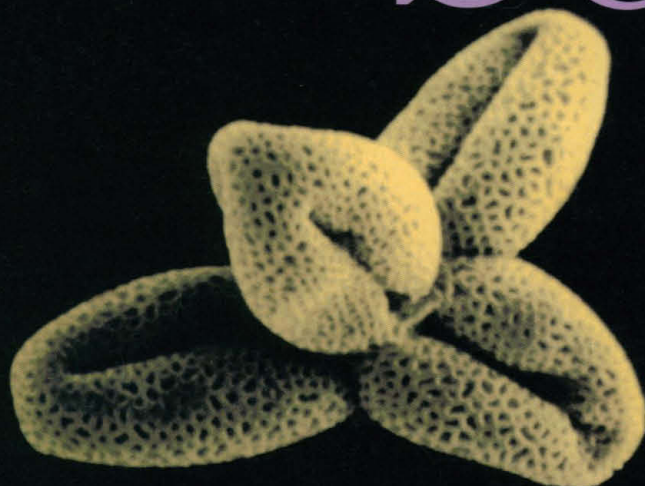


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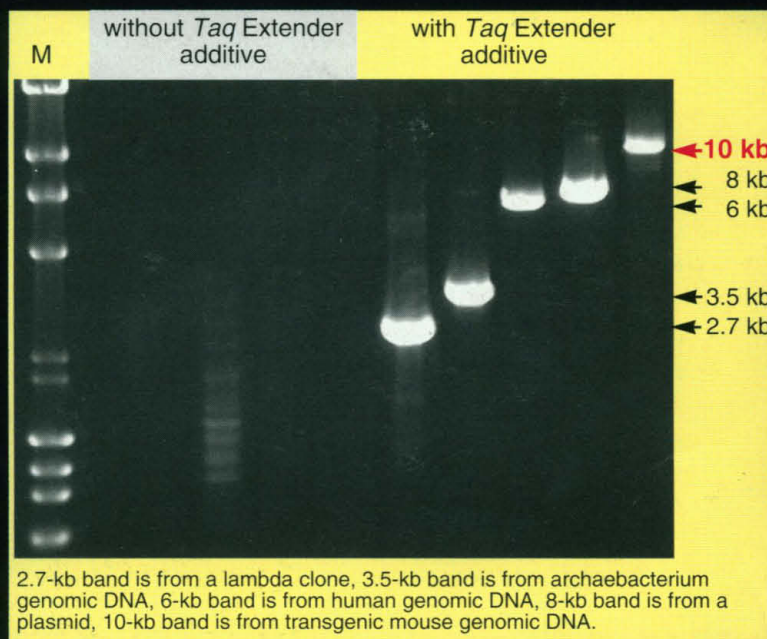
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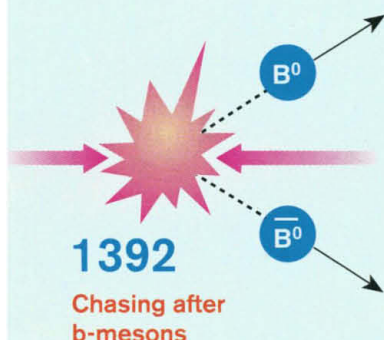
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COVER

In certain fungi, the products of one meiosis remain encapsulated as a group, or tetrad, a feature that has allowed geneticists to study allele segregation, recombination, gene conversion, and other chromosomal properties. These studies are now possible in the higher

plant *Arabidopsis thaliana* because of the discovery of the *quartet* mutations. Shown are pollen grains from plants with a *quartet* mutation, which, unlike wild-type pollen grains, are released in fused meiotic tetrads. See page 1458. [Photo: Daphne Preuss and Sung Y. Rhee]



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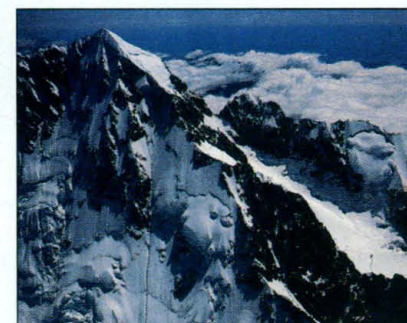
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Dating a glacier

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Getting the word

Along the global information highway are databases containing large amounts of machine-readable text, but finding a particular text needle in the roadside haystacks is no easy matter. Salton *et al.* (p. 1421) present an automated system for establishing links, extracting themes, and summarizing content in large texts. The "Smart" system uses a powerful term-weighting method to generate a set of vectors that represent text content; search requests are matched to the text vectors to produce a ranked list of documents for retrieval. The authors give examples of encyclopedia searching and conclude that the system can be extended to other database structures.

Sea change

Does an ecosystem respond to environmental change as a unit or as a collection of individual species all responding differently? Buzas and Culver (p. 1439; Perspective by Jackson, p. 1412) address this question through the fossil record of foraminiferal communities on the North American Atlantic Coastal Plain, across which the sea has advanced and retreated over a 55-million-year period. Communities as a whole followed the shifting coastal environment, but in the process some species would die out to be replaced by others. Ecological diversity may be important but its detailed long-term composition is apparently less so.

Fractured mantle

Phase transitions in mantle materials, particularly among the polymorphs of $(\text{Mg,Fe})_2\text{SiO}_4$, are thought to produce several

Global cooling

The Younger Dryas (YD), an episode of marked climatic cooling after the initial retreat of the ice sheets beginning about 11,000 years ago, is well recognized in the North Atlantic region. Now there are efforts to find evidence for the YD in the Southern Hemisphere, which would point to a global climate signal. Denton and Hendy (p. 1434) report that many radiocarbon dates from a prominent terminal moraine of the Franz Josef Glacier in New Zealand cluster around 11,050 years ago, indicating that a glacial advance in New Zealand coincided with the start of the YD. The simultaneous onset of cooling in both hemispheres implies that the origin of the YD lies in an atmospheric, rather than oceanic, climate signal.

prominent seismic boundaries in the mantle, and are implicated in the generation of deep earthquakes. Experiments by Rubie and Brearley (p. 1445) show that the kinetics and mechanism of the transition from the β to the γ phase, mostly associated with subduction zones, are quite different from those for the reverse transition, which is thought to be important in rising plumes. In both cases, the change of phase is predicted to cause a local weakening of the mantle.

Hormone signaling (I)

Certain aspects of plant physiology, such as seed maturation and dormancy and stomatal function, are regulated by the hormone abscisic acid (ABA). How the cells respond to ABA has been unknown, although *Arabidopsis* mutants insensitive to ABA can lead to an understanding of the signal transduction pathway. Leung *et al.* (p. 1448) and Meyer *et al.* (p. 1452) have cloned the *ABI1* gene, and found that the wild-type gene encodes a protein that combines a putative Ca^{2+} -binding domain with similarity to serine or threonine phosphatases of type 2C. This unusual combination of functions may lead to an expla-

nation of how, for example, stomatal aperture is affected by both Ca^{2+} and ABA.

Hormone signaling (II)

The hormone estradiol signals to the nucleus by binding to the estrogen receptor (ER), a transcription factor that activates expression of a specific set of genes. Halachmi *et al.* (p. 1455) have identified a protein that may be a key mediator of estradiol-induced transcription. This protein, ERAP160, binds to the ER in the presence but not the absence of estradiol, and its binding correlates with the ability of ER to activate transcription. The interaction between ERAP160 and the ER is blocked by tamoxifen, an antiestrogen used to treat breast cancer; thus, disruption of ERA160 binding may be partially responsible for tamoxifen's therapeutic effects.

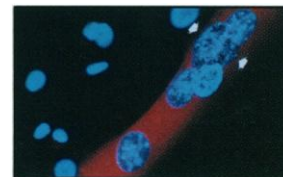
Packing it in

Bacteria may contain more than 1000 plasmids, which collectively carry as much DNA or more than the bacterial chromosome itself. How this amount of DNA is accommodated within the cell is not easy to see. Reich *et al.* (p. 1460) use x-ray

scattering experiments on bacteria and polarized light microscopy of aqueous DNA solutions to show that supercoiled DNA spontaneously forms itself into a liquid crystalline phase, allowing a higher molecular packing density.

Partial compensation

Retinoblastoma protein (Rb) is essential to terminal differentiation in mammalian cells, and mice lacking Rb die through failed development of the hematopoietic and central nervous systems. Although musculature development appears to be normal, Schneider *et al.* (p. 1467) show that muscle cells from these mice could be induced by serum growth factor to reenter the cell cycle, something which would not be possible had ter-



минаl differentiation proceeded in the usual irreversible way. The Rb-related protein p107 appeared to substitute for the lack of Rb during myogenic differentiation, but when the cells were stimulated by serum, expression of p107 fell, suggesting that the ability of p107 to keep cells out of the cell cycle can be overcome by external factors.

Dangerous knowledge

In which Glenn Seaborg's high school and undergraduate notes escape classification review by the Department of Energy, but his account of trick-or-treating with his children is expunged from the public record (Policy Forum, p. 1410).

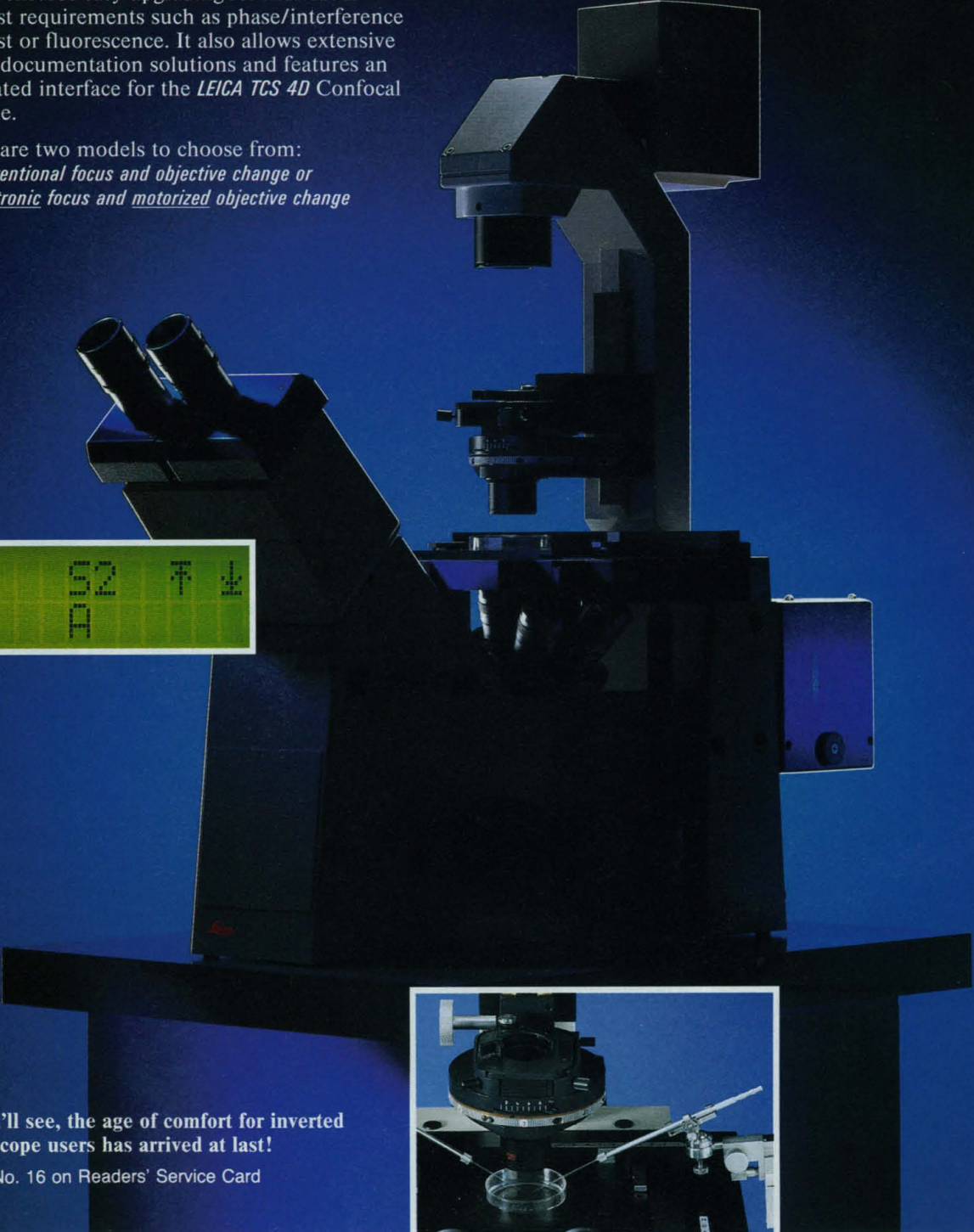
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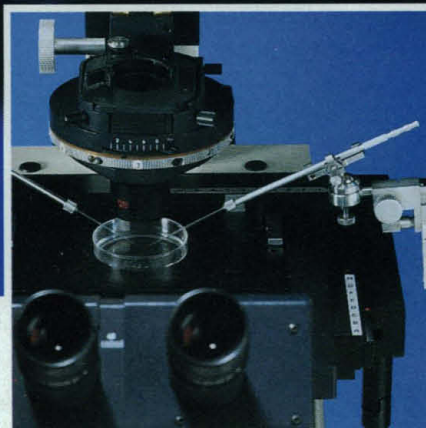
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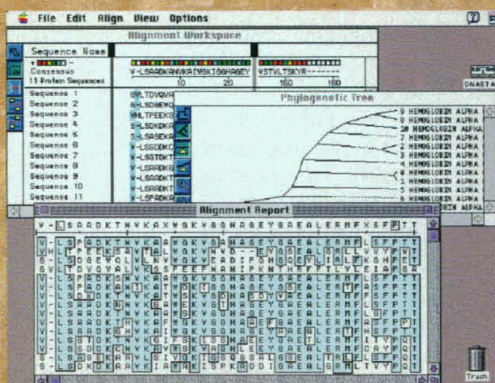
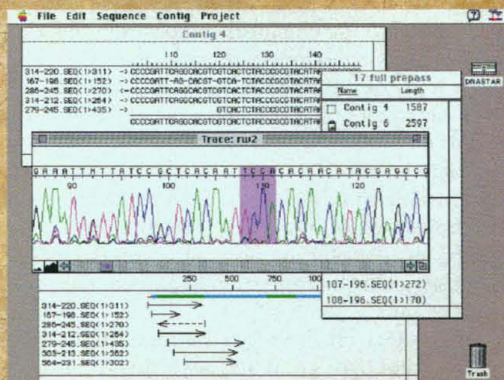
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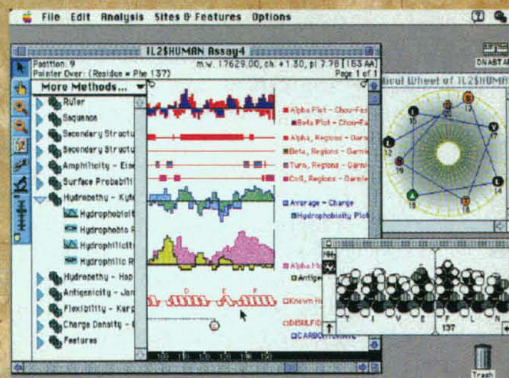
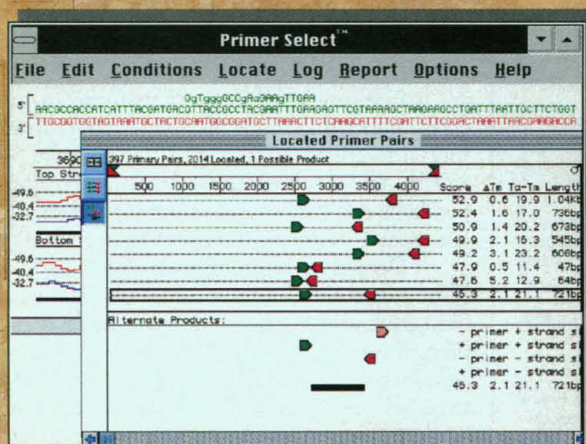
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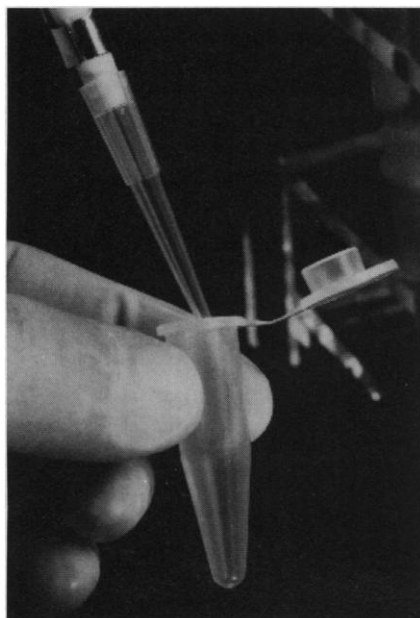
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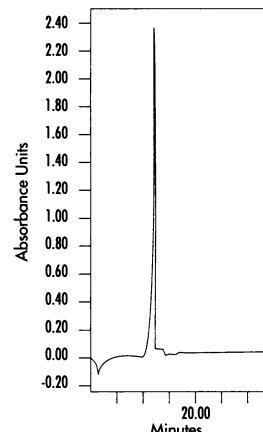
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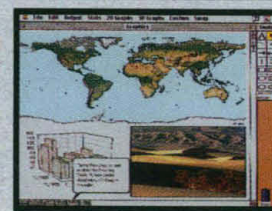
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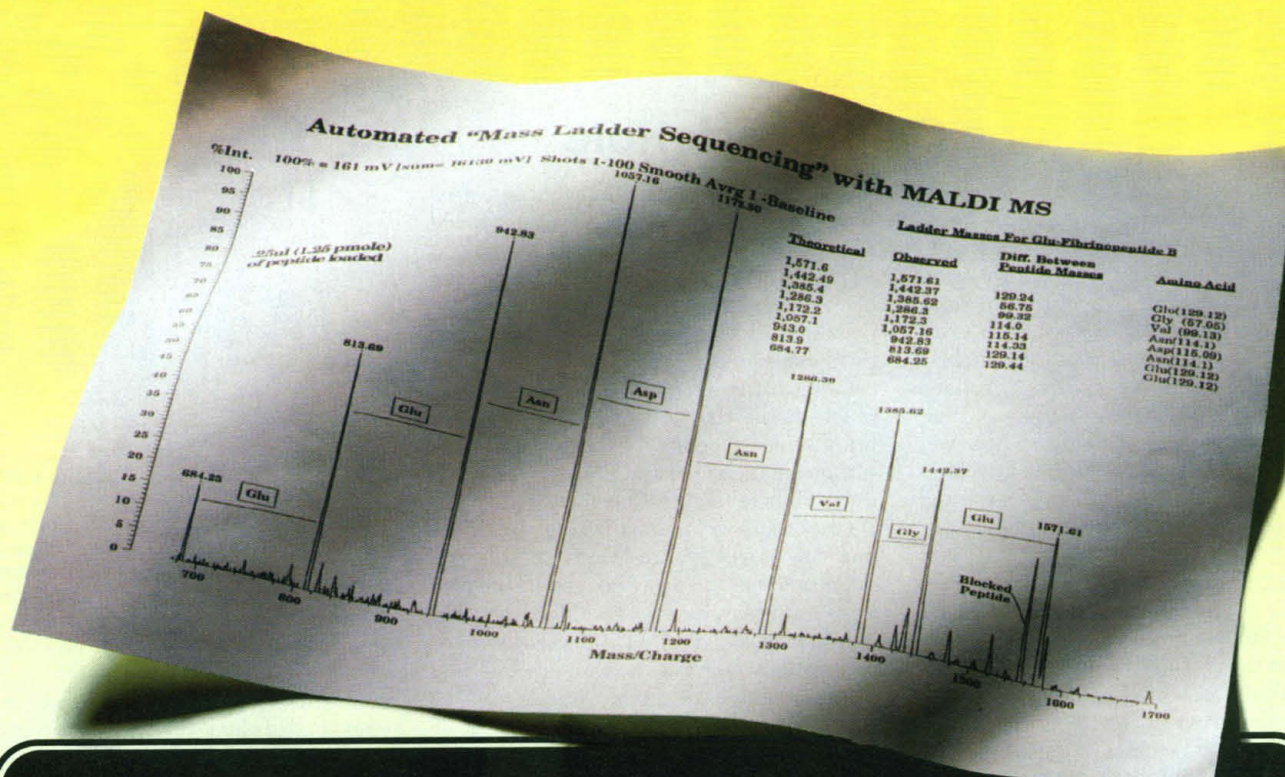
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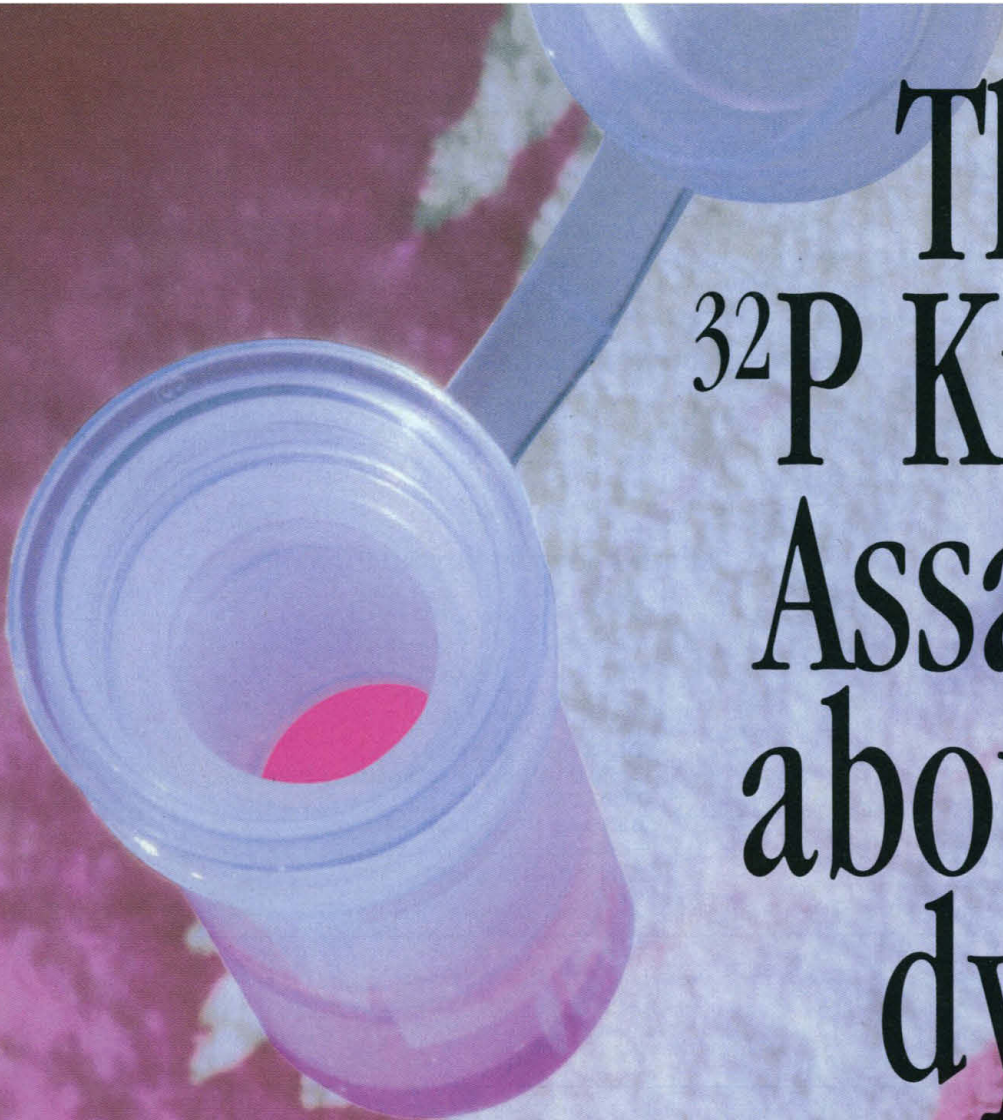
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REFERENCE REAGENTS FOR MURINE AND HUMAN CYTOKINES

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IFN-γ	IL-2	IL-6	IL-10	M-CSF	TNF-β
	IL-3	IL-7	LIF	SCF	RANTES

MURINE REFERENCE REAGENTS:

IFN-α	IL-3
IFN-β	IL-4
IFN-γ	GM-CSF
	TNF-α

TO OBTAIN THESE REAGENTS, CONTACT:

Dr. Craig W. Reynolds
Biological Response Modifiers Program
NCI-FCRDC
Building 1052, Room 253
Frederick, MD 21702-1201
FAX: 301-846-5429

Shipments will be made collect express. Please allow 3 to 4 weeks for delivery.

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Use of these materials is limited solely to *in vivo* and *in vitro* basic research studies and is **not** intended for administration to humans.

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The monoclonal antibodies are available to peer reviewed investigators, for profit institutions or commercial establishments. The 11B.11 antibody is available in either 3 or 20 mg vials. The 3ZD antibody is available in 5 or 20 mg amounts.

Investigators wishing to obtain any of these materials should send requests to:

Dr. Craig W. Reynolds
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Building 1052, Room 253
Frederick, MD 21702-1201
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All requests should be accompanied by:

(1) A brief paragraph outlining the purpose for which materials are to be used, (2) the amount desired, (3) description of investigator's peer-reviewed support. Recipients will be required to sign a Materials Transfer Agreement and to pay shipping and handling costs. Please allow 4 to 6 weeks for delivery.

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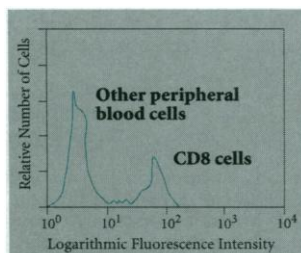
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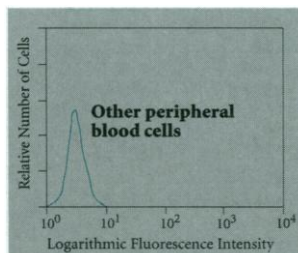
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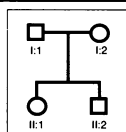
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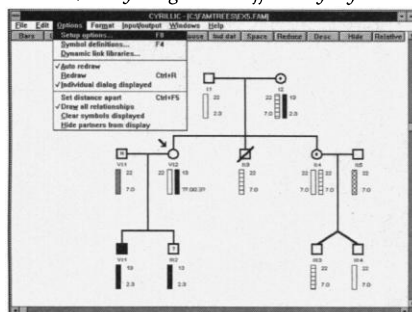
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