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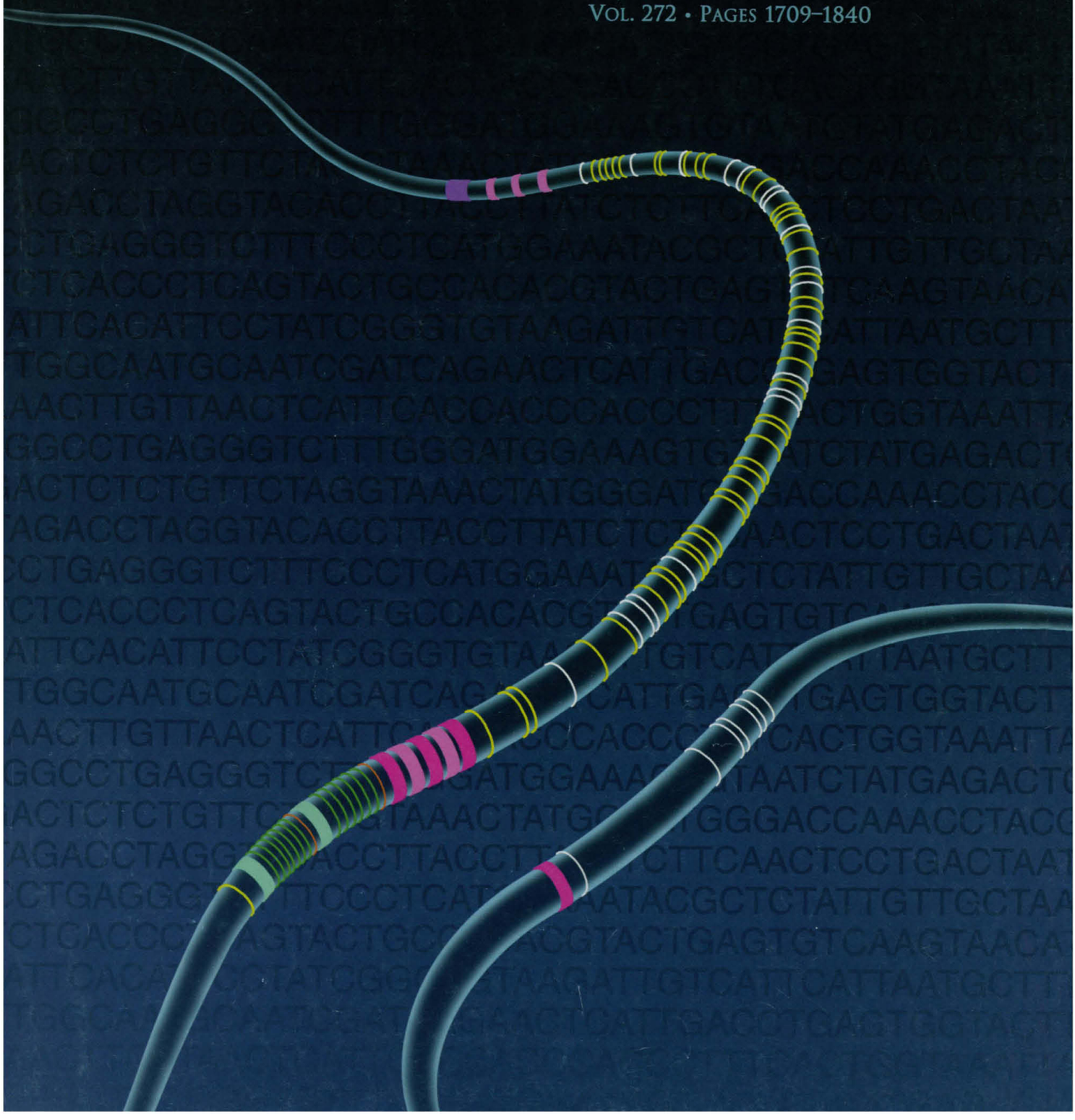

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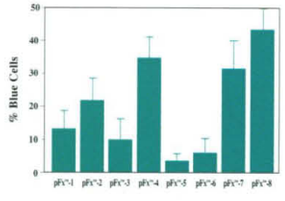

Figure 1: Percent blue cells produced by transfection of CHO cells with a lacZ control vector using PerFect Lipids™ (pFx™1 - pFx™8).

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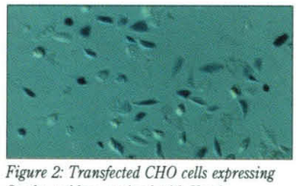

Figure 2: Transfected CHO cells expressing β-galactosidase, stained with X-gal.

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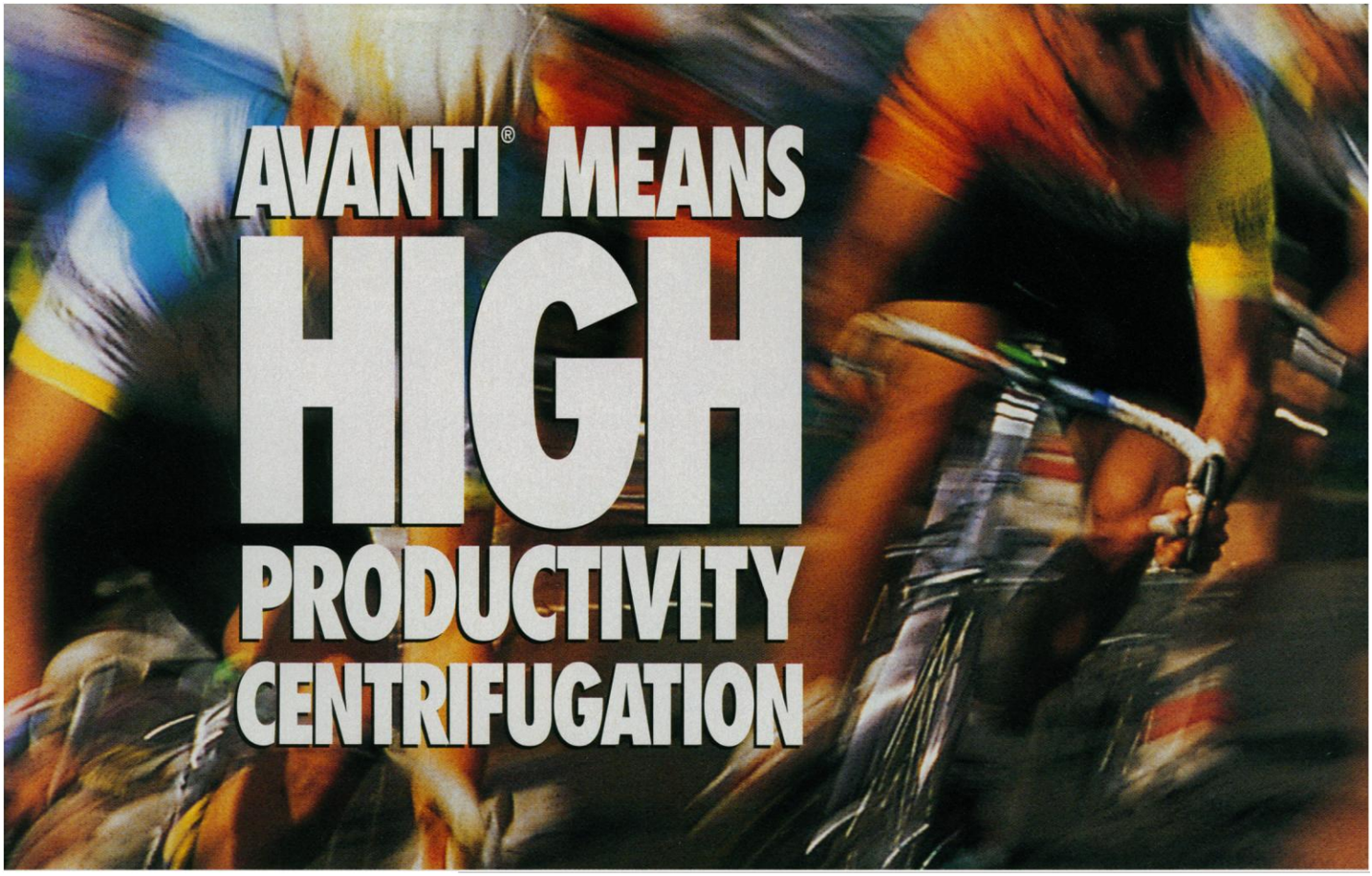
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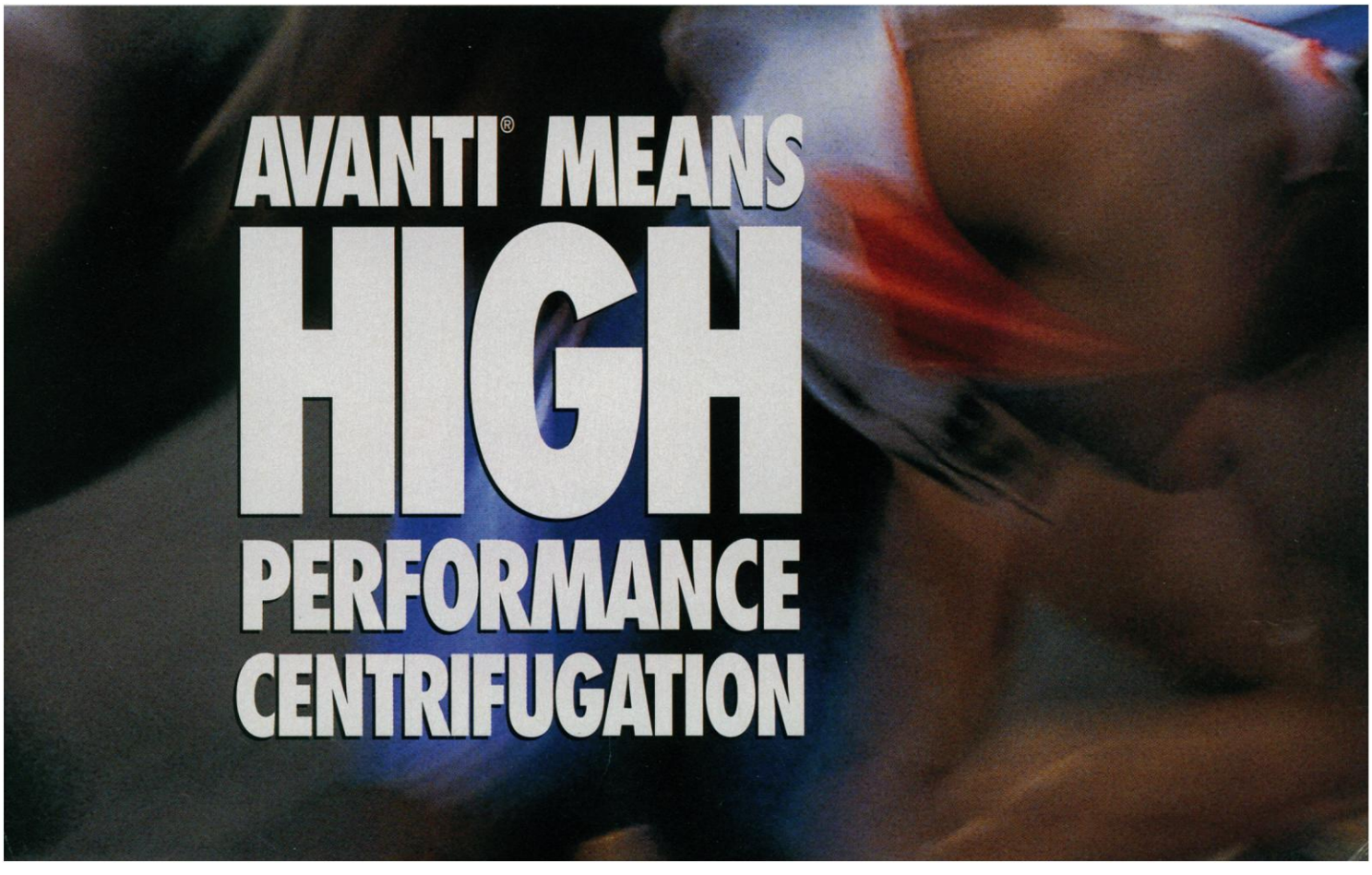
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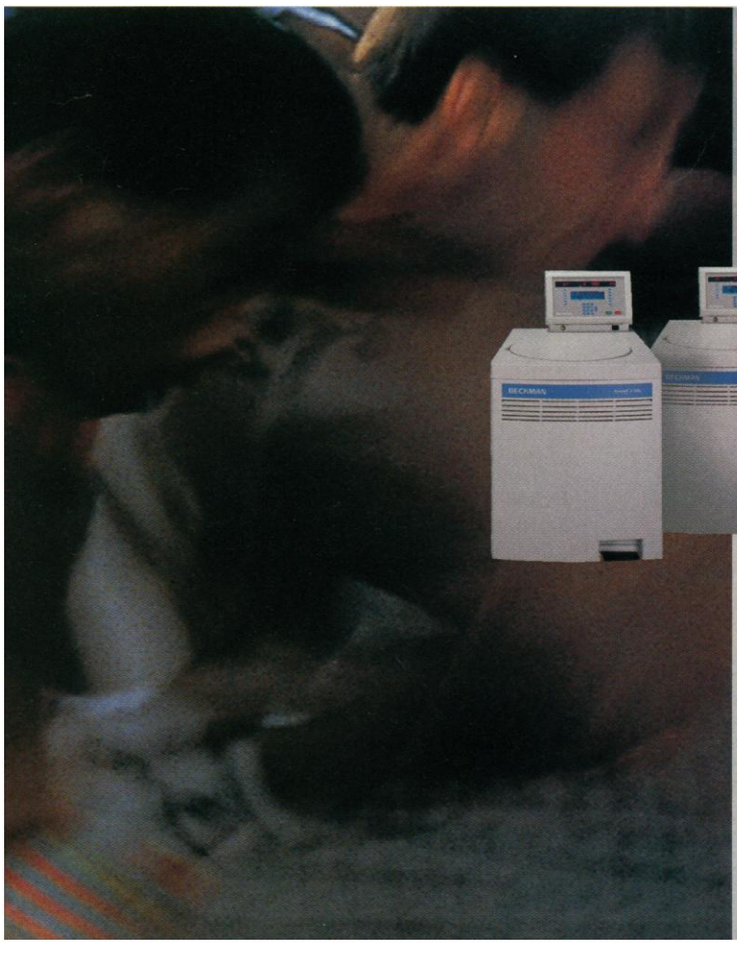

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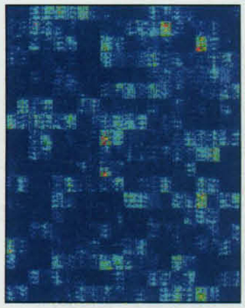

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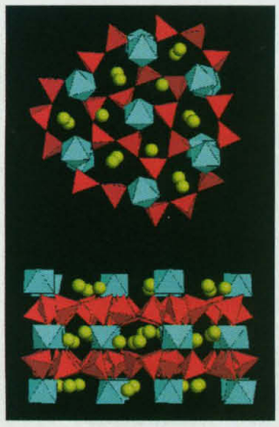

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COVER

Illustration of the human β T cell receptor locus on chromosome 7 (left) and chromosome 9 (right). The locus, comprising multiple genes, has been sequenced, and each coding region is represented by a colored stripe. Trypsinogen genes (pink) are interspersed between T cell receptor variable gene segments (yellow, functional genes; white, pseudogenes) and the two constant gene clusters (green and orange). See page 1755. [Illustration: Designed by R. Holmberg and L. Hood]

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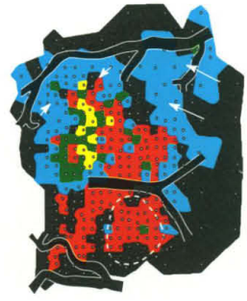

1754 & 1791

Recovery from stroke

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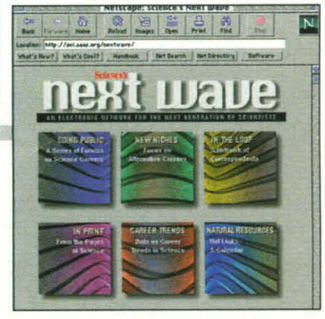

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Cooler Cretaceous

The Cretaceous has generally been thought to have had a warm climate. Stoll and Schrag (p. 1771), however, suggest that continental ice sheets were present and controlling fluctuations in sea level in the parts of the earliest Cretaceous, about 140 million years ago. Strontium concentrations in deep sea sediments vary in accord with inferred fluctuations of sea level from stratigraphy and agree in detail with oxygen isotope values. These results suggest that repeated rapid exposure and weathering of carbonate on the large continental shelves occurred as sea level changed.

■

Just a pinch

Polymers that contain stretches or blocks of two different monomers, one soluble and the other insoluble, in a given solvent can display a variety of morphologies in a solution depending on the relative block lengths. Zhang *et al.* (p. 1777) now show that such polymers can also change their morphology in response to very low ion concentrations. Addition of micromolar $CaCl_2$ or HCl or millimolar NaCl to a polystyrene-poly(acrylic acid) block copolymer (PS-*b*-PAA) in water could change the morphology, for example, from spheres to vesicles.

■

Live detectors

Improvements in separation techniques for biomolecules demand concurrent improvements in detectors. The use of single cells as detectors allows bioactive molecules to be rapidly identified for further analysis. Orwar *et al.* (p. 1779) extended this approach by using patch-clamp recordings from rat olfactory neurons to identify neurotransmitters separated by capillary electrophoresis.

■

Trading places in the atmosphere

The key area of exchange between the troposphere and the stratosphere is in the tropics, and one effect of this process is to control the input of chlorofluorocarbons and other pollutants to the stratosphere. Volk *et al.* (p. 1763) studied the distribution of a variety of tracers in this region using aircraft to quantify the exchange of tropical and mid-latitude air in the lower stratosphere at altitudes from 16 to 21 kilometers. Exchange of air is slower (on a time scale of about 13 months) than has been generally thought and is slower than the time for mixing in the mid-latitudes but comparable to the time for higher ascent of tropical air.

■

Tornado profile

Several detailed models of air flow in and around a tornado have been developed, but observations of the flow have been too coarse to provide rigorous tests. Wurman *et al.* (p. 1774) used a mobile pencil-beam Doppler radar system to examine a tornado up close and in detail. They see a clear eye in the tornado where downdrafts occasionally occurred, and a prominent debris shield surrounding the eye.

■

Sequencing the β T cell receptor locus

The organization underlying a human multigene family has been revealed by large-scale DNA sequencing. Rowen *et al.* (p. 1755; see cover) sequenced the 685-kilobase β T cell receptor locus, which contains 65 variable gene segments, two clusters of diversity, joining, and constant regions, and eight trypsinogen genes. In addition to providing information on polymorphisms and on how these genes are expressed and diversify, this analysis also reveals how multigene families may form and evolve. For example, a portion of this locus has duplicated and translocated from chromosome 7 to chromosome 9.

■

Soaking up some sun

Life depends on the harvest of energy from solar radiation by photosynthetic organisms. Dinoflagellates, major constituents of marine plankton, contain two types of pigments that absorb light, carotenoids, and chlorophyll. Hofmann *et al.* (p. 1788; see the news story by Simon Moffat, p. 1743) present the high-resolution structure of the peridinin-chlorophyll-protein (PCP), a soluble molecule that uses the carotenoid peridinin to collect blue-green photons for transfer, first to its own chlorophylls and subsequently to the chlorophylls of the light-harvesting complex. Two pairs of peridinins are clustered about each of the two chlorophylls in PCP, and PCP, like other proteins involved in photosynthesis, forms a trimer.

■

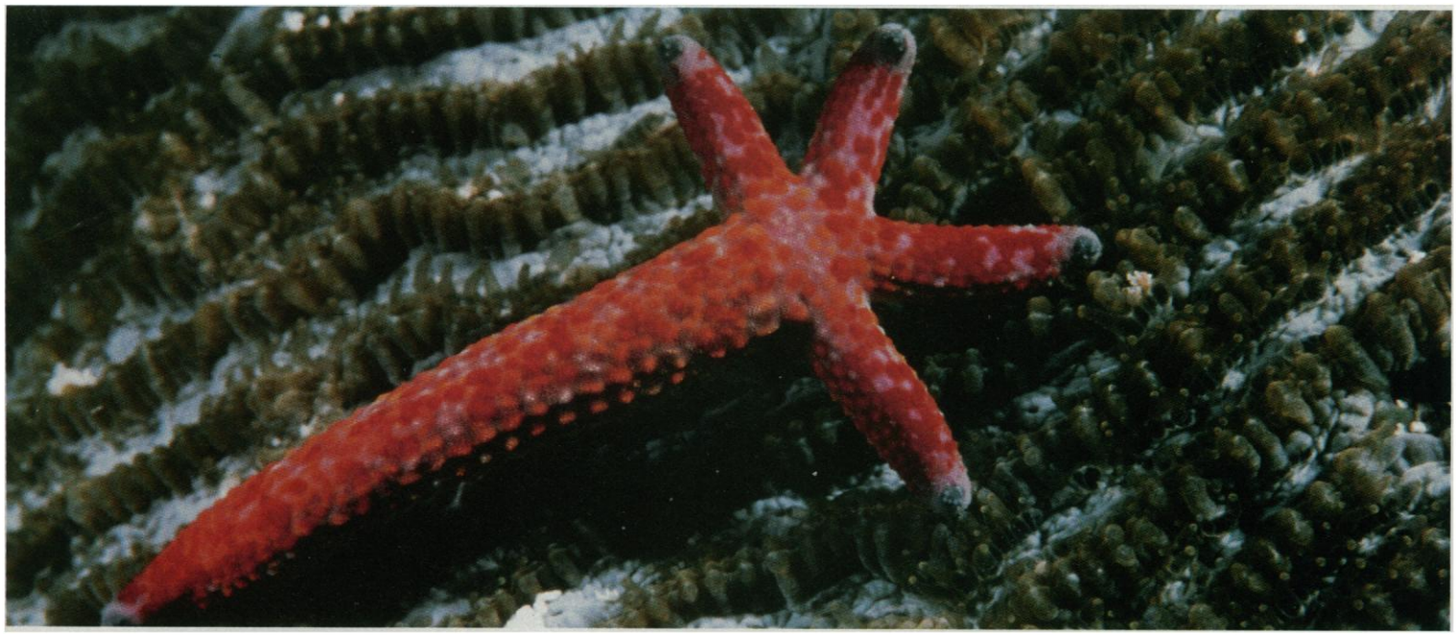
Reorganized manually

The existence and extent of functional neuronal plasticity is especially important in cases of stroke. In humans, recovery of motor abilities after a stroke is gradual and usually incomplete. Nudo *et al.* (p. 1791; see the Perspective by Freund, p. 1754) examined the effects of rehabilitative training on the recovery of finger dexterity in monkeys experimentally subjected to focal infarcts in the hand area of the motor cortex. Training (as opposed to no training) in tasks requiring manual skill promotes reorganization of the undamaged part of the motor cortex as well as recovery of skilled hand use.

■

Waiting for the signal

When activated, the epidermal growth factor (EGF) becomes phosphorylated on tyrosine residues. Proteins that participate in signal transduction within a cell then bind to the receptor at these phosphorylation sites. Galcheva-Gargova *et al.* (p. 1797) now describe a protein that interacts in an opposite way with the EGF receptor. The protein, called ZPR1, binds to the inactive receptor and is released after binding of EGF. ZPR1 then becomes localized in the nucleus in cells treated with EGF. These properties, and the fact that it contains two zinc fingers found in other proteins that function in receptor signaling, indicate that ZPR1 may participate in transmission of signals from the EGF receptor at the cell surface to the nucleus.



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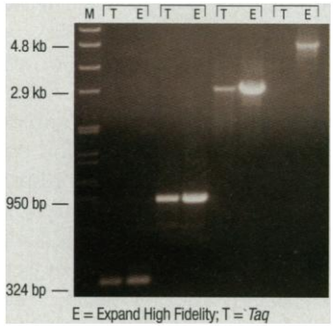

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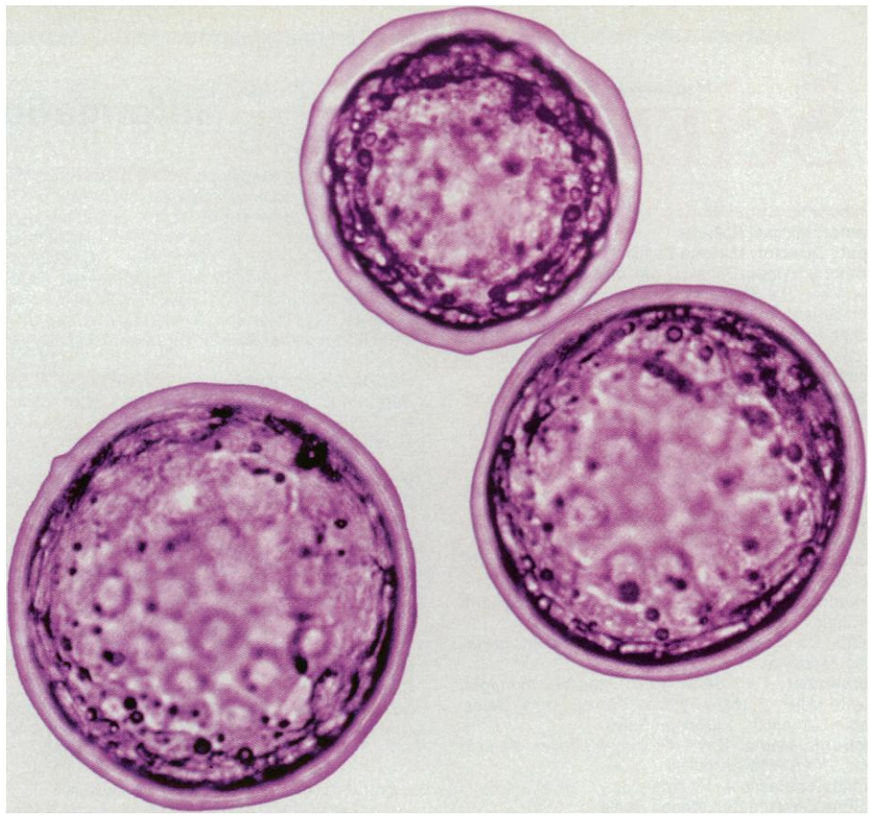

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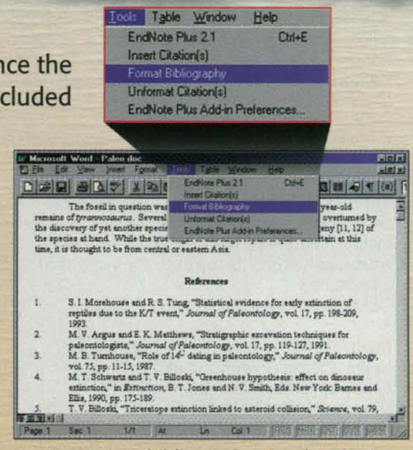

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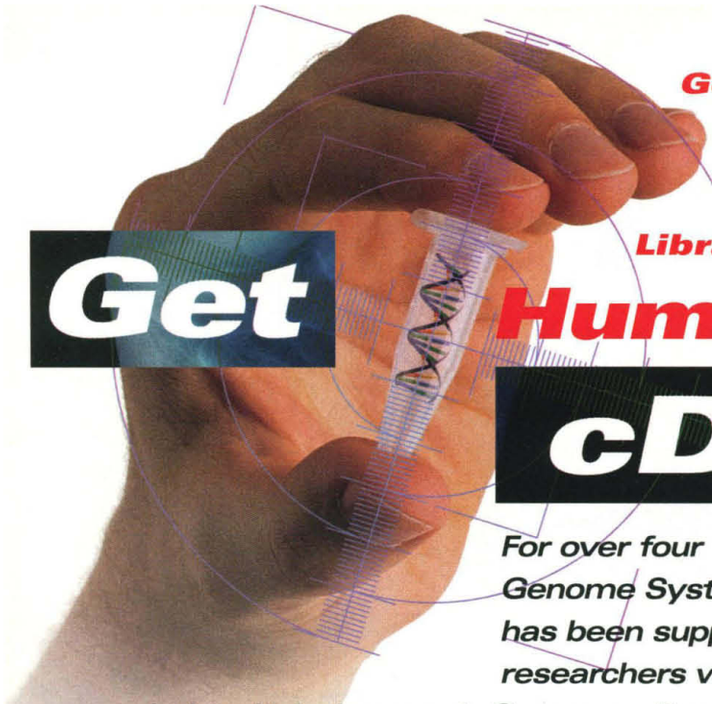

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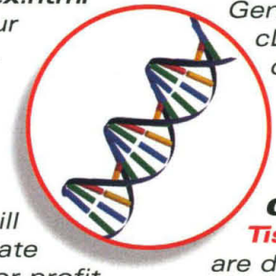

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1. *"The I.M.A.G.E. Consortium: An Integrated Molecular Analysis of Genomes and their Expression", Lennon, G.G., Auffray, C., Polymeropoulos, M., and Soares, M. B. [1995] Genomics.*

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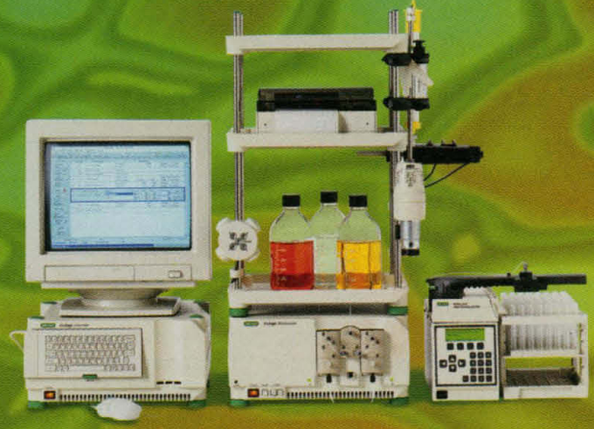

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