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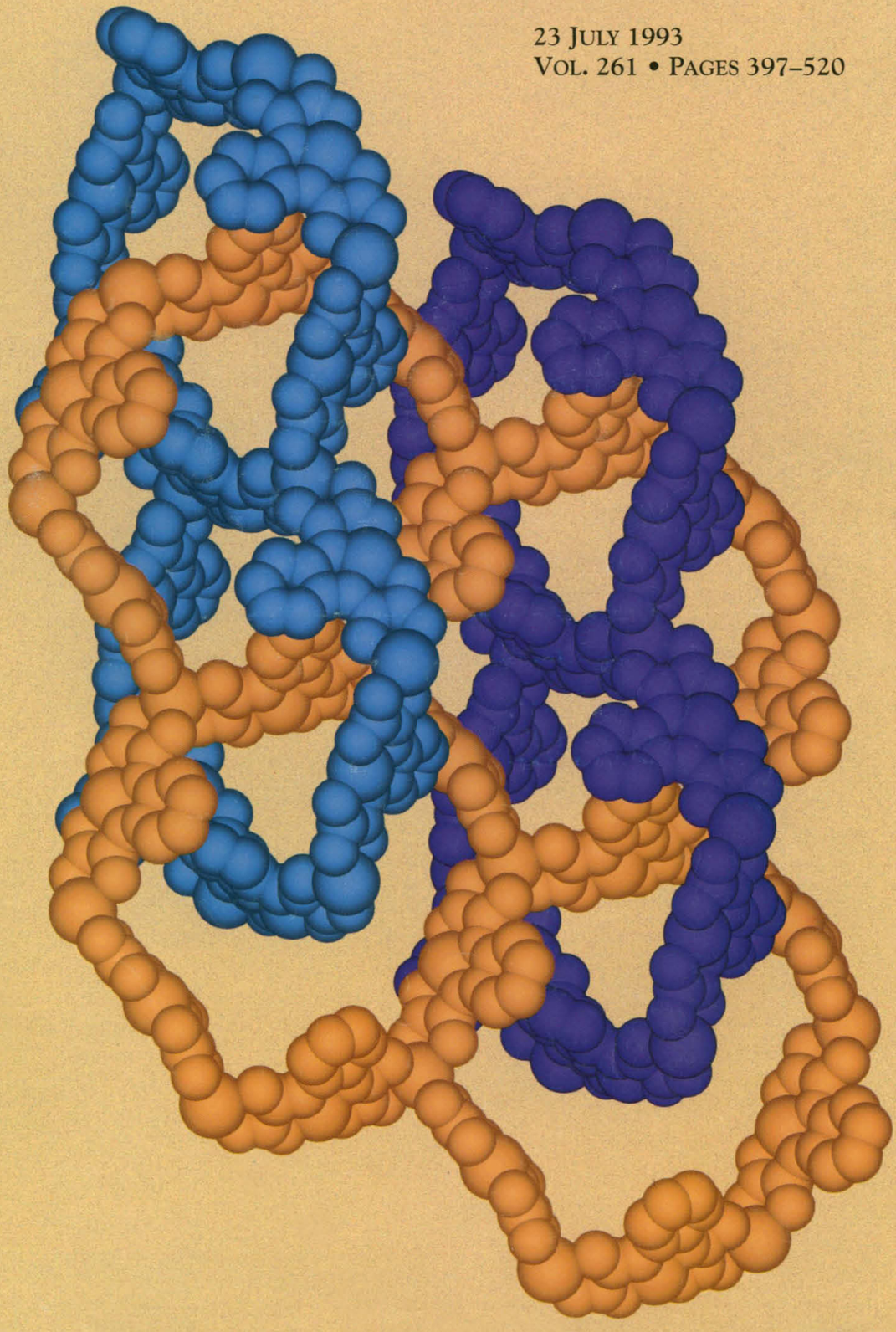

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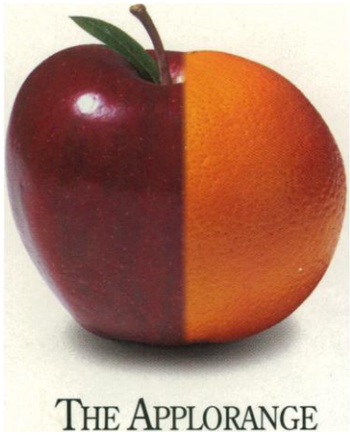

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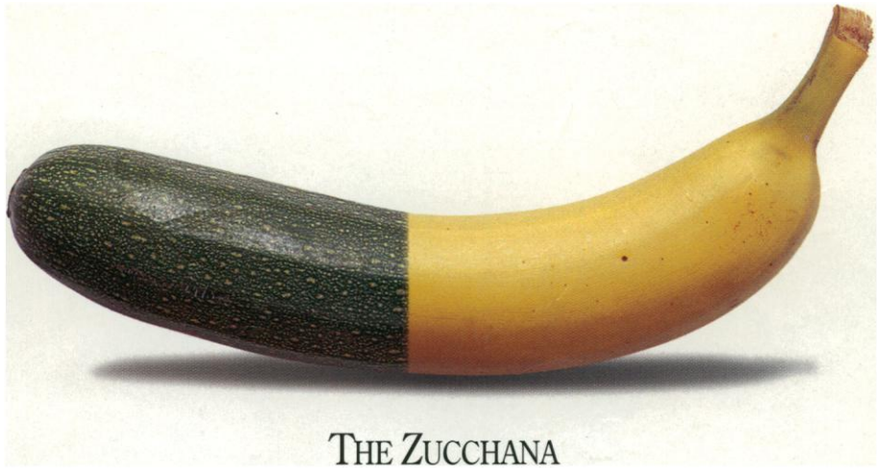

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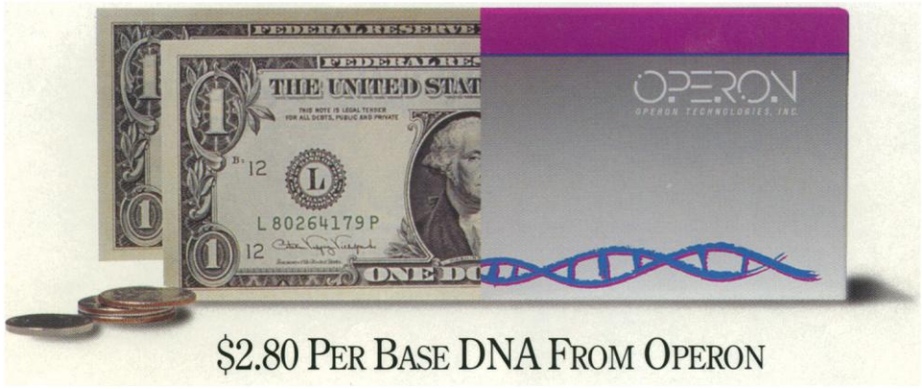

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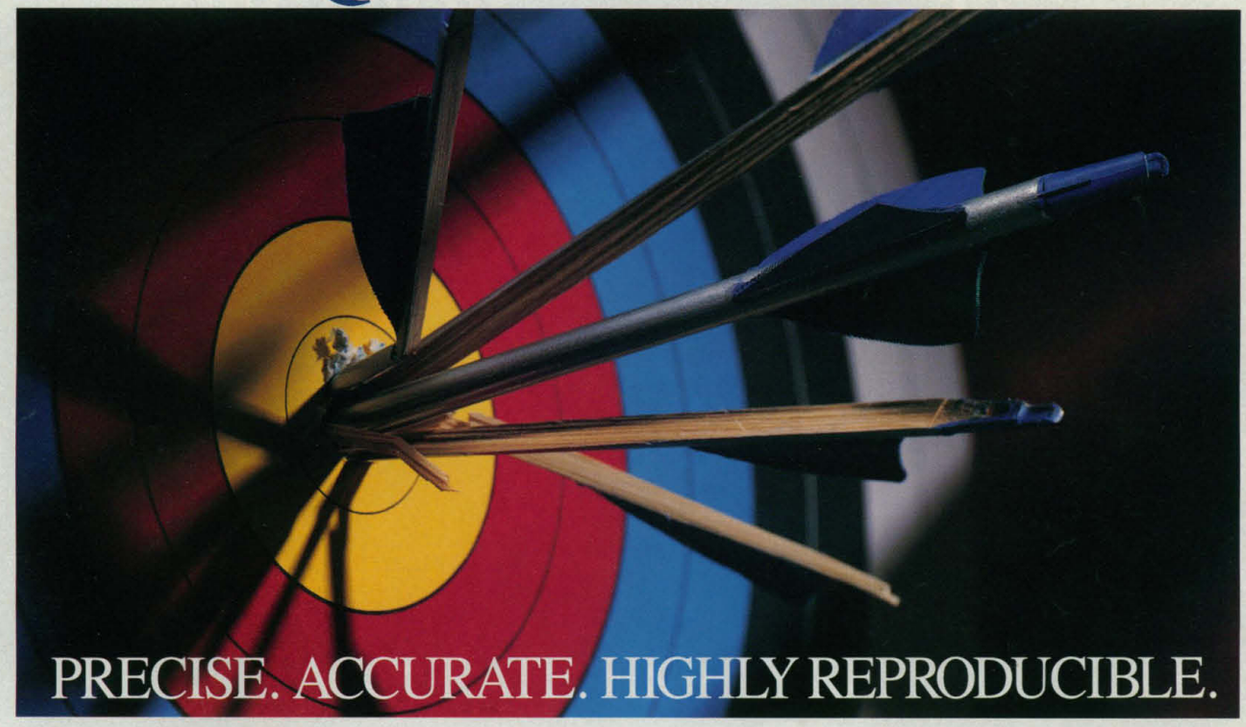

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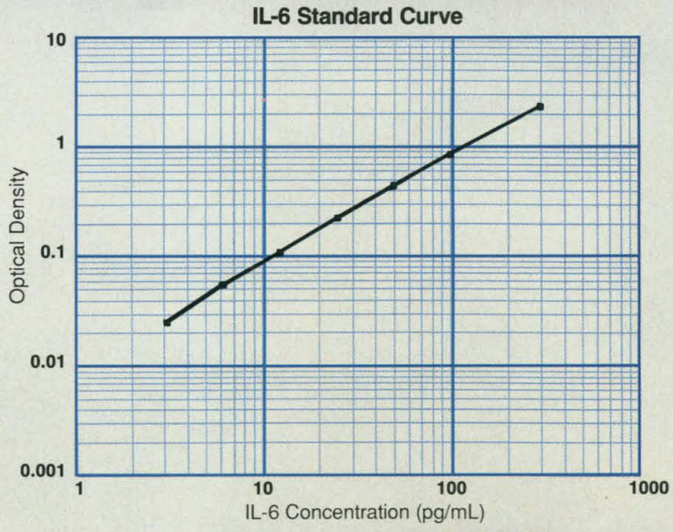

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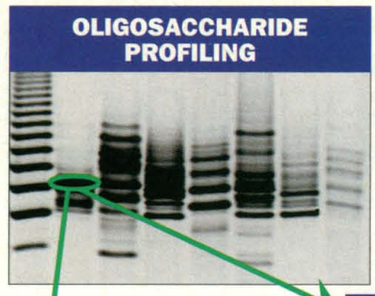
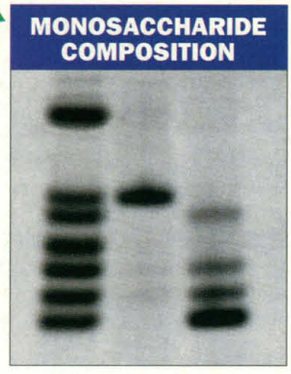
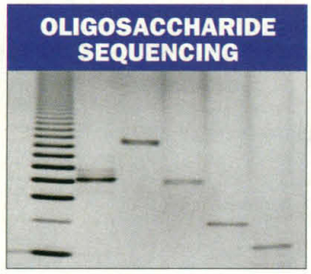


◀ **FACE gel profile of N-linked oligosaccharides released from a number of different glycoproteins**



▶ **FACE gel showing the monosaccharide compositional analysis of a tri-sialylated, triantennary oligosaccharide**



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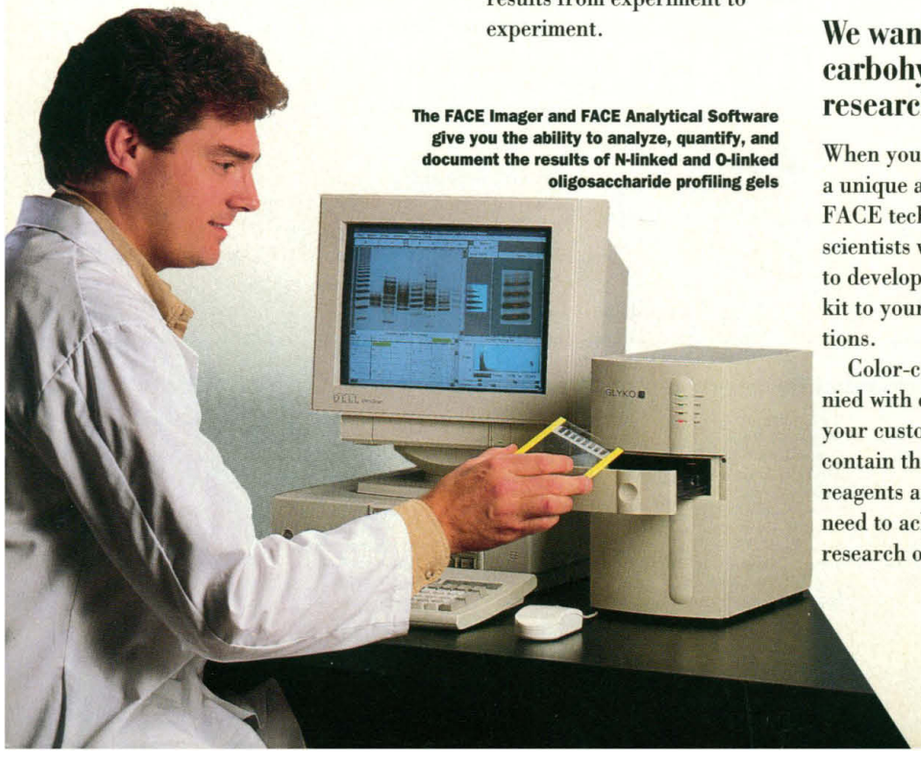

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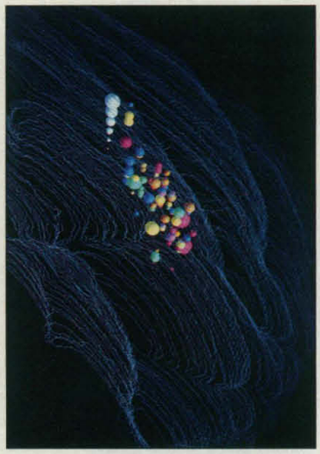

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Fingering spheres of activity in the brain

NEWS & COMMENT

RESEARCH NEWS

PERSPECTIVE

ARTICLE

RESEARCH ARTICLE

DEPARTMENTS

COVER

Structure of a molecular-based magnet that exhibits bulk magnetization at temperatures below 22.5 K. This material contains three kinds of spin carriers, namely Mn(II) and Cu(II) ions together with radical cations, and has two, nearly perpendicular graphite-like networks that interpenetrate like the rings of a necklace. See page 447 and the Perspective on page 431. [Image: L. O. Ouahab, H. O. Stumpf, Y. Journaux]

REPORTS

TECHNICAL COMMENTS

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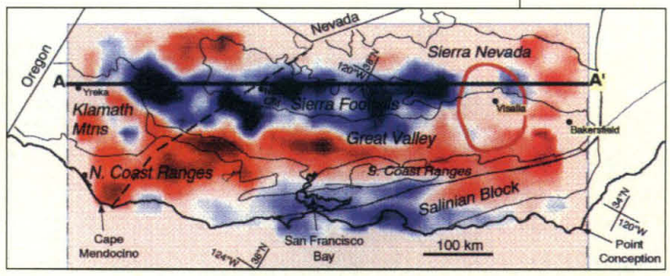
Facial expressions of monkeys



460
A view beneath the San Andreas fault

Indicates accompanying feature

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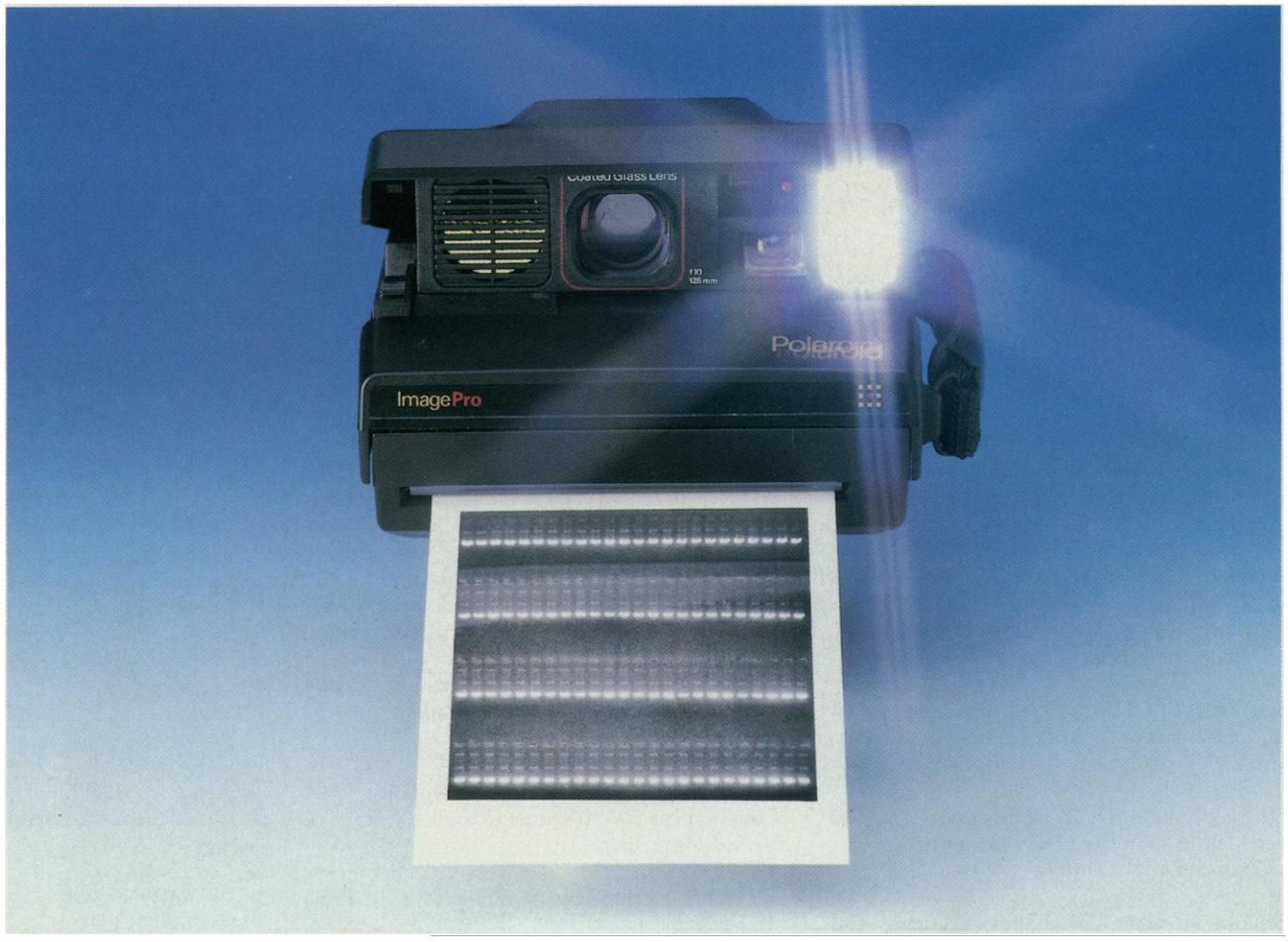

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Distinctive DNA binding

Five classes of zinc-containing DNA binding proteins have been identified; Omichinski *et al.* (p. 438) describe the multidimensional nuclear magnetic resonance structure of a class IV zinc finger, the DNA binding domain of the GATA-1 erythroid transcription factor from chicken. Contact with the DNA is mediated through a helix and a loop in the major groove and through the carboxyl-terminal tail in the minor groove. In the structure, the protein looks like a hand holding a DNA rope; the core of the protein would be the palm and the carboxyl tail the thumb.

Film close-up

One way of making thin films of organic molecules on solid substrates is to use Langmuir-Blodgett films; a well-ordered monolayer can be transferred by dipping the substrate through the film. Viswanathan *et al.* (p. 449) have used atomic force microscopy to show that films of fatty acids bound to metal ions can take on the orientation of the underlying substrate. Films of lead and magnesium fatty acid salts were oriented with respect to a mica substrate, although they exhibited different lattice symmetries. However, the corresponding calcium salt monolayers were disordered, and a film three layers thick adopted a bulk structure.

Teeth tales

Using the pattern of tooth breakage and wear in the many well-preserved fossils of the Rancho La Brea tar pits, Van Valkenburgh *et al.* (p. 456) show that the feeding habits of large carnivores during the Pleistocene, such as the saber-toothed cat, giant bears, and wolves, were significantly different from those of comparable extant species. The extinct species broke their teeth about three times as often as modern carnivores, perhaps, because food was scarce and carcasses were utilized more intensely.

Southernmost Cascadia earthquake

On 25 April 1992, a magnitude 7.1 earthquake struck northern California at Cape Mendocino, just north of the termination of the San Andreas fault along the subduction boundary between the Gorda and North American plates. Oppenheimer *et al.* (p. 433) review the records for this earthquake, the resulting damage and tsunami, and the implications for seismic hazards along this subduction zone and throughout the Pacific Northwest. The earthquake originated at a depth of 10 kilometers under land and propagated upward and seaward; the fault projects to within 5 kilometers of the Cascadia subduction zone.

Activated T cells and ADA

CD26, which is a T cell activation molecule, binds to a 43-kilodalton protein; Kameoka *et al.* (p. 466) purified this protein and used amino acid sequencing to show that it is adenosine deaminase (ADA). The formation of this complex was verified by immunoprecipitation studies. Linking ADA with a T cell surface molecule provides a clue in understanding the form of severe combined immunodeficieny caused by ADA deficiency in humans.

Dissecting HDL

A reduced risk of atherosclerotic coronary artery disease is associated with an increased concentration of high-density lipoprotein (HDL) particles in the blood plasma. The protective mechanism, however, remains unknown. Warden *et al.* (p. 469) overexpressed one of the components of mouse HDL, mouse apolipoprotein A-II, in transgenic mice, thus altering the composition of the HDL. These mice were more susceptible to atherosclerotic disease, even though they had more HDL than normal mice. Fatty streak lesions appeared in the transgenic mice whether they were fed a standard or a high fat diet, although the high fat diet resulted in a more severe effect for males. Thus, the composition of HDL particles may affect their ability to protect against atherosclerosis.

Managing *myc* and metastasis

The product of the *c-myc* gene functions in the regulation of differentiation, cell proliferation, and tumor formation. A surprise awaited Postel *et al.* (p. 478) when they cloned and characterized the gene encoding PuF, a DNA binding protein required for transcription of the *c-myc* gene in vitro. They found that the *PuF* gene is virtually identical to the human *nm23-H2* gene, which encodes a nucleoside diphosphate kinase that is a potential negative regulator of tumor metastasis. Marx (p. 428) discusses the implications in a news story.

Interleukin receptors

The cytokine interleukin-1 (IL-1) prolongs the survival of human polymorphonuclear cells in vitro. The action of IL-1 is antagonized by interleukin-4 (IL-4). In investigating how IL-4 produces this effect, Colotta *et al.* (p. 472) have found evidence for an unusual mechanism that provides tight control of the activity of IL-1. IL-1 binds to two different receptors called the IL-1 receptors type I and II (IL-1R I and IL-1R II). Colotta *et al.* have found that IL-1 acts to promote survival of polymorphonuclear cells by binding to IL-1R I. The other receptor, IL-1R II, appears to act as a decoy that binds IL-1 but does not produce the survival-promoting signal. IL-4 apparently inhibits the action of IL-1 by increasing the expression of IL-1R II and thus inhibiting binding of IL-1 to IL-1R I.

Neuronal N-type calcium channels

Voltage-sensitive calcium channels have been separated into types on the basis of their pharmacological and electrophysiological properties. The N-type are inhibited by a snail peptide, ω-conotoxin, and are responsible for the regulation of neurotransmitter release by calcium. Witcher *et al.* (p. 486) purified these channels from rabbit brain, and showed that the channels have a subunit composition similar to that of the L-type channel of skeletal muscle. Earlier molecular cloning and expression studies have established the existence in brain of proteins related to the skeletal muscle subunits. This study identifies which subunits associate in vivo to constitute the calcium channels of the synapse.

Sensitive touch

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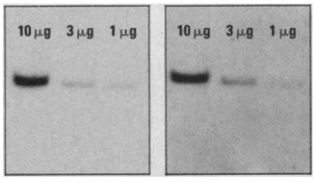

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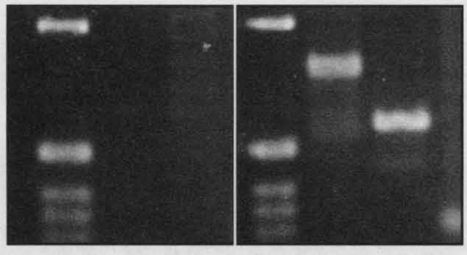

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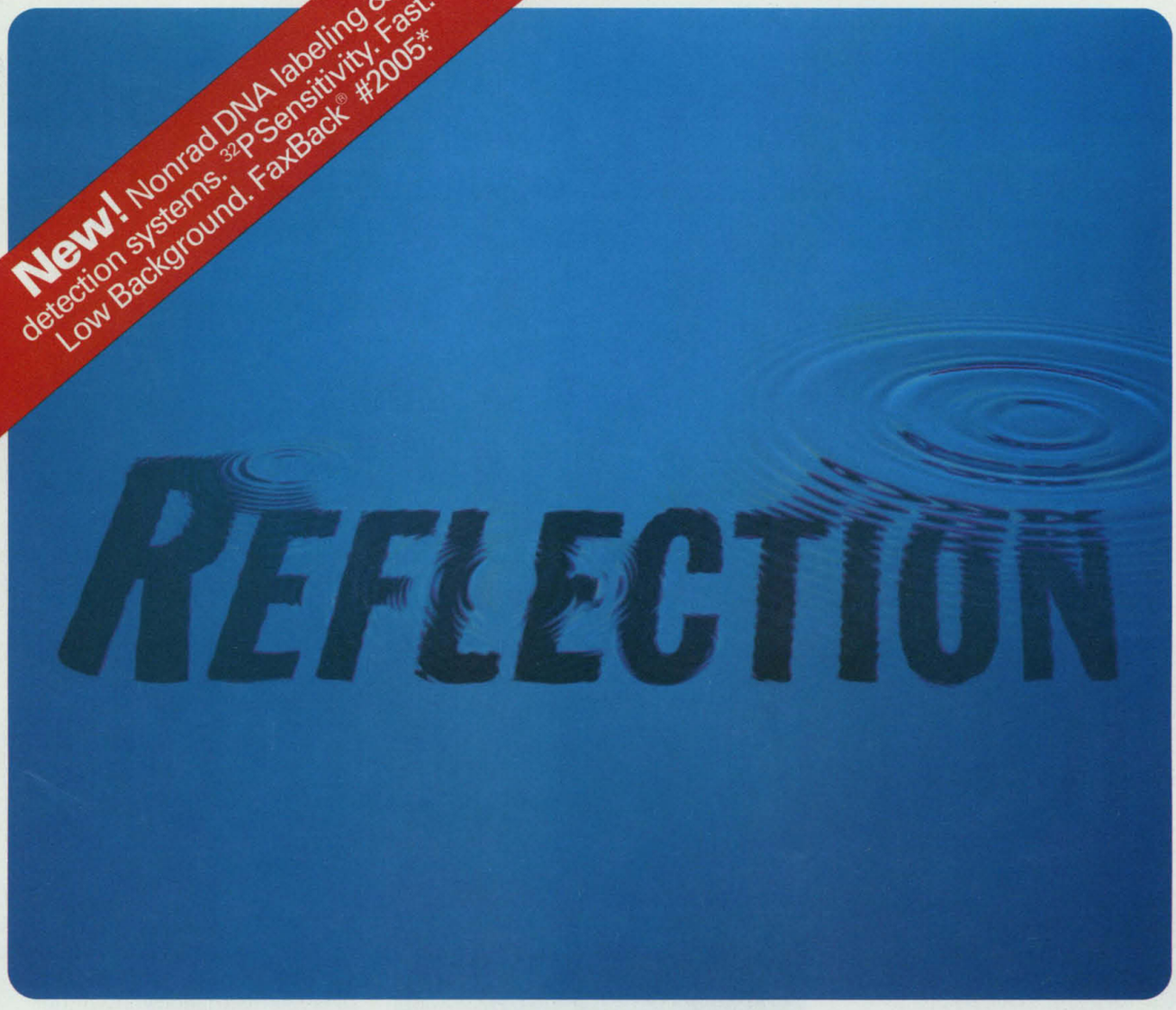

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