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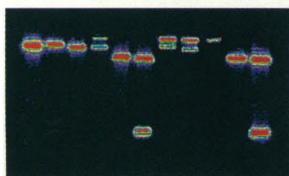
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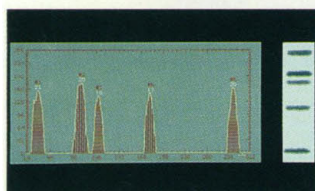
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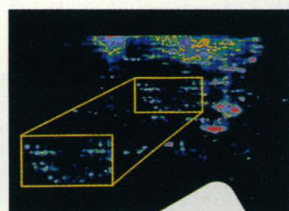
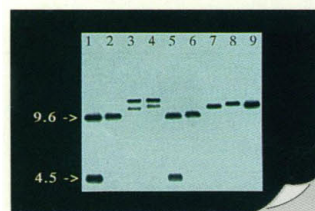
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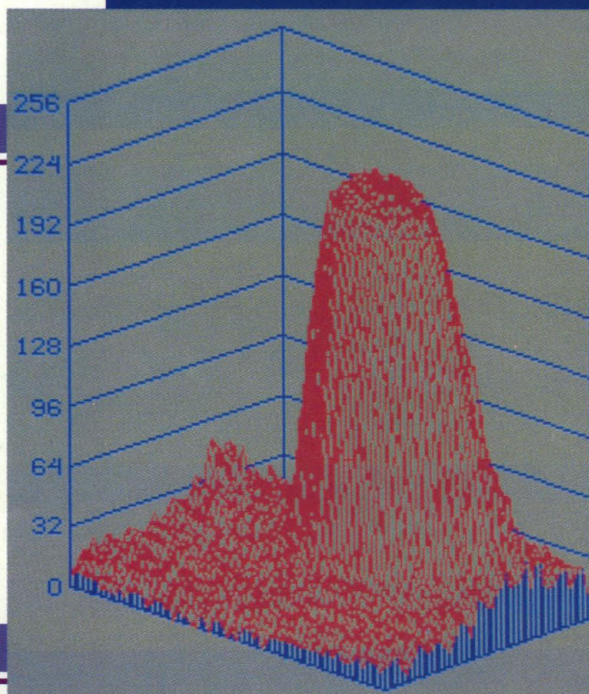
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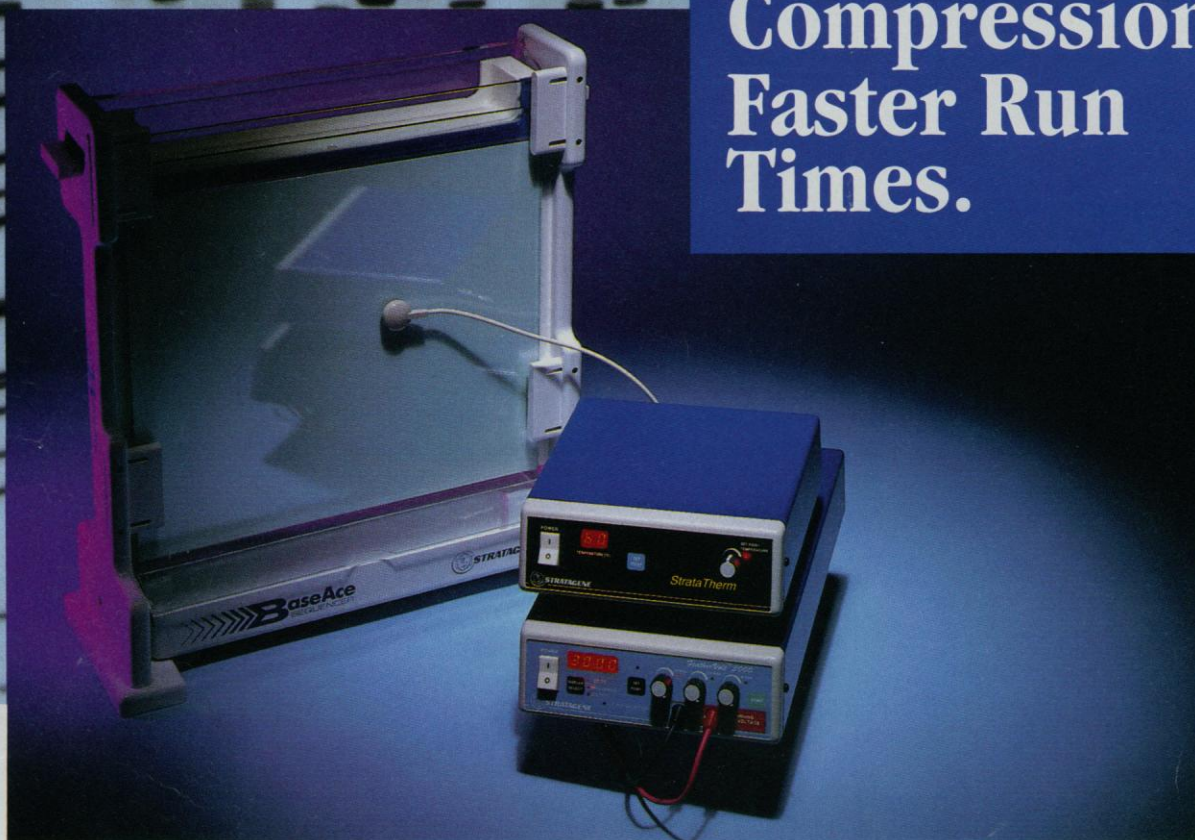
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References  
1. Fox, J.S. (1989). *Strategies* 2: 53-55  
2. Bauer, J.C., and Fox, J.S. (1991). *Strategies* 4: 6-7



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**COVER** Senescence in fruit can be prevented by inhibiting the synthesis of the fruit-ripening hormone ethylene with the use of antisense RNA in transgenic tomatoes. The normal fruits on the left produce ethylene and ripen normally; the antisense-containing fruits in the middle fail to ripen. Treatment of antisense fruits with exogenous ethylene restores ripening (fruits on the right). See page 437. [Photo by Stephen Gladfelter, Stanford University Medical Center]

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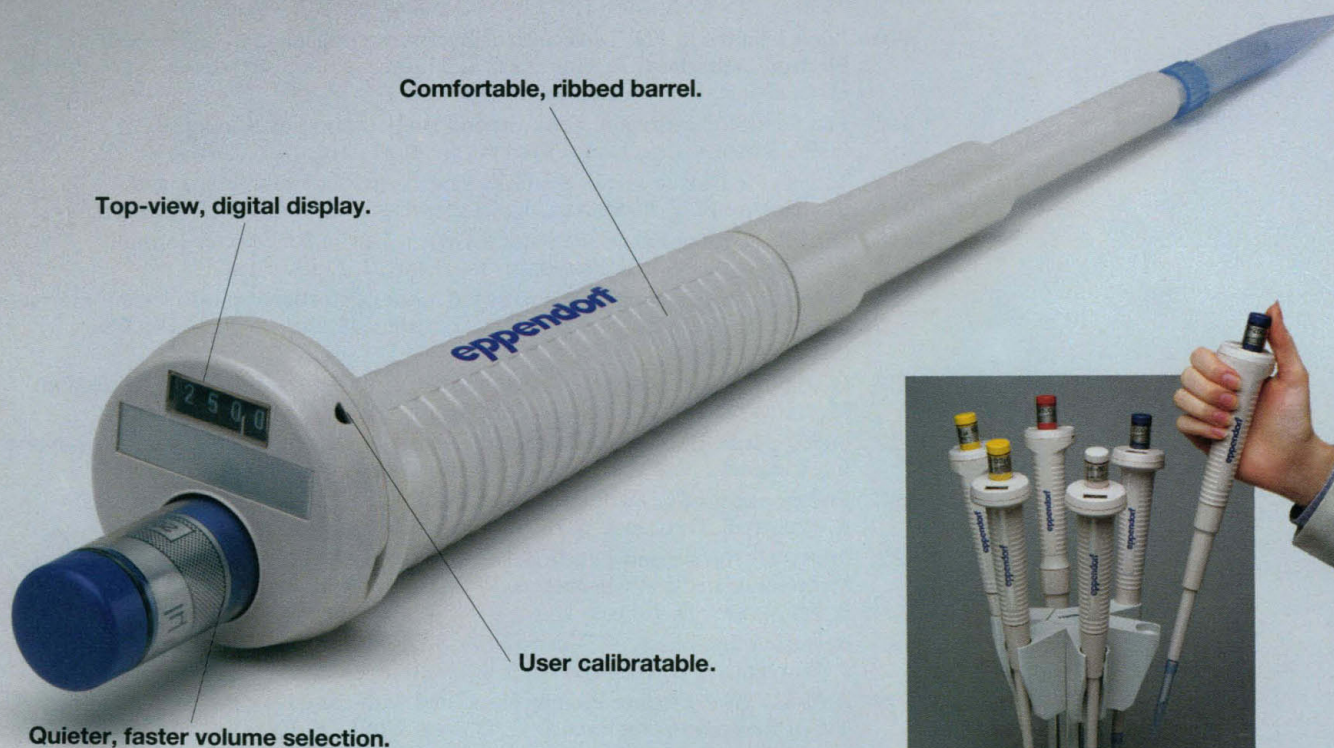
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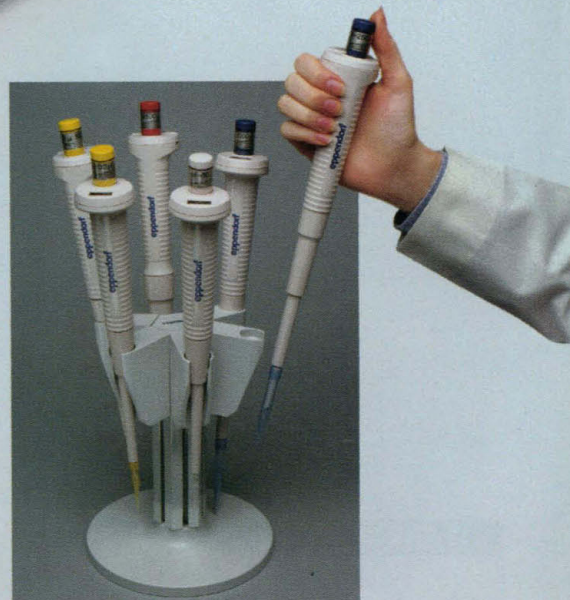
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## This Week in SCIENCE

### Medical decision-making

**D**octors and patients and their families face increasing numbers of difficult decisions regarding medical treatments. High-powered drugs and advanced high-technology equipment can keep critically ill patients alive for long periods; but the "life" extended by these interventions may in some cases not be better than death. Are there objective criteria pertaining to the likely outcome of a given treatment protocol that would facilitate the decision-making process? Knaus *et al.* illustrate for the case of critically ill hospitalized patients how objective probability estimates can be used in the selection of treatment strategies (page 389). Prediction methodology has improved greatly in recent years as large databases and sophisticated analytic procedures have become available. The inclusion of objective criteria in decision-making processes would benefit patients and decision-makers; it should also contribute to more equitable and beneficial allocation of limited health-care resources.

### Isotope heterogeneity

**O**xxygen isotope measurements are useful tracers of fluid-rock interactions. As garnet grows, a record of its interactions with fluid in the rock is preserved in isotope patterns. Chamberlain and Conrad examined garnet samples from deposits in Vermont and Utah with a laser probe and found that heterogeneity in oxygen isotopes within single grains can be as great as that observed between different rock units (page 403). The unexpectedly large variations in small samples provide insights into the geochemical processes that operate during metamorphism.

### Reservoir of AIDS viruses

**Q**uiet T cells may serve as holding tanks for latent AIDS viruses both in AIDS patients and in asymptomatic HIV-1 carriers (page 423). Bukrinsky *et al.* found that

full-length HIV-1 DNA is present in the cytoplasm of a small number of quiescent T cells in both symptomatic and asymptomatic HIV-1-infected individuals; when the cells are activated—which can occur naturally through the actions of mitogens, opportunistic organisms, or other types of inducers, and is brought about experimentally with lectins—the extrachromosomal HIV-1 DNA gets integrated into the host DNA and virus can be mass produced. Whereas in asymptomatic individuals, most of the infected cells have unintegrated HIV-1 DNA, in AIDS patients the majority of infected cells have HIV-1 DNA integrated into the host chromosome.

### Interleukin-1 and bacteria

**G**rowth of certain virulent strains of bacteria is enhanced by the mammalian protein interleukin-1 (IL-1) (page 430). IL-1 is secreted by a range of mammalian cells including those that respond during infections and inflammatory responses. It is a well-known promoter of mammalian cell growth but has not previously been suspected of enhancing bacterial growth. Porat *et al.* found that IL-1 enhanced the growth of virulent strains of *Escherichia coli* in vitro but did not affect growth of avirulent strains. Through its interactions with the bacteria, IL-1 appears to exacerbate rather than inhibit infections. Competition and saturation experiments suggested that the bacterial surface may have tens of thousands of receptors for IL-1. Understanding the effects of IL-1 on bacteria—when and how it operates—could be important in the clinical control of virulent bacterial infections.

### Serotonin receptor

**S**erotonin is an important neurotransmitter. It can exert its effects both directly by activating ligand-gated ion channels and indirectly through second messenger molecules.

There are four known receptors for serotonin that differ in their pharmacologic effects. The one that mediates the direct rapid excitatory responses is called 5HT<sub>3</sub>R. Maricq *et al.* have cloned complementary DNA for 5HT<sub>3</sub>R and have studied the properties of its protein product (page 432). On the basis of the proposed protein sequence, the 5HT<sub>3</sub>R molecule is a member of the ligand-gated ion channel superfamily of proteins. These receptors are expressed in brain tissue and tissue of the spinal cords and hearts of mice. The receptor recognizes an array of cations for which it acts as a channel. Interest in this receptor is high because it is believed to play a part in certain behavioral disorders and in side effects (such as vomiting) associated with chemotherapy; drugs that alter the actions of 5HT<sub>3</sub>R could therefore be of tremendous clinical value.

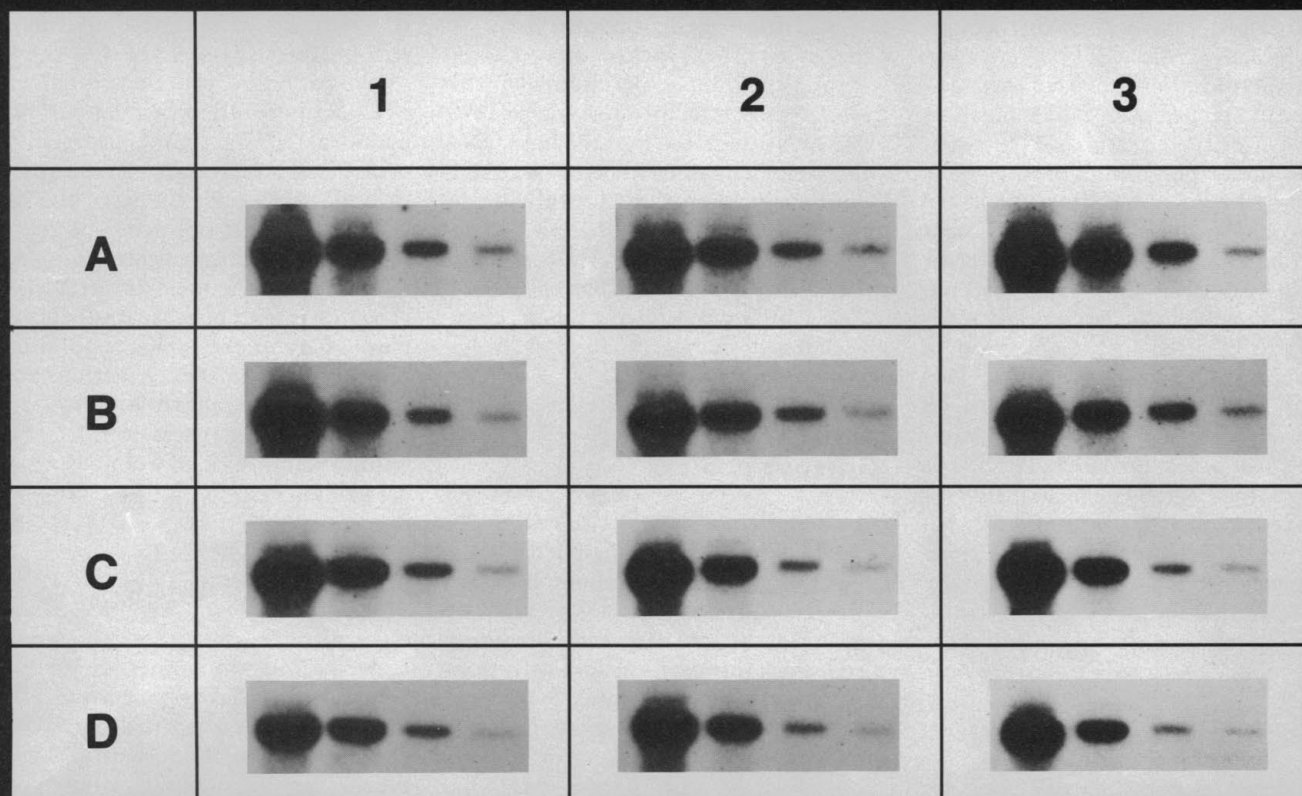
### Tomato ripening

**S**oft, aromatic, juicy red tomatoes: first they ripen, then they rot. One estimate has it that some 50% of fruit worldwide eventually spoils. Thus there is intense interest in discovering means to control the ripening process and prevent spoilage. In normal tomato plants, ripening is preceded by a burst of respiration and an increase in the production of the plant hormone ethylene. Oeller *et al.* show that ethylene is in fact the driving force behind the ripening and not the outcome of it (page 437). The immediate biochemical precursor of ethylene is a compound called ACC; the precursor of ACC is SAM. The conversion of SAM to ACC is catalyzed by the enzyme ACC synthase. When tomato fruits were treated with anti-sense RNA molecules that blocked the production of ACC synthase, SAM could not be converted to ACC, ethylene was not produced, and the senescence of the tomato was prevented. These experiments raise the possibility that fruit ripening might someday be controllable on a commercial scale through the use of transgenic plants. ■ RUTH LEVY GUYER



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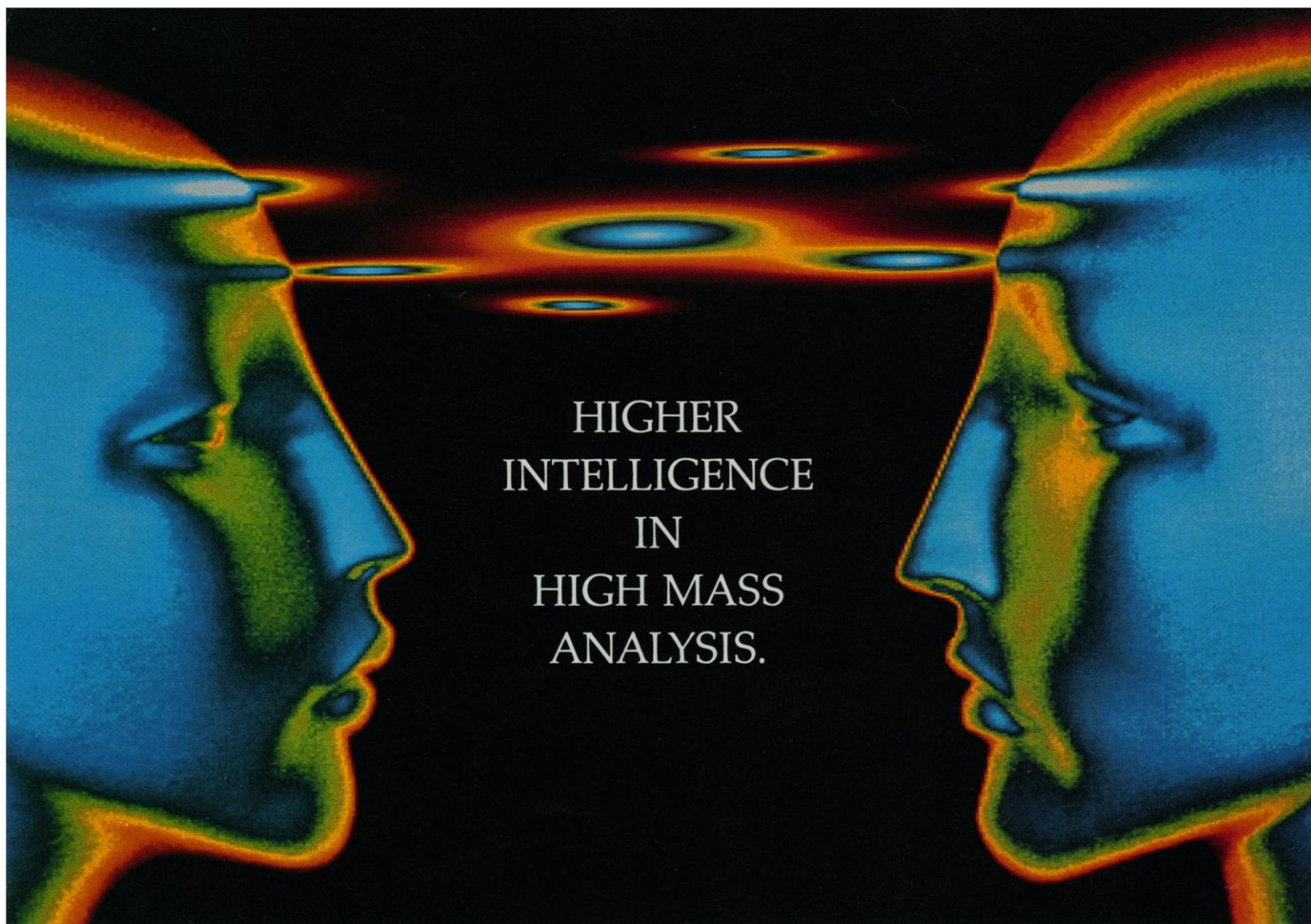
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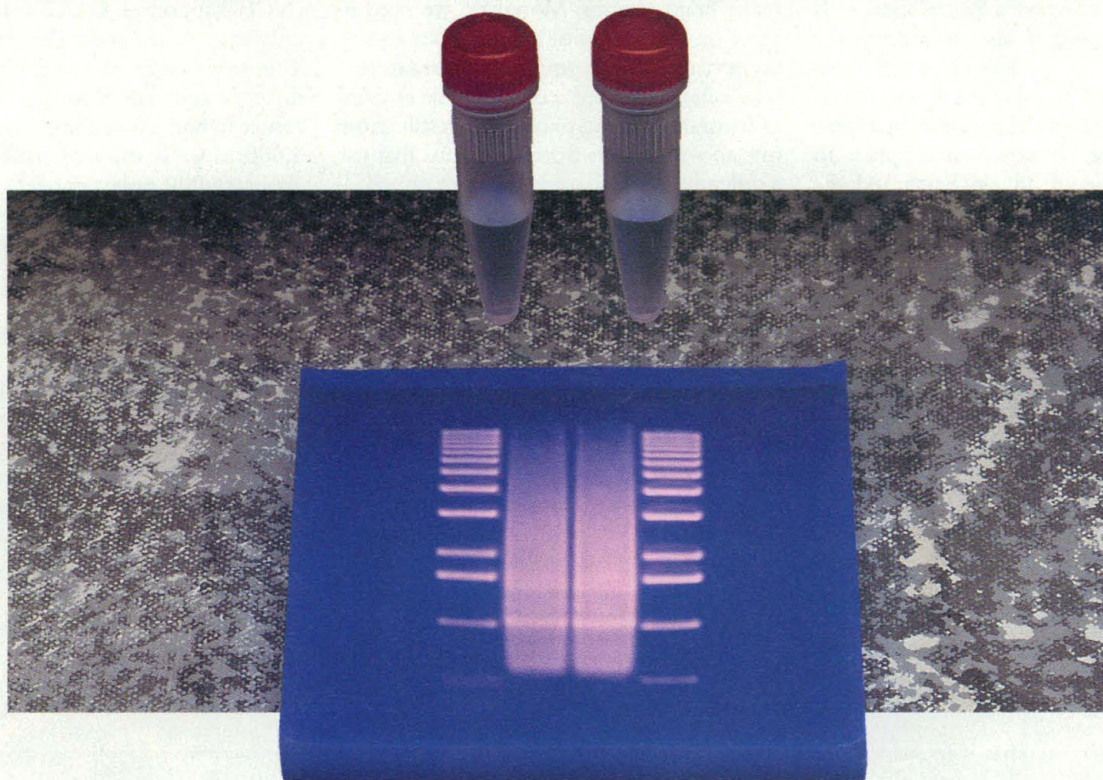
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# Which RNA Sample Contains The Highest Percentage Of PolyA+?



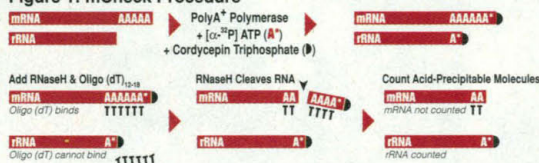
## mCheck™ Can Tell You Before It's Too Late.

The mCheck™ kit is the only system that determines the percentage of PolyA+ RNA in an RNA sample. Intact PolyA+ RNA is required for reactions such as cDNA synthesis, micro-injection, RNase protection studies and in-vitro translation. Relying on O.D. readings and gels to check RNA preparations can result in wasted time, money and sample since these methods cannot determine PolyA+ percentage.

- mCheck accurately determines PolyA+ percentage before time consuming and expensive reactions are started
- mCheck is a simple, reproducible assay that is essential for applications where intact mRNA is required
- mCheck can differentiate between intact mRNA, ribosomal RNA, DNA and degraded message

The mCheck™ kit employs a novel technique to determine PolyA+ percentage and should be used to test all RNA preparations. To determine the quality of your mRNA samples before it's too late, rely on the mCheck kit.

Figure 1: mCheck Procedure



In the presence of cordycepin triphosphate, PolyA polymerase adds 1-2 radiolabelled ATP's to 3' ends of all molecules. Oligo dT binds to RNA with true PolyA+ tails and RNase H cleaves the resulting hybrids. TCA precipitable counts are proportional to polyA+ RNA in the sample.

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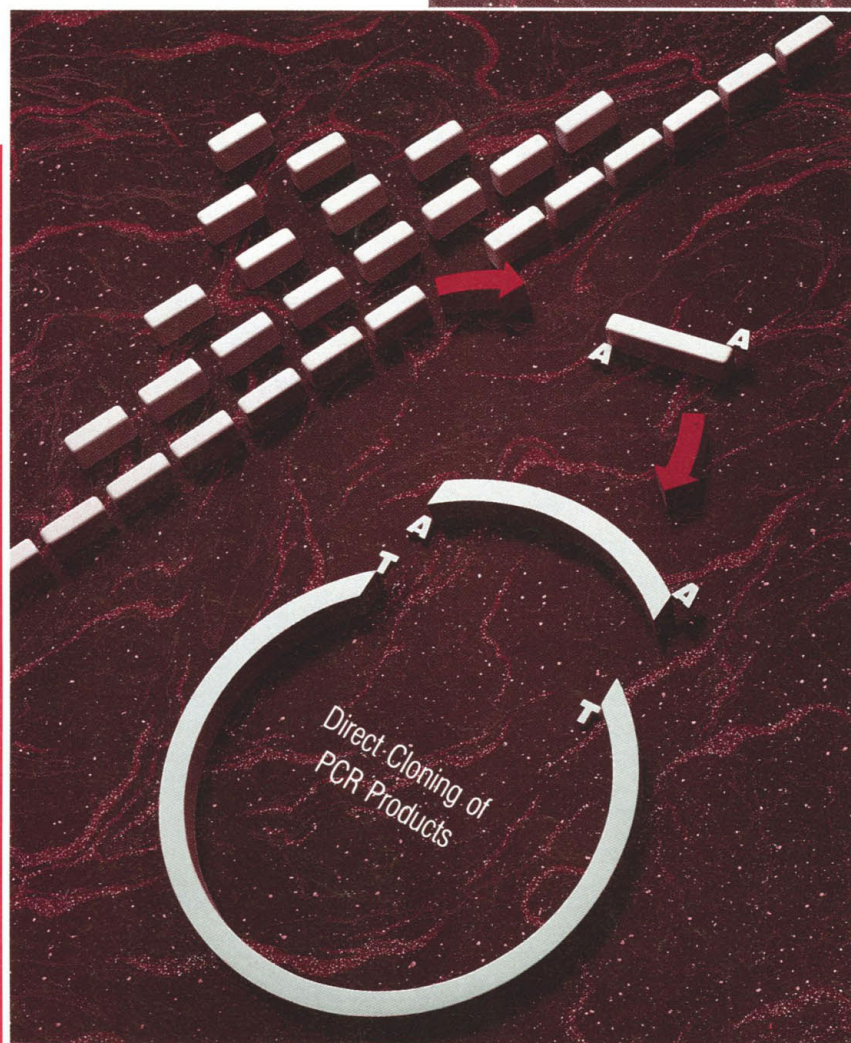
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## APPLICATIONS FOR SCIENTIFIC VISITS TO THE USSR & EASTERN EUROPE

The NAS invites applications from American scientists who wish to visit the USSR, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia. Applicants must be U.S. citizens and must possess doctoral degrees or their equivalent six months prior to the requested beginning date of their visits in physics; chemistry; mathematics and computer sciences; earth, atmospheric, and oceanographic sciences; agricultural, forestry, fishery, and plant sciences; biological sciences; environmental sciences; engineering; archeology and anthropology; geography; psychology; science and technology policy; and the history and philosophy of science. Projects in the economic and social sciences that involve development of new analytical methodologies will be considered on a case-by-case basis. The program has a special emphasis for young investigators.

Applicants for the project development visits need to demonstrate that joint proposals for collaborative research will be prepared during their visits for submission to the National Science Foundation for funding.

### Project Development Visits in 1992

The program of two-week project development visits will support two rounds of visits: April through August 1992 and August through December 1992. **Applications for this program must be postmarked no later than November 30, 1991, for the first round and February 29, 1992 for the second round.**

### New Approach in 1993

American scientists interested in visiting the USSR or Eastern Europe in 1993 may apply to the NAS for travel grants to help defray the costs of the visits. Also, American scientists interested in receiving scientific colleagues from the USSR or Eastern Europe may apply for travel grants to help support the visitors. Applicants are expected to make all logistical and administrative arrangements for the visits since NAS will no longer organize exchange programs through counterpart academies of sciences.

**Application deadlines for these programs are February 29, 1992, for long-term research (one to six months) visits in 1993; September 30, 1992 for project development visits to take place between January and June 1993; and February 28, 1993 for project development visits to take place between July and December 1993.**

Address application requests to:  
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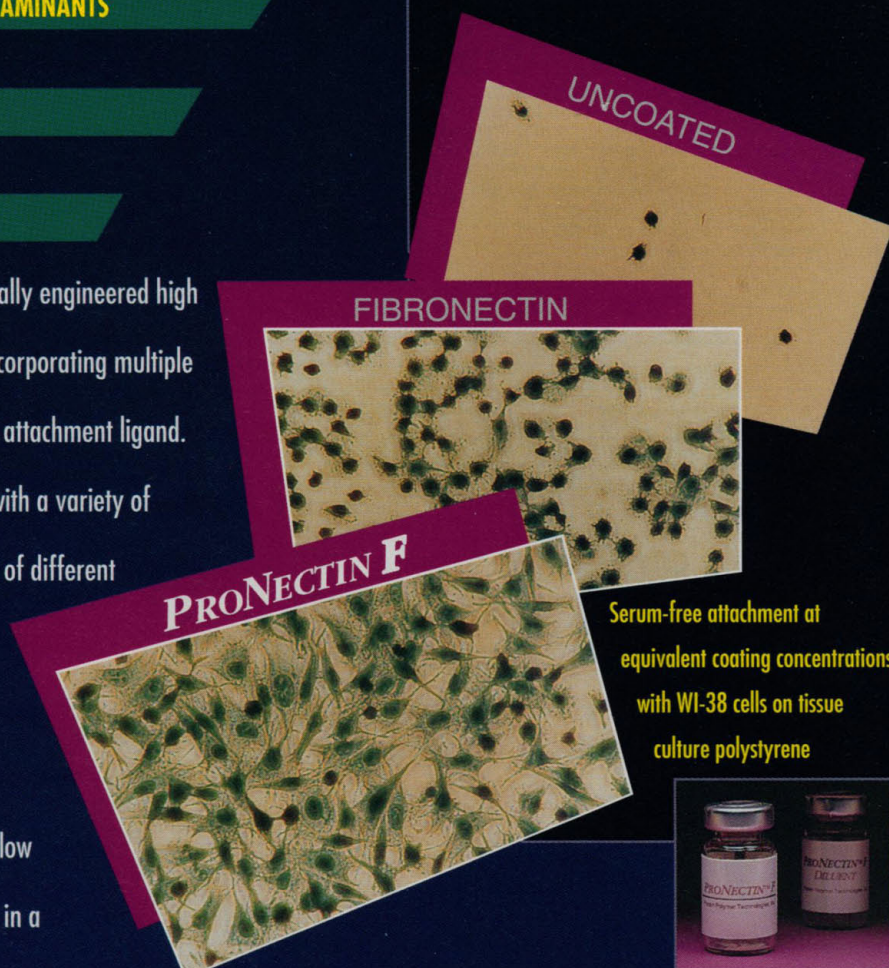
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