

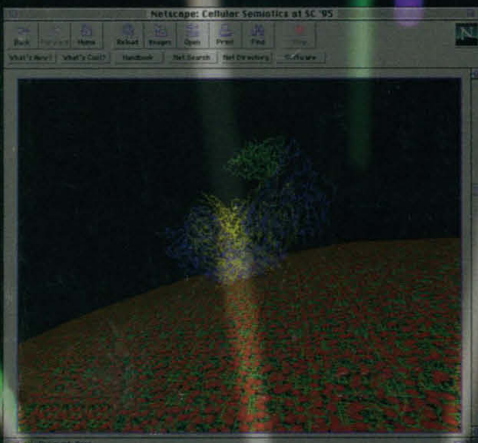


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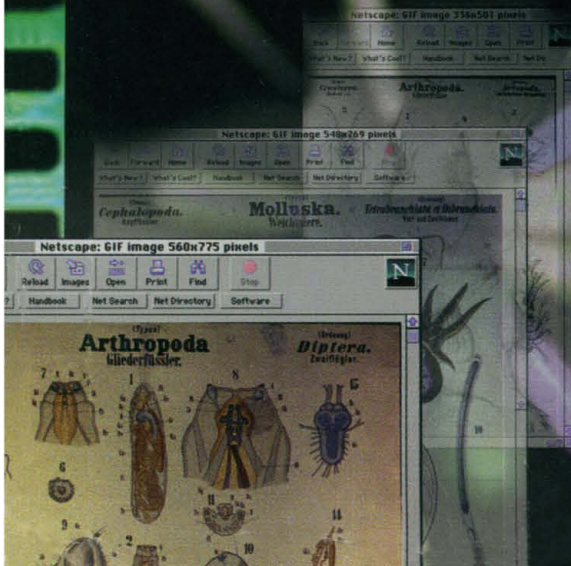
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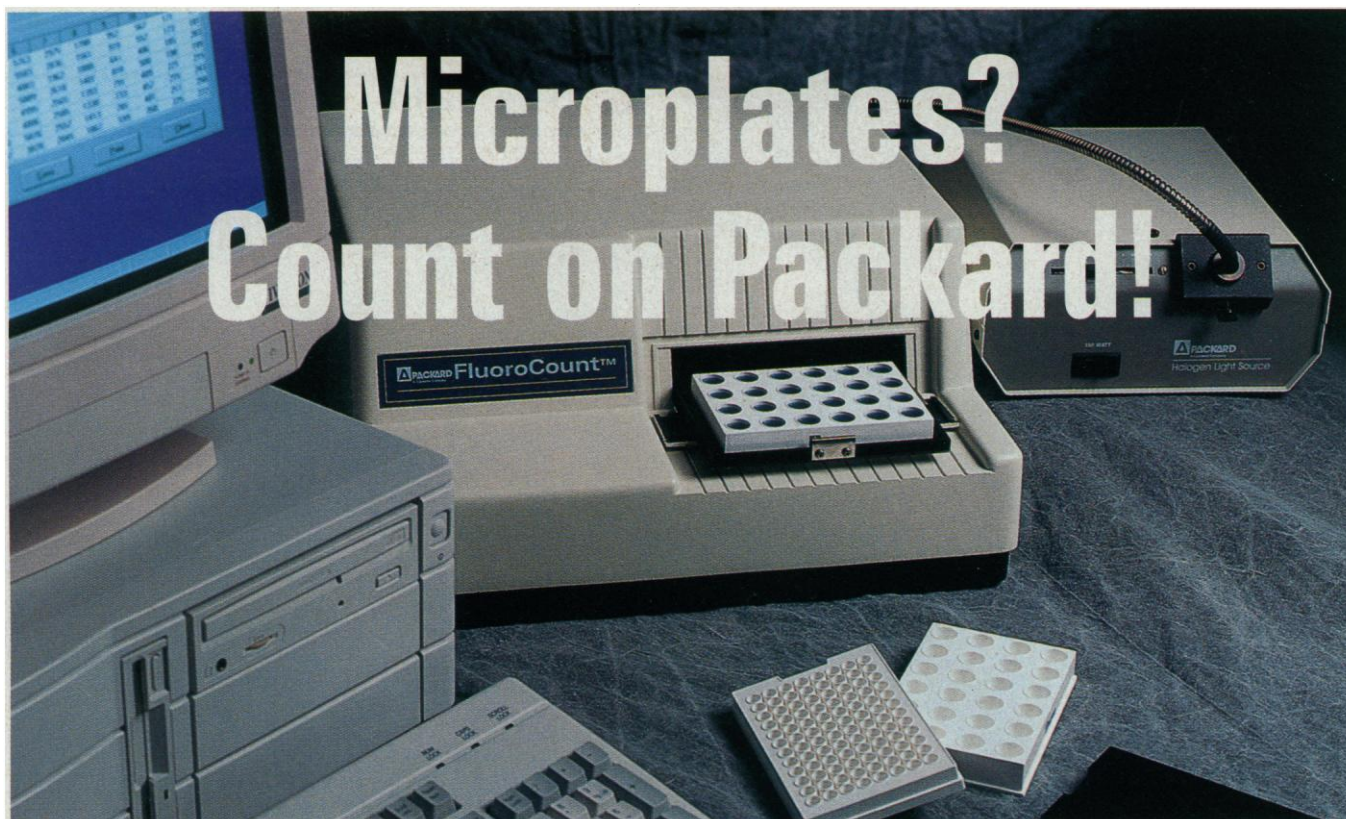
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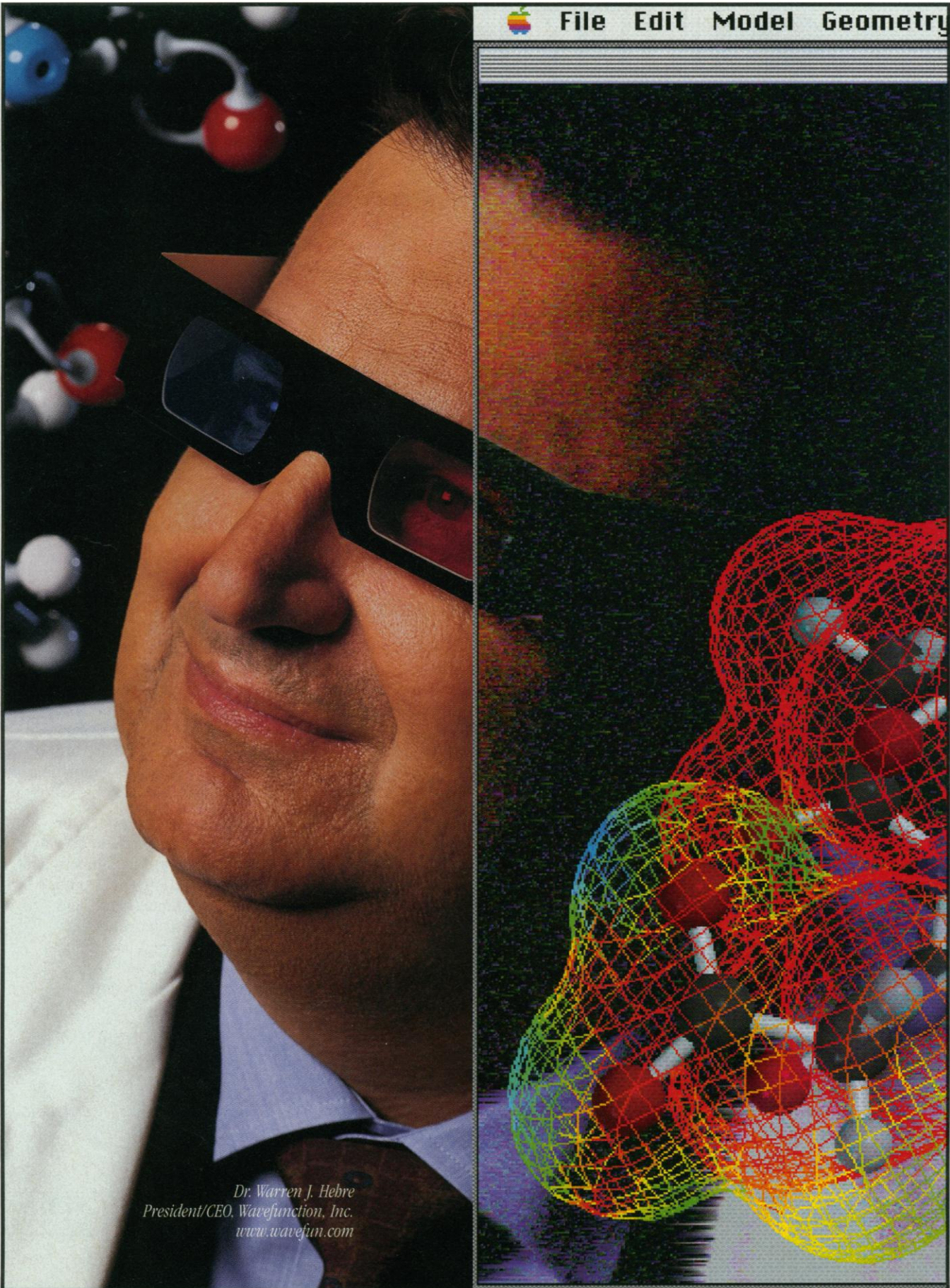
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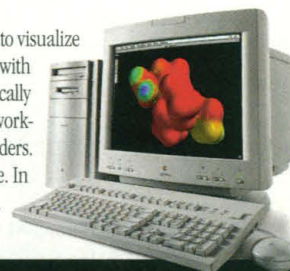
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via the cover caption located at the bottom of the Table of Contents page at *Science* On-Line (<http://www.sciencemag.org/>). Our special section begins on page 585. [Illustration: T. K. Drew]



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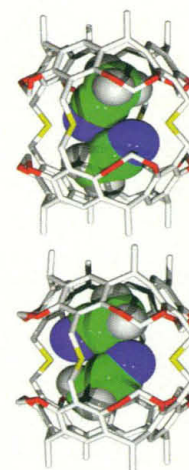
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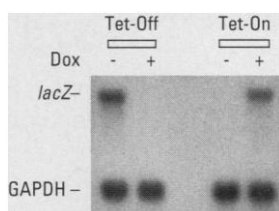


Figure 1. Inducible on/off control of gene expression. HeLa Tet-Off and Tet-On cell lines stably expressing a tet-regulated pTRE-derived plasmid with the *E. coli lacZ* gene were cultured in the absence or presence of 1 µg/ml Dox. For Northern analysis, 10 µg of total RNA per lane was hybridized simultaneously with *lacZ* and GAPDH probes.

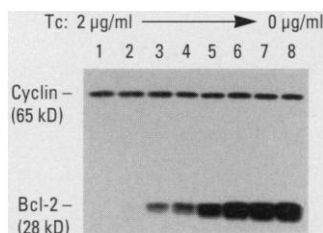


Figure 2. Inducible, high-level expression of the Bcl-2 apoptosis gene. HeLa S3 Tet-Off Cells stably transformed with tet-regulated pTRE-Bcl-2 were grown in 2.0, 0.006, 0.004, 0.002, 0.001, 0.0005, 0.00025, and 0 µg/ml of Tc (Lanes 1–8, respectively). A Western blot containing 100 µg of total protein from each condition was simultaneously probed with human Bcl-2-specific and human cyclin-B1-specific mouse monoclonal antibodies. Tc gave 100-fold induction of Bcl-2.

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Bonding in clusters

Alkali clusters are model systems for studying the effect of different types of bonding on unimolecular reactions, in particular those involving weakly bound complexes. In the absence of spin polarization, chemical bonds are formed; in clusters with aligned spins, van der Waals bonding dominates. However, the latter are high-energy structures that are difficult to stabilize and characterize. Higgins *et al.* (p. 629) have used ultracold helium droplets to stabilize the Na₃ trimer in the lowest quartet (spin-aligned) state. They could follow its dissociation into an atom and a covalently bound dimer. Such studies provide insight into three-body intermolecular forces.

Digitizing x-rays

Radiography is a major diagnostic tool in health care but is still in analog (film) format. One form of digital radiography currently under development, x-ray-sensitive photoconductors, has been materials limited. Wang and Herron (p. 632) have now prepared inorganic-organic nanocomposites that combine the advantages of the inorganic component (high x-ray absorption efficiency) and of the organic component (good dielectric properties and ease of thin-film preparation).

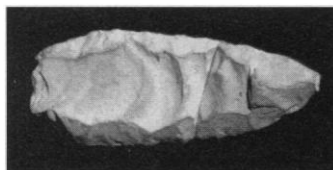
Siberian points

A distinctive Paleoindian tradition that arose in the late Pleistocene in North America (Clovis) is in part characterized by fluted lanceolate points. The origin of the fluting has been uncertain but it has generally been thought to have arisen in

Regulating bone development

The regulation of the replacement of cartilage by bone is crucial for bone formation because it determines the shape and length of skeletal elements. The role of Indian hedgehog (Ihh), a member of the hedgehog family of secreted signaling molecules, in bone formation is the focus of two papers (see the news story by Roush, p. 579). Vortkamp *et al.* (p. 613) found that Ihh is expressed in cartilage cells (chondrocytes) and regulates the rate of their differentiation in hypertrophic cartilage. One of the targets of Ihh signaling is another signal, parathyroid hormone-related protein (PTHrP). In response to Ihh, PTHrP is expressed in the perichondrium, the membrane around the cartilage. Lanske *et al.* (p. 663) knocked out the PTH/PTHrP receptor and show that its expression in the chondrocytes is necessary to mediate the effects of Ihh and PTHrP on chondrocyte differentiation.

North America; similar technology had not been recognized in Siberia. King and Slobodin (p. 634) now describe a single fluted point and many other



lanceolate bifacial points from the Uptar site in northeastern Siberia. The artifacts have a minimum age of 8300 radiocarbon years before the present.

An unquiet sleep

Improvements in three-component broadband seismometers have extended the frequency range of detectable ground motions. Kaneshima *et al.* (p. 642) set up an array of such seismometers at Aso volcano in Japan to record the unusually long-period tremors (about 15 seconds) that occurred during a quiescent cycle of this active volcano. Long-period tremors may be related to interactions between a shallow, fractured hydrothermal system and the underlying magma reservoir.

LTD and learning

Long-term potentiation and long-term depression (LTD) of neuronal synaptic strength in the brain may underlie learning and memory. A new type of LTD has now been described in the mossy fiber-CA3 region of the hippocampus. Kobayashi *et al.* (p. 648) show that LTD is induced presynaptically in this region by activation of metabotropic glutamate receptors (mGluRs). Yokoi *et al.* (p. 645) confirmed this in mice that do not express subtype 2 mGluRs, which are normally expressed at the mossy fiber-CA3 presynapse. Mossy fiber LTD was abolished (although the mice could still perform spatial learning tasks normally), suggesting that this form of LTD does not underlie spatial learning.

Prion phenotypes in yeast

Mammalian prion diseases are caused by the transmission of an infectious protein. In yeast, certain phenotypic traits have been found that also do not require nucleic acids for transmission. Patino *et al.* (p. 622; see the news story by Vogel, p. 580)

have now confirmed that one of these traits can really be considered to act as a yeast prion—the phenotype is explained by a protein conformation that, once induced, can be transmitted to other newly synthesized proteins.

Methylation and plant development

Methylated bases are scattered throughout the genomes of plants and animals, but their function has not been clear. Ronemus *et al.* (p. 654; see the news story by Pennisi, p. 574) used antisense to a methyltransferase gene to produce *Arabidopsis* plants with a reduced amount of genomic cytosine methylation. As observed in another mutant (*ddm*) with reduced methylation, demethylation was detected in multicopy genes. In contrast to the *ddm* phenotype, plants carrying the methyltransferase antisense gene also showed a loss of methylation in four of the five single-copy genes analyzed. The effects on plant development were striking, perhaps reflecting the altered function of the demethylated single-copy genes.

Motors in neurons

The growth cones of neurons move by the extension of filopodia that extend out from the cells in a process that involves the actin cytoskeleton. In order to produce movement, actin filaments need to interact with a motor protein. Wang *et al.* (p. 660) have shown that a particular non-muscle myosin, myosin-V, acts as the motor protein for filopodial extension.

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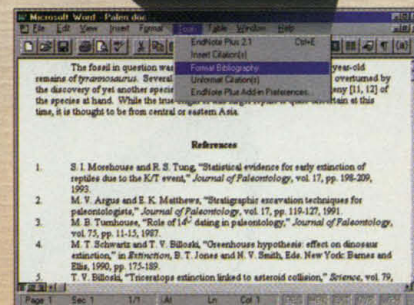
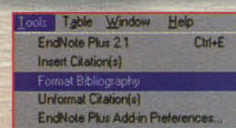
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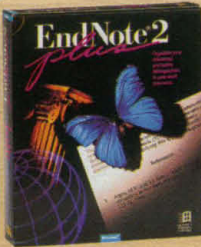
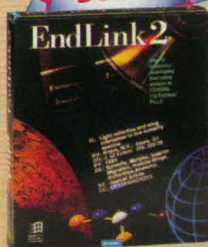
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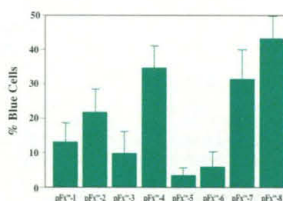


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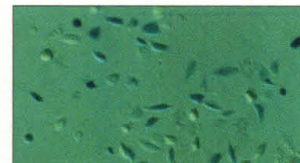


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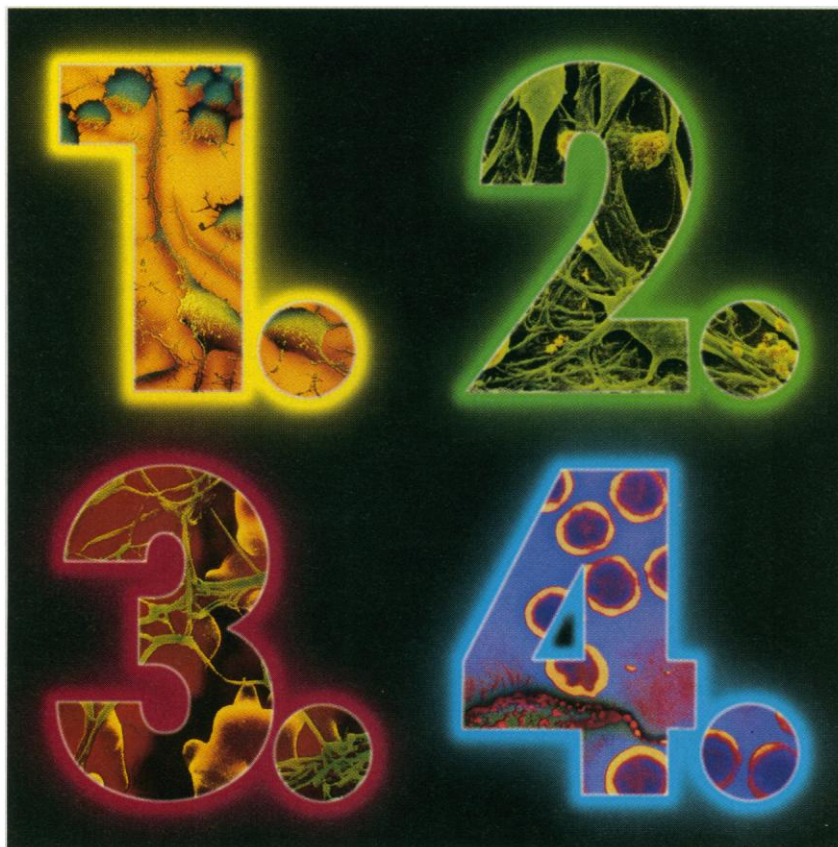
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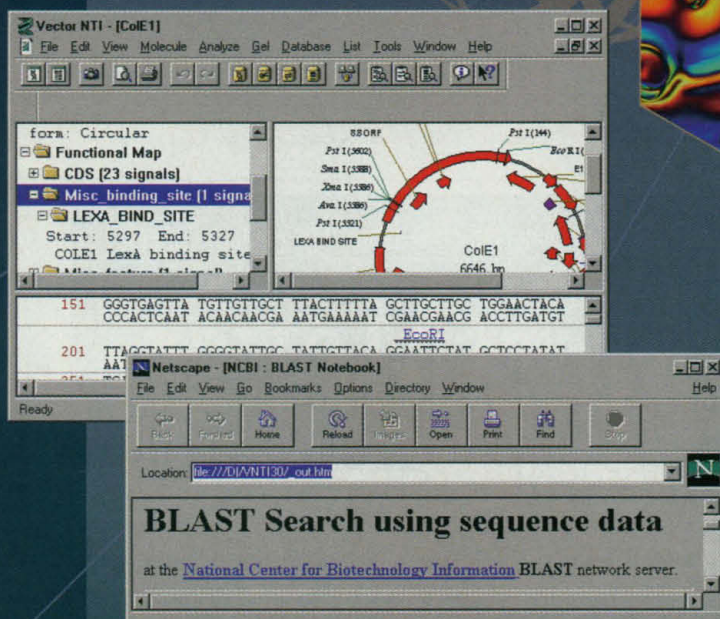
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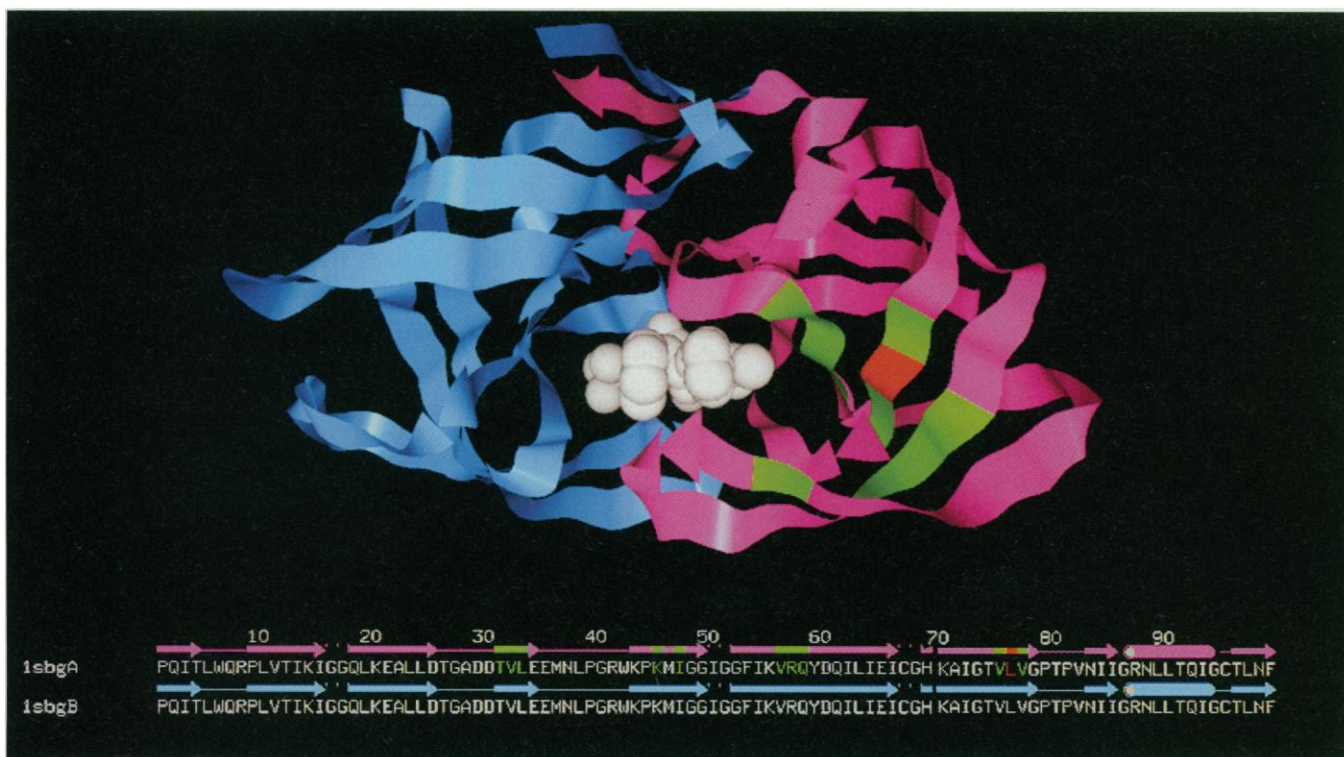
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