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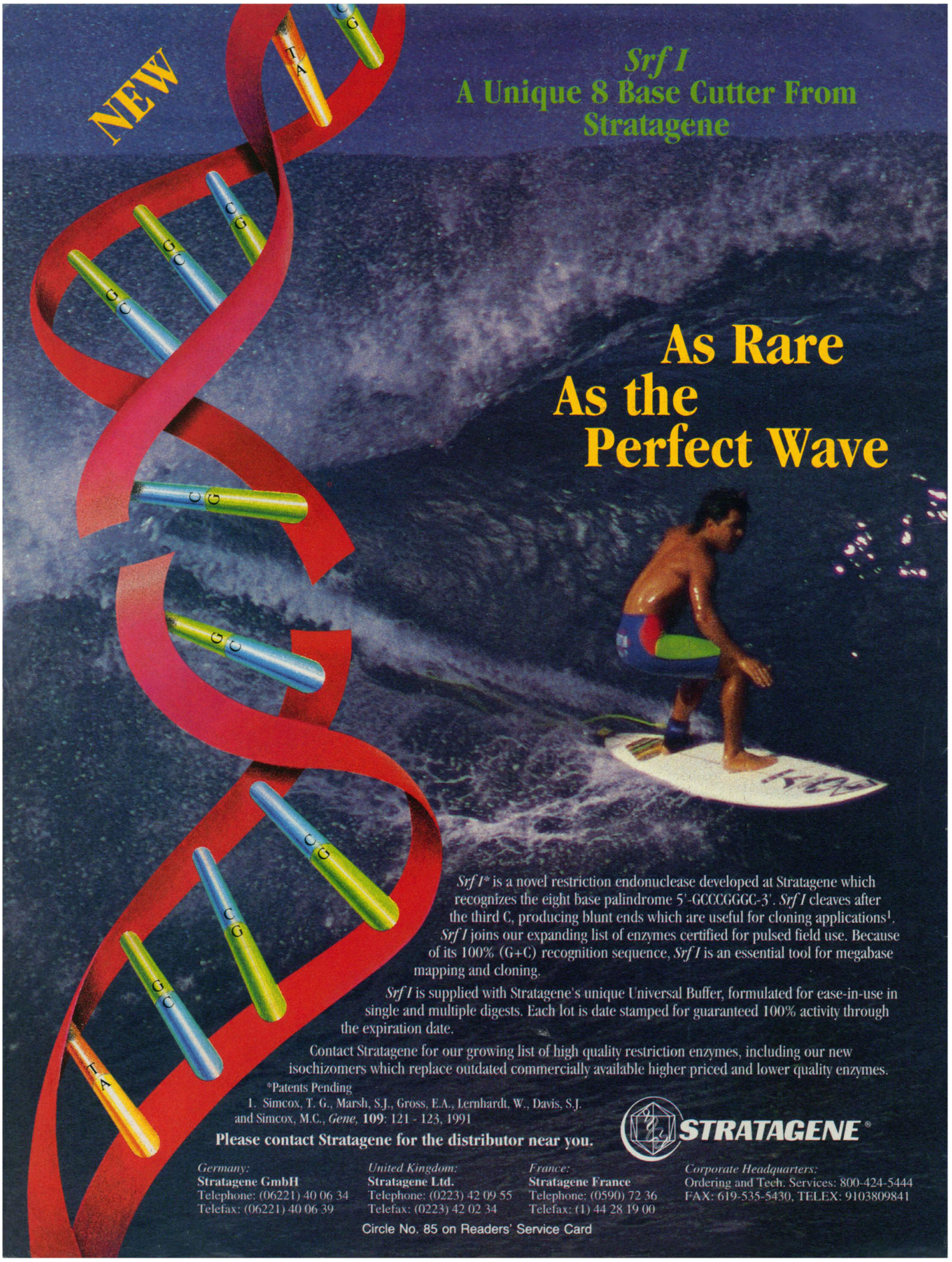

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1. Simcox, T. G., Marsh, S.J., Gross, E.A., Lernhardt, W., Davis, S.J. and Simcox, M.C., *Gene,* **109**: 121 - 123, 1991

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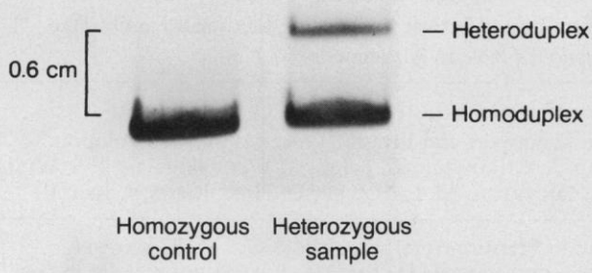
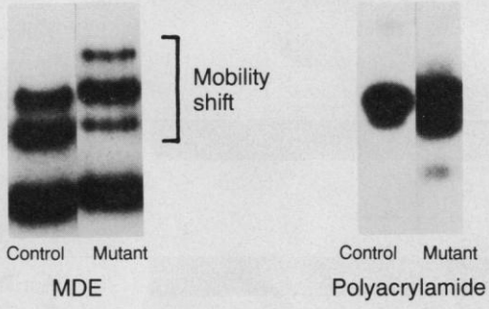


A point mutation detected as an additional band after electrophoresis of an 899 base pair fragment in MDE gel.

SSCP METHOD



Autoradiogram comparism of MDE and polyacrylamide gels showing a point mutation in exon 6 of the p53 gene. A mobility shift was detected in the MDE gel but not in the polyacrylamide gel.

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■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

COVER Granophyre from the roof zone of the Muskox intrusion, Northwest Territories, Canada, with a skeletal quartz crystal (violet, ~0.17 millimeter long) surrounded by optically continuous vermicular quartz intergrown with alkali feldspar (blue). The intergrowths reflect the final crystallization of a magma rich in silica and alkalis that coexisted with an underlying silica-poor magma. See page 708. [Photograph by Brian W. Stewart, California Institute of Technology, with cross-polarized light and a 575-nanometer retardation plate]

This Week in SCIENCE

Glassy antiferromagnet

Amorphous Fe_2SiO_4 exhibits antiferromagnetic behavior similar to that of its crystalline form, even though theory would predict that its transition temperature for entering into the antiferromagnetic ordered state (the Néel temperature) should be lower for the glassy form. Disorder should "frustrate" the delicate geometry of spins imposed by a crystal lattice. Kruger *et al.* (p. 703) used high pressure to convert crystalline Fe_2SiO_4 into an amorphous form.

100,000-year cycles

Cycles of 100,000 years that occur in the records of glacial ice volume during the Pleistocene have been attributed to nonlinear feedbacks between climate and glaciation, but many pre-Pleistocene climate records, such as tropical lakes levels, also show such cycles even when global glaciation was probably absent. In a modeling study, Crowley *et al.* (p. 705) show that a simple linear response between variations in solar radiation and climate may be operating. In equatorial regions, the twice yearly passage of the sun overhead interacts with the precession cycle to produce a temperature maximum, and possibly monsoon activity, every 100,000 years.

Mafic Muskox

In layered magma chambers, chemical diffusion can be extremely slow between the heavier mafic magmas from the mantle and the silica-rich magma formed from the melting crust, but isotope diffusion can be sufficiently rapid to reveal signatures of the dynamics between these melts. Stewart and DePaolo (p. 708; cover) studied samples from the Muskox mafic intrusion. Isotopic records for Nd and Sr were used to constrain models of the physical processes in the magma chamber and to show that the Muskox intrusion crystallized in about 100,000 years.

Computer as chemist

A computer algorithm, based on graph theory, successfully searched for new organic chemical reactions; two novel elimination reactions were found and experimentally verified. Herges and Hoock (p. 711) used the program to do an exhaustive search of seven-center, eight-electron pericyclic reactions. Semiempirical methods were used to explore the two new reaction pathways for different heteroatoms. One of these reactions, in which carbon disulfide is eliminated, can be used to generate synthetically important intermediates.

NMR diffraction

Nuclear magnetic resonance (NMR) has been used in a diffraction mode to analyze small-scale sample heterogeneity, such as porosity and granularity. Barrall *et al.* (p. 714) have experimentally developed an approach, originally proposed by Mansfield in the 1970s, that yields a statistical characterization of length scales in a material, such as average distances between pores. This method can reduce by several orders of magnitude the amount of data that needs to be obtained compared to other approaches.

Five DNA prints

In court cases, the probability that an individual's "DNA fingerprint" is calculated by the multiplication rule. For this calculation to be valid, the DNA sequences (loci) analyzed must occur independently; this independence, especially among different ethnic groups, has been questioned. Risch and Devlin (p. 717) analyzed DNA print matching in two large databases (FBI and Lifecodes) and found no evidence suggesting linkage disequilibrium (nonindependence across loci). Even the most common five-locus genotype occurred no more often than about 1 in 10^6. Thus any individual five-locus "print" is extremely rare.

Insulin and NO

L-Arginine causes release of insulin from B cells of the pancreas. Schmidt *et al.* (p. 721) report that the B cells contain a nitrogen oxide (NO) synthase that converts L-arginine into NO. The NO produced causes accumulation of guanosine 3',5'-monophosphate and release of insulin. Abnormalities in synthesis of L-arginine–derived NO might therefore be a cause of diabetes mellitus.

Integrase reversal

Viral integrases not only mediate the cleavage and ligation reactions that insert viral DNA into the host genome, but their activity can be reversed, demonstrating that such proteins are indeed enzymes. Chow *et al.* (p. 723) reversed the activity of human immunodeficiency virus (HIV)–1 with a Y-shaped oligonucleotide substrate that they constructed so that it mimics the recombination intermediate. HIV integrase not only cleaved this oligomer but also several others that deviated significantly from this structure. DNA cleavage of partially single-stranded Y-oligomers, or "DNA splicing," was also mediated by HIV integrase.

Amyloid processing

Different processing pathways of amyloid β precursor (βAPP) can yield either amyloid β protein (AβP), which is deposited as plaques in Alzheimer's disease, as well as nonamyloidogenic proteins. Estus *et al.* (p. 726) show that the two largest carboxyl-terminal derivatives of βAPP in the human brain have the entire AβP sequence at or near their amino terminal. Golde *et al.* (p. 728) find that in the secretory pathway βAPP is cleaved at a single site in the AβP region to yield a secreted protein and a nonamyloidogenic fragment, whereas in the endosomal-lysosomal pathway potentially amyloidogenic carboxyl fragments are produced [see news story by Marx (p. 688) on amyloid processing].

EDITED BY PHILLIP D. SZUROMI

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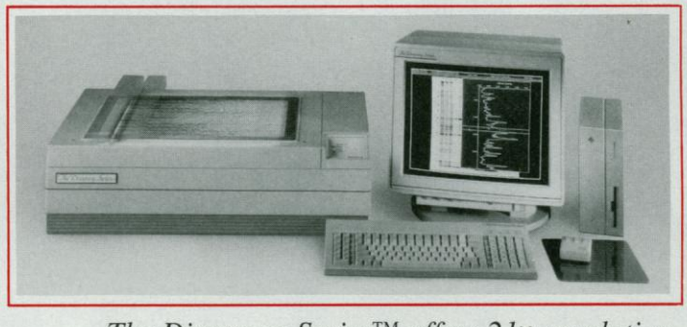

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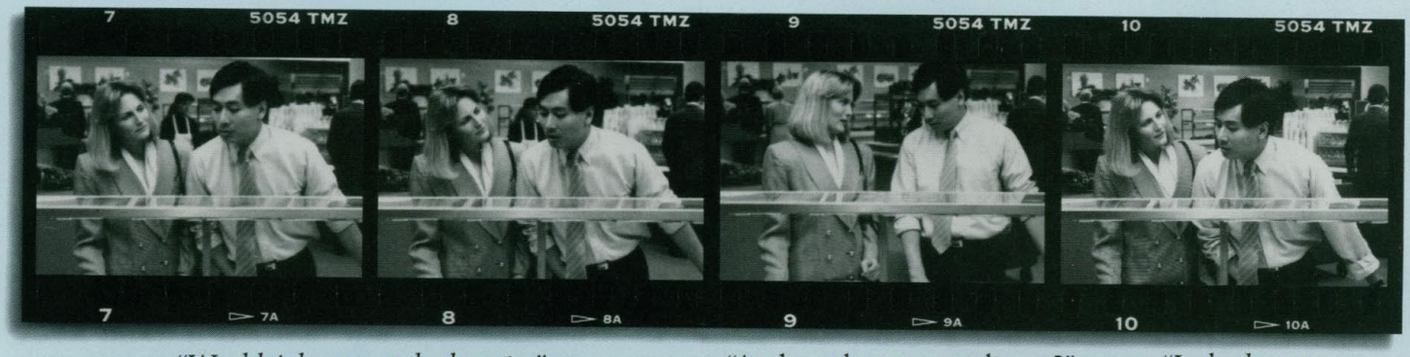

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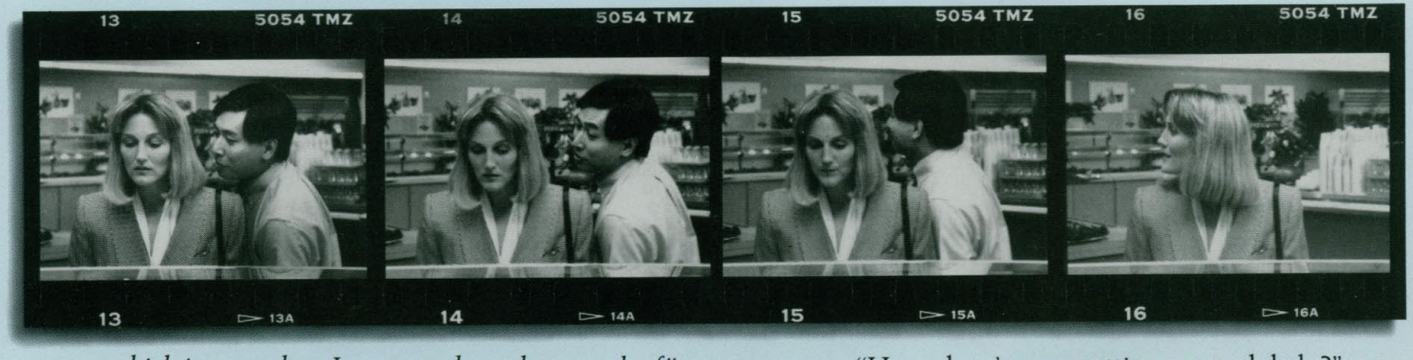

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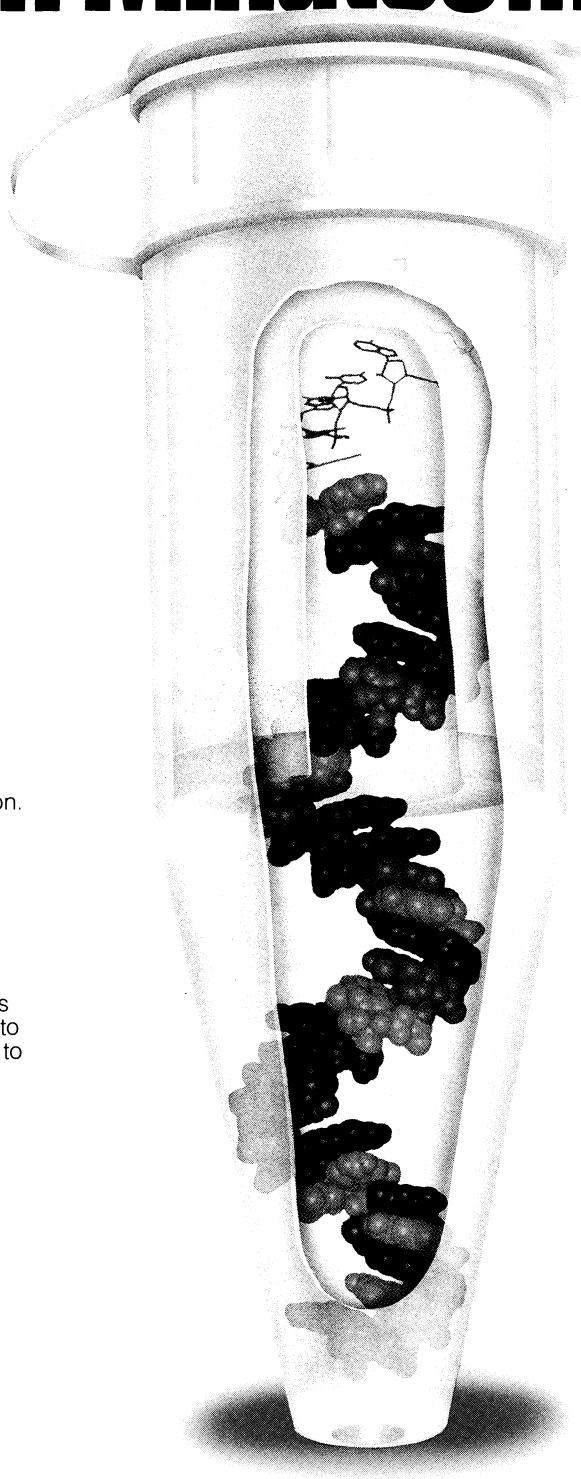

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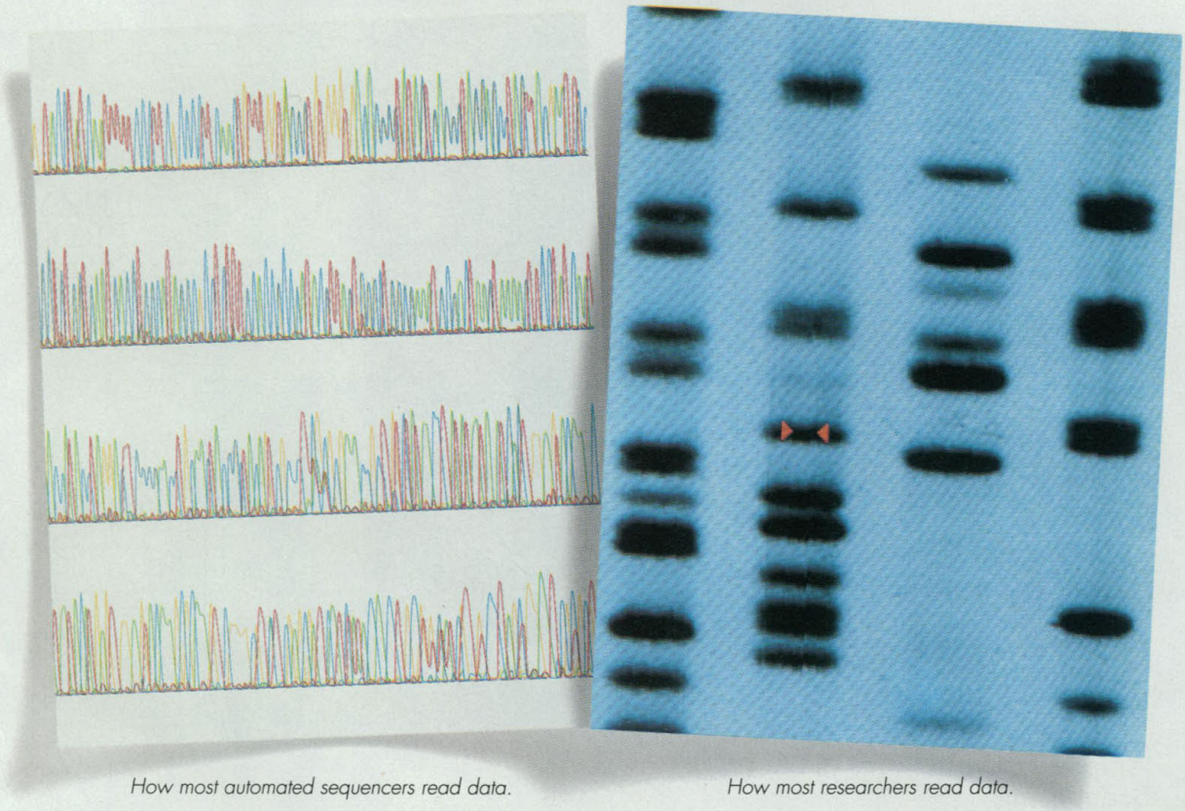

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