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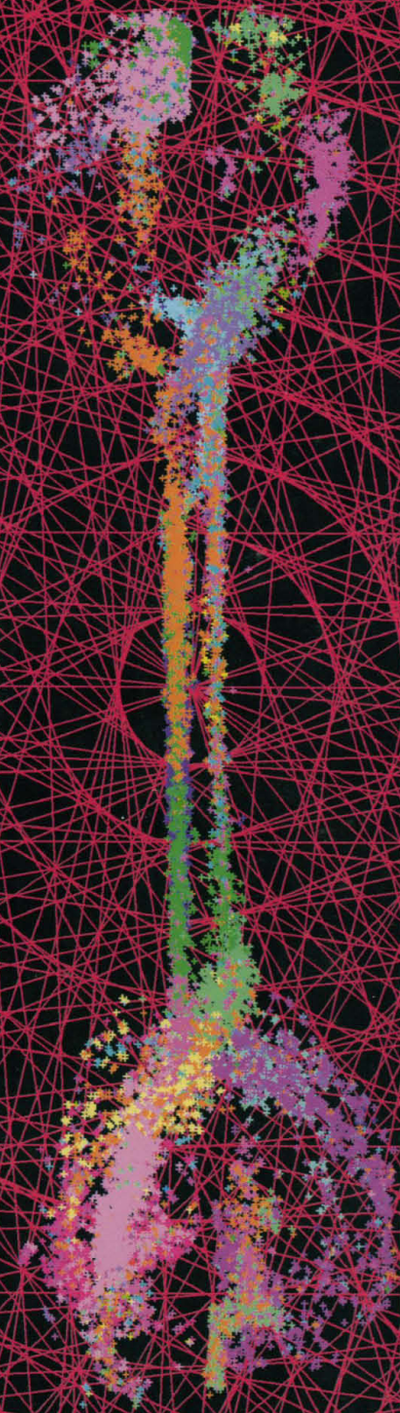
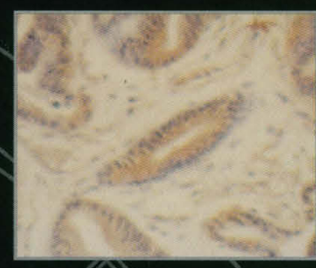


QUALITY ANTIBODIES FOR SIGNAL TRANSDUCTION RESEARCH

Anti-SHC,
Western blot.



Anti-endothelial cell
Nitric oxide synthase (NOS),
immunocytochemistry.

Picture provided by
Drs. J. Roberts and S. Sladek.

STRUCTURAL PROTEINS

PROTEIN Kinase C

TYROSINE KINASES

TUMOR MARKERS

Ras pathway

MAP Kinase pathway

PHOSPHATASES

NOS

SUBSTRATES

PHOSPHOTYROSINE

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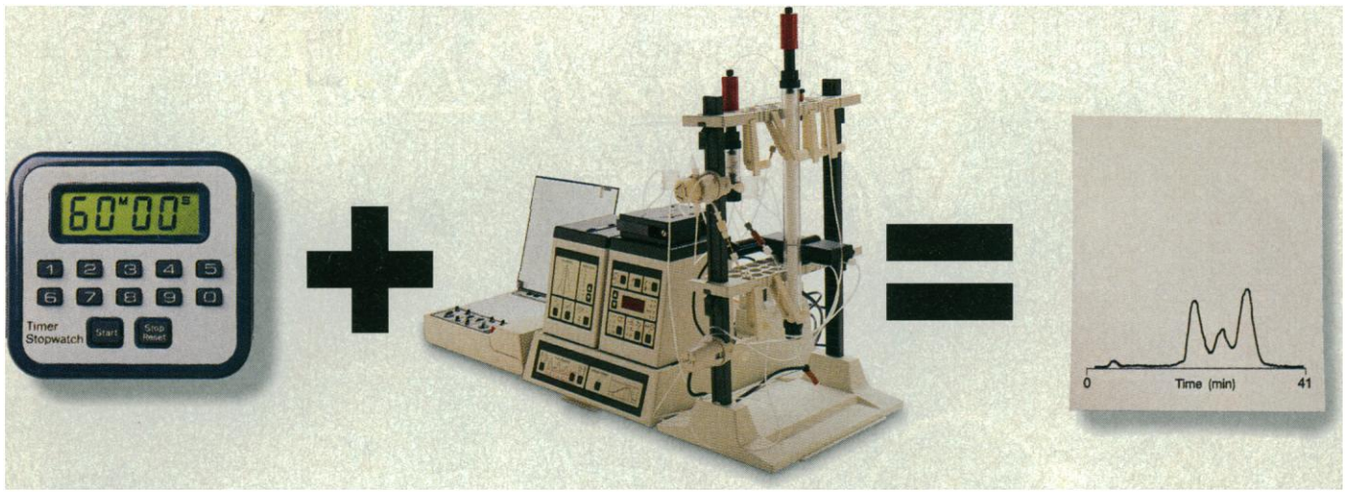

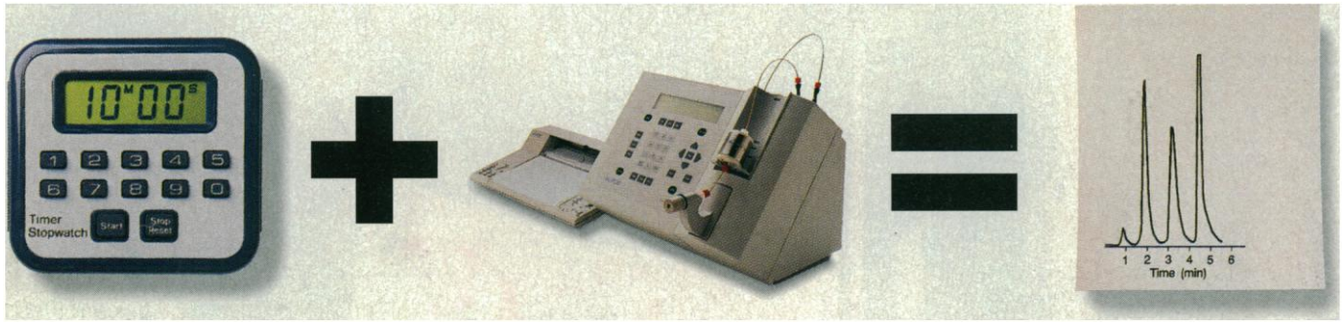

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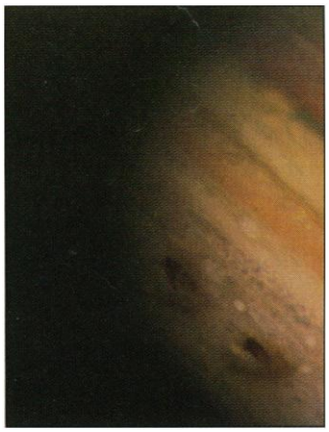
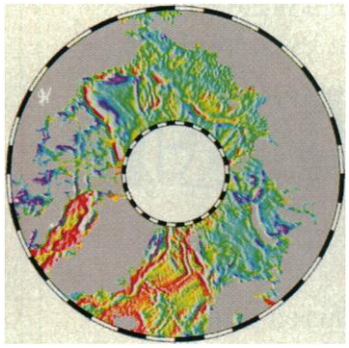


587, 601 & 625
All eyes on Jupiter



621
Plate tectonics beneath the Arctic ice

NEWS & COMMENT

RESEARCH NEWS

PERSPECTIVES

ARTICLES

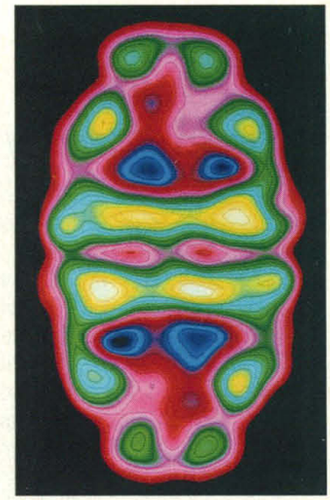
RESEARCH ARTICLE

DEPARTMENTS

COVER

A hippocampal neuron (different colors represent different neurons) was active when a rat was located at the position of each cross on the dumbbell-shaped track. During the subsequent sleep period the firing pattern of these neurons was re-expresed, and correlations between pairs of these neurons are represented by the red lines. The re-expression of firing patterns may contribute to the storage of memories. See Reports on pages 676 and 679 and News story on page 603. [Image: M. Wilson and B. McNaughton]

REPORTS



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Football chaperones

◩ Indicates accompanying feature

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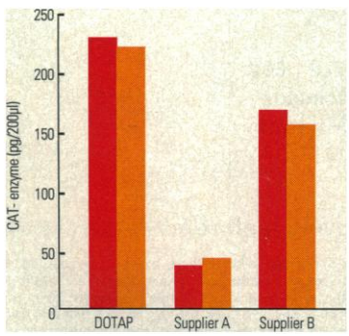

Comparison of transfection efficiencies of different liposome-mediated reagents. COS-1 cells at 60% confluency were transfected for 8 hours with 5 µg pSV2-CAT DNA in 6 ml of medium containing **10% Fetal Calf Serum**. Liposomal transfection reagents from Boehringer Mannheim, Supplier A, and Supplier B were used in the transfection. After 48 hours of stimulation, the cells were lysed and analyzed for CAT expression with the Boehringer Mannheim nonradioactive CAT ELISA. The CAT expression indicates the efficiency of the transfection. The reproducibility of results is indicated by the orange bars (Experiment 1) and gold bars (Experiment 2).

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Beneath the ice

The tectonic history of the Arctic Ocean Basin has been difficult to study because of the extensive cover of sea ice. Laxon and McAdoo (p. 621) present a gravity map of the Arctic Ocean derived from satellite altimetry of sea ice. The data, essentially a view of the distribution of mass of the oceanic crust and mantle underlying the sea floor, allow resolution of active and extinct spreading ridges. These features can be connected with those of adjacent land masses such as Alaska. One extinct spreading ridge is indicated beneath the sediments of the Canada Basin.

Jovian troposphere

Infrared observations of Jupiter that span 13 years have been used by Orton *et al.* (p. 625) to map variations in the temperature of the planet's troposphere, a region in which both radiation and convection influence atmospheric dynamics. Seasonal variations related to Jupiter's 12-year orbital period are evident, but there is also an apparent quasi-periodic temperature oscillation about the equator, on a time scale of 2 to 5 years, along with individual thermal features to the north and south. Some of the structures observed in the troposphere correlate well with known stratospheric features and indicate the presence of strong vertical shear flows.

Stress and impact

Nanotubes of carbon exhibit a wide variety of morphologies—they can be straight, twisted, or even form tight coils. Amelinckx *et al.* (p. 635; see the Perspective by Weaver, p. 611) present a growth model that accounts for these differences in terms of the stresses that build up in the growing tube. Although fullerenes may have only been recently produced in the lab, their presence is of old. Becker *et al.* (p. 642) have isolated fullerenes from a carbon-rich layer associated with the 1.85-billion-year-old Sudbury impact structure in Ontario, and Heymann *et al.* (p. 645) found C_{60} in soot from a Cretaceous-Tertiary boundary layer.

Encephalitis and autoimmunity

Rasmussen's encephalitis is a rare childhood disorder that causes seizures, dementia, and hemiplegia and that is usually treated by removing the affected cortical hemisphere. Glutamate and other excitatory amino acids have been implicated in diseases such as epilepsy, so Rogers *et al.* (p. 648) immunized rabbits with portions of the extracellular domain of glutamate receptors (GluRs) to generate antibodies. What they found was that rabbits immunized with the GluR3 protein developed seizures and histopathological features similar to Rasmussen's encephalitis. A correlation was found for the presence of serum antibodies to GluR3 in children with this disease. One child treated by plasma exchanges showed a temporary decrease in seizure frequency.

Symmetric chaperonins

Protein folding in vivo is often assisted by chaperonin proteins. The current model for how the GroEL and GroES chaperonins work is that unfolded proteins bind and fold in a hollow formed by two seven-unit GroEL rings, to which a seven-unit GroES "cap" and adenosine triphosphate (ATP) or diphosphate (ADP) are bound. Structural and kinetic data in three reports call certain aspects of this model into question. Azem *et al.* (p. 653) and Schmidt *et al.* (p. 656) present cross-linking and electron microscopy evidence that a symmetric complex with two $GroES_7$ caps ("football-like" structures) forms in the presence of ATP but not ADP and constitutes a fully functional chaperonin. The unfolded protein apparently binds to the outside of this complex because the central $GroEL_{14}$ cavity is blocked. Todd *et al.* (p. 659) present a kinetic analysis and a model for how the components of this heteromeric complex coordinate the hydrolysis of ATP; the unfolded protein plays a passive role.

First steps

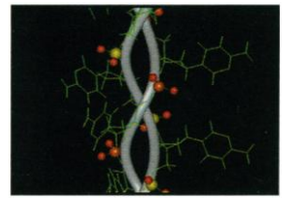
During the Devonian about 380 million years ago or so, it is thought that vertebrate tetrapods first evolved and walked on land. Daeschler *et al.* (p. 639) describe an early tetrapod shoulder girdle recovered from the Upper Devonian rocks in North America. The complexity of the shoulder girdle implies that experimentation with limb design occurred early in this evolutionary leap.

Running gears

Runners adopt a wide variety of styles to get from point A to point B as quickly as possible. Carrier *et al.* (p. 651; see Random Samples, p. 608) present a mechanical analysis of the foot during running. They find that efficiency is optimized by changing the gear ratio at which muscular force generated by the leg is transmitted to the foot. The gear ratio changes during the step as a result of the forward movement of the point of contact of the foot with the ground, reaching a maximum at the point of lift-off from the toes.

Turned around

The interaction of the coat protein of the Pf1 virus, a filamentous phage, with the single-strand of DNA that it encapsulates, produces one of the most twisted and extended DNA structures known. The structural model of Liu and Day (p. 671)



places the phosphates on the inside of two opposing DNA strands, with the bases directed out. Both the DNA and protein helices have the same pitch.

On triplet repeats

Triplet repeats are sets of three nucleotides that are arranged in tandem in portions of the genome. The cytosine-thymine-guanine triplet occurs in myotonic dystrophy, and the number of repeats is correlated with severity of the disease and age of onset. Wang *et al.* (p. 669) show that, in vitro, nucleosomes occur preferentially at the site of these repeats as assessed by electron microscopy. Nucleosomes are protein-DNA structures that can inhibit gene expression, suggesting that this physical association may underlie the physiological consequences of these repeats.

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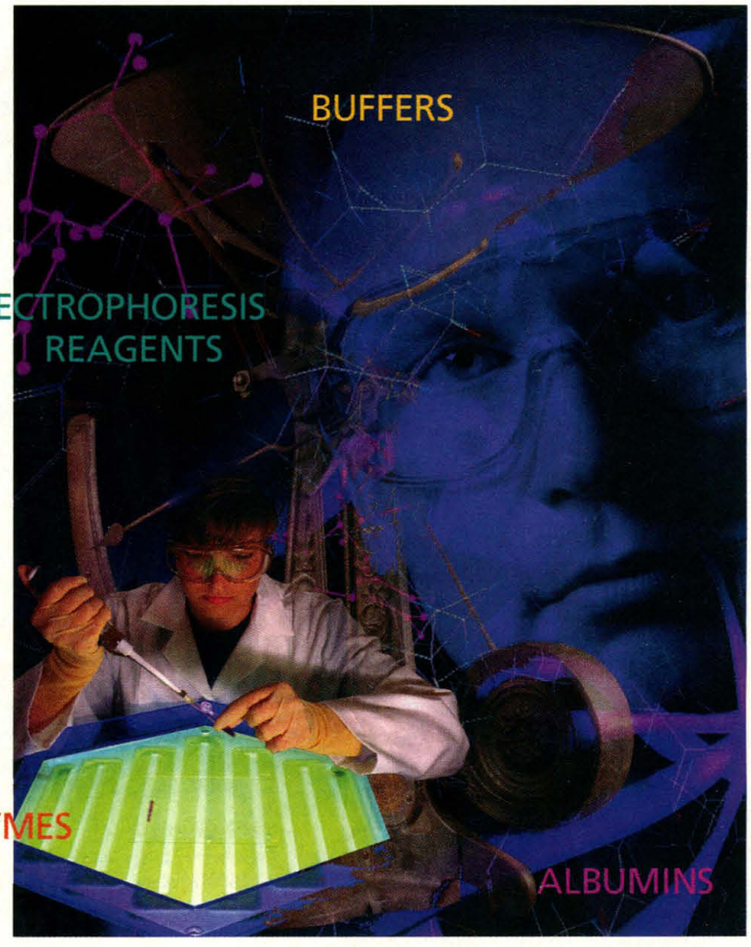

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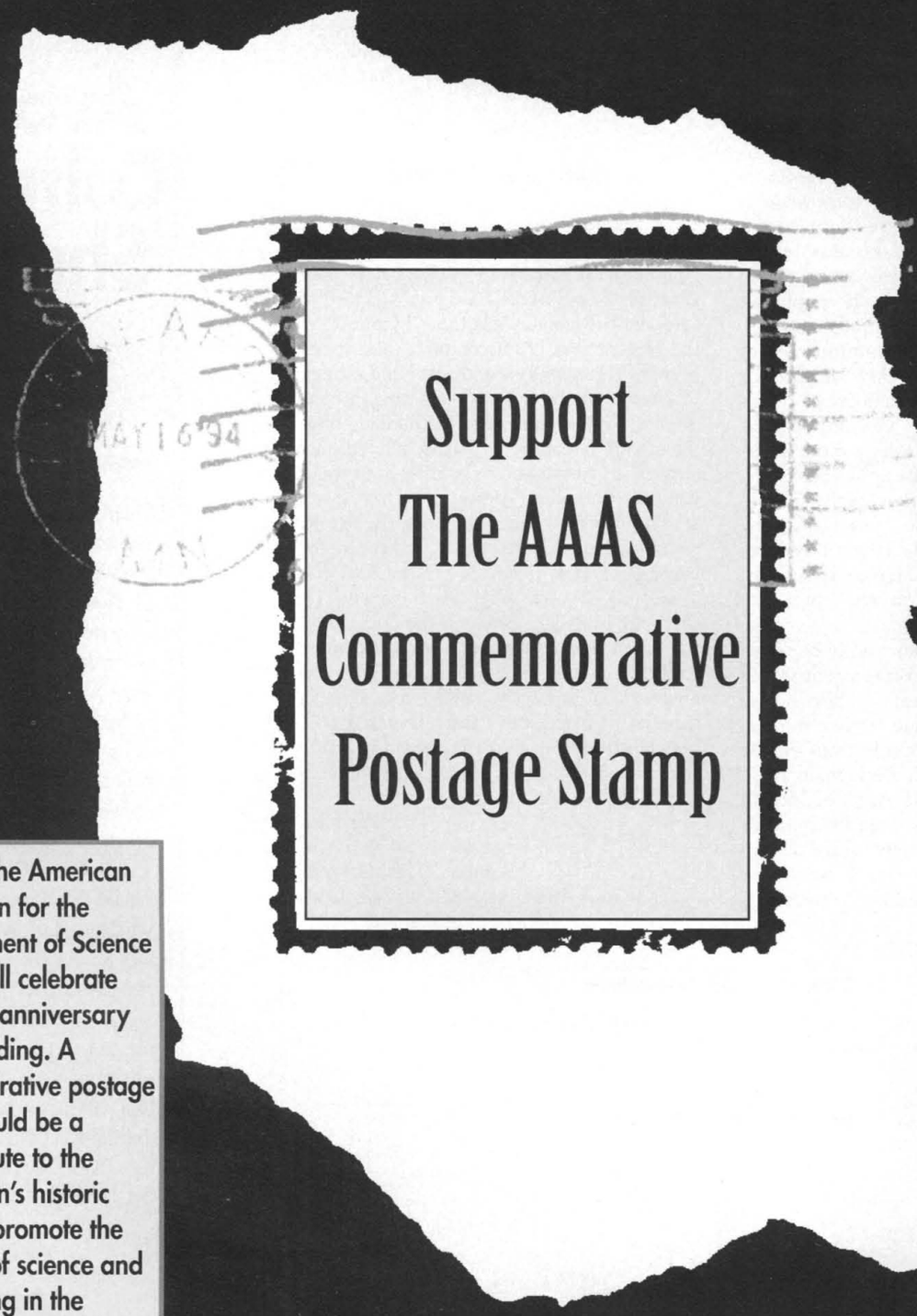

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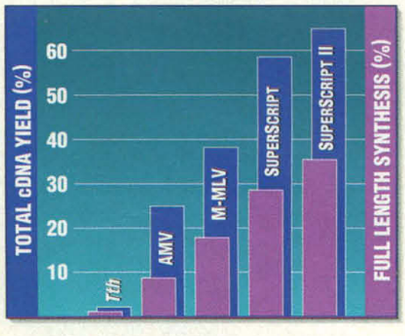

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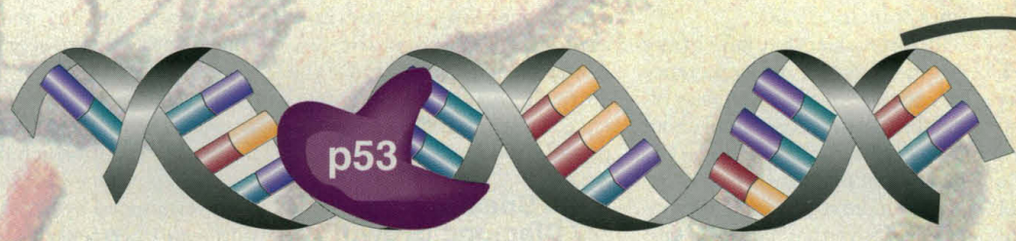
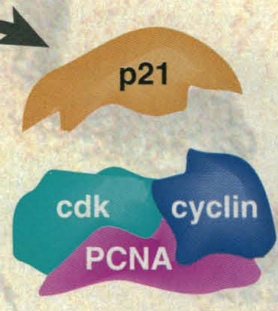


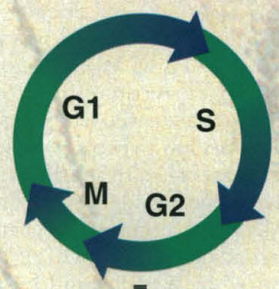
p21 promoter



p21 (also known as Sdi1, Waf1, Cip1, and Pic1),[1-6] and p16[7] are inhibitors of cyclin-cdk protein kinases.

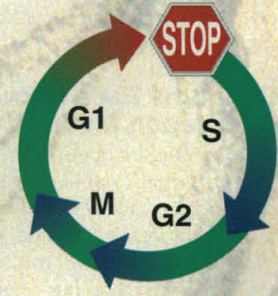
PharMingen now offers antibodies to p21* and p16 in addition to our antibodies specific for tumor suppressor proteins including:

- **p53**
- **Rb**
- **p107**
- **p300**
- **DCC**



Other cell cycle reagents include antibodies, recombinant proteins, and cell lysates for studies related to:

- **Cyclins**
- **Cyclin-dependent kinases (cdks)**
- **Onco-proteins**
- **Transcription factors**
- **Apoptosis**
- **Signal transduction**



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*** AGIS Pharmaceuticals, Inc.** (Houston, TX) has granted PharMingen exclusive rights to commercialize the p21 monoclonal antibody technology for non-clinical research purposes. Patent pending.

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