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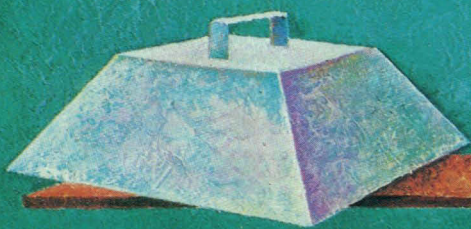
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COVER Two functionally related jaw muscles in zebrafish specifically express *engrailed*-homeoprotein in their nuclei. Expression begins in the muscle precursors and may be involved in determining their identities. Immunolabeled (stained nuclei) and unlabeled striated muscle fibers are shown on either side of associated jaw cartilage in a 3-week-old zebrafish. See page 802. [Polarized microphotograph by Kohei Hatta]

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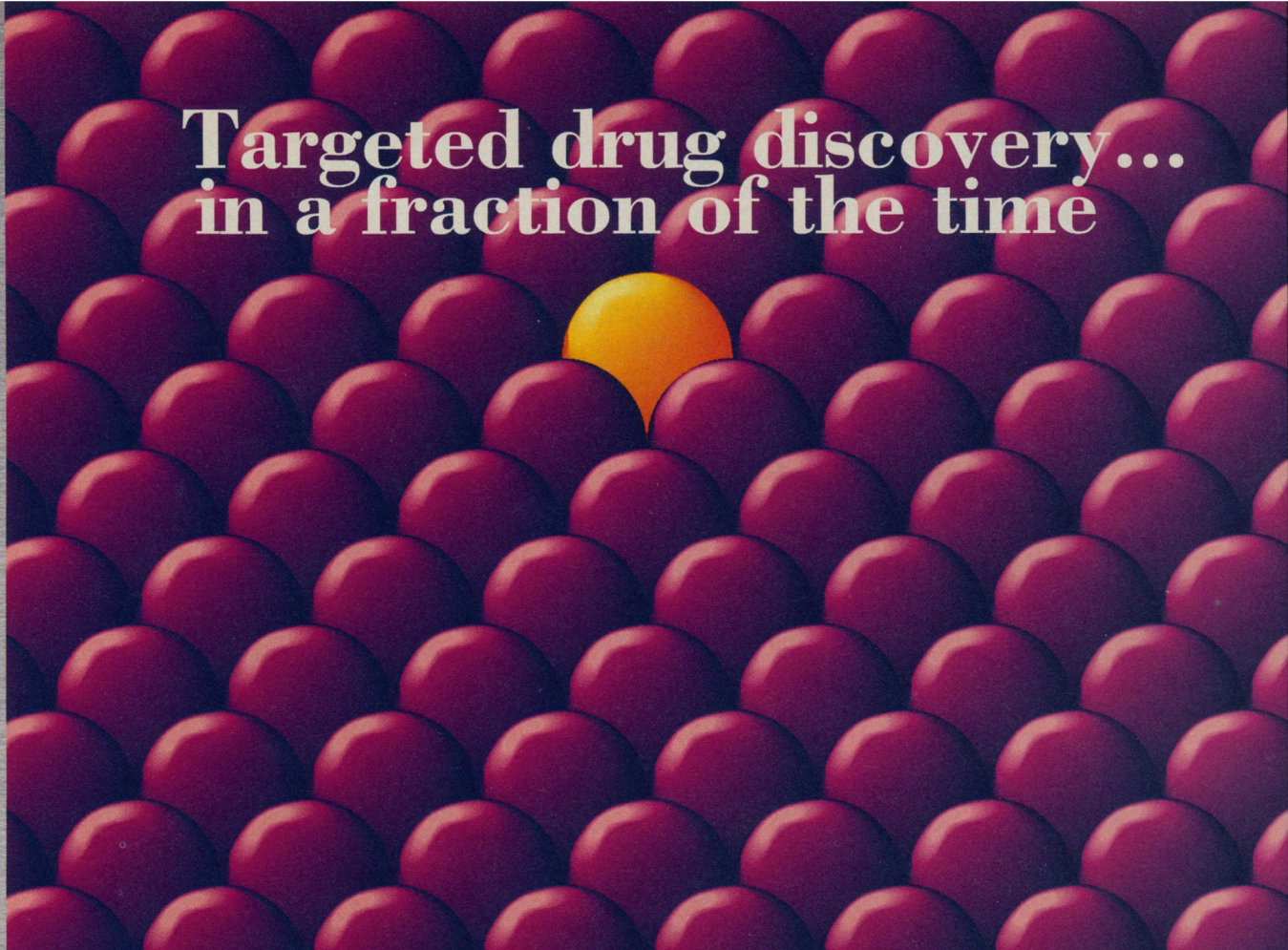
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This Week in SCIENCE

General relativity

SEVENTY-FIVE years ago, Albert Einstein published his general theory of relativity. The theory states that gravity is caused by curvature in the geometry of space and time owing to the presence of energy and mass; it predicts various phenomena, such as the bending of light by matter. For 45 years, only a small number of experiments and observations put general relativity theory to the test; then, around 1960, five years after Einstein's death, discoveries in astronomy, conceptual advances in physics and astrophysics, and the availability of new tools provided numerous tests of experimental gravitation and repeated confirmations of various tenets of the theory. Will describes the experimental odyssey of general relativity from its formulation to today and looks at future experiments aimed at furthering understanding of gravitational phenomena (page 770).

Stick-slip motion

SOMETIMES the interaction of two solids sliding past each other produces an annoying squeak; at other times, for example when the solids are a violin string and a bow string, it can be put to esthetically pleasing advantage. Simulations performed by Thompson and Robbins—in which two solids separated by a thin film of fluid molecules were slid by each other—reproduced many features of boundary lubrication by simple fluids that have been observed in recent experiments (page 792). The molecular dynamic simulations showed that stick-slip motion—the solids alternately stick together and slip apart—originates from the thermodynamic instability of the contact region and not, as previously thought, from a dynamic instability. Periodic transitions occur at the boundary between orderly solids (when sticking occurs) and disordered fluid states (when slipping takes place). As movement speed increases, melting becomes erratic and recrystallization incomplete; above a critical velocity the film stays in a liquid state and slides smoothly.

Face facts

TWO muscles (cover) that are positioned near each other in the jaw of the mature zebrafish cooperate in enlarging the buccal cavity and causing the jaw to protude. What are the molecular signals during embryonic development that direct the development, positioning, and innervation of these muscles? One crucial signal appears to be expression of the gene *engrailed* (page 802). Hatta *et al.* observed that *engrailed* expression began in precursor cells of LAP and DO muscles early in embryonic development and continued for several weeks after the fish had hatched; the gene was not expressed in other muscle cells of the head or in LAP and DO cells of adults. The pattern of expression is consistent with roles for the *engrailed* gene product both in specifying positional information and in facilitating association of the muscles with appropriate nerve cells. In the 5 October 1990 issue of *Science* (page 34), Barinaga described virtues of the zebrafish system that have lead developmental biologists to look on these fish as the vertebrate equivalents of fruit flies and roundworms, organisms that have provided much insight into invertebrate development. It is anticipated that homologs of *engrailed* and of zebrafish muscles may be found in other vertebrates, including humans.

Aniridia model

ANIRIDIA in humans—absence or malformation of the iris—can occur as an isolated pathology or as part of the WAGR syndrome, which includes Wilms (kidney) tumors, genitourinary malformations, and retardation. The genetic basis for WAGR is loss of human chromosomal region 11p13, where genes involved in the manifestation of aniridia and Wilms tumors and probably the other effects reside. There is now a mouse model for aniridia called the Small-eye defect. The aniridia-associated gene deletions from chromosome 2 of these mice correspond to those deleted from human chromosome 11p13 in WAGR; in the

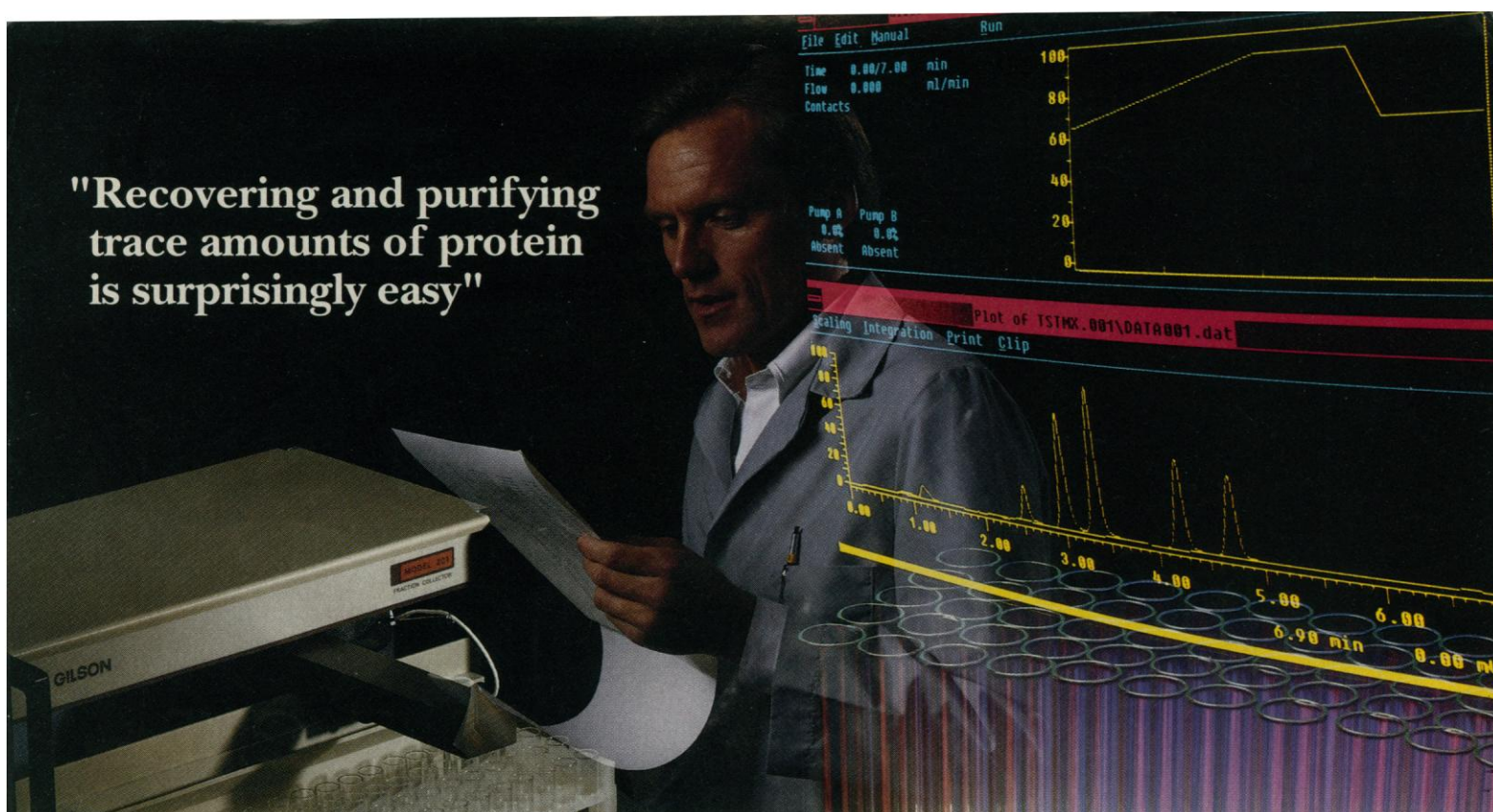
mice only aniridia develops, not Wilms tumors or genitourinary abnormalities (page 823). Glaser *et al.* discuss how scaling effects, multiple gene mutations, and other factors might account for the phenotypic differences observed between mice and humans despite similar gene deletions. Even the characteristics of aniridia in humans and mice are somewhat different. Although affected eyes of both humans and mice have little or no iris tissue, ocular problems of mice are more severe and affect the lens, anterior chamber, and retina. Developmental studies in the mice suggest that aniridia is the outcome of a defect in lens induction.

Viral dirty tricks

VIRUSES use diverse tricks to counter or evade immune responses of the hosts they have infected. The vaccinia virus, for example, produces a protein that binds tightly to a derivative of the fourth component of the multicomponent complement system of the host (page 827); this blocks the complement cascade, an elaborate and orderly series of reactions in which close to a dozen serum proteins work together with antibodies to neutralize or kill viruses. Kotwal *et al.* found that the vaccinia protein had strong sequence similarity with proteins normally produced by the host for controlling the complement cascade. Related viruses—ectromelia and cowpox—also can produce such a protein, suggesting that mimicry of this sort may be a general device used by the orthopox viruses to block host defenses. Epstein-Barr viruses (EBV) have been found to use a different form of mimicry (page 830). EBV produces a protein (BCRF1) that looks like the host's interleukin-10 molecules. And, like interleukin-10, BCRF1 molecules block the production of interferon- γ , which is known to inhibit the growth of EBV-infected cells. Hsu *et al.* speculate that the BCRF1 gene is a captured host gene and that exploitation of captured host immunoregulatory genes may be a common tactic of viruses for subverting immune regulation.

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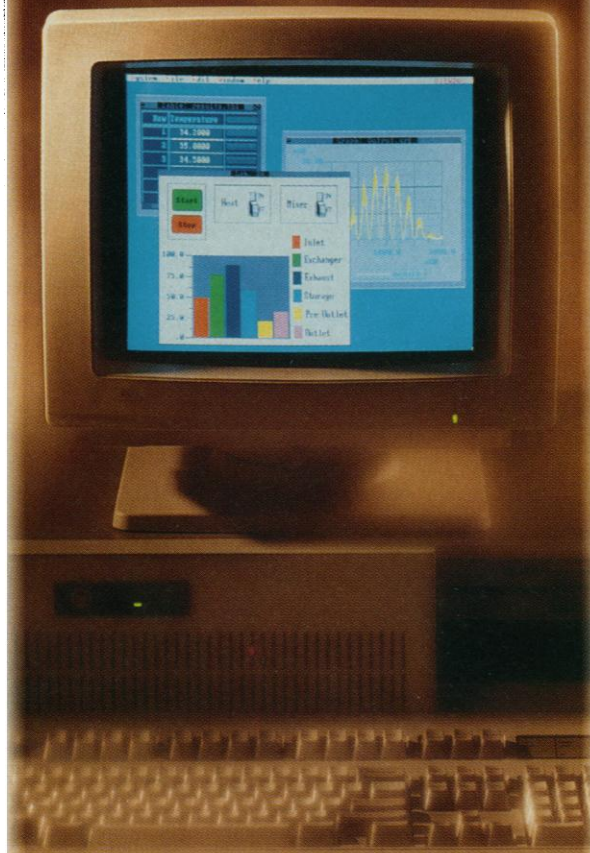
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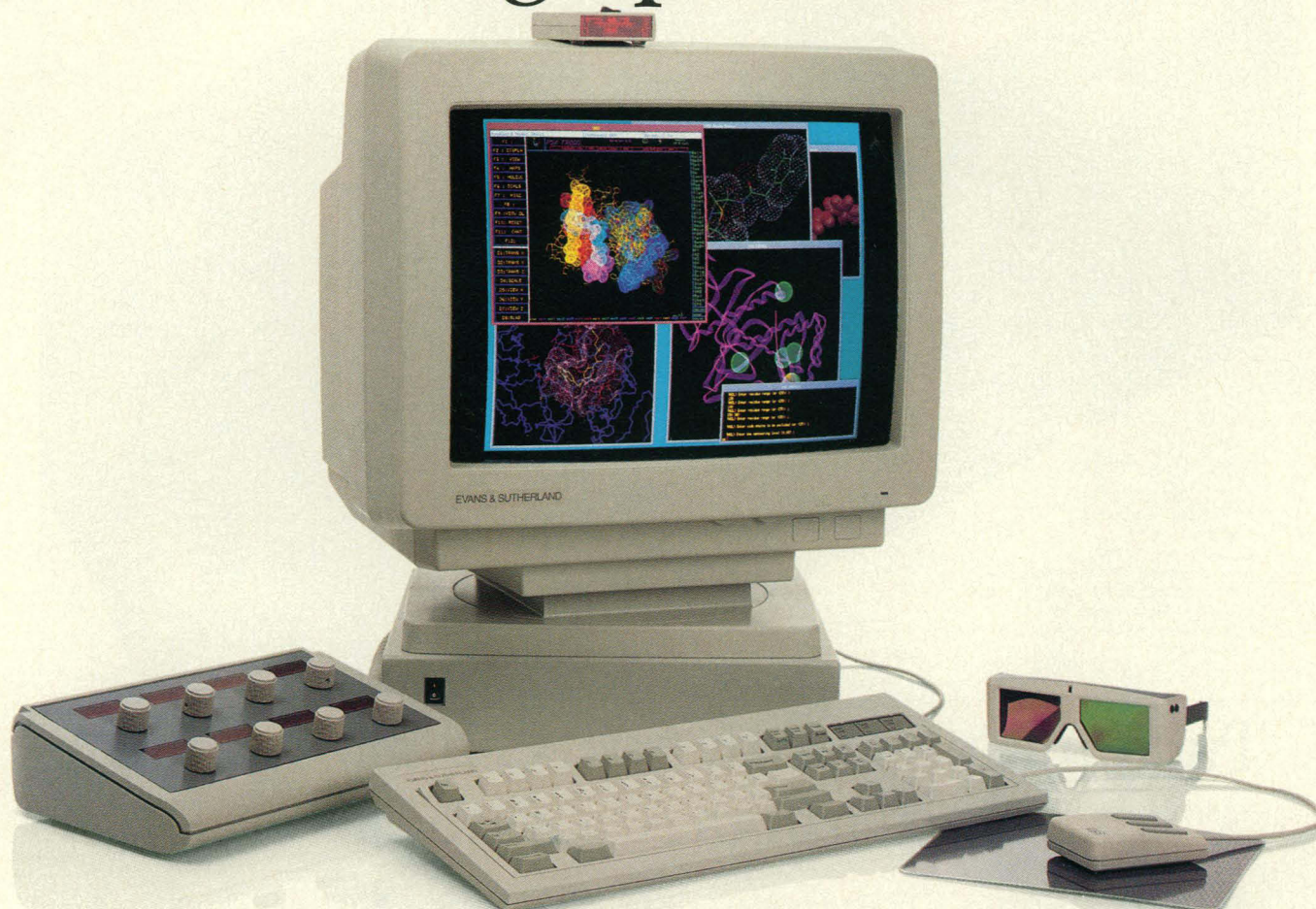
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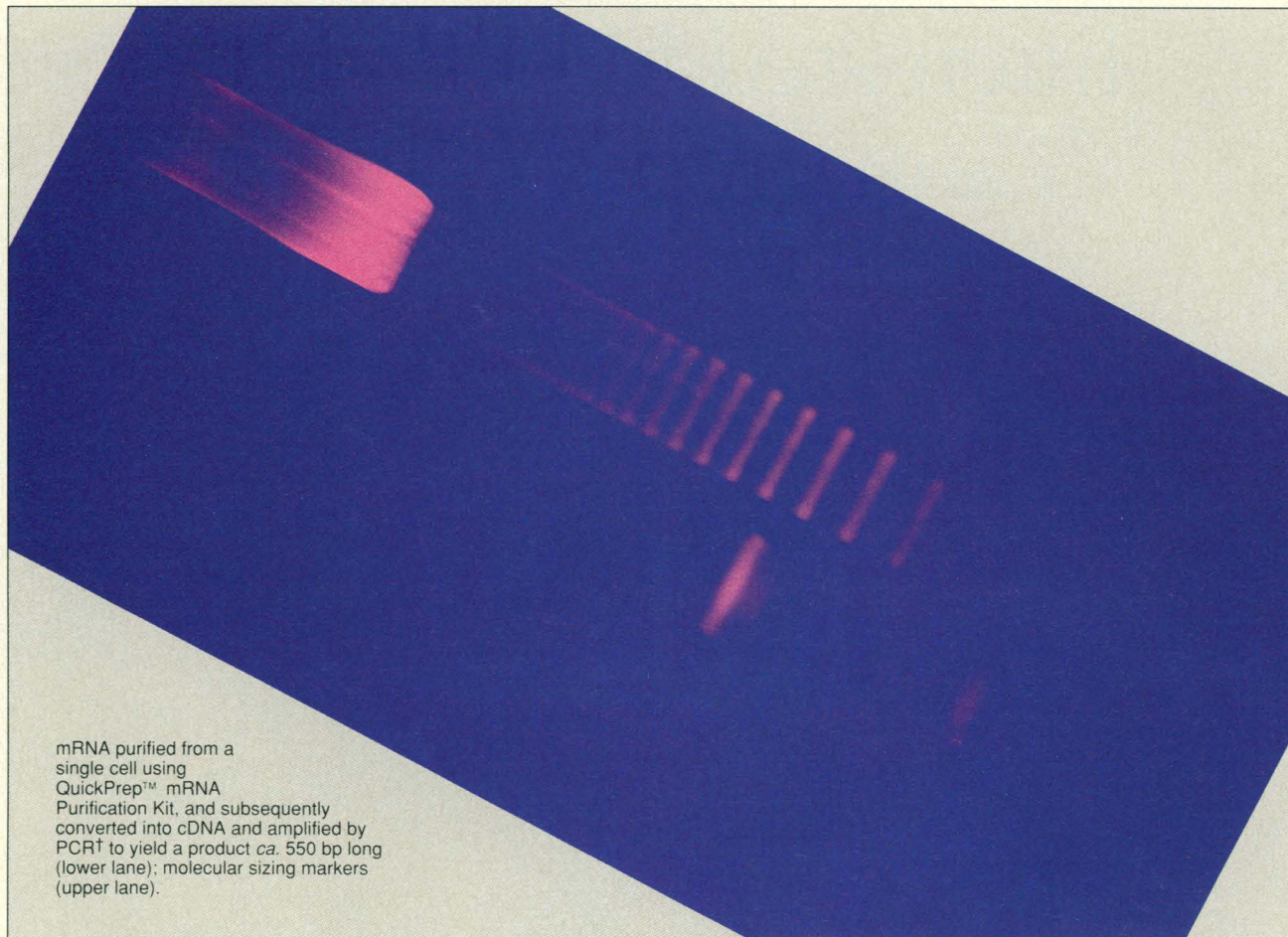
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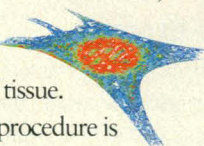
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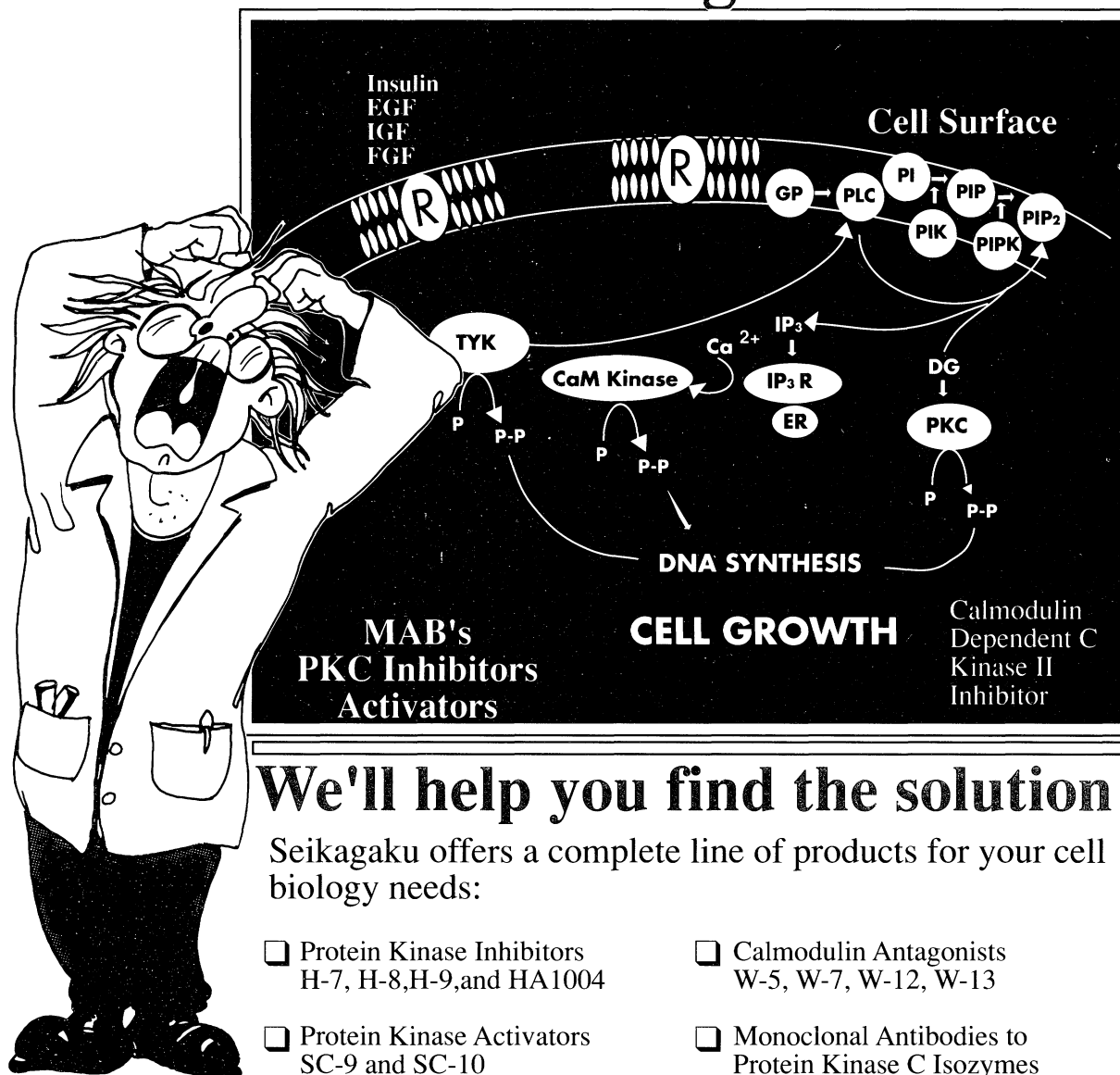
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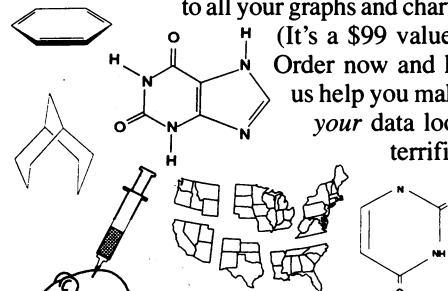
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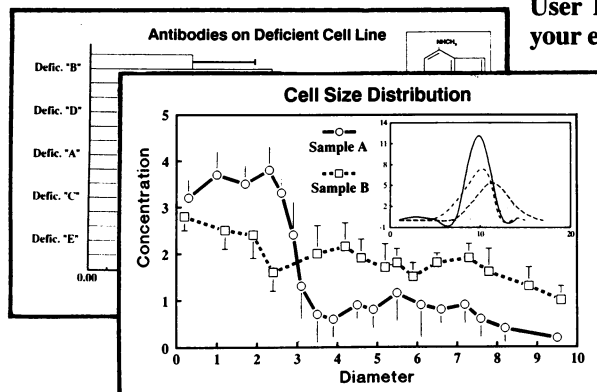
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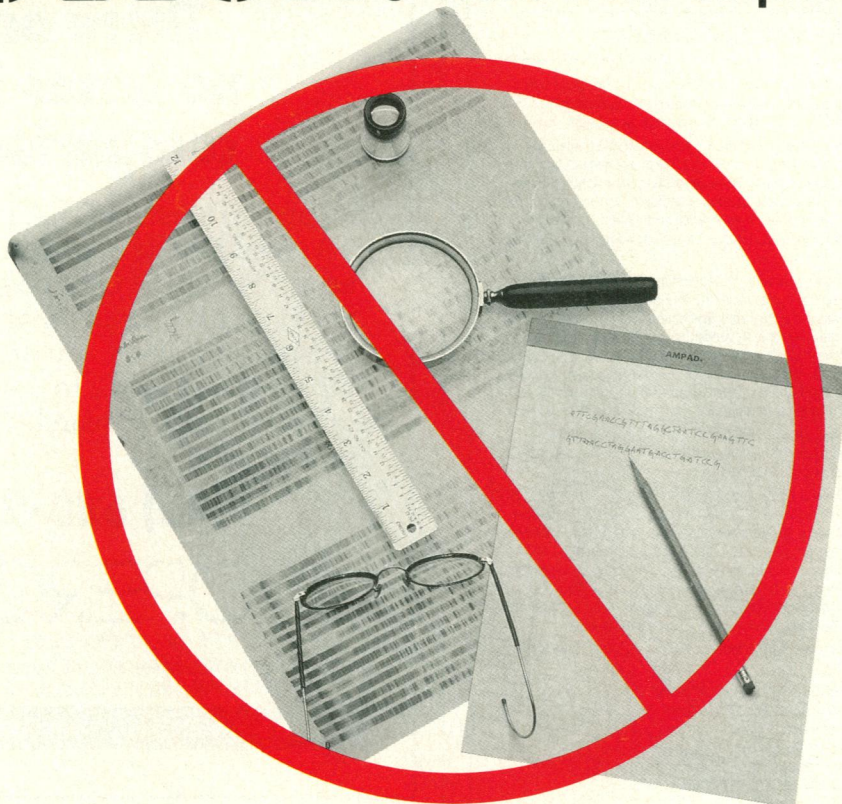
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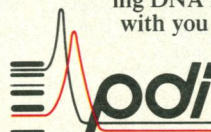
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APPLICATION PROCEDURE	Applicants should submit a letter of intent and a resume and arrange to have three letters of reference sent directly to the program administrator. Candidates should include in the letter of intent a statement which tells why they have applied to the program and a brief description of their public service experience. Letters of reference should be solicited from people who can discuss not only the candidate's competence as a physicist but also the candidate's education and experience which would make the candidate particularly qualified to serve in a Congressional office. Completed applications, including all letters of reference, must be received by 15 February 1991.
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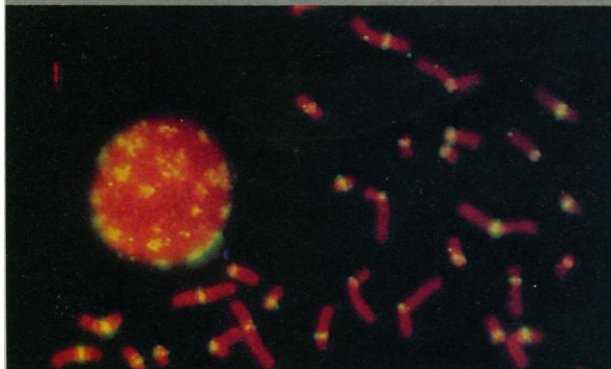
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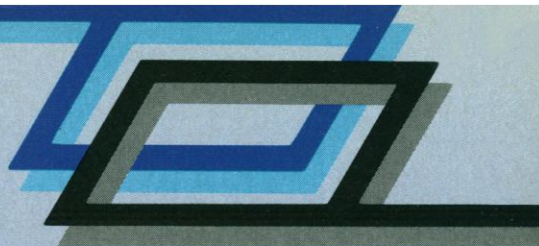
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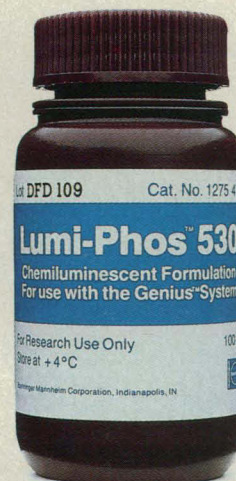
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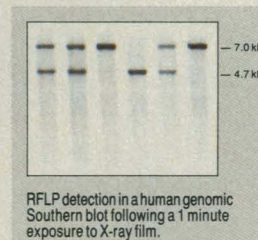
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