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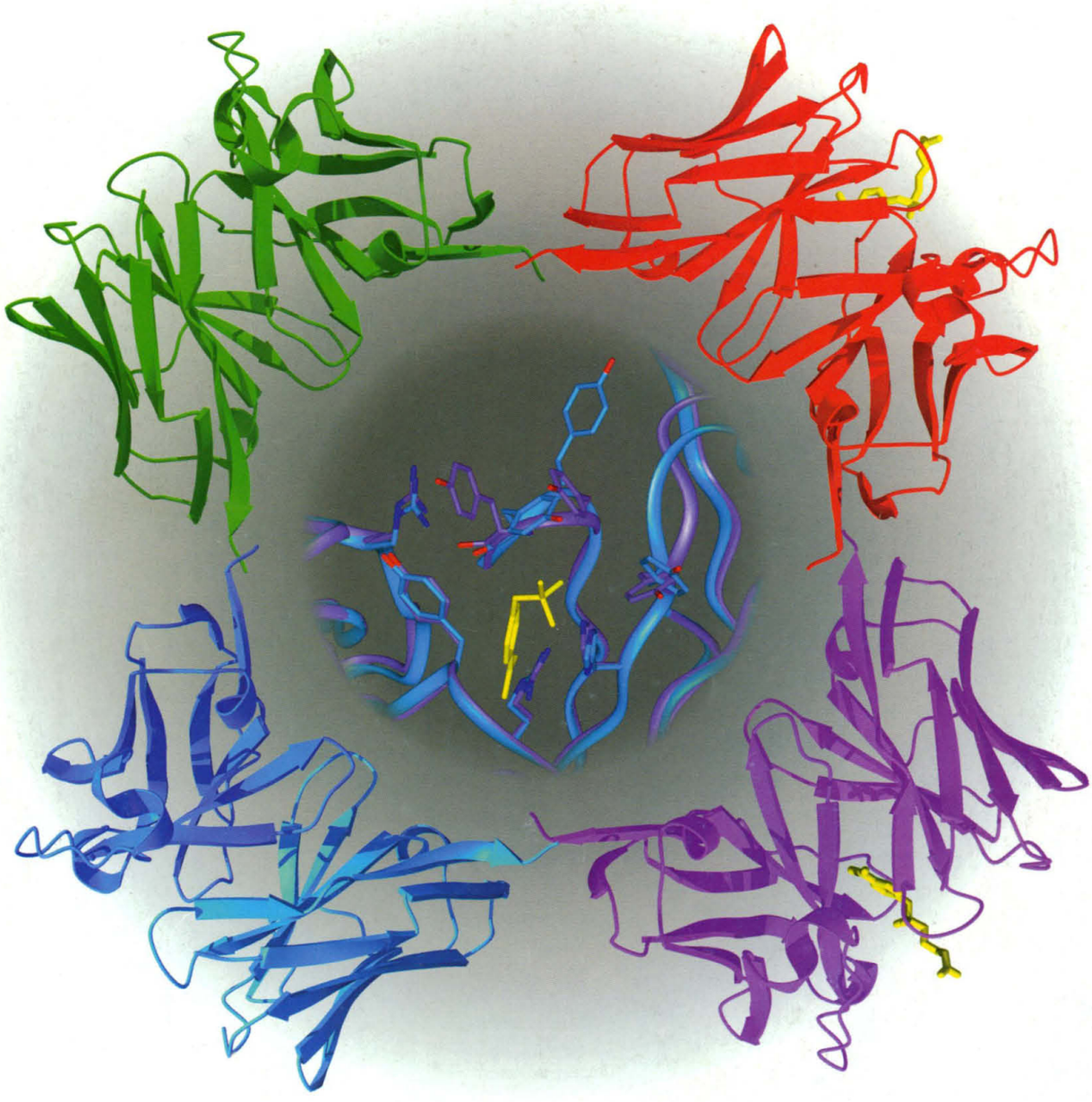


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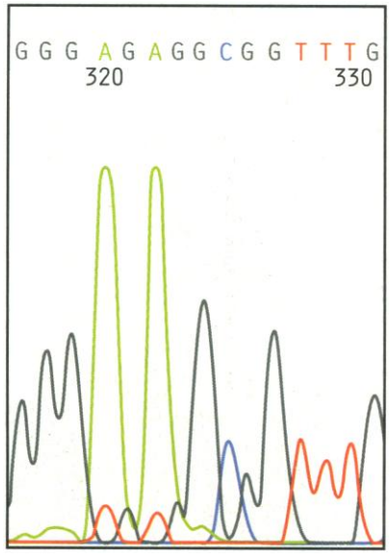

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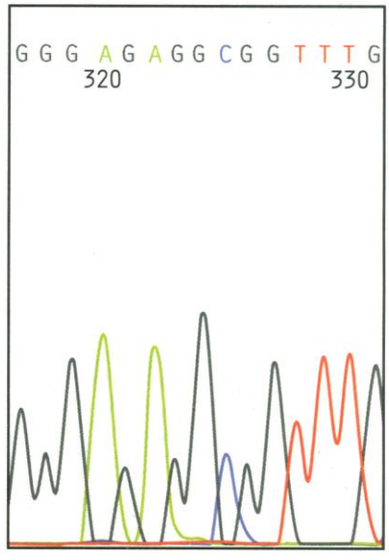

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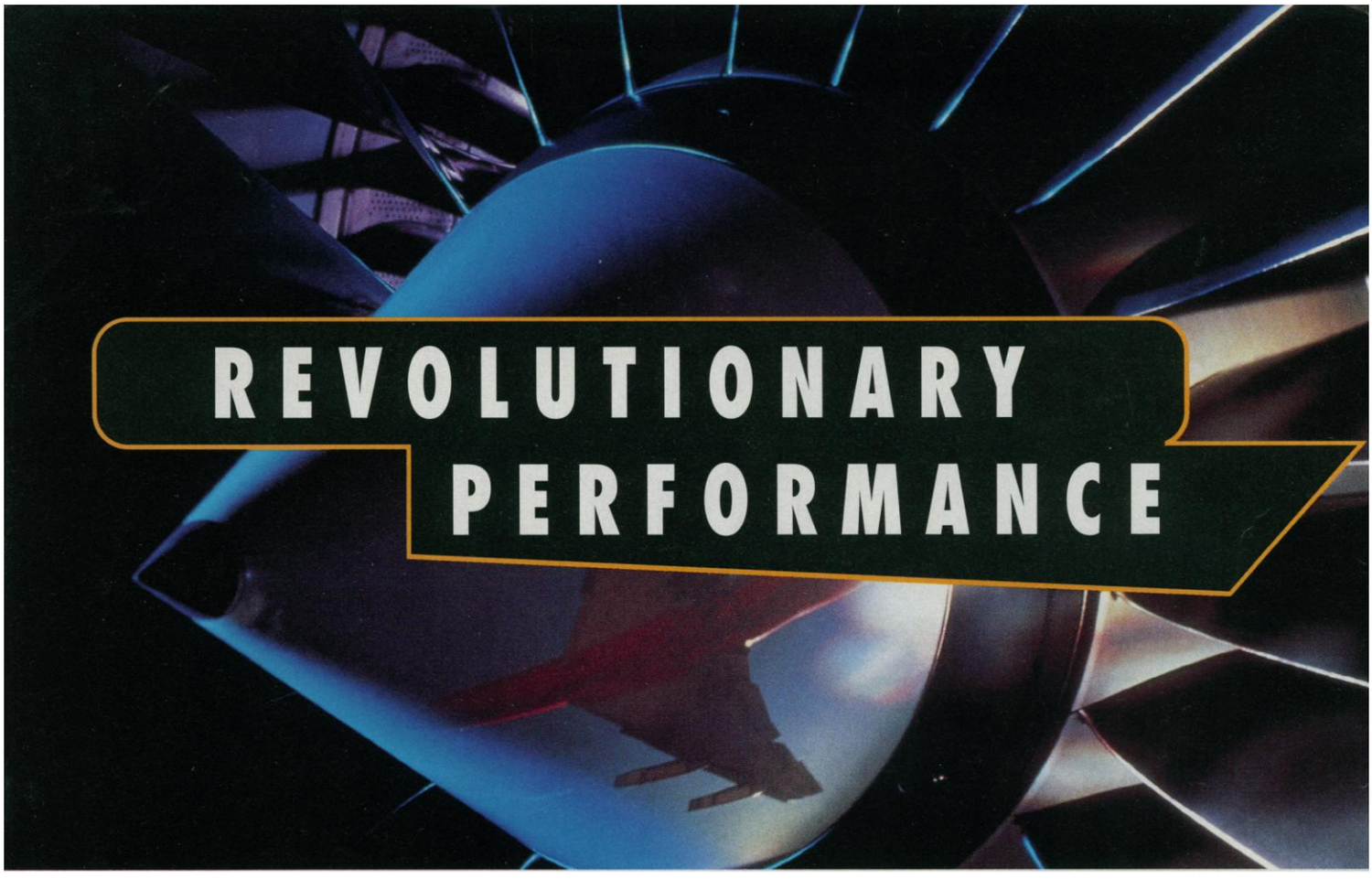
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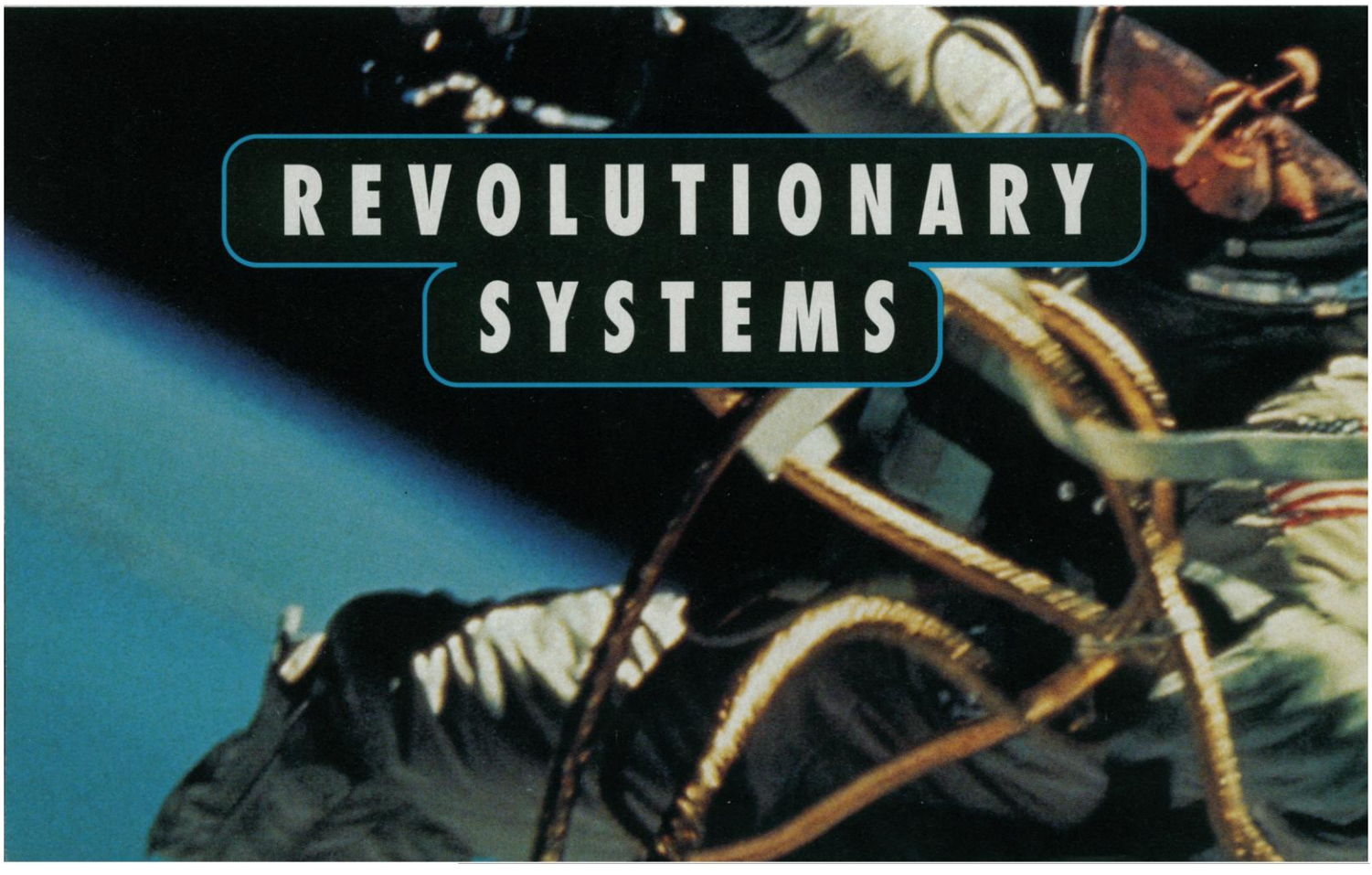
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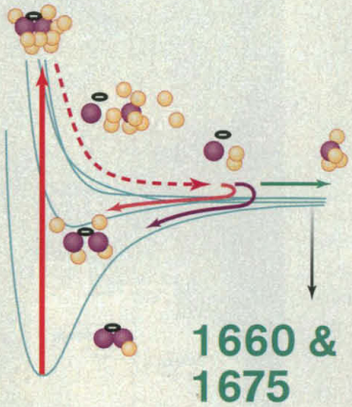
Endangered habitat



1660 & 1675
Quick chemistry

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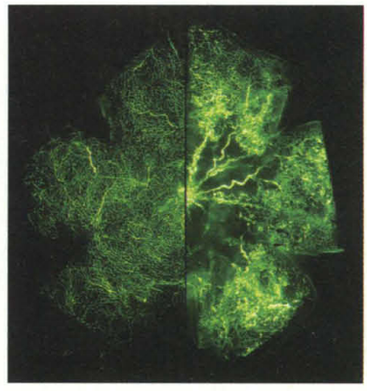
COVER

X-ray crystal structures of the ligand-bound and free forms of the variable domains of a catalytic antibody and its germline precursor. The binding of ligand (yellow) to the germline antibody (blue and purple) results in structural changes that lead to improved complementarity. The mutations in the antibody that occur as an immune response progresses (green and red) lead to a high-affinity, lock-and-key binding interaction. See page 1665 and the Perspective on page 1658. [Image: G. Wedemayer, L. Wang, P. Patten, P. Schultz, and R. Stevens]

TECHNICAL COMMENTS



1706

Blinding growth of blood vessels

Indicates accompanying feature

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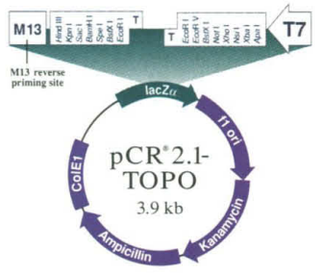

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edited by PHIL SZUROMI

Scattered objects

Beyond the orbit of Neptune lies a band of objects called the Kuiper belt, which is a source of comets. Duncan and Levison (p. 1670) simulated the evolution of such objects after they were perturbed by Neptune and found that some formed a disk of scattered icy objects, distinct from the Kuiper belt, in the early solar system. Recently, two objects with unusual orbits were discovered that may be members of this ancient disk. If such a disk exists, it may provide a source for the short-lived comets whose orbits are controlled by Jupiter.

Raising Nevada

Most of the Basin and Range Province in the western United States has been thought to have been uplifted recently (during the last 5 million years). Wolfe *et al.* (p. 1672) present an analysis of fossil leaf data collected from Nevada that provide an indication of paleoaltitude. The data imply instead that this part of the Basin and Range Province stood about 3 kilometers above sea level about 15 million years ago before subsiding to the current mean elevation of 1.0 to 1.5 kilometers about 13 million years ago.

Picky surface

Gas-phase chemical reactions can be highly atom-specific; for example, the reaction of iodine chloride (ICl) with deuterium atoms forms three times as much DI as DCl, although the latter product is more stable. Similar reactions with surfaces are thought to be much less selective because of the numerous possible reaction sites, but Liu *et al.* (p. 1681) show that the reaction of a molecular beam of ICl with the silicon (111)-(7x7) reconstructed surface formed an iodine-rich surface layer. The preferential ejection of chlorine to the gas phase, the least energetically favorable outcome, appears to be due to interactions that align the ICl molecule with the I end toward the surface.

Controlling graft-versus-host disease

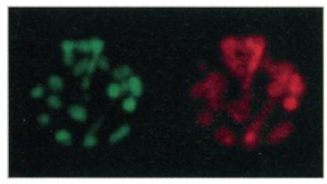
Allogeneic bone marrow transplantation (the use of a less than perfectly matched donor) is used to reconstitute the immune system after severe treatments for cancer. Because the T cells in the donor's marrow recognize the recipient as "foreign," they are usually removed from the original bone marrow graft. If the cancer recurs, an effective treatment is to infuse the donor T cells, but this procedure frequently runs the risk of graft-versus-host disease (GvHD), a potentially lethal complication. Bonini *et al.* (p. 1719; see the news story by Wickelgren, p. 1646) devised a strategy for killing the donor T cells if they started attacking normal host tissue. They transferred a herpes simplex virus "suicide vector" (thymidine kinase) into donor T cells in culture, selected for the cells that expressed the gene, and infused the genetically modified cells into 12 patients. Ganciclovir was used to successfully control GvHD by eliminating the donor lymphocytes in three patients, and antitumor activity was seen in five patients.

Growth hormone and blindness

The most common forms of untreatable blindness arise from by the abnormal growth of new blood vessels in the retina, a process triggered by oxygen deprivation. Vascular endothelial growth factor (VEGF) is thought to participate in this process of neovascularization, but other factors also likely play a role. In experiments with mouse models, Smith *et al.* (p. 1706) show that hypoxia-induced retinal neovascularization requires the action of growth hormone (GH) and one of its downstream effectors, insulin-like growth factor–1 (IGF-I). These results suggest that GH and or IGF-I inhibitors may prove useful for preventing certain forms of blindness.

Iron link in Friedreich's ataxia

Friedreich's ataxia is a degenerative disease affecting the nervous system and the heart. Although mutations in a gene product, frataxin, have been associated with the disease, the sequence of frataxin has not provided insights into its function. Babcock *et al.* (p. 1709) found that a yeast gene that has



high sequence similarity to frataxin encodes a mitochondrial protein involved in regulating iron homeostasis and mitochondrial function. Human frataxin was also shown to be a mitochondrial protein. As abnormal iron accumulation has been previously observed in Friedreich's ataxia, these results suggest a mechanism for the observed pathology.

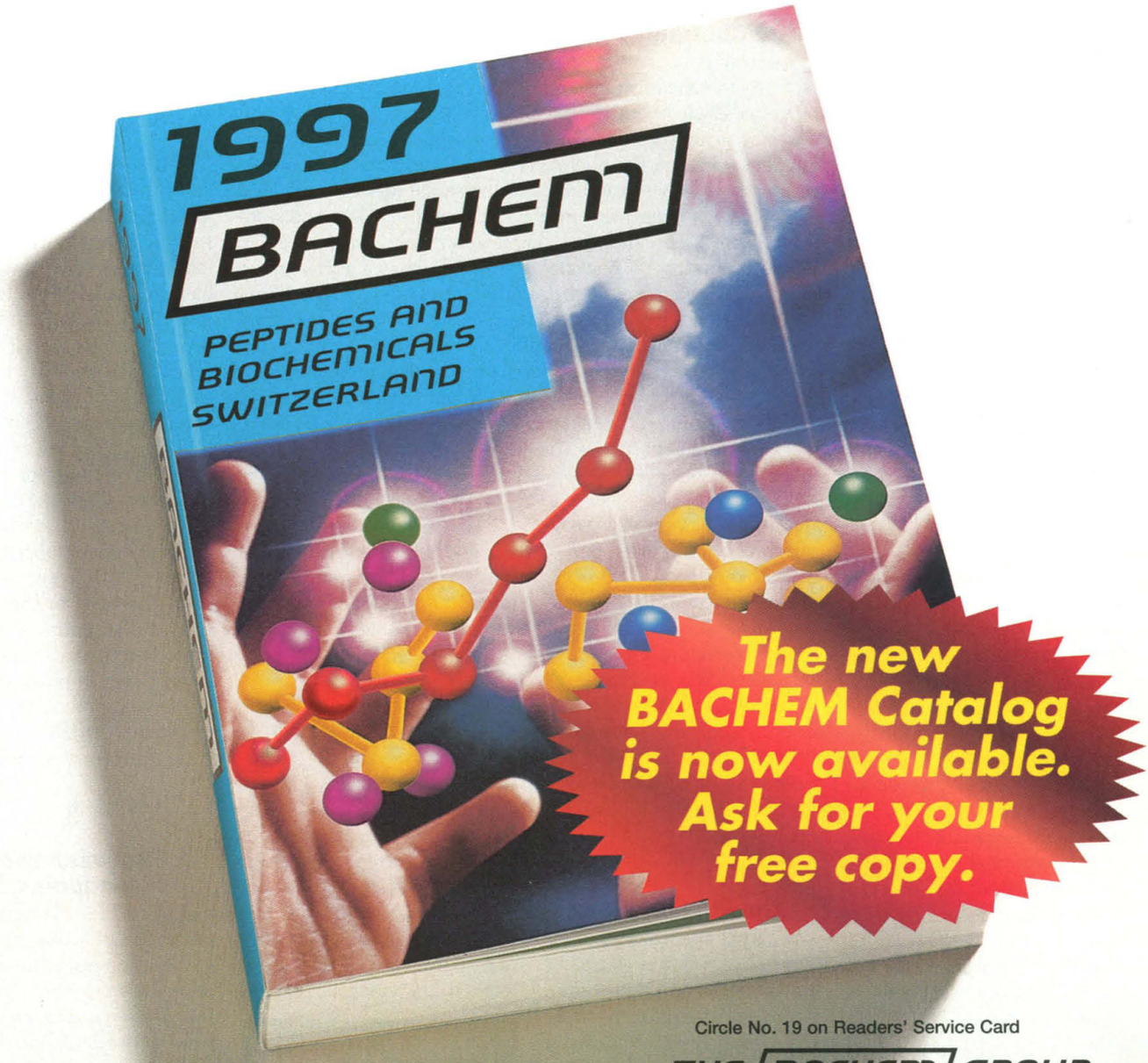
Enhancing platelet production

Thrombopoietin is a cytokine that promotes growth of megakaryocytes—cells in the bone marrow that give rise to platelets. Cwirla *et al.* (p. 1696) used several sophisticated screens to select small peptides that potently bind to and activate the thrombopoietin receptor. Although the sequences of these peptides are not present in thrombopoietin, one dimerized 14–amino acid peptide had a mean effective concentration (EC_{50}) of 100 picomolar, essentially the same as that of the natural 332-amino acid cytokine. Thrombocytoppenia, the insufficiency of platelets circulating in the blood, is encountered after chemotherapy or bone marrow transplantation.

Between two kingdoms

Transposable elements are pieces of DNA that can move around a genome as discrete units. This movement had been seen only between closely related species until Gueiros-Filho and Beverley (p. 1716; see the Perspective by Hartl, p. 1659) demonstrated that it could occur between two different kingdoms. The *Drosophila* element *mariner* was shown to inactivate or trap genes in *Leishmania major*, a protozoan that causes the fatal disease leishmaniasis. This finding will make genetic analysis of *Leishmania* easier and suggests that *mariner* can be a powerful genetic probe to study other eukaryotes as well.

Look what's new!



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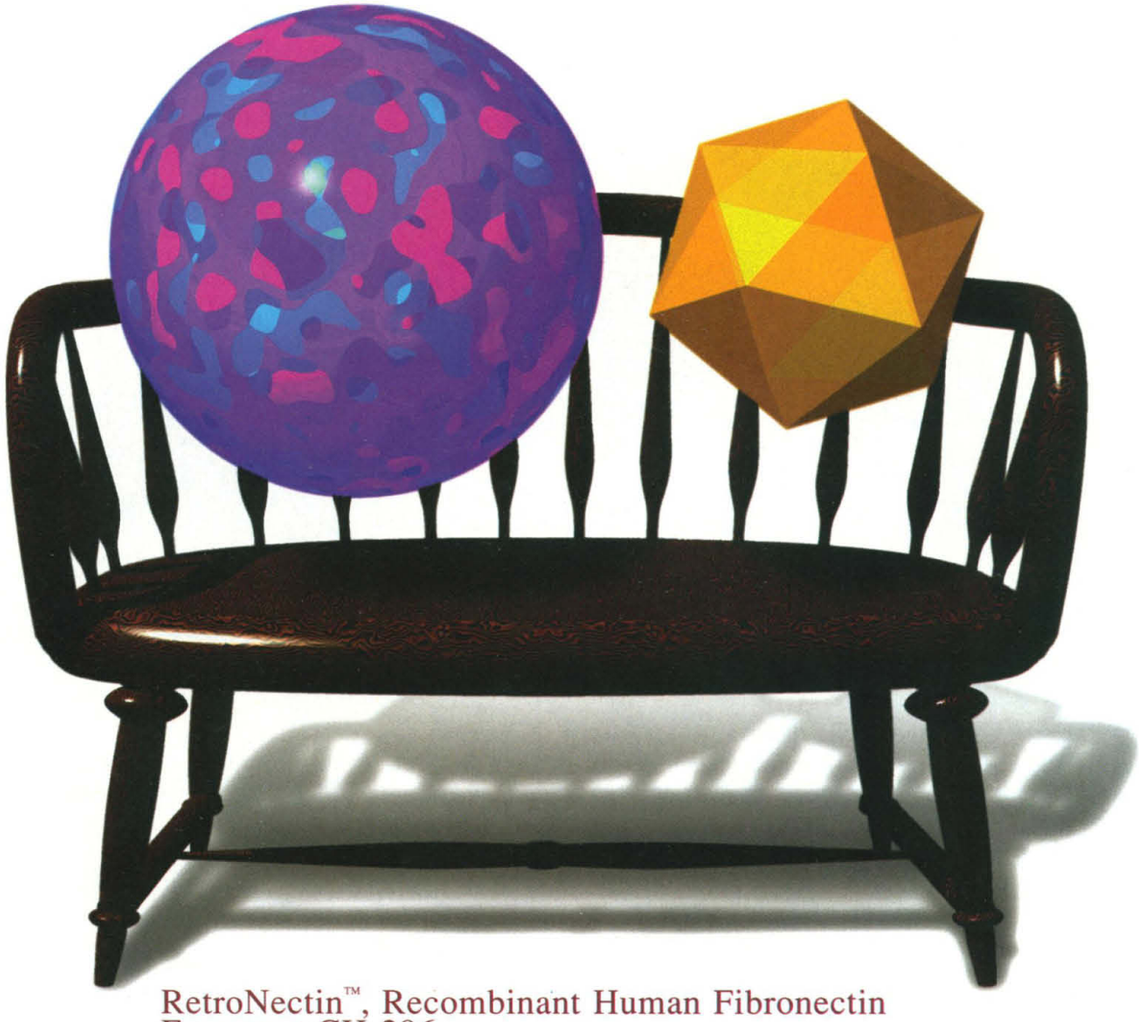

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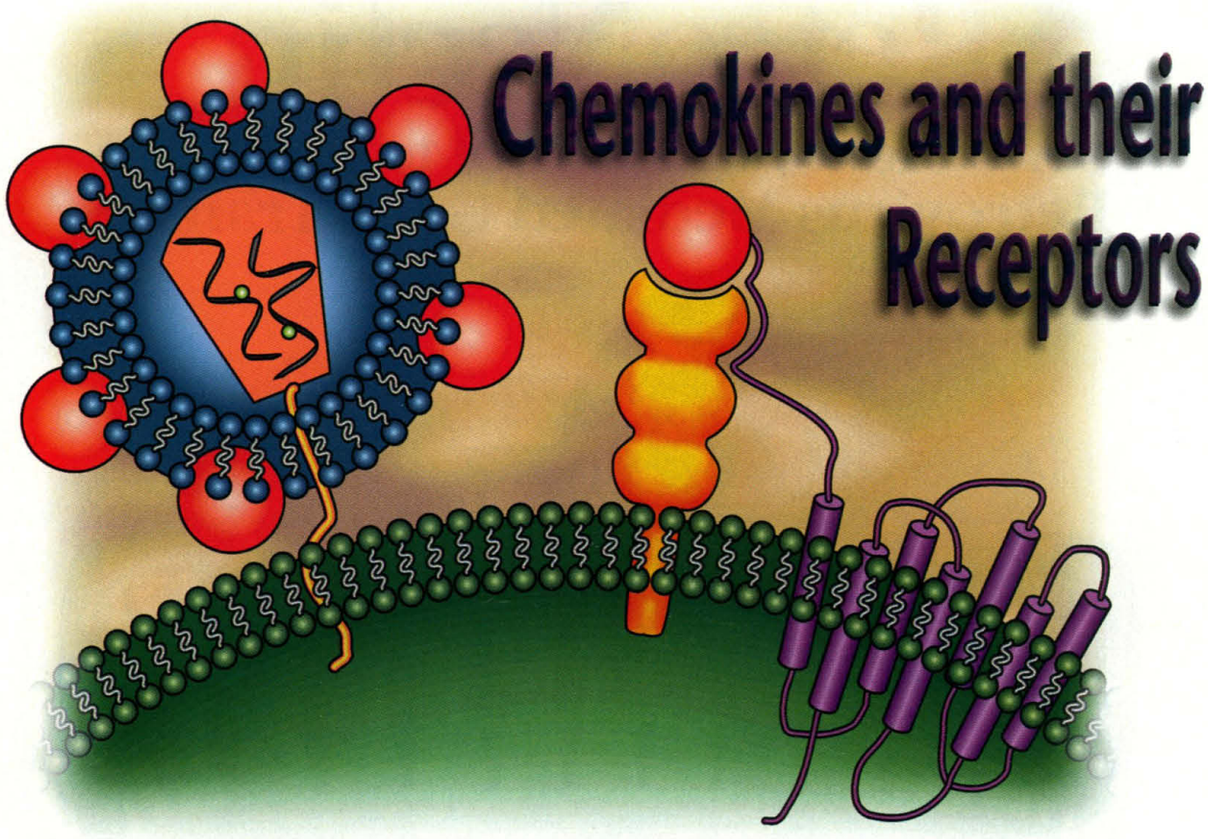

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The Mac OS Report

Number two in a series—the facts about Mac OS 8

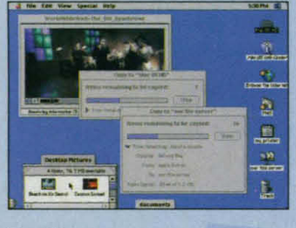
Mac® OS 8 is coming. It will give you, and millions of other Macintosh® users, a whole new way of working.

It will give your Apple® Macintosh computer (or, for that matter, any other Mac OS computer of your choice) a dramatic new look and feel, along with all kinds of enhanced capabilities for accessing the Internet.

It will also set an entirely new standard of powerful, intuitive computing—a standard the competition can try to catch up to. (Again.)

A new way of working

The moment you start using Mac OS 8, you'll feel the difference: you'll find yourself accomplishing more in less time. A multi-threaded Finder™ lets you execute multiple tasks simultaneously, such as launching applications and copying files. Mac OS 8 includes new information-management tools, such as contextual pop-up menus and spring-loaded folders, that give you quicker and easier access to all your information. A scalable environment lets you either limit your menu and window options, or expand them—whichever works better for you. A new, dimensional look makes the interface more dynamic and engaging than ever. And Mac OS 8 also includes the latest versions of QuickTime® with its MPEG support, QuickTime VR and QuickDraw® 3D.

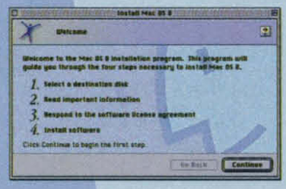


How easy is it to get going with all these new technologies and features? Very. Because our new installer and setup assistants take you through each step of configuring your new system software. Once you're up and running, PowerPC™-native code improves your performance. Mac OS 8 is also completely compatible with all PowerPC and 68040-based hardware and software.

A new way of accessing the Internet

Mac OS 8 includes TCP/IP and PPP for easy network or modem access direct from the Finder. You get Netscape Navigator™ and the PointCast Network.™ And a new Internet Setup Assistant makes it easier than ever to get on the Net, whether you're doing it from home with a modem or from work with a high-speed connection.

Personal web sharing is standard, so you can turn any Macintosh into an Internet web server. And Java™ support is built in, so you can run Java applications just as though they were any other desktop applications. (If you were wondering, Windows® 95 can't do this.)



And more advancements are on the way

Mac OS 8 is one of the most significant advances in OS technology ever. And it's just the beginning—additional upgrades are planned. And our support for the Mac OS will continue for years.

At the same time, we're also working on an industrial-strength OS, code-named Rhapsody, that will offer features such as protected memory, preemptive multitasking and symmetric multiprocessing. Rhapsody will also provide backwards compatibility, so you can be sure that the vast majority of your Mac OS apps will run on Rhapsody, too.

In other words: Apple is still developing the most innovative, user-friendly and consistently superior products on the market. That's one part of our system that won't change. To learn more, visit www.macos.apple.com.

If you want to use Netscape Navigator to browse the Net, you'll like this: it's an integrated part of Mac OS 8.

PointCast

It's the PointCast Network. It comes with Mac OS 8. And it grabs the news you want directly off the Net to create customized desktop news pages. Daily. Hourly. As often as you want.

Java Authorized Licensee

When you get Mac OS 8, you also get built-in Java support, so you can run both local and network-based Java software just like other desktop applications.

Mac OS

Mac OS has always been the easiest and most intuitive of all operating systems. Now, Mac OS 8 brings this kind of computing to a whole new level.

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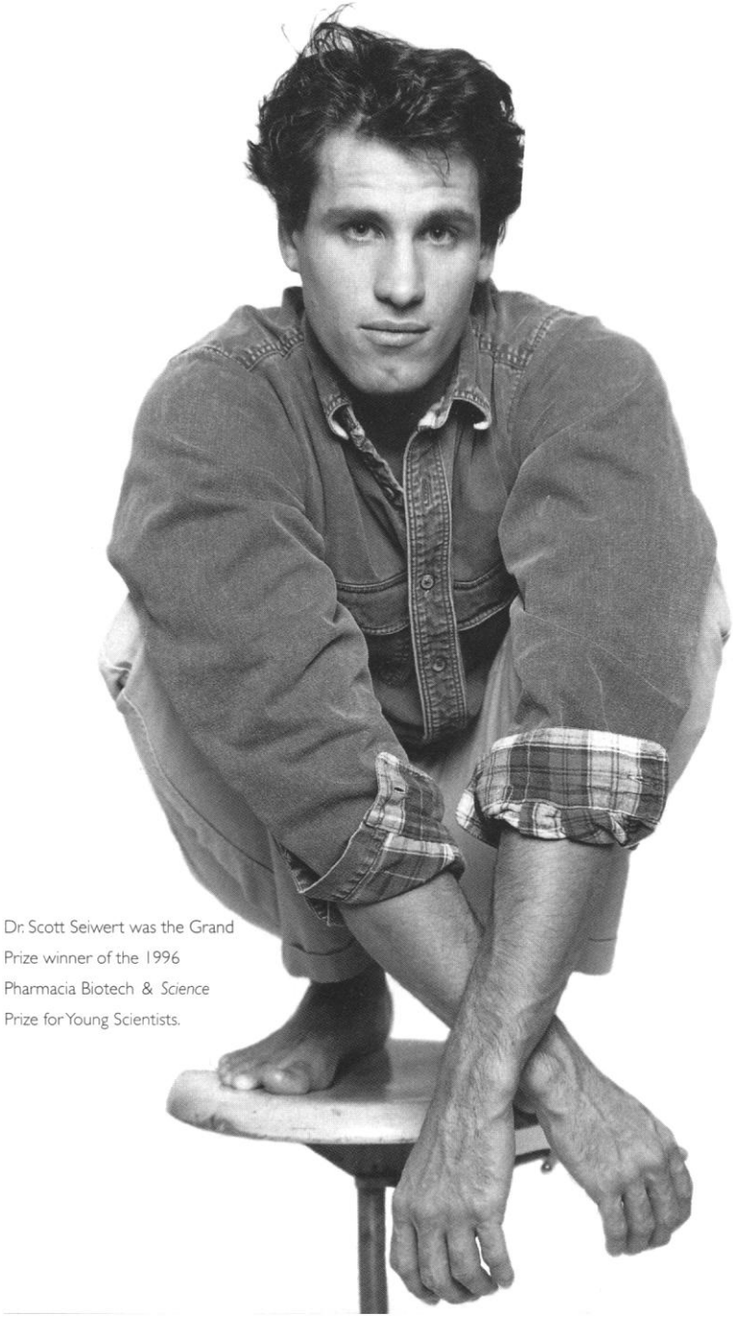
AND A TRIP TO SWEDEN

BY WRITING 1,000 WORDS–HE DID!

(OH YEAH, AND $20,000)



Dr. Scott Seiwert was the Grand Prize winner of the 1996 Pharmacia Biotech & *Science* Prize for Young Scientists.

If you're a recent Ph.D. graduate whose thesis work was in molecular biology, we'd like to congratulate you. We'd also like to give you a little recognition for a job well done. All you have to do is enter an essay based on your graduate thesis to the 1997 Pharmacia Biotech & *Science* Prize for Young Scientists.

Your essay will be reviewed by a panel of distinguished scientists—whom will then select one Grand Prize winner and up to seven other winners.

The Grand Prize winner will receive the rewards mentioned above; all other winners will receive $5,000 each and a free trip to Sweden to attend the award ceremony.

CALL FOR ENTRIES

To be eligible, you must have received your Ph.D. between 1 January and 31 December 1996. Your thesis work must have been in the field of molecular biology. To enter, you must submit a 1,000 word essay which describes your thesis work and places it in perspective with regard to the field of molecular biology. The essay may be submitted in either English, French, German, Spanish, Japanese, or Chinese (Mandarin).

The closing date for entries is 30 June 1997. All prizes will be presented in Sweden in December 1997. Full details and the required entry form can be collected from:

- the administrator of the Award Committee at the address below
- within the *Science* homepage at http://www.aaas.org/science/prize.htm
- within the Pharmacia Biotech homepage at http://www.biotech.pharmacia.se

Pharmacia Biotech & Science Prize for Young Scientists
IN MOLECULAR BIOLOGY 1997

The Award Committee
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Tel: +44 1223 302067, Fax: +44 1223 302068
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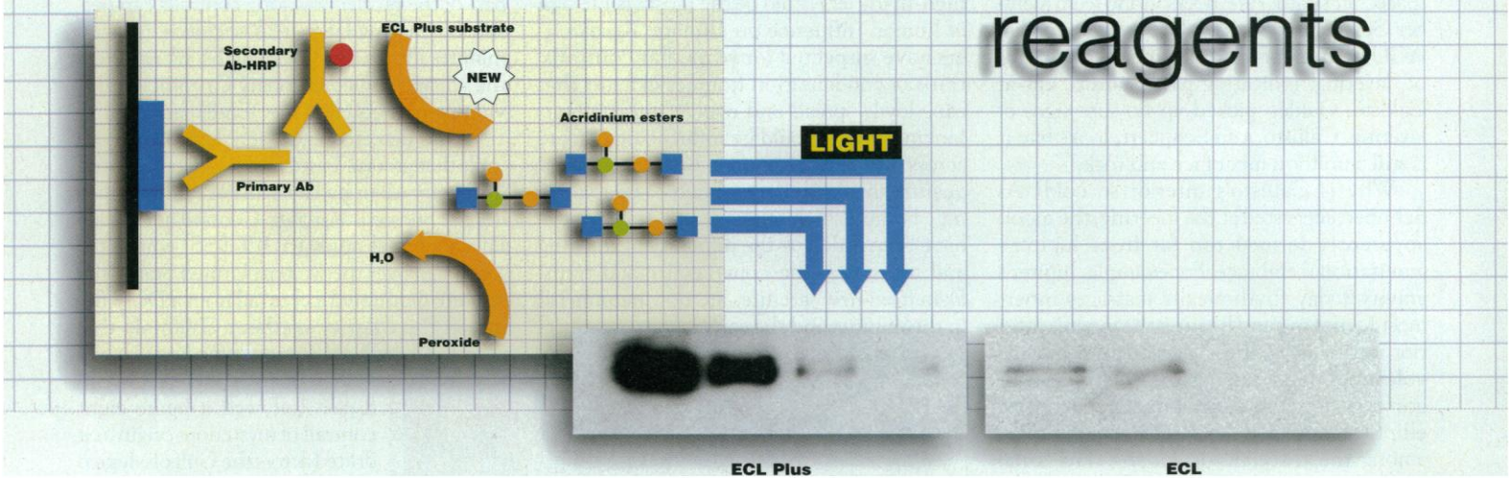

ECL Plus and ECL results obtained using:
Target: Rat brain homogenate
Loadings: doubling dilutions starting at 1:20 original homogenate
Primary antibody: 1:5,000 dilution of mouse anti-beta tubulin
Secondary antibody: 1:5,000 dilution of anti-mouse Ig HRP conjugate
Exposure: 5 minutes to Hyperfilm ECL

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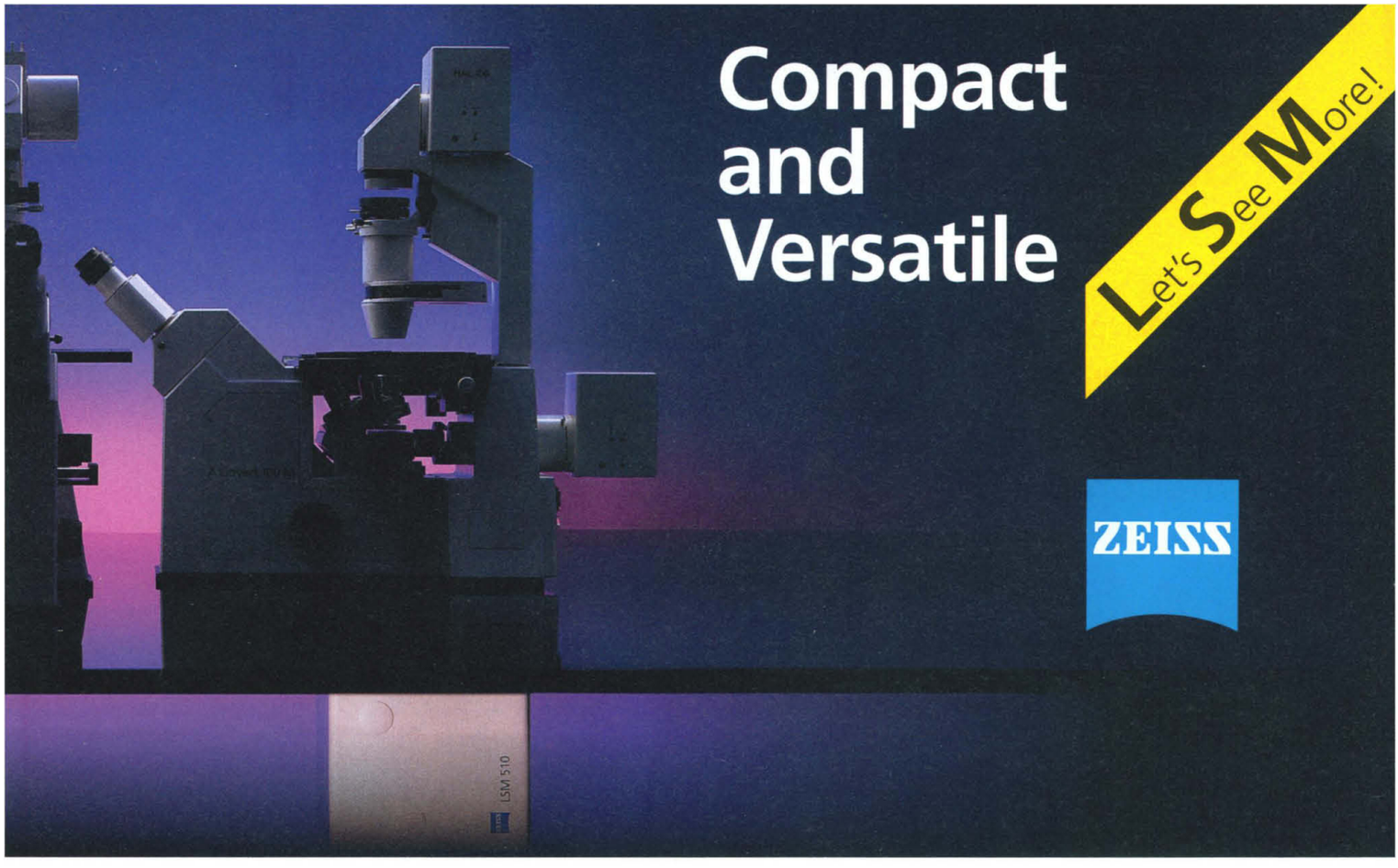

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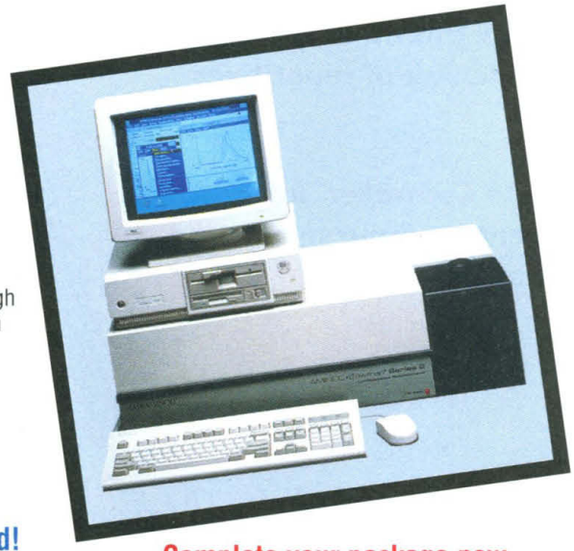

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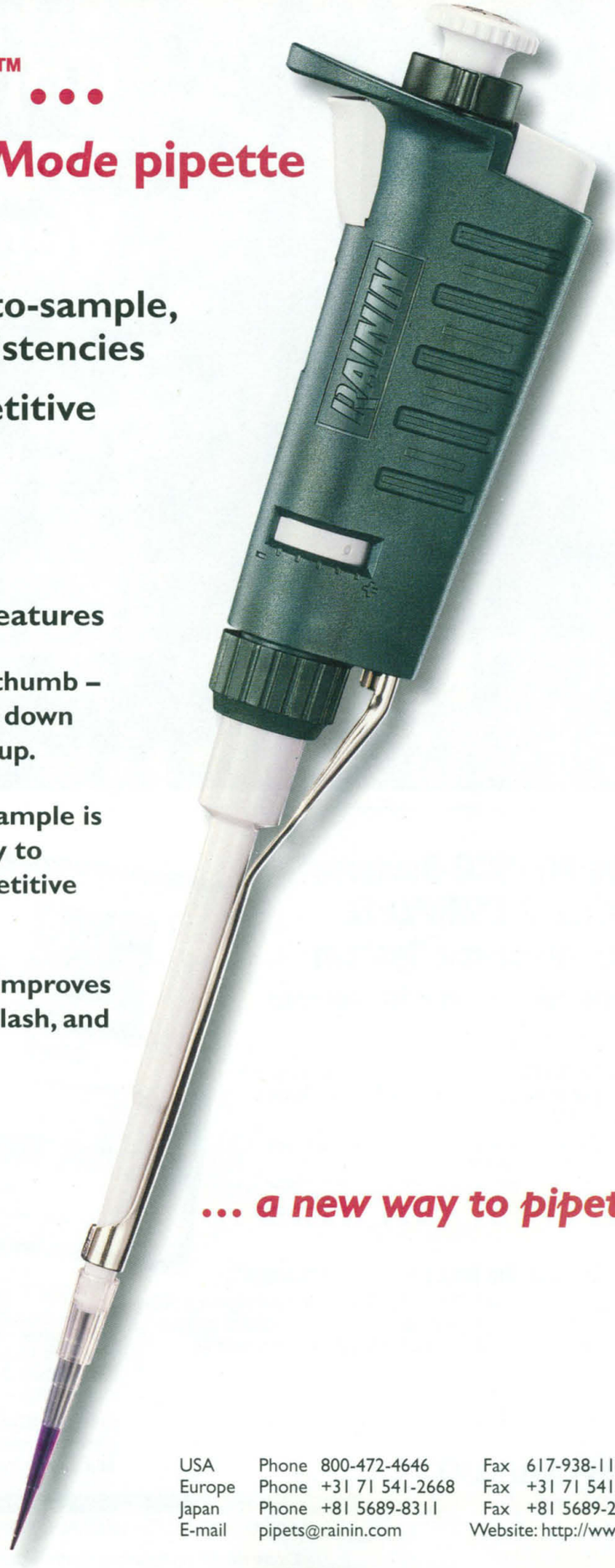

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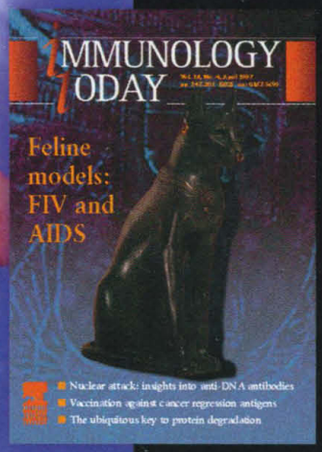

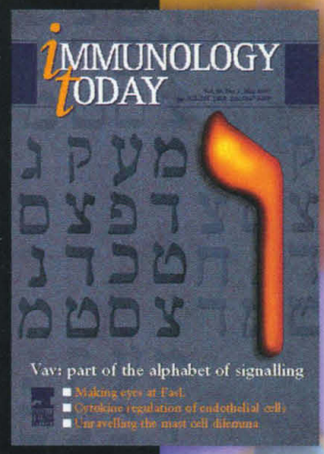

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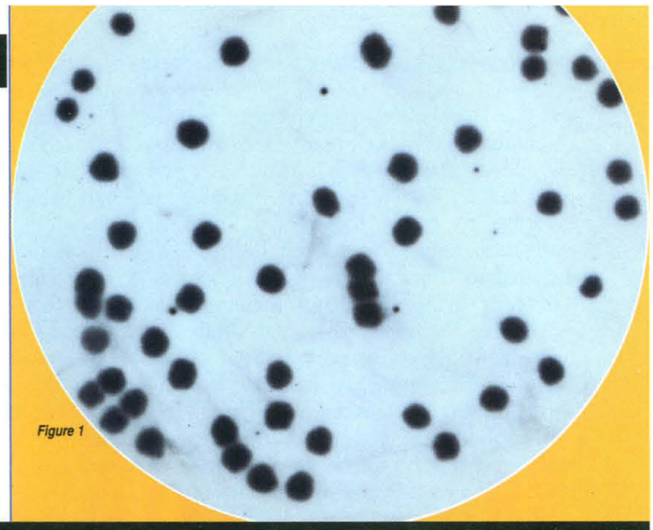

Figure 1

See for Yourself — Superior Sensitivity in Short Exposure Time

At NEN, we're committed to serving the life scientist as never before.

That's why we're expanding our already comprehensive Renaissance nonradioactive labeling and detection product offering by introducing 19 new high-sensitivity labeling kits and detection substrates.

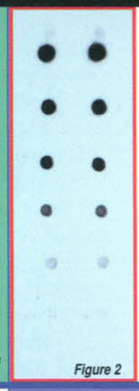

Figure 2

Figure 1. Colonies were screened for the TGF- ß1 gene with a fluorescein-labeled oligonucleotide probe and Enhanced Luminol. *This film demonstrates results obtained using the Renaissance 3'- End Labeling Fluorescein Kit with Antifluorescein-HRP (NEL823) and the detection substrate Enhanced Luminol (NEL201). Discs were exposed to Reflection film for 15 minutes.*

Figure 2. Mouse ß-actin was detected using a fluorescein-labeled ssRNA probe and ready-to-use CDP-Star. *This film demonstrates results obtained using Renaissance RNA Fluorescein Labeling Kit with Antifluorescein-AP (NEL633) in conjunction with ready-to-use CDP-Star (NEL601). Blots were exposed to Reflection film for 5 minutes.*

Whether your labeling method of choice is Random Priming, Nick Translation, 3'-End Labeling, or RNA Transcription, there is a convenient kit for use with our chemiluminescent or chromogenic substrates. For ultimate flexibility, versions of all kits are available to make hybridization probes labeled with either fluorescein or biotin and include either alkaline phosphatase or horseradish peroxidase conjugates. Once your DNA or RNA probes are labeled, detection is quick and simple on GeneScreen membrane with either ready-to-use CDP-*Star*™ or Enhanced Luminol and Reflection™ film or 4CN Plus.

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Call today to learn more about how Renaissance products provide the quality and choice you need for your lab. And when you do, ask about our expanding line of nonradioactive nucleotide analogs available in a wide range of fluorescein- and biotin-labeled deoxynucleotides, ribonucleotides, and dideoxynucleotides.

Figure 3. The v-Fos gene was detected in 125 ng of blotted mouse genomic DNA in less than 5 minutes using CDP-Star. *This film demonstrates results obtained using the Renaissance Random Primer Biotin Labeling Kit with Streptavidin-AP (NEL604) in conjunction with ready-to-use CDP-Star (NEL601). Blots were exposed to Reflection film for 5 minutes.*

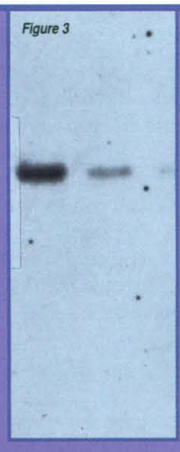

Figure 3

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