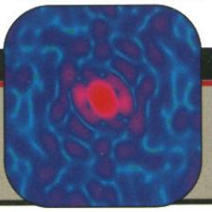
1002
Anthrax fingerprints

LEAD STORY 1006
No decision on Mars landing sites



1008
X-ray visionaries

U.S. CLONING DEBATE

Hatch Signs On to Pro-Research Bill

More legislators took sides last week in one of the most emotional scientific debates ever to hit the U.S. Congress as the Senate prepares to vote this month on anticloning legislation.

Proponents of therapeutic cloning welcomed the support of two right-to-life conservatives, senators Orrin Hatch (R–UT) and Strom Thurmond (R–SC), on a bill that would outlaw human reproductive cloning but allow what researchers prefer to call nuclear transplantation. The measure, introduced last week by Senator Arlen Specter (R–PA), is the scientist-backed response to a bill sponsored by Senator Sam Brownback (R–KS) that would ban all forms of human cloning; Brownback's measure is identical to a bill the House of Representatives passed last summer. Senate Majority Leader Thomas Daschle (D–SD) has promised to schedule a vote before the Senate takes a 1-week recess on 24 May.

Major catch. Senator Orrin Hatch tells colleagues that he supports their cloning bill.

Science lobbyists who favor the Specter bill claim that the political climate has improved markedly from mid-April, when both President George W. Bush and influential physician-senator Bill Frist (R–TN) came out strongly for the Brownback bill. "I think Hatch deciding to join the [Specter] bill has decisively shifted the debate in the research community's favor," says Pat White of the Federation of American Societies for Experimental Biology.

The penultimate phase of the Senate battle opened on 1 May, when Specter and 11 co-sponsors introduced a new version of a bill originally crafted by senators Edward Kennedy (D–MA) and Dianne Feinstein (D–CA). Hatch, although a strong opponent of abortion, has made it clear over the past few months that he's sympathetic to the scientists' side. But he hadn't committed to a specific bill until a press conference the day before.

The new bill, called the Human Cloning Prohibition Act of 2002 (S. 2439), contains no substantive changes from the Kennedy-Feinstein measure. However, it has been updated with references to a report published early this year by the National Academy of Sciences that said human cloning, but not research cloning, should be banned (*Science*, 25 January, p. 601). The bill also makes a determined attempt to establish nuclear transplantation as the accepted term for the latter. "Human cloning," that is, cloning to make a baby, is pronounced "unsafe, immoral, and unacceptable." Hatch said at the press briefing that he doesn't believe test-tube embryos are humans, because "human life requires and begins in a mother's nurturing womb."

S. 2439 anticipates the development of artificial uteri by banning implantation of a cloned human embryo not just in a uterus but in "the functional equivalent of a uterus." Otherwise, it follows the earlier bill: It establishes criminal penalties—up to 10 years in jail and a $1 million fine—for implanting a cloned embryo, calls for nuclear transplantation research to be conducted according to federal rules on scientific and ethical review of research, and specifies penalties of up to $250,000 for violations.

Lobbyists count roughly a dozen undecided—or at least opinion-withholding—senators, with the rest of the 100 members equally divided pretty much along party lines. Last month the National Right to Life organization launched radio ads in eight mostly southern and midwestern states that refer to the opposition as "clone and kill" advocates. Ads in Rhode Island accuse the state's biotech firms of wanting to get rich patenting human embryos. Last week a new group called CuresNow began airing TV commercials featuring Harry and Louise, a fictional couple created by the health insurance industry in 1993 to attack the Clinton Administration's proposed health care plan. Today the pair are talking about finding a cure for their diabetic niece.

Adding to the suspense are the Senate's arcane rules, which leave plenty of room for surprises. Daschle has not explained the rules under which the bills will be debated or whether amendments will be permitted. Although it only takes 51 members to pass a bill, 60 are needed to overcome delaying tactics by opponents.

Any bill that passes the Senate will then have to be reconciled with the House's version (H.R. 2505). Although Congress is likely to face intense pressure to do something, the deep philosophical divide on the issue leaves little room for it to maneuver. A temporary moratorium on nuclear transplantation "is not a compromise," says Kevin Wilson of the American Society for Cell Biology. "It might as well be Brownback." Douglas Johnson of National Right to Life also dismisses the idea of half a loaf. "A ban just on reproductive cloning would be worse than no bill at all," he says, warning that it would open the door to "human embryo farms."

–CONSTANCE HOLDEN

U.S. APPOINTMENT

Zerhouni Confirmed as NIH Director

Elias Zerhouni's nomination to head the National Institutes of Health (NIH) sailed through the Senate last week. Two days after a gentle hearing that only briefly touched on tough topics such as stem cell research, legislators confirmed Zerhouni's appointment on a voice vote. Only his swearing-in remains before he takes the helm of the $23.6 billion biomedical research giant.

This close. Elias Zerhouni clears Senate, awaits NIH swearing-in.

CREDITS: (TOP TO BOTTOM) TERRY ASHE/AP; KENNETH LAMBERT/AP

Zerhouni, a radiologist and executive vice dean at Johns Hopkins University School of Medicine in Baltimore, Maryland, told members of the Senate Health, Education, Labor, and Pensions Committee that "disease knows no politics" and that NIH "must always remain factual," not "factional." Only Senator Paul Wellstone (D–MN) pressed Zerhouni on whether he agrees with President George W. Bush's decision to limit federally funded research to 78 approved lines of stem cells. "You can do a lot" with those lines, Zerhouni replied. However, he hinted that he might eventually make the case for more lines: "If it becomes evident through this research that there are pathways to develop cures and so on, I'm going to be the first one to assemble that information … and share that with everyone."

He said the director's "most important role … is to reestablish morale and momentum" as well as to recruit NIH institute directors. NIH has been run by acting director Ruth Kirschstein for more than 2 years, and five institutes do not have permanent directors. Zerhouni said he's interested in fostering "crosscutting initiatives" and promoting "access to new technologies," such as a DNA chip he brought along as a prop.

–JOCELYN KAISER

EVOLUTIONARY BIOLOGY

Timing Is Everything For *Wolbachia* Hosts

Wolbachia may be the most common infectious bacteria on Earth, but they are by no means ordinary. Among their accomplishments: They manipulate their hosts' sex life to boost their own reproductive success. Researchers have long wondered what sort of molecular trickery *Wolbachia* use to pull off this feat. Now they know at least one of their secrets: Like an auto mechanic, they can alter the timing of a key step of their hosts' reproductive cycle so that it either misfires or runs smoothly. The finding is "a really major advance," comments *Wolbachia* expert John Werren of the University of Rochester in New York state.

Wolbachia infect millions of species of insects, crustaceans, and other invertebrates, but they can't live outside their hosts' cells. To jump to the next victim, they infect developing eggs that will grow into adult hosts. Because males cannot pass the bacteria on in sperm, *Wolbachia* have evolved many sophisticated strategies to skew populations in favor of infected females (*Science*, 11 May 2001, p. 1093).

On page 1124 of this issue, researchers at the University of California, Santa Cruz, offer the first good glimpse of how *Wolbachia* do this in a species of wasp known as *Nasonia vitripennis*. In these wasps, as in many insects, the sex of the offspring is normally determined by a bizarre process: If an egg is fertilized by a sperm, the progeny will be female, but unfertilized eggs will divide and develop into male embryos. *Wolbachia* play havoc with *Nasonia*'s reproduction. When an infected male mates with a healthy female, the offspring will all be male, but if two infected wasps mate, the result will be a normal ratio of male and female offspring, all infected with the bacterium.

Skewing the sex ratio in this way works to *Wolbachia*'s evolutionary advantage. By making uninfected female wasps produce only sons, the bacteria reduce the number of uninfected female wasps in the population. That makes it more likely that *Wolbachia* from other females will get carried down from one generation to the next.

Researchers have been unable to expose how *Wolbachia* perform such manipulations largely because they haven't had the right tools, according to co-author William Sullivan. "You couldn't answer these questions 5 years ago," he says. "The technology just wasn't there." In recent years, however, Sullivan and others have figured out how to create movies of a developing embryo that reveal the activity of its proteins and genes. *N. vitripennis*'s eggs develop slowly, making them ideal for a starring role.

Once the wasp's egg is fertilized, its chromosomes go through a complex choreography. The compartments that contain each set of chromosomes (called the pronuclear envelopes) move to a special location in the egg known as the metaphase plate, then the envelopes break down, allowing the chromosomes to escape and find their correct place at the plate. Only then can they be duplicated as the egg divides into new cells.

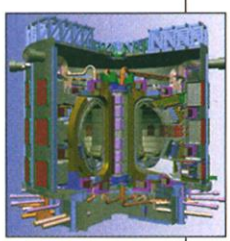
Sullivan and postdoc Uyen Tram observed this process using dyes that attach to proteins that help destroy the walls of the male and female pro-

CREDITS: (TOP TO BOTTOM) ITER; J. WERREN

Out of sync. Parasitic bacteria delay a key chromosomal movement in *Nasonia* wasps.

ScienceScope

ITER Reconsidered Four years after bailing out due to cost concerns, the U.S. government is considering rejoining a slimmed-down international fusion power project. Secretary of Energy Spencer Abraham last week told an international conference that President George W. Bush was "particularly interested" in the International Thermonuclear Experimental Reactor (ITER) and had asked the Department of Energy (DOE) "to seriously consider American participation" in the $4 billion project (*Science*, 3 May, p. 823).



Fusion advocates welcomed the speech, as did potential partners in Japan, Russia, Canada, and Europe. But DOE science chief Ray Orbach cautioned that it will take a while "to do due diligence on the scientific issues" and decide whether ITER, or some other domestic fusion project, would be the United States' best bet. Fusion researchers are due to meet in Colorado this summer to hash out the issues, and they hope to issue a consensus recommendation by the end of the year. ITER planners, meanwhile, hope to select a site for the planned machine at about the same time. Finding funding for any fusion project, however, could be difficult.

Bigger Rebates? The United Kingdom wants to expand the reach of its R&D tax credit in a bid to spur commercial science. The government last month unveiled a budget proposal to increase existing tax credits for small firms and—for the first time—give large companies a tax break for R&D spending.

Currently, companies with fewer than 250 employees can deduct 100% of their R&D expenses. Under the new plan, these small firms would be able to deduct 125%, with large players getting a new 25% rebate. Analysts estimate that the breaks would cost the treasury about $585 million.

Government officials hope the rebates will help persuade multinational firms to shift some of their R&D operations to the island. Indeed, large pharmaceutical companies may be the biggest beneficiaries of the change, says Daniel Abrams of the U.K.'s BioIndustry Association, because small biotech outfits already benefit from other subsidies. Parliament, which must approve the new credits, is expected to consider the change later this year.