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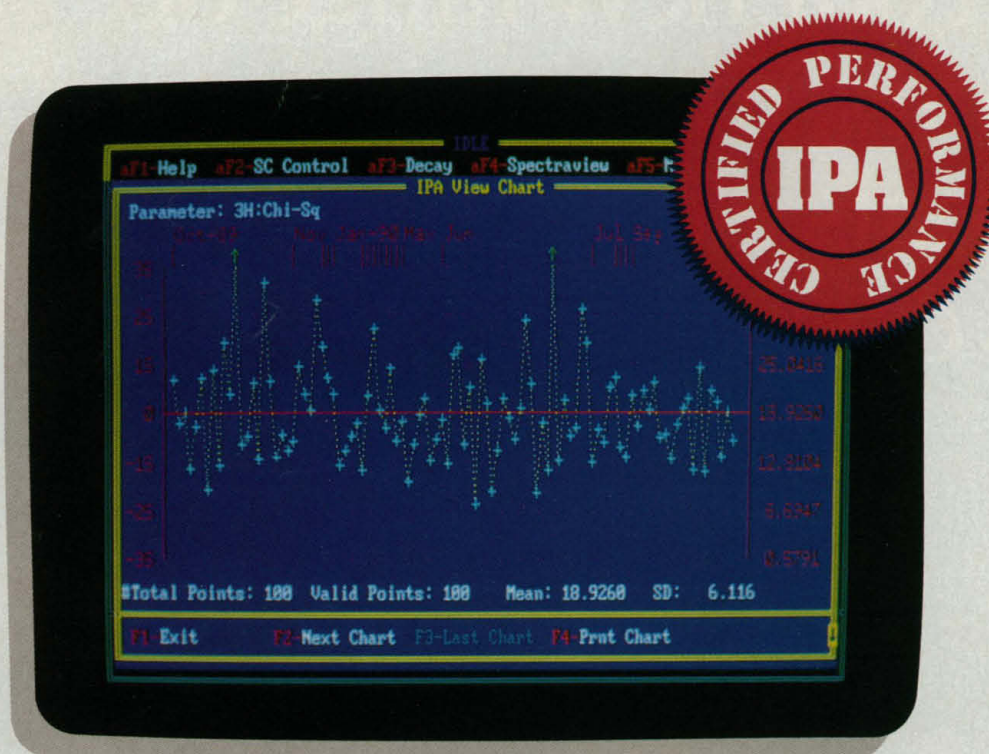
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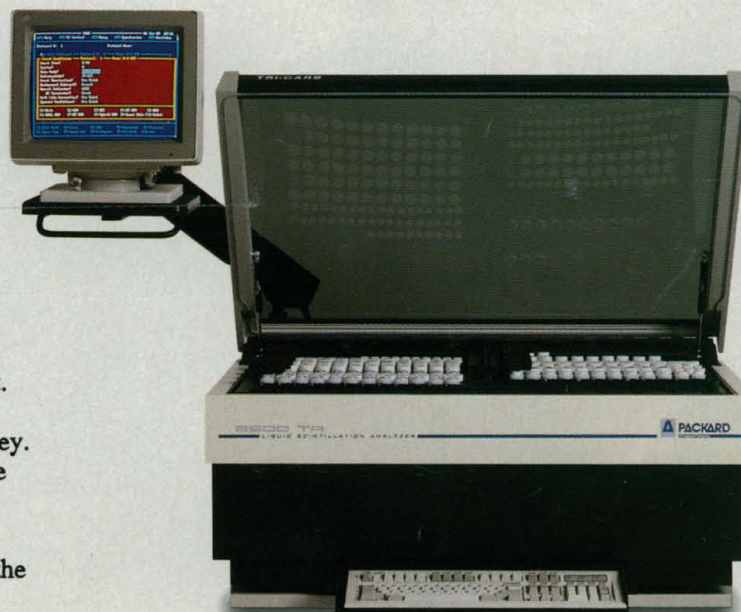
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Parasitic virulence varies
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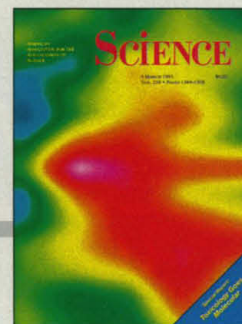
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COVER

Zonally averaged latitudinal spreading of the increase (yellow, orange, and red) in reflected shortwave radiation measured by the Earth Radiation Budget Experiment after the eruption of Mount Pinatubo in June 1991. The vertical scale is latitude from 40° S to 40° N, and the

horizontal scale is time from May to November 1991. Volcanic aerosols reflect some of the sun's energy back to space; as a result, Earth's climate is cooled. See page 1411. [Image: P. Minnis *et al.*, Atmospheric Sciences Division, NASA Langley Research Center]



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A chip of a semiconductor

■ Indicates accompanying feature

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Aerosol cooling by Mount Pinatubo

The eruption of Mount Pinatubo in June 1991 injected gases and ash into the stratosphere. Aerosols produced from this eruption acted to cool global climate, primarily by acting to reflect more of the incoming solar radiation. Minnis *et al.* (p. 1411) use measurements from the Earth Radiation Budget Experiment to quantify these and other changes in Earth's radiation budget that occurred after the eruption. Cooling increased through September 1991 and was related to both an increase in albedo over clear areas resulting directly from the presence of the aerosol as well as an increase in the albedo of clouds as the aerosols acted as nucleation sites for cloud droplets.

Creating a piece of a crystal core

A cadmium sulfide (CdS) complex containing a large number of Cd and S atoms has been made that has a structure resembling bulk CdS, a semiconductor. Herron *et al.* (p. 1426) found that recrystallizing $\text{Cd}_{10}\text{S}_4(\text{SC}_6\text{H}_5)_{12}$ with dimethylformamide (DMF) formed $\text{Cd}_{32}\text{S}_{14}(\text{SC}_6\text{H}_5)_{36}\text{DMF}_4$. The core of this large cluster is similar to a 12 angstrom spherical piece of CdS in the sphalerite form. The cluster has luminescence and exciton properties similar to those of extended solids.

Helium and neon inside C_{60}

Fullerenes can be prepared by arc heating graphite rods in low pressures of helium. Saunders *et al.* (p. 1428) show that heating C_{60} to high temperatures releases helium. The amount corre-

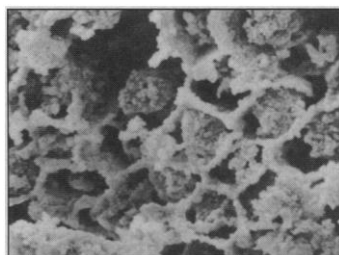
Receptor domains as receptor antagonists

When many hormones or neurotransmitters bind to their cellular receptors, they cause activation of heterotrimeric guanine nucleotide binding proteins (G proteins). The G proteins couple the receptors to enzymes that are activated in response to the bound ligand. Luttrell *et al.* (p. 1453) expressed a gene encoding a fragment of the α_{1B} -adrenergic receptor in cells along with the wild-type receptor. The fragment contained the region of the receptor primarily responsible for interaction with G proteins, and its presence specifically inhibited signaling by the full-length receptor. Even signals mediated by the same G protein through interaction with other receptors were not affected. The results suggest that it may be possible to design drugs that act as very specific antagonists of such receptors.

sponds to about 1 in 10^6 molecules incorporating a helium atom and is consistent with a simple model based on cavity volume. The activation energy for release suggests a reversible bond-breaking event in the fullerene cage. Neon can be incorporated into C_{60} by using a neon atmosphere.

From soft tissue to fossil

Some of the most spectacular and valuable fossils in the geologic record preserve intricate details of soft tissues of extinct organisms. Such fossils often consist of calcium phosphate,



and it has been thought that elevated levels of phosphate in sediment pore waters were needed for this process. Briggs and Kear (p. 1439) show that the calcium and phosphate present in tissue itself can be sufficient to create a fossil. They studied the decay of shrimp un-

der simulated fossilization conditions and found that the shrimp became partially mineralized with amorphous calcium phosphate, especially under anaerobic conditions. This mineralization process preserved morphological details of the soft tissue.

Antigen receptors and infection response

Certain diseases caused by parasitic infection, such as leprosy, tuberculosis, and leishmaniasis, progress in a highly variable way; some infected individuals are asymptomatic, and others manifest most or all of the symptoms of the disease state. Reiner *et al.* (p. 1457) analyzed the types of T cell receptors (TCRs) used by mice that were infected with the disease-causing agent of leishmaniasis, *Leishmania major*. Mice that responded by mounting an inappropriate T helper 2 CD4^+ attack developed progressive leishmaniasis and yet expressed the same TCRs as the cells from mice that produced a healing T helper 1 response. Because the same epitope can drive both immunity and progression of disease, candidate vaccine antigens from immune individuals might actually exacerbate the disease.

Targeting killers

Interleukin-2 (IL-2) can activate a killer cell response when it is added to peripheral blood in vitro. The lymphokine-activated killer (LAK) cells that are generated are cytotoxic to colon cancer cells in vitro but appear to have little effect when used in clinical trials against advanced human colon cancer. One potential problem is that an insufficient number of LAK cells arrive at the tumor mass. Takahashi *et al.* (p. 1460) show that the effectiveness of LAK cells can be improved by targeting them to the tumor cells with monoclonal antibodies (MAbs). They conjugated LAK cells to MAbs to a cell surface antigen of the tumor cells with polyethylene glycol. Such cell conjugates were more effective against human colon adenocarcinomas established in the livers of severe combined immunodeficient (SCID) mice than either the LAK cells or the MAbs alone.

Vesicle budding and GTPase activation

Proteins are transported in vesicles that bud from the membranes of the endoplasmic reticulum. The formation of such transport vesicles in the yeast *Saccharomyces cerevisiae* requires binding and hydrolysis of guanosine triphosphate (GTP) by a GTP-binding protein called Sar1p. Yoshihisa *et al.* (p. 1466) examined the interaction of Sar1p with another protein, Sec23, that is also required for vesicle budding. They found that Sec23 activated the guanosine triphosphatase (GTPase) activity of Sar1p but not that of other small GTP-binding proteins. Sec23 has no sequence similarity to other GTPase-activating proteins and thus may be an example of a new class of these enzymes.

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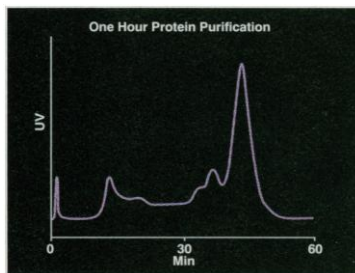
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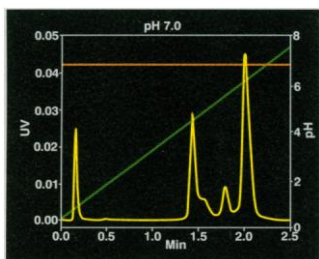
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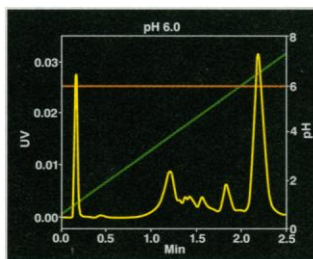


Anion exchange separation of recombinant protein with conventional LC column and instrumentation.

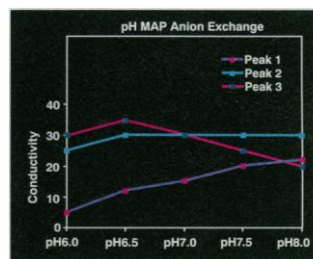
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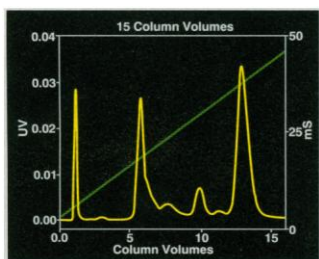
We began by running the separation at several pHs.



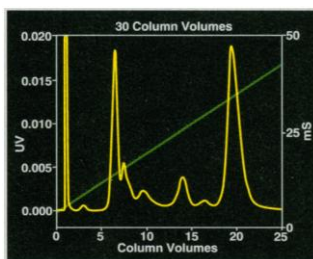
Confirmed the optimum pH at 6.0.



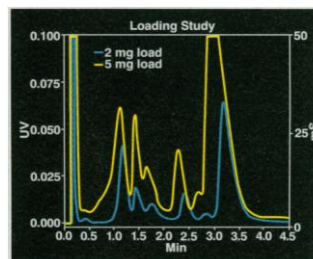
Plotted results from built-in spreadsheet.



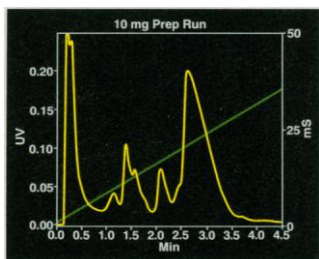
Tested gradient slopes for improved resolution.



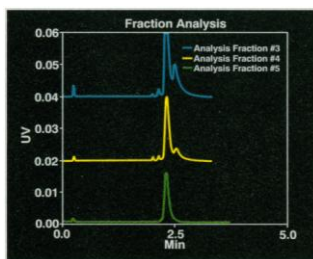
Selected 30 column volume gradient as optimum.



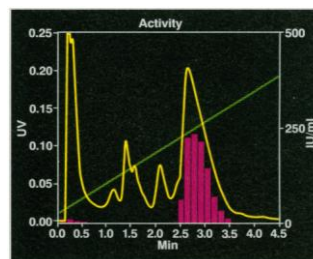
Studied the effect of loading at 2 mg and 5 mg.



Ran a 10 mg prep. Collected fractions.



Analyzed fractions by reversed phase.



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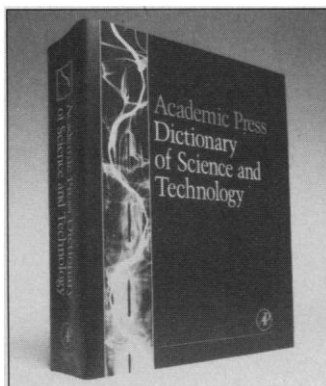
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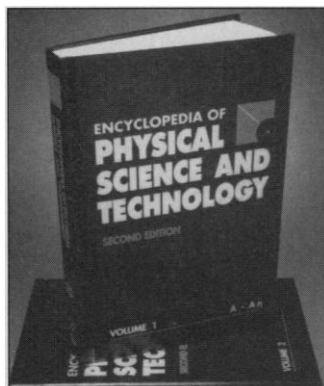
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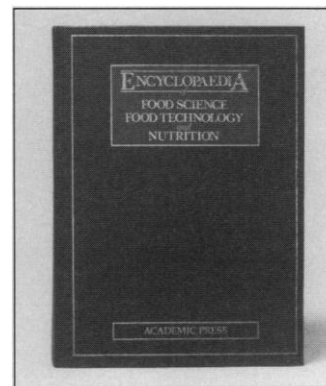
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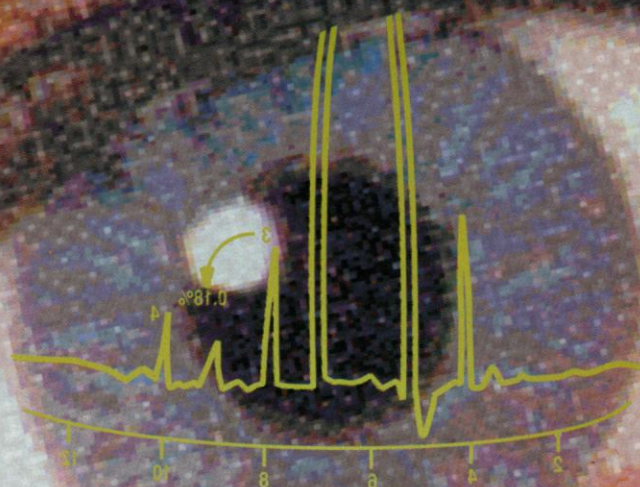
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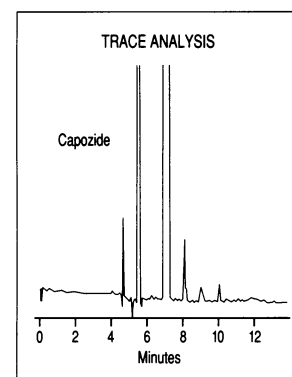
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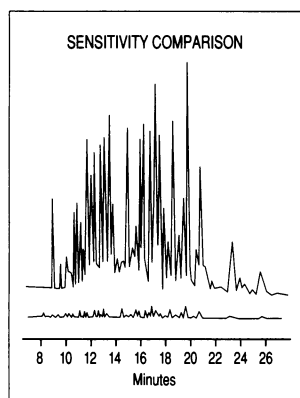
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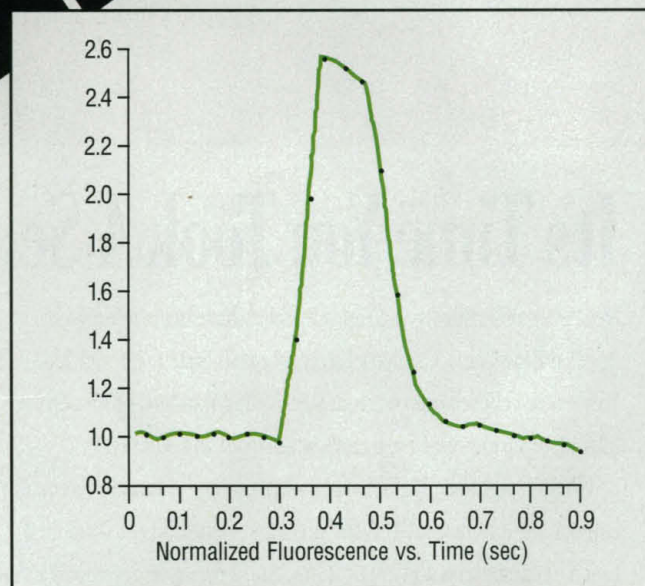


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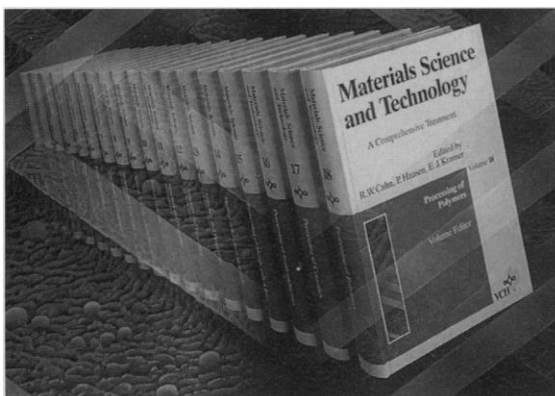
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