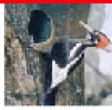
NEWS



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Senator boosts chances of stem-cell reform

WASHINGTON DC
Prospects for US stem-cell research brightened considerably last week when a key Republican senator backed the idea of loosening funding restrictions on the work.

In a speech on the floor of the Senate on 29 July, majority leader Bill Frist (Republican, Tennessee) endorsed efforts to increase federal funding for research on newly derived human embryonic stem-cell lines. He said that President George Bush's policy of limiting the use of federal funds to a handful of lines derived before 9 August 2001 needed changing.

"I believe the president's policy should be modified," Frist said. "We should expand federal funding and current guidelines governing stem-cell research, carefully and thoughtfully staying within ethical bounds."

Frist's announcement makes it much more likely that the Senate will pass legislation similar to that already passed by the House of Representatives, which voted to loosen funding restrictions in May (see *Nature* **435**, 544–545; 2005). Research advocates even say that Frist's speech might make it possible for the Senate to later override a promised presidential veto of the bill — although the return of the bill to the House is unlikely to gather similar levels of support.

And whether or not the bill passes this year, they say, Frist's speech marks a turning point in the US debate on stem-cell research, because of his highly visible role in the Republican party and the Senate. "The ramifications of this are huge," says Kevin Wilson, director of public policy at the American Society for Cell Biology.

Frist had said recently that he was opposed to modifying the president's policy, and his change of mind was a surprise to many people involved in the stem-cell debate. But *Nature* has learned that Frist consulted with at least two scientists just days before his speech.

On 27 July, Frist spoke to Irving Weissman, a stem-cell pioneer at Stanford University and an outspoken critic of the president's policy. Weissman told him that the stem-cell lines currently approved for research cannot be used for therapeutic trials in people because they are probably contaminated with mouse viruses. He also explained that US companies are likely to need licences to develop therapies using the best techniques in the field, which have been pioneered by South Korean researchers.

"I told him that prohibiting a line of research has consequences, not just from a scientific perspective, but also from both economic and health perspectives," Weissman says.

The fact that Frist's speech placed strong emphasis on the development of potential treatments is encouraging, Weissman adds. "I knew something was going to happen, but I was surprised by how far he went," he says.

Bill Frist heads for the Senate to announce his support for changes to rules on stem-cell research.

But Frist's change of heart still leaves it unclear whether he will give his full support to the core measure of the proposed bill, which would allow researchers to use federal funds to work on any embryonic cell lines. Frist said that he supports research into methods of producing human embryonic stem-cell lines that don't involve the use of a viable embryo.

In recent weeks, senators have proposed a flurry of bills supporting such methods — none of which has yet been shown to work (see *Nature* 436, 309; 2005). *Nature* has been told that two senators, Kay Bailey Hutchison (Republican, Texas) and Norm Coleman (Republican, Minnesota), have also suggested 'compromise' bills. One would allow funding for research on cell lines created since the president's policy was announced until now. The other would allow researchers to use only 'spare' embryos created for *in vitro* fertilization currently existing at fertility clinics.

These bills could still pull Senate support away from the core measure — passed by the House and favoured by most scientists. As majority leader, Frist gets to decide how and when to put each bill to the vote when the Senate reconvenes next month after a long recess. ■

Erika Check

More falling foam puts shuttle programme in serious doubt

After an embarrassingly large chunk of foam fell off the external fuel tank of the space shuttle Discovery during its 26 July launch, NASA has suspended further shuttle flights until the problem is solved. But as the agency has already spent two years and well over $1 billion trying to make the shuttle safe, critics say there will be no quick solution.

A similar piece of foam fell off Columbia's fuel tank during take-off in January 2003. The hole it punched in the shuttle's wing caused the craft to burn up on re-entry, killing all seven astronauts inside. At the insistence of the Columbia Accident Investigation Board (CAIB), NASA has poured resources into ensuring the safety of future missions, in particular to secure the insulating foam that prevents ice from building up on the fuel tank.

Although the foam that came off Discovery's tank last week didn't hit the craft, the size of the chunk, which weighed about 400 grams, shows that despite all the effort the problem is as big as ever.

Agency administrator Michael Griffin says it will be fixed "in short order", and has put together a 'tiger team' to look for answers. But many engineers question what NASA can do that it hasn't tried already. "Unless there is a significant redesign, there will always be a safety issue with this foam," says Henry McDonald, former head of the NASA Ames Research Center in California, and now at the University of Tennessee at Chattanooga.

Developing new foam could take at least a year, he says, with redesigns to the tank taking even longer. As the ageing shuttle fleet is due to be decommissioned in 2010, McDonald argues that NASA should now cut its losses and stop shuttle flights for good.

Doug Osheroff, a physicist at Stanford University in California, and a member of the CAIB, agrees that small tweaks won't help much, but major changes could take years. "We clearly don't understand all the mechanisms for foam shedding," he says.

The best way for NASA to quickly reduce the risk to the shuttle crew is to fly with fewer people, Osheroff says. "There's no reason to go up with seven astronauts."

As *Nature* went to press, Discovery's crew was preparing to make emergency repairs, unrelated to the foam incident, to the craft's underside. For the latest news on the shuttle's progress, see www.nature.com/news/specials/returntoflight. ■

Mark Peplow

Bone cells linked to creation of fresh eggs in mammals

A claim that stem cells in bone marrow and blood can restock mammalian ovaries with eggs is raising hackles among reproductive biologists. If true, the finding opens up avenues for delaying the menopause and preserving fertility in female chemotherapy patients. It also raises issues for women who have had bone-marrow transplants, by implying that subsequent children could be the genetic offspring of the donor.

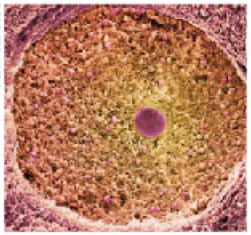
Supporters of the work, which is headed by Jonathan Tilly at Harvard Medical School, have hailed it as a compelling challenge to the standard view of how ovaries work. "I see amazing implications coming from this work," says Kutluk Oktay, a physician at New York Presbyterian Hospital who pioneered ovarian transplants in women. But critics are dismayed that Tilly is already discussing the implications for women when, they say, he has yet to prove his case in mice.

Tilly first caused a stir in 2004, when his team published a paper suggesting that adult mouse ovaries can produce new eggs (J. Johnson *et al. Nature* **428**, 145–150; 2004). The work countered the view that female mammals are born with a store of eggs, and that when the store runs low, the ovary shuts down and menopause ensues. Biologists are still debating the claim. "It has never been reproduced as far as I am aware," says Allan Spradling, a developmental biologist at the Carnegie Institution in Baltimore.

Now, Tilly has proposed something even more radical. His team found that bone-marrow stem cells in both mice and women express genes typical of germ cells. In mice, these genes cycle in unison with the same markers in the ovary (J. Johnson *et al. Cell* **122**, 303–315; 2005). Tilly proposes that these stem cells can travel to the ovaries, and that ovaries might signal to bone marrow, via an unidentified factor, for new stocks of eggs. "That factor could be of immense value therapeutically," he says, for example in treating premature menopause (see page 606).

"The paper is an outstanding challenge to a dogma."

To test the idea, his team transplanted bone marrow or blood cells to mice that were either genetically sterile, or which had been given doses of chemotherapy that should destroy their eggs. Within two months of the bone-marrow transplants, the researchers say, the mice regenerated hundreds of follicles — eggs encased by surrounding cells — at various stages of development, that persisted for at least a year. "That was amazing," says Tilly. And just 30 hours after the blood transfusions, several new eggs were visible.



Follicles may regenerate and produce new eggs, thanks to stem cells in bone marrow and blood.

Such rapid restocking leaves other researchers incredulous. Alan Trounson, a stem-cell researcher at Monash University in Melbourne, Australia, says that the quick appearance of eggs is unexpected and surprising.

Critics also doubt whether the new eggs come from the transplants. Tilly labelled his blood-transfusion cells with a protein that glows green, then showed the dye was present in the eggs. But Spradling says the eggs could have absorbed the dye from the blood.

Tilly's supporters argue that such scepticism is an understandable reaction to a radical idea. "The paper is an outstanding challenge to a dogma," says Oktay, adding that the idea is consistent with his finding that ovarian transplant patients seem to ovulate for longer than expected. "I don't think any revolution could be bloodless."

To prove the case, everyone agrees that Tilly must produce baby mice from eggs that come from bone-marrow transplants or blood transfusions. "We have tons of experiments under way to address this," he told *Nature*. "Should we show that, it's case closed." ■

Claire Ainsworth