For understanding human development.

The culture technology is likely to be of broad interest to scientists. Martin Pera, a stem-cell researcher at the University of Melbourne in Australia, says that studying embryos in vitro could help researchers who are trying to grow stem cells into embryo-like structures to judge the accuracy of their work.

Once that feat is achieved, scientists could use these structures to conduct larger and more-complicated experiments to explore topics such as the development of birth defects or the effects of toxic compounds.

The fertility industry could also benefit from new in vitro technology, Norbert Gleicher, head of the Center for Human Reproduction, an IVF clinic in New York City, notes that about 50% of embryos that implant into a mother’s uterus do not survive. Studies of embryos in vitro could help researchers to understand what goes wrong in such cases. “The implantation process is a big black box for us clinicians,” says Gleicher, who has collaborated with Brivanlou. Gleicher was not involved in the latest work, but he is beginning to use the in vitro culture method to study how to evaluate the viability of embryos for implantation in IVF clinics.

The ability to grow an embryo in vitro for 13 days raises ethical and policy considerations. At least 12 countries, including the United Kingdom, bar scientists from working with embryos older than 14 days. The US government drew up guidelines suggesting the limit in 1979, on the basis that 14 days marks the beginning of gastrulation in humans. It is also around the latest point at which an embryo can split into identical twins. After this time, the logic goes, a unique individual comes into being.

Zernicka-Goetz and Brivanlou doubt that their embryos would survive much beyond the 14-day mark, because work in mice suggests that more-developed embryos need an unknown mix of hormones and nutrients from the mother to survive. To develop further, the embryos might also require a 3D scaffold to grow on, rather than the flat plates used in the initial tests. To learn more, the researchers are beginning to run experiments with embryos from non-human primates and from cows.

But their achievements in the lab may be grounds for re-examining the limit, says George Daley, a stem-cell researcher at Children’s Hospital Boston in Massachusetts. He says that it is somewhat arbitrary. Such a debate would be complex and heated, and it could reach beyond researchers working directly with human embryos. If scientists succeed in growing stem cells into embryo-like structures, it could be difficult to determine whether the structures count as embryos, and thus are subject to the 14-day rule. “It’s an interesting ethical discussion we’ve got ahead of us here,” says Pera.

However it plays out, Brivanlou says that the new technology will give developmental biologists plenty to work on. “Every hour as we move forward in development is a treasure box for me,” he says.

Scientists have protested against the CSIRO’s decision to cut some 300 jobs in climate research.

of Excellence for Climate System Science in Sydney. “But we don’t want to lose sight of the fact that the total scale of capability in CSIRO is being very significantly reduced,” he added.

Other scientists were harsher in their judgement. “While the retention of some of CSIRO’s climate-science capabilities is welcome, the level announced is analogous to trying to put a sticking plaster over a gaping wound,” said Dave Griggs, a sustainability researcher at Monash University in Melbourne, in a statement released through the Australian Science Media Centre.

“This new climate-science centre will be clearly flagging to the international community that CSIRO is committed to a long-term climate-science research capability,” Australia’s chief scientist, Alan Finkel, told Nature. Finkel, who has helped to broker discussions between the CSIRO and climate scientists, acknowledged that there had been “questions raised about CSIRO’s reputation” by the cuts.

CLIMATE PROTESTS
Opposition to the CSIRO’s cuts — the result of a strategic shift away from basic climate science — has been strong. Almost 3,000 scientists have signed an open letter to the CSIRO and to Australia’s government, raising concerns over the effects of the move on the nation’s climate-research capacity. Rallies have been held in major Australian cities, and CSIRO management has been questioned by the Australian senate about its decision, as part of an ongoing inquiry scrutinizing government budget cuts.

But much damage has already been done. One senior scientist from the CSIRO who did not want to be named told Nature that senior staff members were already finding new jobs or looking for work elsewhere, and that the organization would find it difficult to keep climate scientists after demonstrating that it does not value their work.

Another researcher — John Church, a specialist in sea-level rise who has worked for the CSIRO for 38 years — says that the new centre is a positive step, but that the overall job losses are “still an incredible cut” to the organization’s capability. “You can’t hope to cover the range of activities that we did previously when [the CSIRO Oceans and Atmosphere unit] had more than 100 staff, with only 40,” he says.

Church says that he expects to be among the scientists made redundant later this year. The reputational damage to the CSIRO is “not going to disappear overnight”, he says.

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CORRECTION
The News story ‘Human embryos grown in the lab for longest time ever’ (Nature 533, 15–16; 2016) wrongly characterized the US 14-day restriction on in vitro growth of human embryos as a law — it is a guideline.