NATURE | NEWS

Stem-cell pioneer bows out

Geron halts first-of-its-kind clinical trial for spinal therapy.

Monya Baker

22 November 2011

The first company to test a human embryonic stem-cell product in patients has become the first big player to bail out of the field. Last week's move shook investor confidence and raised questions about whether the company had overreached itself, as well as underscoring just how difficult novel therapies are to develop.

Geron, based in Menlo Park, California, announced on 14 November that it would cease work on its stem-cell-therapy programmes to focus on its anti-cancer portfolio. "It's kind of a heartbreak," says Melissa Carpenter, principal of Carpenter Group Consulting in Seattle, Washington, who served as Geron's director of stem-cell biology in the company's early days. "It is truly unfortunate for the field that the first possible product didn't get to go out of the gate."

Human embryonic stem (ES) cells have the potential to turn into any of the body's cell types, and so could replace defective tissue in myriad diseases. Geron chose to pursue a treatment for spinal-cord injury — an ambitious goal, not least because spinal damage involves many cell types. Some in the field speculate that Geron went forward with the programme, at least in part, because the neural-cell precursors it was testing are relatively easy to derive from human ES cells, and because dramatic results in animal studies impressed investors when the company needed funding. However, human trials are often the only way to test such unprecedented therapies.

Only four of a planned eight patients in Geron's phase I trial have received injections of specialized cells derived from human ES cells. John Scarlett, who became Geron's chief executive in September (see 'Rough ride'), says that the company will continue to monitor enrolled patients, but will not recruit more. None of the four patients receiving stem-cell injections suffered serious adverse events, but there were also no hints that the therapy was working (although phase I trials are not designed to test for efficacy).

The price of Geron's stock fell by more than 30% at the news, from US$2.28 to $1.50 per share as *Nature* went to press. But the company estimates that discontinuing stem-cell research will save $25 million a year, allowing it to conduct half a dozen phase II clinical trials of its two cancer products in the next two years without raising additional funds. Cell-therapy studies would have taken longer and cost more.

REDUX/EYEVINE

View Rough ride

Advanced Cell Technology (ACT) of Santa Monica, California, is now the only company conducting regulator-approved clinical trials involving human ES cells; these aim to treat degenerative eye diseases using specialized retinal cells.

Investors and patients are eager for reassurance that human ES cells have commercial and therapeutic potential, says Robert Lanza, chief scientific officer of ACT. "The field at this early point desperately needed a big success," he says. "It certainly puts a lot of pressure on us to deliver."

"Just because Geron is out, it doesn't mean that other trials will slow down."

Geron's decision comes shortly after a ruling that products and processes involving human ES cells are not patentable in Europe (see *Nature* http://dx.doi.org/10.1038/news.2011.597; 2011), but analyst Reni Benjamin of investment bank Rodman & Renshaw in New York believes that Geron's decision was unrelated. It was probably already in the works when long-term chief executive Thomas Okarma left the company abruptly in February, and reflects a change in business strategy rather than a verdict on cell therapies in general, he says. "Just because Geron is out, it doesn't mean that other trials will slow down."

Geron had invested heavily to bring human ES cells to clinical trials. It funded the studies leading to the cells' derivation in 1998 (J. A. Thomson *et al. Science* **282,** 1145–1147; 1998) and burned through cash while devising ways to manufacture specialized cells from the stem cells, as well as running extensive animal tests to show that the cells were safe enough to use in humans. These early efforts paved the way for others trying to move stem cells into the clinic. "It's exponentially easier," says Lanza. "We know exactly what [regulators] want."

There may be other benefits for the field. Geron controls extensive intellectual property relevant to human ES-cell therapy, says Ken Taymor, a stem-cell patent expert at the University of California, Berkeley, and it may now be more willing to license this portfolio to help others pursuing such therapies.

Asked what other companies can learn from Geron's decision, Michael West, who ran Geron from 1990 to 1998 and is currently chief executive of biotech company BioTime of Alameda, California, simply suggests: "Don't be the first one out the door. The first one out the door gets all the arrows in his back."

Nature **479,** 459 (24 November 2011) doi:10.1038/479459a