

# World Science News in Review

## [Biological Sciences]

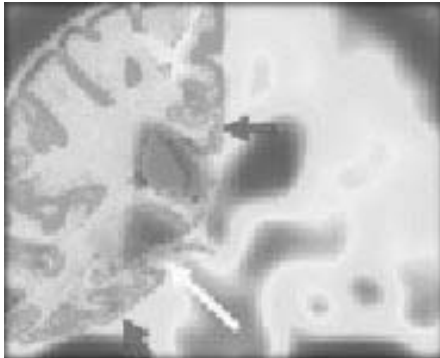
### Better Imaging Technique for Alzheimer's Patients

Until now, the brain irregularities of an Alzheimer's patient could be studied only after death. A research team at UCLA reports in the *American Journal of Geriatric Psychiatry* that they have been able to image the plaques and tangles associated with Alzheimer's in a living patient.

These plaques and tangles are "the best marker for disease progression," according to co-author Dr. Gary Small, UCLA professor of psychiatry and biobehavioral sciences. The imaging was accomplished by injecting a protein (FDDNP) containing a radioactive tracer into nine Alzheimer's patients, and subsequently taking Positron Emission Tomography (PET) scans of their brain lesions.

However, scientists have found that these plaques and tangles could also be present in healthy people. This means the new technique is more valuable for future research than as a diagnostic tool. It could help scientists monitor the effects of trial medications on brain pathology. "We're going to need a way to see whether or not the drugs are working rather than wait to see if the patient develops the disease," said Dr. Steven DeKosky, director of the Alzheimer's Disease Research Center at the University of Pittsburgh.

According to DeKosky, the new technology should contribute significantly to Alzheimer's drug development "within the next two to three years."



### Cloning Under Fire: Dolly's Got a Problem

Recent reports have shocked active proponents of cloning—Dolly, the 6-year-old cloned sheep, has arthritis in her left hind leg, hip, and knee. Ian Wilmut, one of Dolly's creators, was disappointed with the news, but noted that the problem may be a coincidence rather than a side effect of the cloning.

However, others have raised questions about the arthritis, a problem that generally corresponds to older age. Despite Dolly's successful pregnancy, this health problem has been used to undermine the scientific credibility of cloning. Some scientists

have suggested that the arthritis may be indicative of the unpredictable effects of cloning, and animal rights groups have also used the findings to further their claims.

Despite this momentary setback, research continues. Researchers recently cloned two piglets, genetically modifying them so that their organs would not be rejected if transplanted into humans. This problem with Dolly is unlikely to cascade into a complete abandonment of cloning.

Although Dolly's arthritis is troublesome, she is still healthier than most other cloned animals. Most attempts at cloning large animals have led to deformities, early deaths, or large, unsustainable sizes of organs or of the animal itself. Arthritis is a small concern compared to these larger issues. It is difficult to predict whether any conclusion can really be drawn from the news. What can be learned, however, is that further long-term research and study on cloning issues is necessary.



### Biotech Crop Use Increases Globally

Amid great controversy concerning their safety, genetically engineered crops seem to be globally spreading across agricultural fields. Global plantings of the crops have jumped nearly 20 percent since last year, concerning agronomists who say they may cause developing world industries to suffer and could lead to hunger among farmers who cannot compete with the large developed world-based industry that uses the modified crops to produce greater numbers of large fruits and vegetables.

According to a report issued by the International Service for the Acquisition of Agri-Biotech Applications (ISAAA), a group that promotes the technology, farmers grew an estimated 130 million acres of biotech crops in 2001—about 21 million more than the year before.



But behind the increase in numbers is a stark polarity in who has access to the genetically modified crops. The United States and Argentina, who have been pressured by the International Monetary Fund (IMF) to use the crops, account for 90 percent of the sector and most of the growth since last year. But Argentina's farming structure collapsed as a result of IMF recommendations this year, leading many to wonder if the imposition of such technologies on the country's farmers is a desired strategy.

"There was much speculation in 2000 that indeed the global area [of biotech crops] would decrease rather increase" in 2001, said Clive James, a scientist who is chairman of ISAAA. ISAAA defends the safety record of the crops, in spite of recent controversy in the United States and Europe concerning allergies caused by the genetically modified products, but the group did not comment on the potential effects of the new crops on rural economies and global commodity prices that affect developing-world farmers.

The most popular biotech crops contain bacterium genes that make the plants either resistant to bugs or weed killers. Farmers in China who used to spray their cotton crops as many as 15 times a year have started planting an insect-resistant variety known as Bt for its added bacterium gene. The crop doesn't need to be treated more than twice, said James.

But in the process, scientific reports suggest that the toxin used in the plants is killing off important insect life and that similar crops using the "Roundup" formula from Monsanto, Inc., have potentially disastrous human health effects that are not being mentioned by trade representatives trying to advance the spread of these crops in developing countries. As the controversy continues, new research may lead to answers about the safety and efficacy of these new crops, offering insight into whether they may solve large food crises in countries with mass starvation.

### Canadian Study Shows Effectiveness of Graphic Cancer Warnings on Cigarette Packages

The Canadian Cancer Society polled 2,000 Canadian adults, 633 of whom were smokers, about the effectiveness of



graphic warnings in causing people to stop smoking. Pictures, including a brain after a stroke, a damaged heart, and a limp cigarette warning of impotence, replaced black-and-white text warnings on cigarette packages. The most effective images were of a diseased mouth and a lung tumor.

In general, 43 percent of the smokers and 40 percent of the nonsmokers grew more concerned with the health hazards of smoking. Fifty-eight percent of the smokers admitted that the full-color picture warnings on the packages provoked more consideration on the effects of cancer. Of the smokers, 44 percent said that the pictures motivated their desire to quit smoking; 21 percent said that the new warnings deterred their desire for a cigarette; and 27 percent declared that they now smoke less within their homes. 35 percent of the smokers and 34 percent of the nonsmokers said that they now know more about the hazards of smoking because of these graphic images.

The Bush administration has failed to address this issue. Now, however, after this study, Representatives James V. Hansen (R-Utah) and Marty Meehan (D-Massachusetts) have declared that they will stimulate legislative action making graphic warnings mandatory on American cigarette products. The World Health Organization (WHO) is considering creating an international treaty calling for mandatory graphic image-based warnings on cigarette packages as a worldwide requirement.

Hopefully, these graphic pictures will thrust the smoky truth of cigarettes into the health concerns of people everywhere, motivating a stop in this disease-instilling practice.

### Snakes Eyes Will Change the World

The study of snakes' eyes and infrared sensors by Dr. Michael S. Grace at Florida Institute of Technology could someday lead to major advancements in everything from heat-seeking missiles for the military to tiny devices that might help physicians locate tumors in the human body.



Snakes can use their eyes to create a visual image of the world around them, or they can use their sensitive infrared sensors to create a similar image based on heat emitted by objects in their environment. By understanding how snakes are able to convert infrared radiation into a second source of vision, one could easily design a heat-seeking missile that can secretly invade the heat exhaust valve of an enemy aircraft or a small medical probe that can detect very small temperature changes caused by a tumor in parts of the human body.

## [Physical Sciences]

### **Astronomers Assert Pale-Green Color of Universe**

The universe is pale green on the cosmic spectrum, according to astronomer Ivan Baldry and his colleagues at Johns Hopkins University.

After examining data from the Australian 2df Galaxy Redshift Survey of more than 200,000 galaxies to determine the birth rate of stars as the universe aged, Baldry and colleagues created a cosmic spectrum. Each galaxy was assigned a numeric value according to its color. Upon adding them up and taking their average, the universe was declared to be a shade of pale green.

“Because young stars are hot and blue, they dominate the light,” Baldry said, “and it’s only when the young stars decline that [colors change].” As the universe ages, it begins in the blue period, moves through green, and progresses toward red. “The reason the color’s changing is because the rate of stars forming is changing,” he said. “We’re in a stage of a declining rate of star formation. More stars were forming in the past than at the present time.”

Astronomers believe that the pace of star formation has slowed after a stellar baby boom. NASA scientists presented research indicating that the peak star-formation period occurred soon after the Big Bang, which is earlier than previously believed. To see the pale-green color, the human eye would have to see the universe as a whole, not broken up into its component parts. “The only way to see it is if you saw all the universe from the same distance away and it was not moving,” Baldry said.

### **Asteroid Barely Misses Earth**

Dubbed “2001 YB5,” an asteroid approximately 1,000 feet in diameter and traveling at 68,000 mph crept within 520,000 miles of Earth on Monday, January 7.

“It’s a fairly substantial rock. If it had hit us at that sort of speed, you would be taking out a medium-size country, France, I sup-

pose, or Texas, or something of that order,” said Director Jay Tate of the Spaceguard Centre in Wales. NASA’s Near-Earth Asteroid Tracking program discovered 2001 YB5 on December 26, 2001. Astronomers calculated the asteroid’s trajectory and determined that Earth was in no danger of a collision. The asteroid came within twice the distance of the moon.

Dozens of asteroids pass within close proximity of Earth, though few as close as 2001 YB5. As more and more near-Earth asteroids are discovered, astronomers are seeking a standardized means of warning the public.

### **Mass Spectrometry Aids Drug Research**

Mass Spectrometry has been commonly used to measure the decay of carbon atoms to age artifacts like the Shroud of Turin. Ken Turteltaub, a researcher at the Lawrence Livermore National Laboratory, uses it to measure the absorption of medicines and toxins in humans.

The application of the carbon dating technique in medicine reduces the amounts and samples of blood that must be collected from humans or animals for testing. A small quantity of blood and tissue is converted to carbon and labeled with carbon 14. After the sample is accelerated through a magnetic track, the amount that reaches the detector at the end is counted. It “tallies the amount of drug or toxins that reaches the blood, the brain, or other internal organs,” said Livermore physicist John Vogel.

After the amount received by the body is counted, other tests are still needed to confirm that those amounts are enough to cause cancer or other diseases. The most immediate use of the technique is to ascertain dosage for new medication. Pharmaceutical companies may use the technology to safely and efficiently test whether or not medications and drugs are appropriate for children. Another potential benefit is easier monitoring of bone-loss drugs on postmenopausal women. Researchers are looking for further applications and are enthusiastic about using mass spectrometry to protect health. ■

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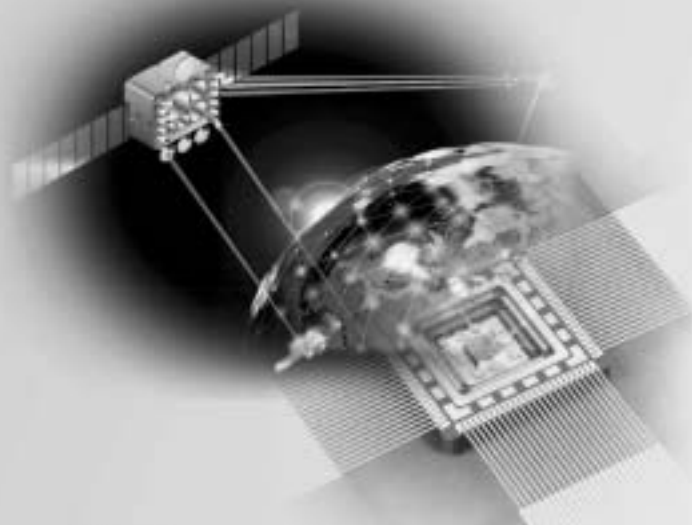
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