

ENERGIZING EGGS

Experimental fertility treatment faces scrutiny

As the US Food and Drug Administration (FDA) debates the merits of mitochondrial replacement in eggs, some observers will be looking for hints as to how the agency may regulate another mitochondrial manipulation — one with fewer ethical and safety concerns.

OvaScience, a biotechnology company in Cambridge, Massachusetts, wants to boost the success rate of *in vitro* fertilization (IVF) by infusing eggs with fresh mitochondria. The mitochondria are harvested from an IVF patient's own egg precursor cells, a cell type discovered by Jonathan Tilly, a reproductive biologist at Northeastern University in Boston, Massachusetts. Tilly says that these precursor cells can be coaxed to develop into mature eggs in adult women, challenging the dogma that women are born with all the eggs they will ever have. Tilly's results are disputed (see *Nature* **491**, 318–320; 2012), but OvaScience has long-term plans to harvest precursor cells and use them to create fresh eggs for women for whom conventional IVF has failed.

The company's first project, called AUGMENT, is to harvest precursor cells, isolate their mitochondria, and inject

them into mature eggs to see if they can revive eggs from infertile women, as work with mitochondria from donor eggs has suggested. Mitochondrial DNA from egg-precursor cells is thought to contain fewer mutations than mitochondrial DNA in the eggs themselves. Because OvaScience would be using mitochondria from a patient's own cells, the company hopes to sidestep ethical concerns raised by 'three-parent' embryos.

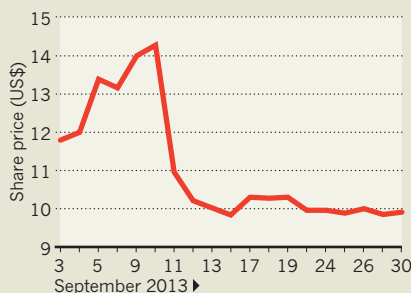
OvaScience has argued that AUGMENT involves 'minimal manipulation' — the same injection procedure, for example, is already used to put sperm into an egg — and therefore would not need FDA approval to be deployed in clinics. Regenerative Sciences in Broomfield, Colorado, has also argued that one of its stem-cell therapies involves 'minimal manipulation'. The FDA challenged that idea, and its injunction on the treatment was ultimately upheld in court (see *Nature* **488**, 14; 2012).

OvaScience investors clearly feared that AUGMENT would meet the same fate when, on 10 September, the company announced that the FDA had issued a letter questioning whether the project was exempt from agency review. OvaScience voluntarily suspended enrolment in the US arm of its AUGMENT clinical study, pending a meeting with regulators. The company's shares fell 23% that day, and have yet to recover (see 'Egg regs').

But analyst Jeffrey Cohen of Ladenburg Thalmann, a financial services company in Miami, Florida, says that the FDA letter has not changed his favourable assessment of OvaScience. The AUGMENT study is continuing in Europe, he notes, where the market for IVF is as much as three times larger than in the United States, and regulatory hurdles are not expected to be a barrier. **Heidi Ledford**

EGG REGS

OvaScience shares plummeted on 10 September, the day the company revealed that the US Food and Drug Administration might regulate its fertility treatment.



on the technique, and Parliament, which had banned all germline modifications, will vote on whether to allow the procedure next year.

There are also ethical considerations. The HFEA said that the procedure should be considered in the same ways as a tissue donation, and that any resulting child should not have the right to know the identity of the donor of the healthy mitochondria. The FDA, unlike the HFEA, does not consider ethics, and that worries Marcy Darnovsky, executive director of the Center for Genetics and Society, an advocacy group in Berkeley, California. Her group has opposed such trials, in part because of concerns that acceptance of the technology might lead to the selection of embryos with

specific traits for non-medical reasons.

Mitalipov agrees that any trial would need to proceed with caution, but says that if he cannot perform the trials in the United States, he would consider going to the United Kingdom if it allows the procedure first. "Patients are suffering the same issues, no matter where they are." ■

CORRECTION

The print version of the World View by George Church (*Nature* **502**, 143; 2013) was published before the author had approved changes. The online version was amended to better reflect his views.