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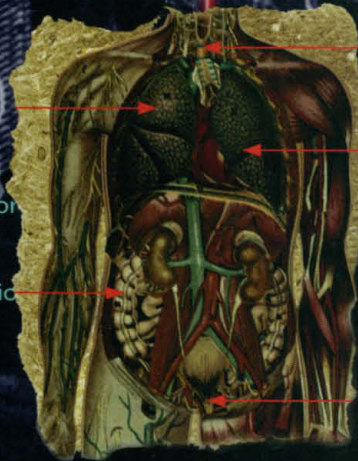
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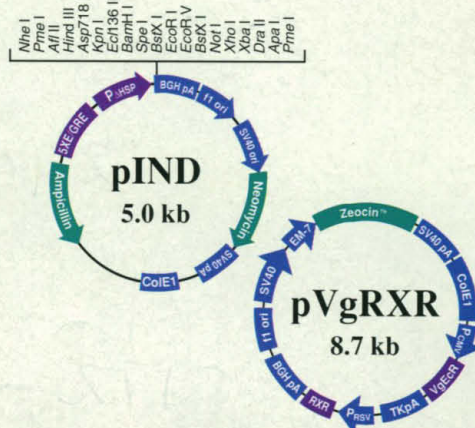


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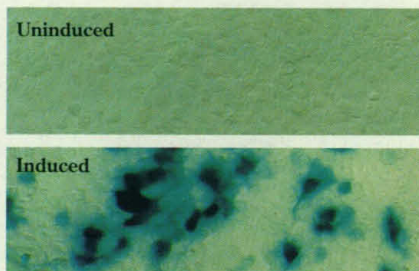
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For transient transfection and induction, simply clone your gene of interest into pIND, then cotransfect it into mammalian cells with the regulator vector, pVgRXR. Approximately six hours later, treat the transfected cells with the ecdysone analog, muristerone A and begin analysis. Depending on the sensitivity of the assay, you can begin detecting induced expression in as little as two hours. For stable transfection, use dual selection with Zeocin™ and G418.



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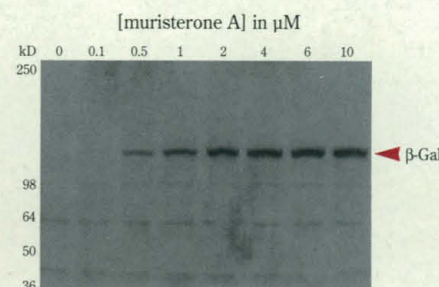
The slides below show a simple colorimetric assay of 293 cells cotransfected with pVgRXR and pIND/lacZ before and after muristerone treatment. This example vividly illustrates the Ecdysone System's tight control and capacity for high inducibility.



Uninduced and induced transiently transfected 293 cells stained with X-gal.

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1. No, D. *et al.* (1996) *Proc. Natl. Acad. Sci. USA* 93: 3346-3351.

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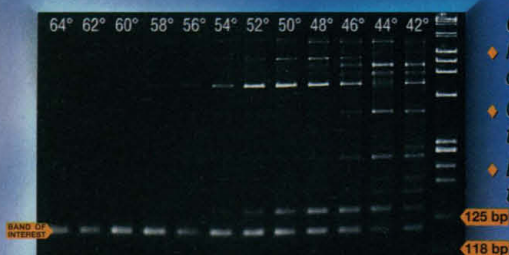
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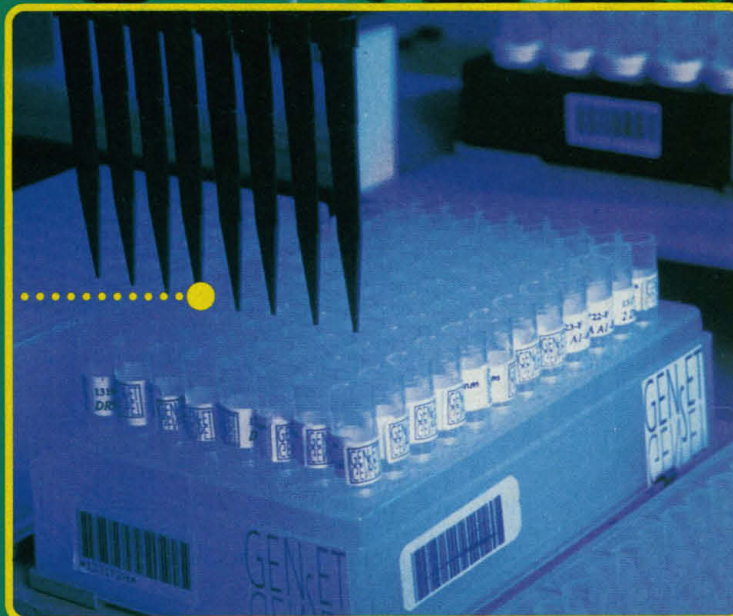
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303

Room for just one electron



310

New perch for ecologists

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COVER

Information retrieval involves searching organized collections of documents across the Internet. Its functionality depends on the relation between the concepts in a user's mind and the words in the documents. As systems improve, this relation grows ever closer. The cover illus-

trates the evolution of information retrieval, as discussed in the lead article in this special issue (page 327), using words and concepts related to medicine. See related articles beginning on page 334 and the News story on page 301. [Image: Heidi Kellner and Bruce Schatz]



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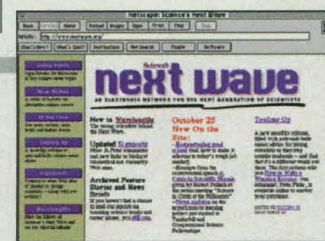
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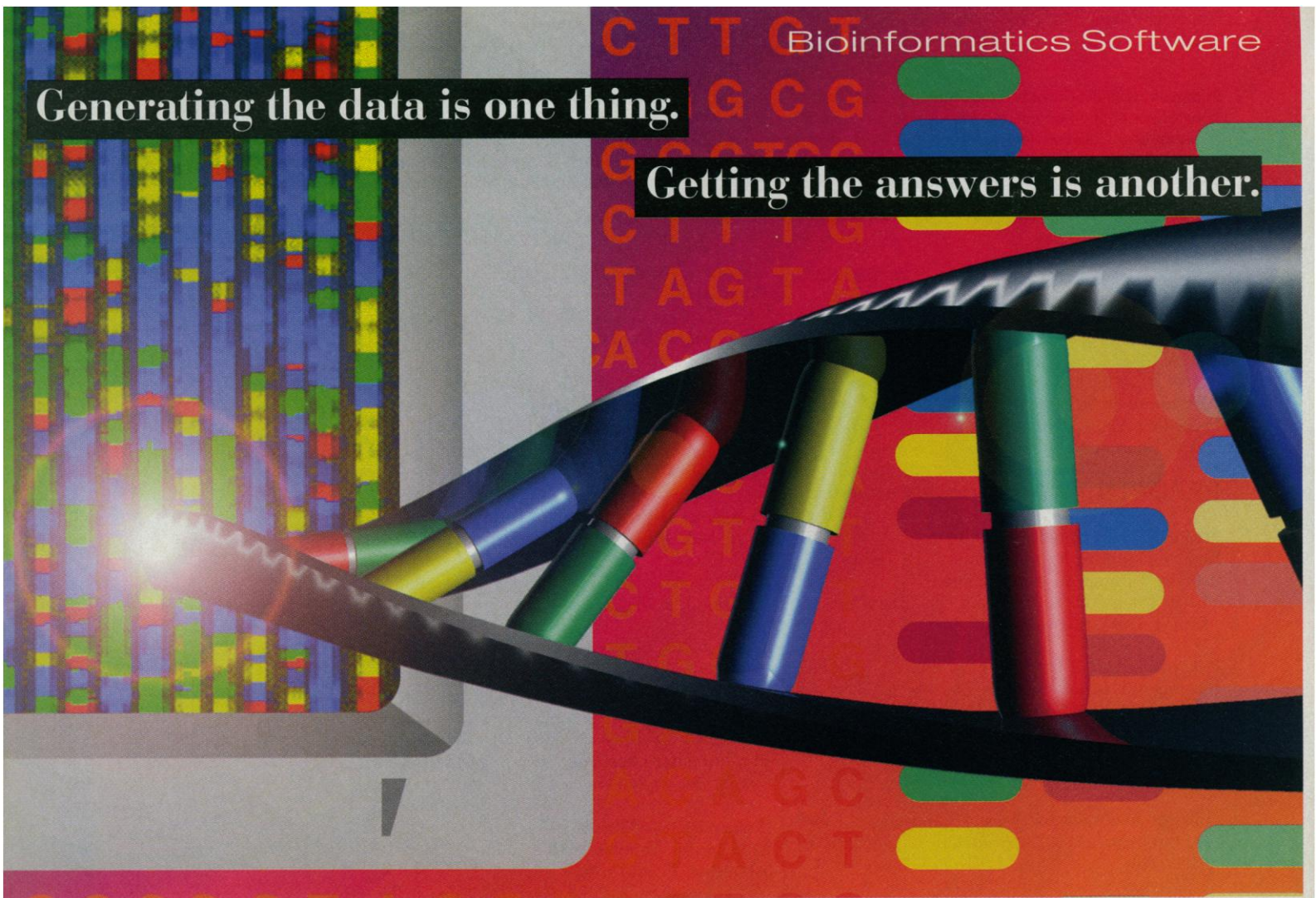
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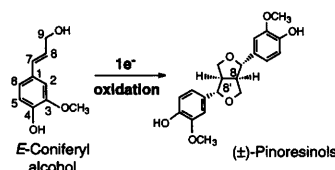
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Lending a handedness

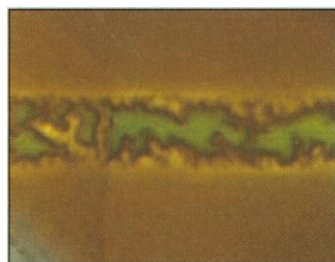
The synthesis of many plant and insect biomolecules, such as lignin, requires coupling two molecules through phenoxy



radical reactions. Although such reactions appear to achieve some control over the points of attachment and the handedness (or stereochemistry of the products) in vivo, reconstituted enzymatic reactions in vitro show little specificity. Davin *et al.* (p. 362; see the news story by Kaiser, p. 306) have isolated a 78-kilodalton protein from *Forsythia* that can confer stereoselective coupling on such reactions, although it lacks a catalytic center, even in the presence of enzymes or even ordinary inorganic oxidizing agents. The authors suggest that this "dirigent" protein holds the free-radical intermediates in a preferred orientation.

Limiting the flow

The current that polycrystalline films of high-temperature copper oxide superconductors can carry is often limited by defects and misalignment be-



tween grains. Pashitski *et al.* (p. 367) have imaged both crystalline texture and supercurrent flow in $\text{TlBa}_2\text{Ca}_2\text{Cu}_3\text{O}_x$ thin

Quantum computing with NMR spectroscopy

Certain difficult computational problems, such as finding prime factors, could be performed much faster if quantum computing, in which interactions of pure quantum states correspond to logical operations, could be realized in a practical manner. Most schemes implemented or proposed require isolating or controlling single atoms to maintain the coherence of quantum states. Gershenfeld and Chuang (p. 350; see the news story by Taubes, p. 307) propose a different approach in which the manipulation of nuclear spins in a chemical compound with nuclear magnetic resonance (NMR) methods performs quantum computation. Such an approach might seem improbable in that the nuclear spins of a bulk sample form a statistical ensemble that would rapidly undergo decoherence. However, the authors show that the deviation from the equilibrium spin states can be manipulated so that it acts like a pure, low-dimensional quantum state.

films grown on yttria-stabilized zirconia and found that critical current densities are limited mainly by a few high-angle grain boundaries.

Forming a gap

The asteroid belt is a nonuniform band with several gaps that lack asteroids and several concentrations with an overabundance of asteroids. Numerical simulations by Liou and Malhotra (p. 375) provide a mechanism to explain one of the more puzzling gaps (from 3.5 to 3.9 astronomical units) that occurs in the outer asteroid belt. The subtle inward migration of Jupiter and outward migration of Saturn over a 10-million-year time scale can reproduce this gap in the outer asteroid belt.

Spin control

Mantle convection and plate tectonics change Earth's moment of inertia and move its rotation axis, but during the past 100 million years the rate of this movement has been sur-

prisingly small. Richards *et al.* (p. 372) modeled changes in the internal mass distributions associated with mantle convection in order to understand the stability of Earth's rotational pole and found that subduction was the most significant mass mover in the mantle. Paleosubduction likely accounts for the small polar wandering derived from paleomagnetism and hotspots, rather than more complex mechanisms such as adjustments of Earth's rotational bulge.

Experimental chaos

Chaos in ecological systems has long been predicted from the application of nonlinear dynamics to population biology but experimental confirmation has been difficult. Building on previous studies, Costantino *et al.* (p. 389; see the Perspective by Godfray and Hassell, p. 323) predicted a series of complex dynamic patterns resulting from manipulation of pupal mortality in laboratory populations of the flour beetle *Tribolium* and were able to confirm these experimentally. This work has

shown that a few simple equations can capture population dynamics quantitatively.

From the specific to the general

In a field with as much variety and variation as ecology, the ability to make generalizations is as difficult as it is sought after, but two reports offer new approaches. In a theoretical study, Hanski and Gyllenberg (p. 397) unite two robust empirical patterns in nature that previously were unrelated, namely, the species-area curve and the distribution-abundance curve. Brett and Goldman (p. 384) illustrate the value of applying the statistical tools of meta-analysis to ecological problems. Drawing from data in all of the relevant published literature allowed the authors to select between alternative models of food-web dynamics.

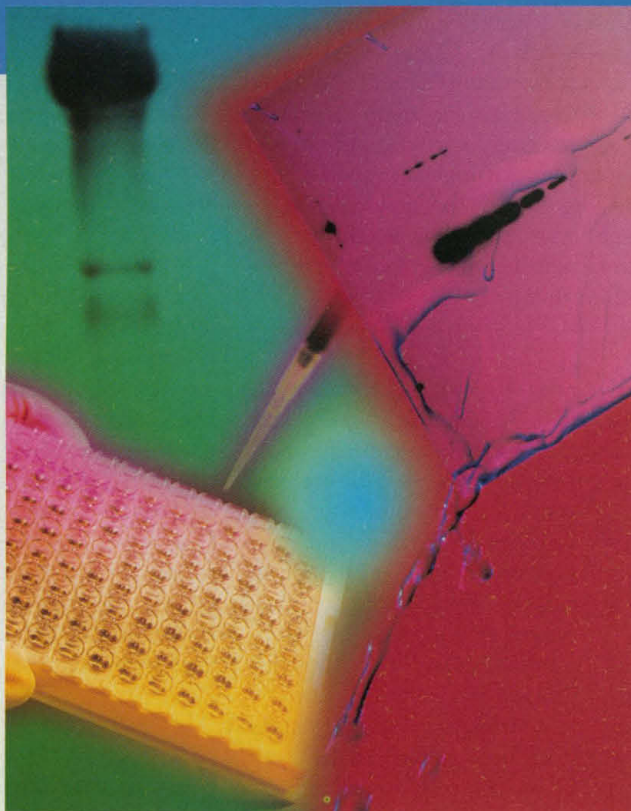
Eluding tags for destruction

Proteins that have been tagged in the cell by the protein ubiquitin are recognized and degraded. Musti *et al.* (p. 400) report that such regulated destruction contributes to the control of the activity of the transcription factor and proto-oncogene c-Jun. When the c-Jun protein is phosphorylated by mitogen-activated protein kinases, not only is its DNA binding and transcriptional activation enhanced but its ubiquitination is also inhibited. In this manner, the transcription of genes regulated by growth factors and other stimuli that activate c-Jun is enhanced by the reduced degradation of the transcription factor.

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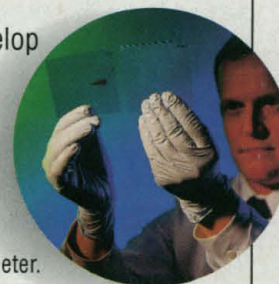


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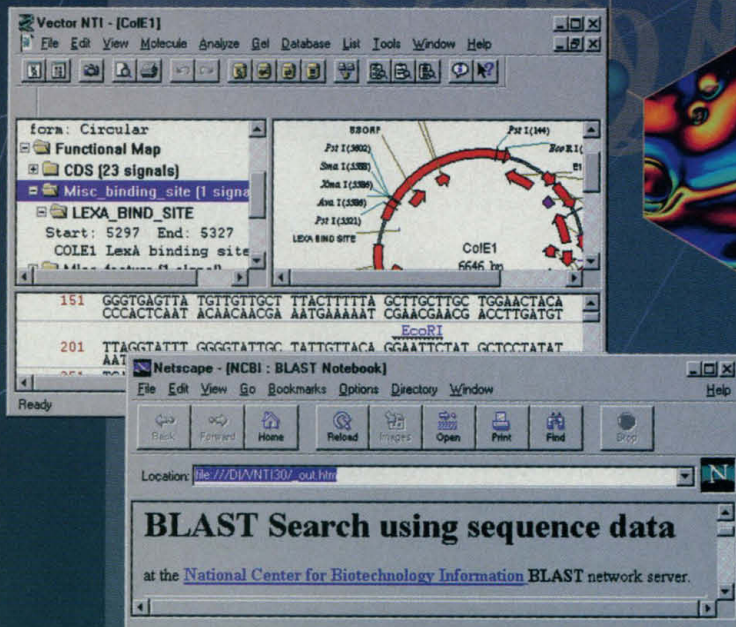
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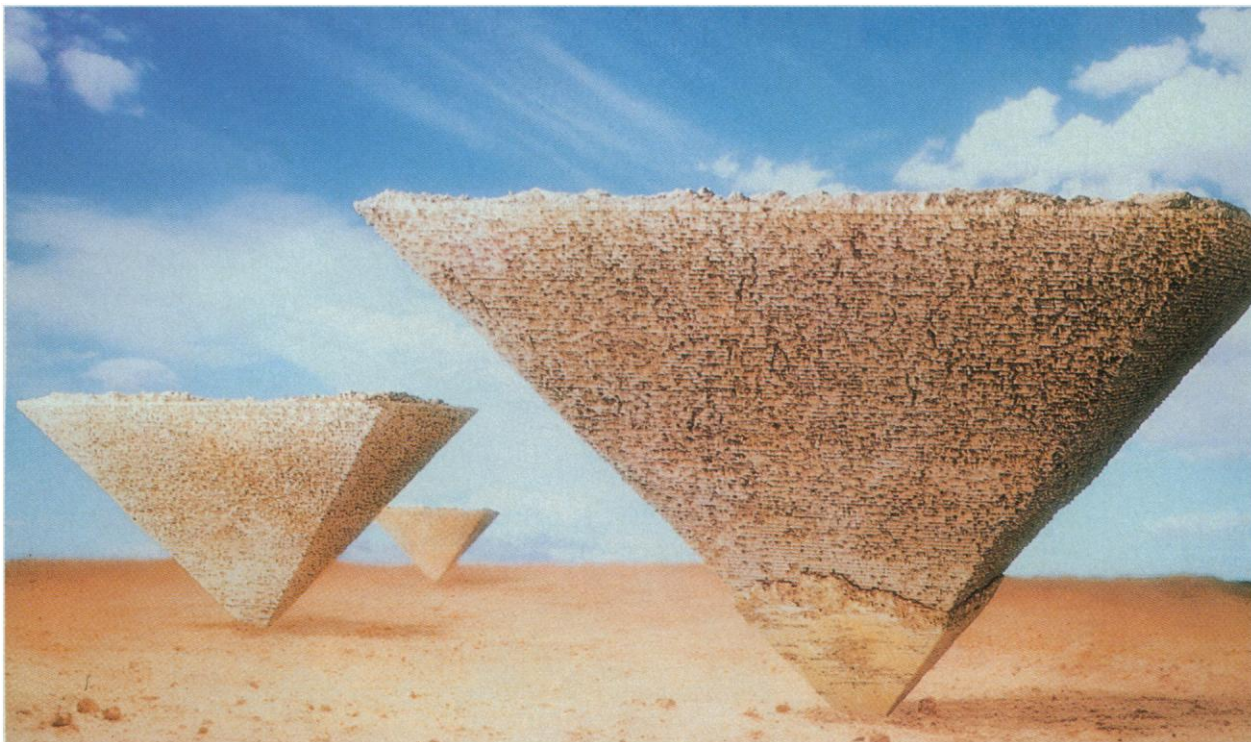


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Cultural Thesis, -- for example, history or natural features of a region etc.

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3. Application Period

The application period is from Monday, January 6, 1997 to Wednesday, April 30, 1997. Put together the application materials as per the application instructions and mail to Art and Science Foundation.

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5. Application Instructions

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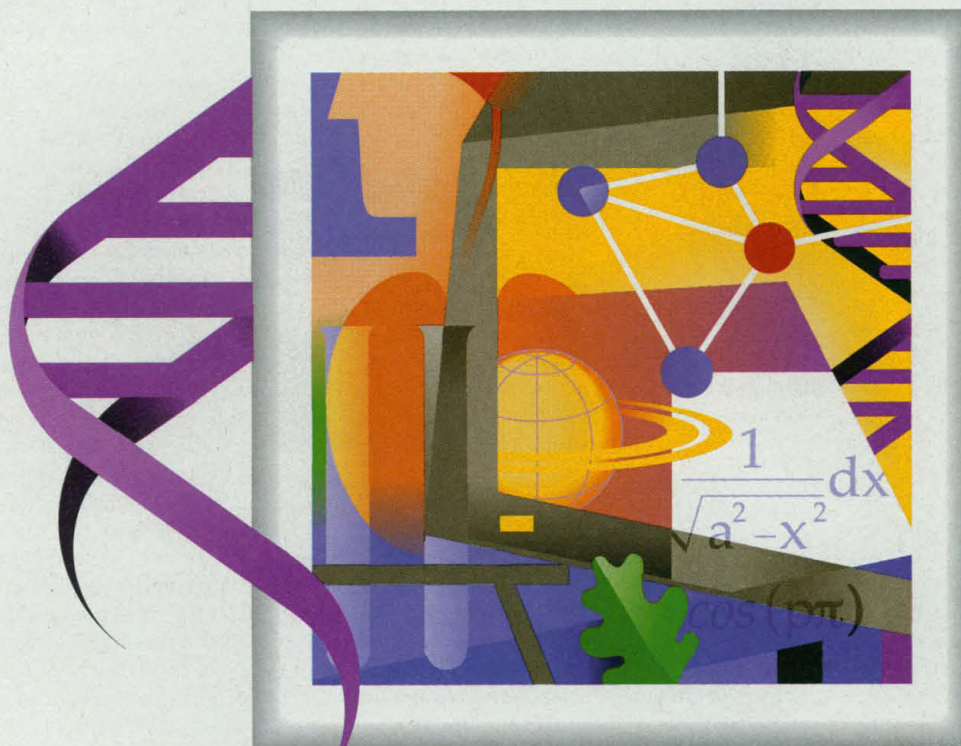
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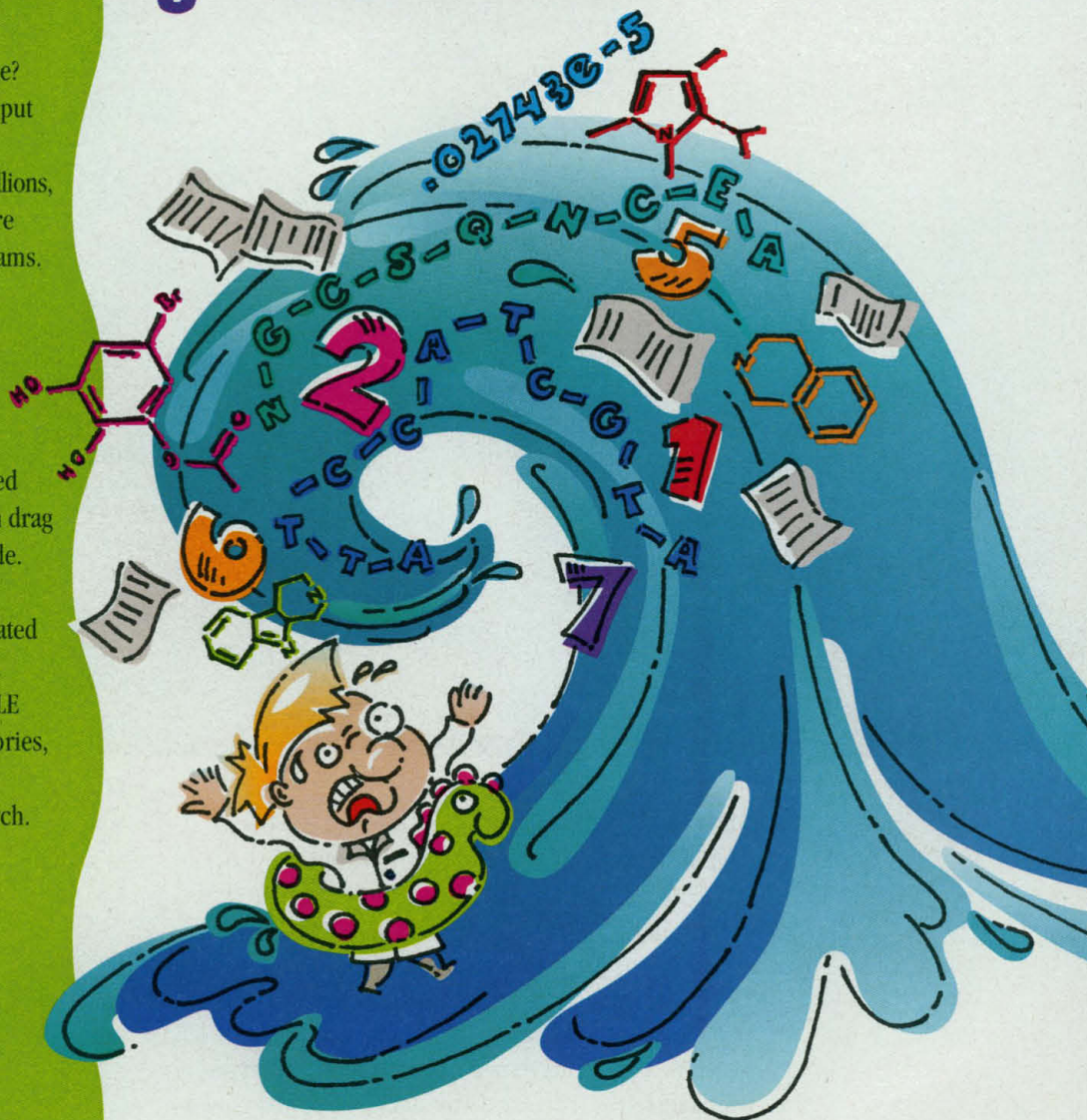
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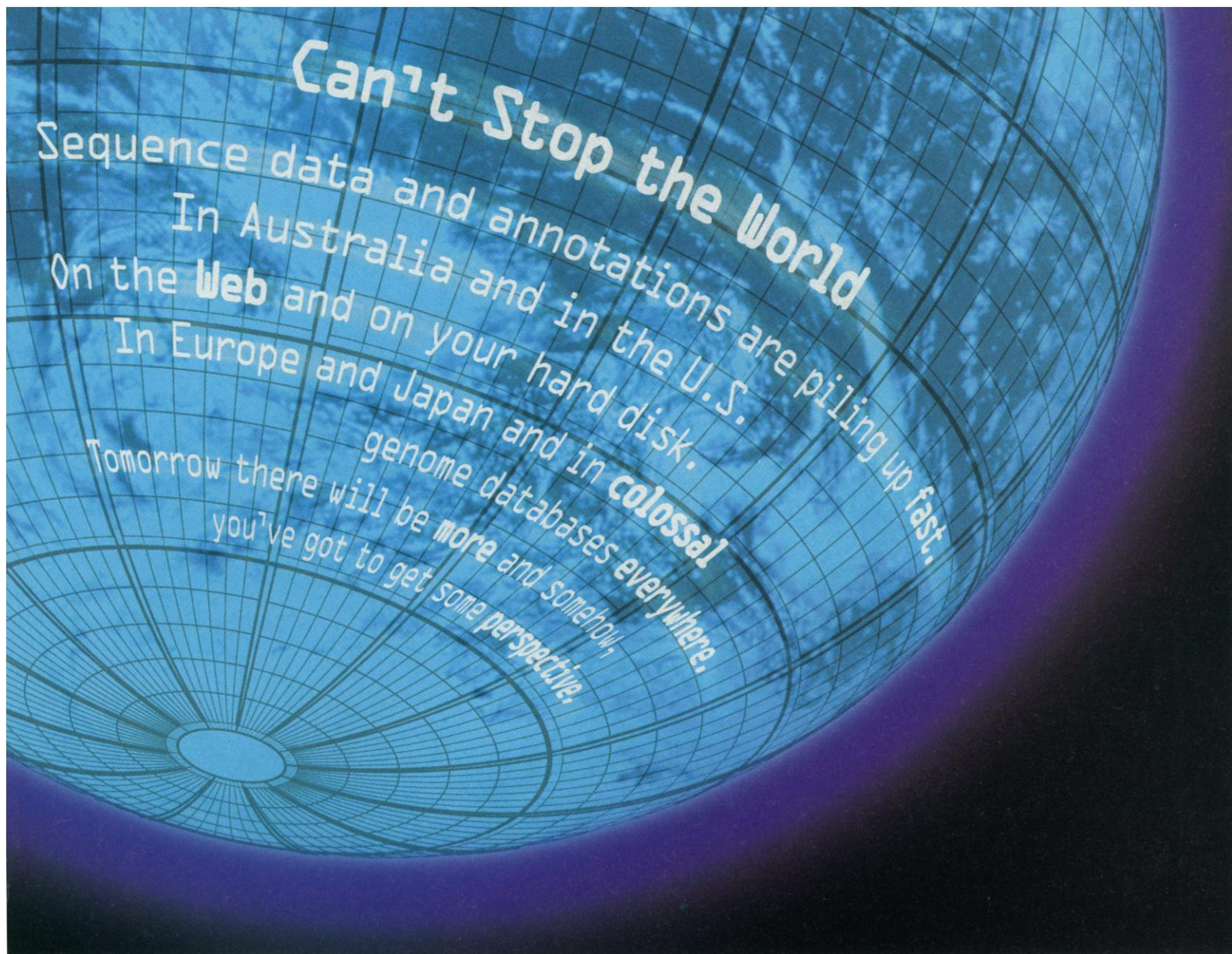


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NOMINATIONS FOR THE 1998 LOUIS-JEANTET PRIZE FOR MEDICINE

Nominations are being sought for the 1998 Louis-Jeantet Prize for medicine. One to three prizes will be awarded. They will amount to a maximum of 2 million Swiss Francs (approximately 1.5 million US Dollars) in 1998. These prizes will provide substantial funds for the support of biomedical research projects (fundamental or clinical) of the highest quality. Candidacies in clinical research are strongly encouraged.

Candidates (either individuals or research groups) must be nominated by scientists, physicians or institutions having detailed knowledge of the candidates' research. The Louis-Jeantet Prize for medicine is not intended to honour past accomplishments but to help and encourage the winners' continued research activity. Candidates shortlisted for the final selection will therefore be asked to provide a research project to which the financial support of the Prize could give decisive impetus.

The winners of the ten previous Louis-Jeantet Prizes for medicine have been **Bert Sakmann, John Skehel and Rolf Zinkernagel** in 1988, **Roberto Poljak, Walter Schaffner and Greg Winter** in 1989, **Nicole Le Douarin, Harald Von Boehmer and Gottfried Schatz** in 1990, **Pierre Chambon, Frank Grosveld and Hugh Pelham** in 1991, **Paul Nurse, Christiane Nüsslein-Volhard and Alain Townsend** in 1992, **Jean-Pierre Changeux, Richard Henderson and Kurt Wüthrich** in 1993, **Thierry Boon, Jan Holmgren and Philippe Sansonetti** in 1994, **Dirk Bootsma and Jan Hoeijmakers, Peter Goodfellow and Robin Lovell-Badge**, and **Peter Gruss** in 1995, **Björn Dahlbäck, Ulrich Laemmli and Nigel Unwin** in 1996, **Philip Cohen, Kim Nasmyth and Richard Peto** in 1997.

The following general points should be noted:

1. The Prize is intended for researchers working in European countries, members of the Council of Europe. The candidates need not, however, be themselves nationals of any of these countries.
2. Applications must be submitted, confidentially, on the official forms only. These are obtainable from:

**The Secretary of the Science Committee
The Louis-Jeantet Foundation for medicine
P.O. Box 277
CH-1211 GENEVA 17
Switzerland**

Further information will be sent with the nomination form.

3. The deadline for applications is February 15, 1997.

The name(s) of the winner(s) of the 1998 Louis-Jeantet Prize for medicine will be announced in January 1998. The Prize Ceremony will take place in Geneva (Switzerland) in April 1998.