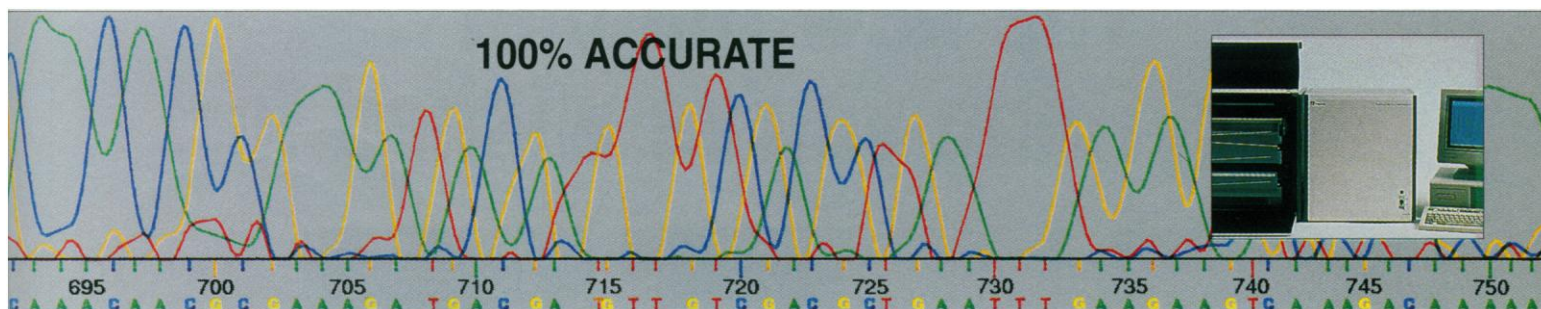


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1. Data supplied by M. Uhlen and T. Hultman from routine sequencing run at the Royal Institute of Technology, Stockholm, Sweden.

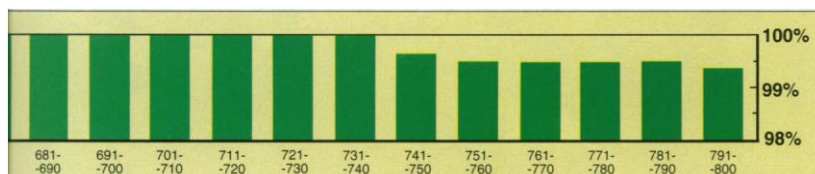
2. Comparison of three non-isotopic automated DNA sequence analysis systems. Poster presentation at the *San Diego Conference on Nucleic acids*, Nov. 20-22, 1991. Van Ranst, M., Fiten, P., Voet, M., Volckaert, G., Opdenakker, G.

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., Erle, H., Rupp, T., Sproat, B., Ansorge, W.

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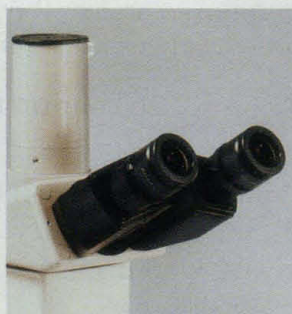
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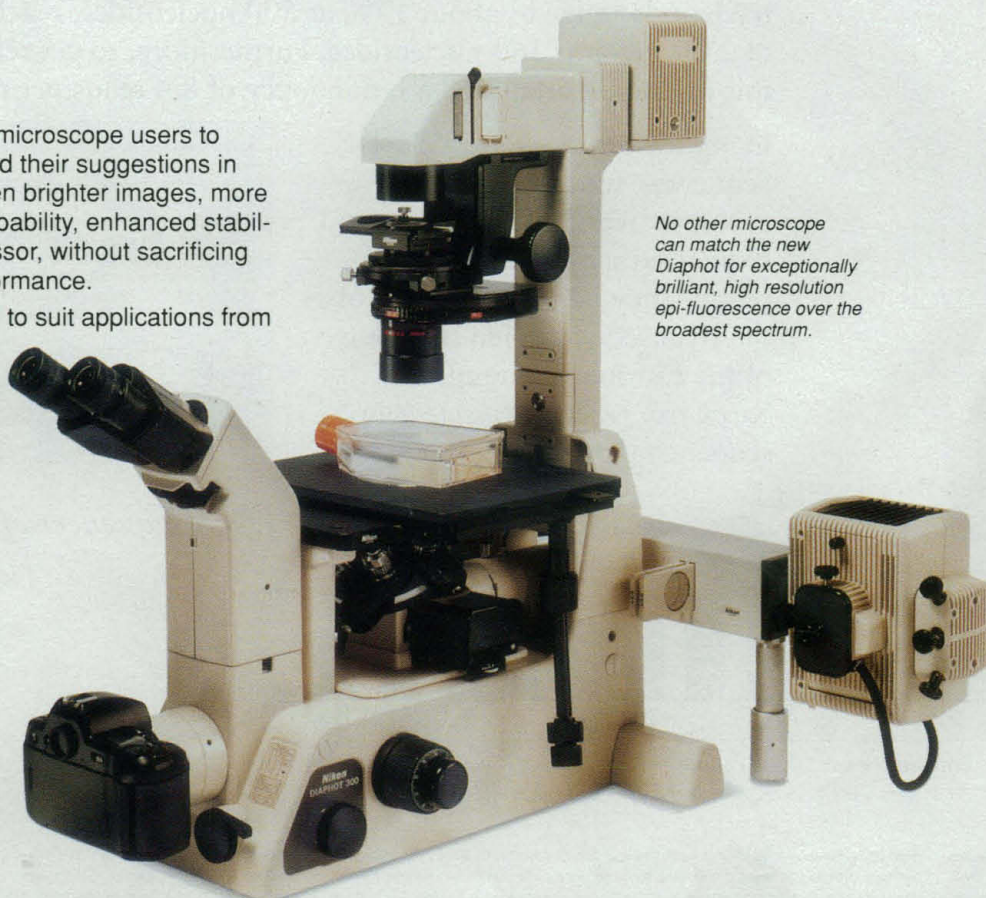
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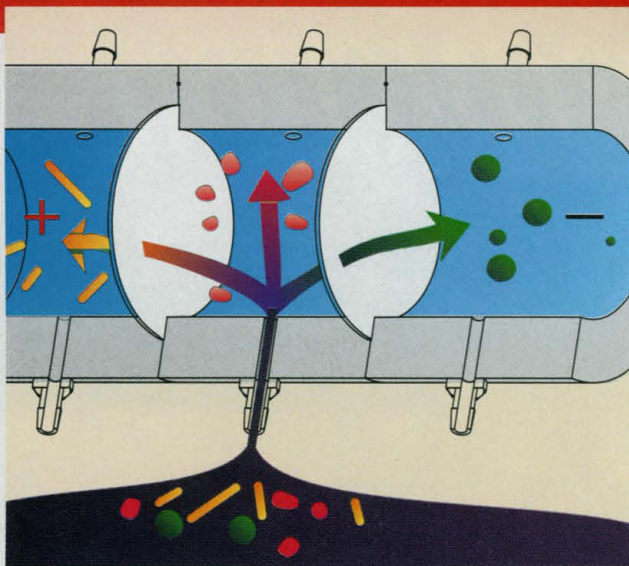
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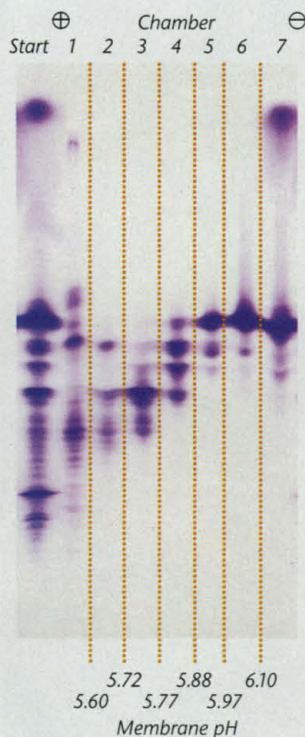
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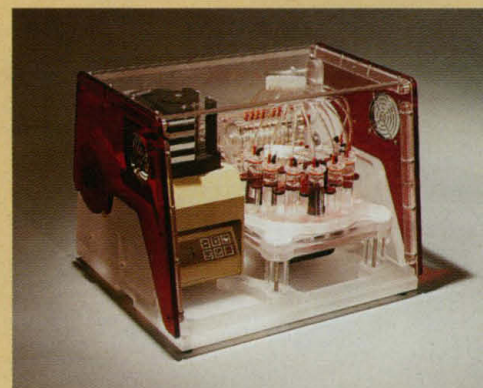
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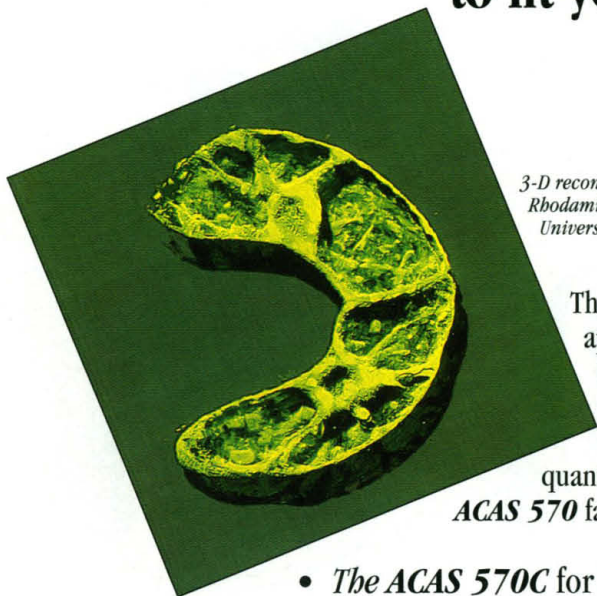
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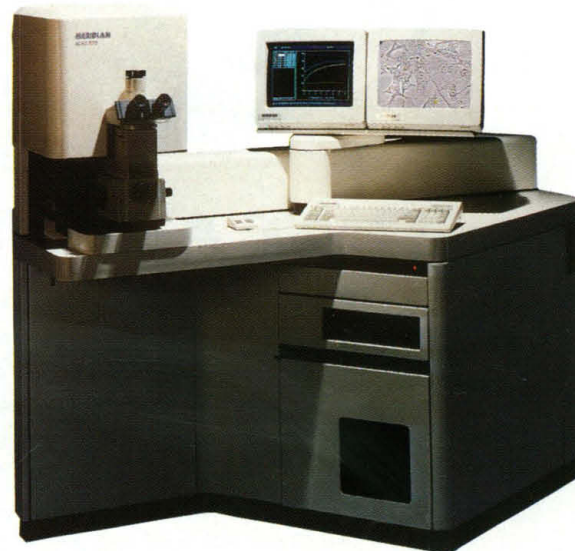
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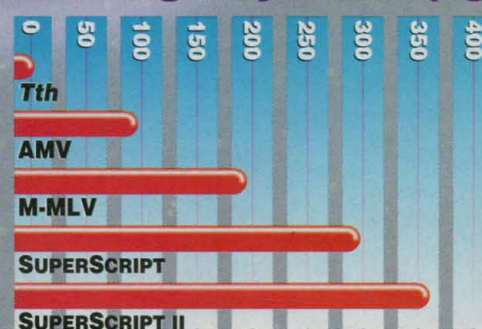


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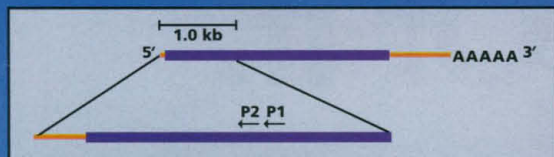
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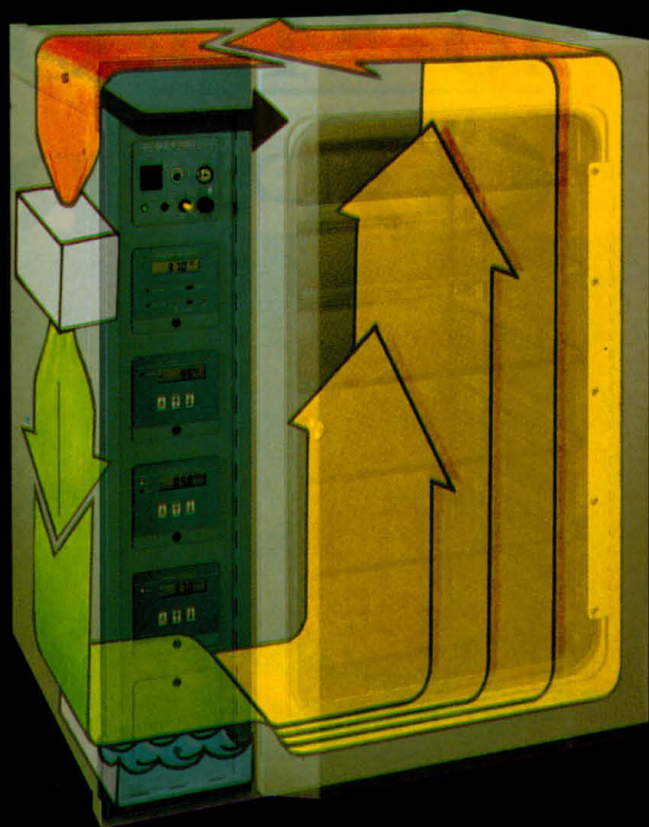
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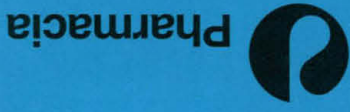
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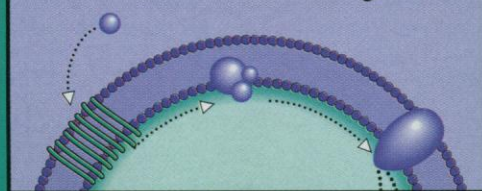
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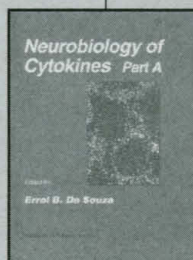
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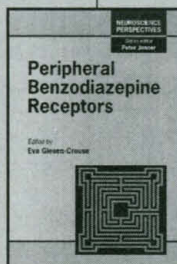
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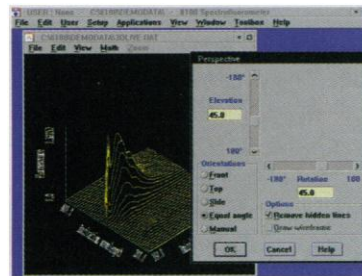


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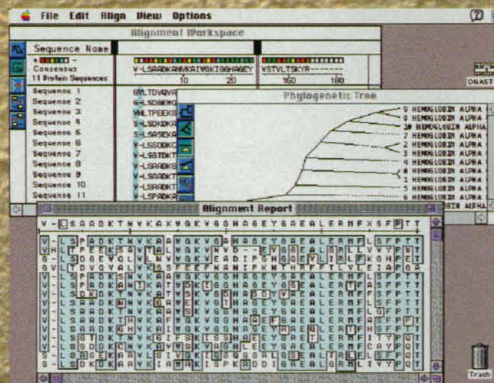
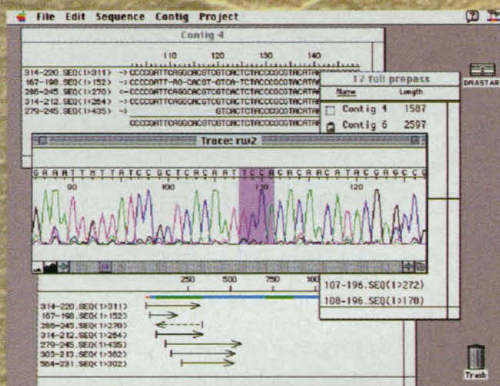
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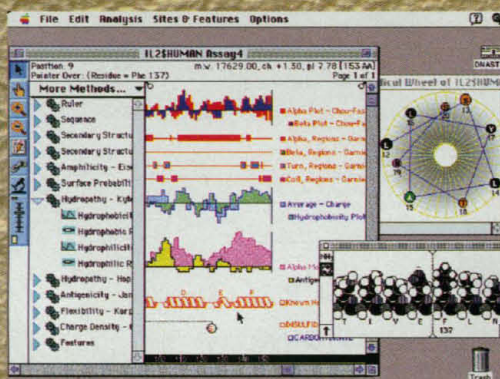
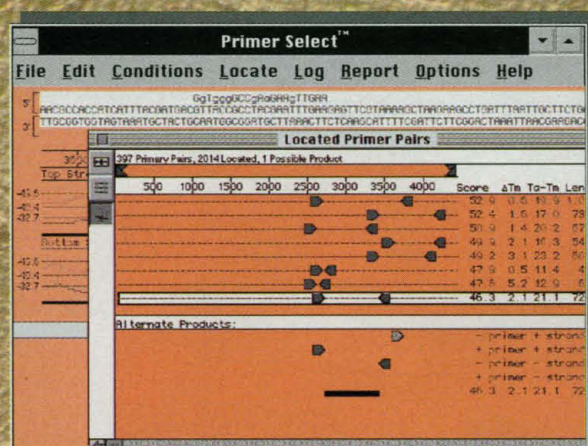
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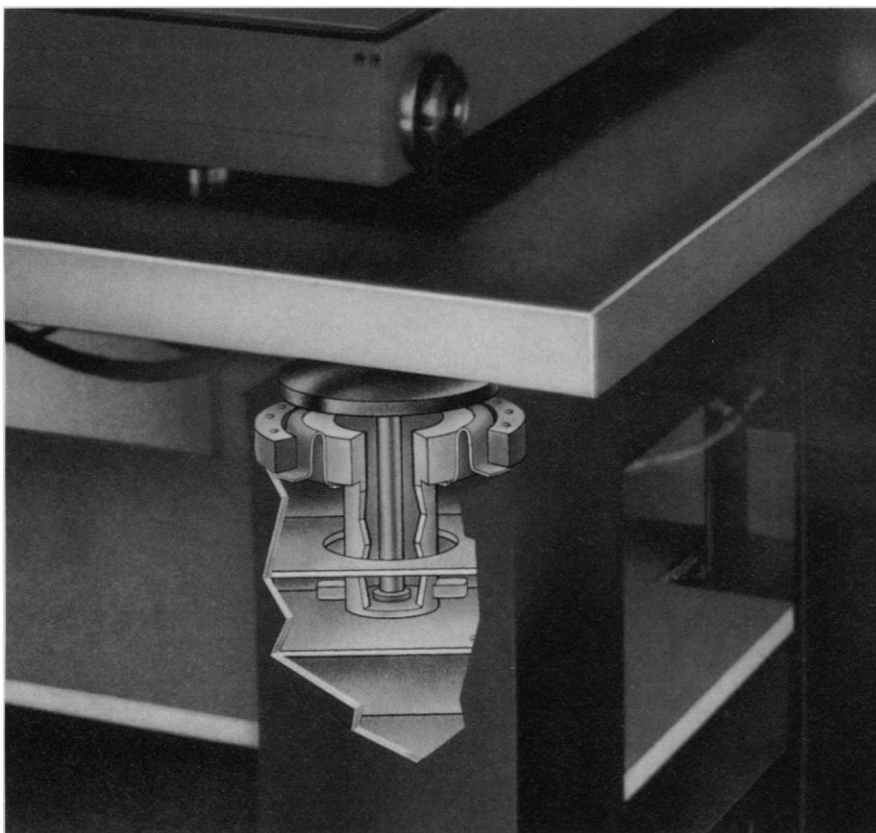
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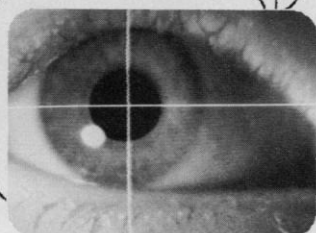
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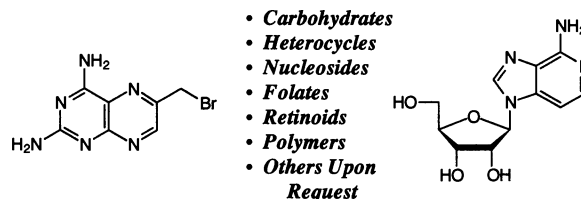
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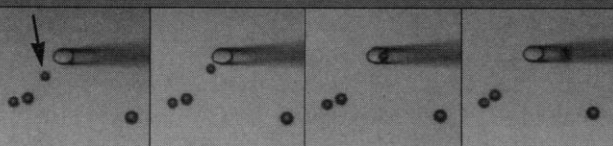
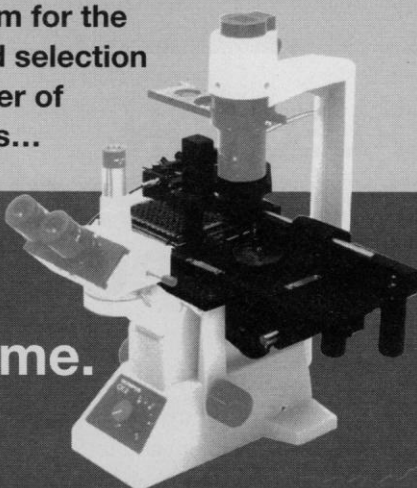
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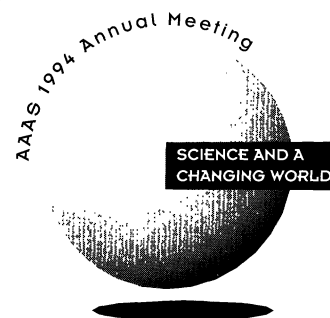


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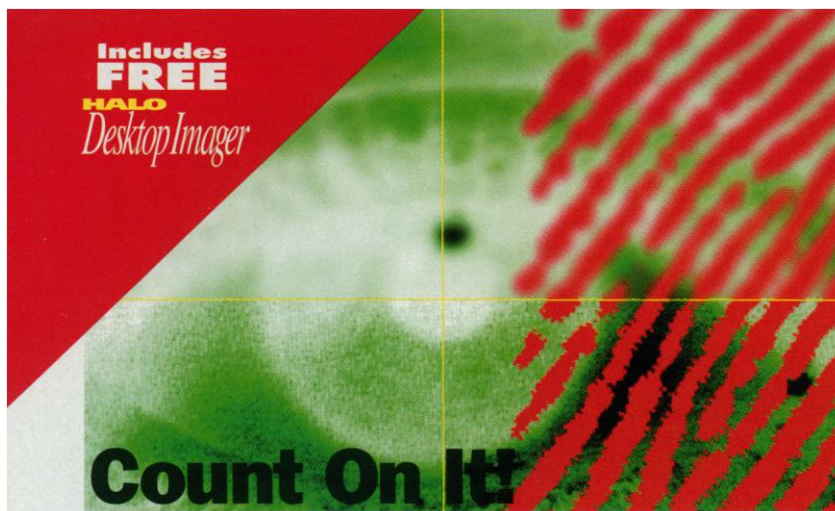


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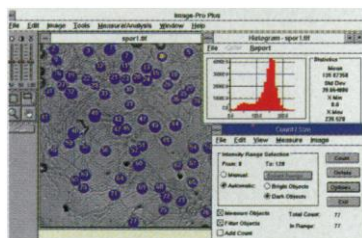
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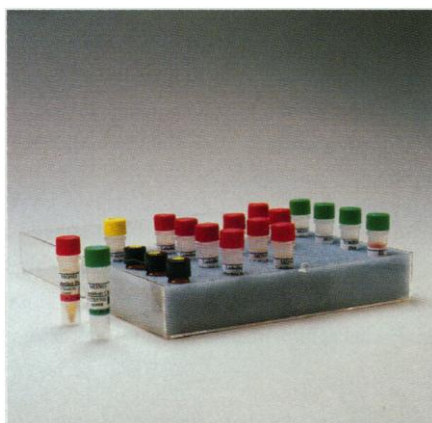
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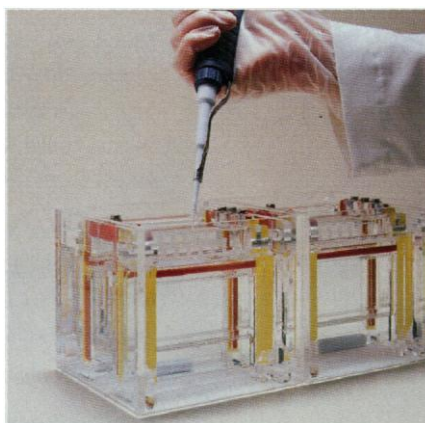
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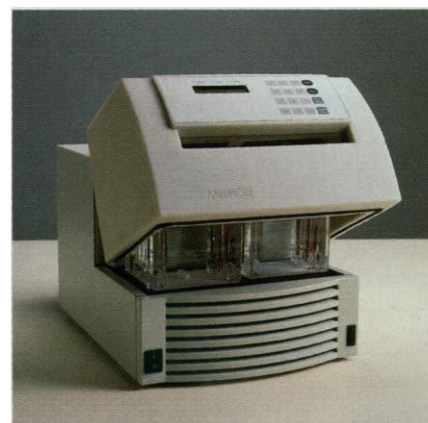
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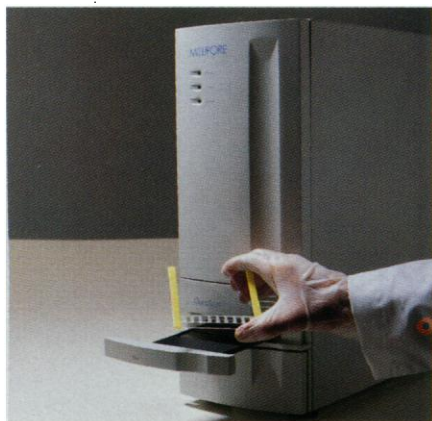
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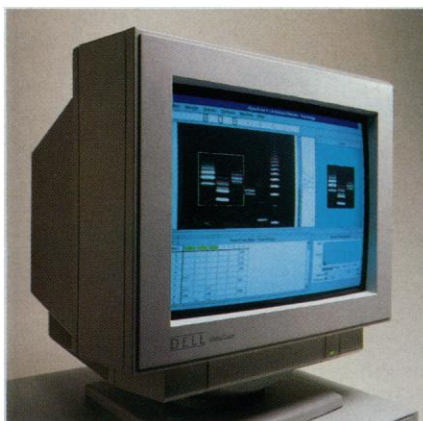
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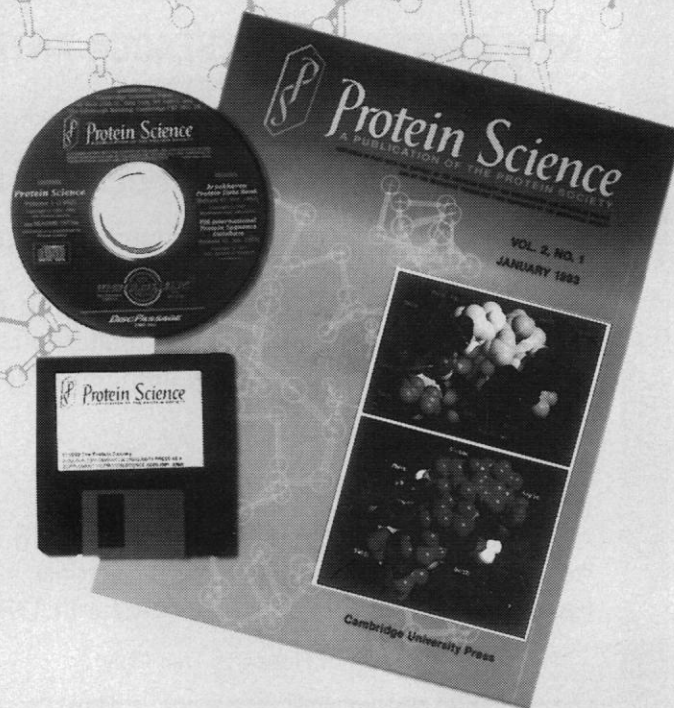
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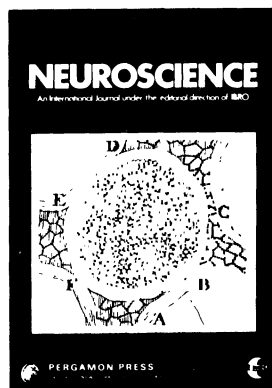
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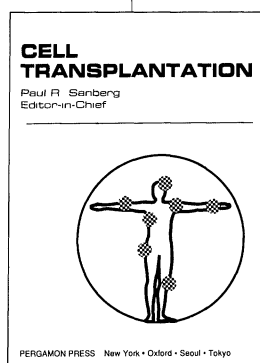
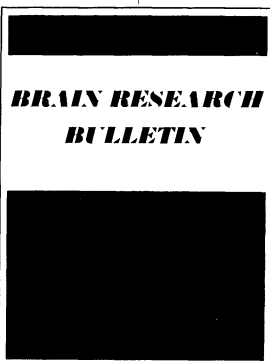
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