

also mean higher expenses for some research facilities. And some scientists see the pending legal battle as simply the latest tactic in a long campaign by activists to eliminate the use of all animals in research. But observers on both sides of the dispute agree that the lawsuit—announced Tuesday at a Washington, D.C., forum on the issue organized by the National Academy of Sciences*—represents the most serious legal challenge ever to the 27-year-old rules.

The controversy centers on a clause in the Animal Welfare Act (AWA), the nation's flagship animal protection law, which directs the Secretary of Agriculture to define as animals any "warm-blooded animal as the Secretary may determine is being used, or is intended for use, for research." Although the law specifically includes dogs, monkeys, hamsters, and other animals in the definition—and specifically excludes farm animals—it is silent on the status of rats, mice, and birds bred for research. In 1972, USDA declared the three creatures nonanimals. That definition exempted researchers from a host of AWA regulations, including annual facility inspections and the need to consider alternatives when designing experiments.

Over the last decade, however, animal rights activists have stepped up efforts to change the department's interpretation of the act. In 1994, the Washington-based Humane Society of the United States and the Petaluma, California-based Animal Legal Defense Fund (ALDF) won a federal court ruling that USDA's exclusion was legally "strained and unlikely." But that ruling was thrown out by an appeals court because the groups couldn't demonstrate that their members have been directly harmed by the regulations. This time, however, even some USDA officials concede that the plaintiffs are likely to vault over that hurdle because several have a financial stake in USDA's definition. The list includes a Pennsylvania group that funds the development of nonanimal research methods and the president of InVitro International, an Irvine, California, company that sells nonanimal lab tests.

Last April, the same parties had petitioned the USDA to change its animal definition. On 28 January, the agency signaled it was taking the request seriously by publishing the petition, along with its own comments, in the *Federal Register* (www.access.gpo.gov/su_docs/fedreg/a990128c.html) and requesting public comments by 29 March. But the next day the petitioners decided to sue. The move, says attorney Andrew Kimbrell of the Washington-based International Center for Technology Assessment, who is preparing the suit with the ALDF, was based on USDA's comments, which Kimbrell believes suggested that the agency was prepar-

ing to reject the petition. "They first need to acknowledge that they have this obligation—then we can discuss solving some of their funding problems," he says.

News of the suit surprised USDA officials. "It is unfair to suggest that we have already decided what we are going to do," says W. Ron DeHaven, deputy administrator for animal care with USDA's Animal and Plant Health Inspection Service. However, a 1990 study concluded that USDA would have to carve out an estimated \$3.5 million from its \$9 million enforcement budget to handle the additional oversight. DeHaven says the cost to researchers is unknown at this time.

Some scientists are worried that any change in the definition could doom animal use in smaller labs, particularly those involved in undergraduate education, by requiring costly new facilities. And they note that publicly funded biomedical scientists must already consider substitutes under guidelines issued by the Public Health Service. The coalition's "objective is to eliminate the use of animals in research; [the alternatives argument] is a pigtail," says L. Gabriel Navar, a physiologist at Tulane University in New Orleans, Louisiana, and president of the American Physiological Society.

Kimbrell disagrees and says researchers would be better off joining animal activists to seek the necessary resources for broader regulation. The sooner USDA "starts obeying the law," he argues, the sooner animal rights lobbyists can fight for the money USDA will need to regulate its newfound wards.

—DAVID MALAKOFF

PHYSICS

First Light for a Gamma Ray Flashbulb

The first laser had hardly beamed its world-changing needle of red light in 1961 when theorists began realizing just how far this new technology could conceivably go. One way was upward through the spectrum, from visible light to the higher energy ultraviolet and x-ray ranges and even into the territory of gamma radiation—the ultimate "light," energetic enough to blow missiles out of the sky or simulate conditions near stars.

More easily dreamed than done. But for nearly 40 years, a small research community has set its course toward that goal. And in the 25 January *Physical Review Letters*, a team of a dozen researchers from five different countries has moved a step closer by showing that a form of hafnium-178 extracted from accelerator waste can release energy stored in its nuclei as a blast of gamma photons, at energies more than 1.3 million times those of the red photons of the world's first laser.

The gamma rays that emerged from the

ScienceScope

Pluto Plea Leave Pluto alone! That's the message astronomers all over the world are sending the International Astronomical Union (IAU). A recent discussion about whether Pluto should be cataloged as the 10,000th entry in the list of minor bodies in the solar system rather than the ninth planet (*Science*, 8 January, p. 157) has alarmed planetary researchers, who worry that the public would see the move as a demotion for Pluto.

The Committee of the Division for Planetary Sciences (DPS) of the American Astronomical Society joined the chorus last week in a statement forwarded to the IAU, arguing that there is no compelling reason for the celestial body's declassification. "For now at least, nothing should be done," says DPS chair Don Yeomans of NASA's Jet Propulsion Laboratory in Pasadena. Most solar system researchers agree, says Alan Stern of the Southwest Research Institute in Boulder, Colorado. Although Pluto is by strict definition a trans-Neptunian object, dozens of which have been found in the past decade, Stern sees no reason why it can't be called a planet, too.

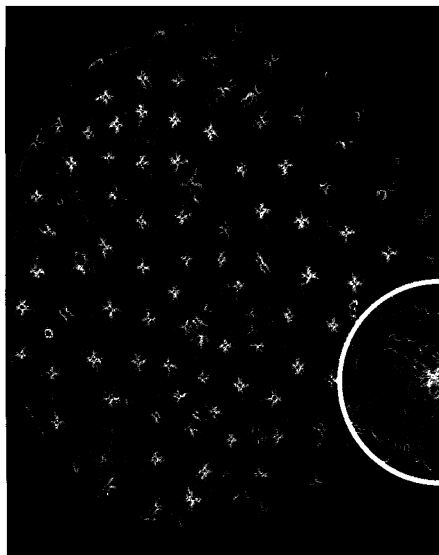
The IAU isn't about to make a decision anytime soon. But it now knows how strongly some people feel about the subject. Says Yeomans: "There are nine planets, period."

Going Megaglobal Delegates to the Megascience Forum, a 6-year experiment in stimulating international cooperation among science policy-makers sponsored by the Paris-based Organization for Economic Cooperation and Development (OECD), have recommended extending the forum's shelf life past its expiration date. At their final meeting last week, delegates offered to reincarnate themselves as a Global Science Forum that would add a new voice to perennial debates over issues such as climate change, land use, and food production. OECD ministers will consider the proposal in June.

The forum gathers research officials and top scientists into working groups on international scientific issues; its successes include sounding an early alarm about the dangers posed by commercial encroachment into bandwidths of interest to radioastronomers and a pending proposal to set up a global biodiversity information facility.



* Regulation of the Care and Use of Rats, Mice, and Birds (2 February 1999).



Centrosome galaxy. Cdk2-E causes proliferation of star-shaped centrosomes in an egg extract.

kick in as the cell cycle progresses.

The first substance the Sluder team tested was the Cdk2–cyclin E (Cdk2-E) complex, reasoning that because the complex is involved in prodding cells to begin making new DNA, it might also regulate the centrosome duplication that seems to happen at about the same time. To test that idea, Sluder's postdoctoral fellow, Edward Hinchcliffe, obtained a specific inhibitor of Cdk2-E activity, a modified version of a frog protein called Xic1, from James Maller at the University of Colorado School of Medicine in Denver.

The team monitored the inhibitor's effects by using time-lapse photography to follow the increase in the numbers of centrosomes over time in their microscope's field of view. They had already learned that, without the inhibitor, three-quarters of the aster-shaped centrosomes replicate three times in a 6-hour period, and most of the rest replicate twice. The inhibitor greatly reduced this centrosome copying; 79% doubled just once and none doubled three times. Conversely, adding extra Cdk2-E overcame this effect, allowing the centrosomes to replicate multiple times. "This is clean evidence that we have one very important set of [proteins] that are essential for [centrosome] replication," says Brinkley.

Meanwhile, at Stanford, Stearns's group had taken a slightly different approach. The researchers had decided to look closely at the Cdk2-E complex after first finding that two naturally occurring Cdk2 inhibitors, proteins called p21 and p27, block centrosome replication in developing frog embryos. But rather than observing the effect of these inhibitors on the overall increase in the numbers of centrosomes, the Stanford team used deconvolution microscopy to watch what happens to the centrioles, the

two bundles of short microtubules that form the core of the centrosome. We could "see precisely what's going on inside the centrosome," says Stearns.

Normally, after 1 hour in frog-egg extract, the paired centrioles in each centrosome have separated, presumably taking the first step toward duplication. But in the presence of p21 or p27, Stearns and his Stanford colleagues, graduate student Kathleen Lacey and pathologist Peter Jackson, found that the centrioles stayed put. "We both showed that Cdk2-E is probably the thing that's driving centrosome duplication," Stearns says.

Many questions remain, including how Cdk2-E triggers the duplication and what its molecular partners are, as it apparently doesn't act alone. In the October 1998 *Nature Genetics*, Brinkley and Subrata Sen at the M. D. Anderson Cancer Center in Houston reported that they had cloned a gene that when overexpressed in mouse cells resulted in extra centrosomes. This gene is also overexpressed in cancer patients. It may act in conjunction with Cdk2-E and, when in excess, "lead to a lot of chaos and genetic instability" and eventually, cancer, Brinkley notes. And that, he adds, "was Boveri's original notion."

—ELIZABETH PENNISI

POLYMER ELECTRONICS

Insulator Gives Plastic Transistors a Boost

Anyone who has dropped a laptop computer or mobile phone knows, to their cost, that they are not tough. But the glass and brittle semiconductors that make their displays prone to shattering could one day give way to a material that is cheap, easy to manufacture, and tough—a material pretty much like plastic. Before an all-plastic display makes a commercial debut, however, researchers will have to overcome a major drawback of polymer electronics: Polymer transistors, which would be needed by the thousands in a display, require impractically high voltages to make them work. Now, by simply changing an insulating material in a polymer transistor, a team of IBM researchers reports on page 822 that they have cut the voltage it needs to a level comparable with the amorphous silicon used in today's displays.

"This is excellent work," says plastic transistor pioneer Francis Garnier of the CNRS Laboratory of Molecular Materials in Thiais, France. Says Cambridge University physicist Richard Friend, "[Such] molecular semiconductors have now been built up as very credible materials for technologists."

The team, led by Christos Dimitrakopoulos of IBM's T. J. Watson Research Center in Yorktown Heights, New York, skirted a long-

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Let Them Debate! Like outlaws itching for a showdown with the sheriff, angry French scientists have been gunning for research minister Claude Allègre ever since he proposed controversial reforms of the nation's research agencies last year (*Science*, 23 October 1998, p. 607). Allègre has spurned scientists' demands for a formal national debate on the future of French science. Now, the scientists are plotting the next stage of their insurgency.

Last week, presidents of the 40 sections within CNRS, France's basic research agency, and other science VIPs issued a communiqué insisting that "the circumstances demand" a national debate. The research ministry's answer came swiftly: *Non*. Instead, the ministry wants to continue ongoing discussions of Allègre's plans within its science agencies. "We don't believe a national debate is the best solution," says the ministry's director-general for research, Vincent Courtillot.

The next move is up to the scientists, who have already shown some fighting spirit. "We all agree changes are necessary, but there is no reason not to [debate]," says neurophysiologist Rose Katz, president of the French biomedical agency INSERM's scientific council. CNRS historian Denis Peschanski vows that his colleagues will organize a national debate—"with the agreement of the minister or without it."

Magnetic Makeover Dutch scientists are turning dreams of upgrading their High Field Magnet Laboratory in Nijmegen into reality. The Dutch Foundation for Fundamental Research on Matter and the University of Nijmegen have signed off on a \$23 million plan to refurbish the lab, which probes materials such as superconductors and studies the effects of magnetic fields on living organisms. A new power supply will boost the 20-tesla fields of two existing magnets to 34 and 41 teslas, says lab director Jan-Kees Maan, and the lab will install a new pulsed magnet, capable of producing an 80-tesla field—800,000 times as strong as Earth's magnetic field.

The additions will allow the lab to better compete with facilities in Tallahassee, Florida, and Grenoble, France. Elsewhere on the European magnet front, scientists face a 15 February deadline for commenting on a European Science Foundation report calling for a jointly funded, continent-wide magnet lab that would be home to even more powerful devices.

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