► are able to contract spontaneously.

Their first cell lines were created using fetal skin cells; others were derived using donor cells from an 8-month-old patient with a rare metabolic disorder called Leigh syndrome, to prove that ESCs could be made from more mature donor cells. The technique does not require prohibitive numbers of eggs: it took 15 from one donor to produce one cell line and 5 from a different donor to make another. “The efficiency was the most impressive thing,” says George Daley, a stem-cell expert at Children’s Hospital Boston in Massachusetts.

Such improvements might be necessary to convince people that SCNT research is still worthwhile. Egg donors for the experiment received US\$3,000–7,000 in compensation. This is expensive and, according to some bioethicists, risks creating an organ trade that preys on the poor. Because the technique requires the destruction of embryos, funds from the US National Institutes of Health (NIH) cannot be used to make or study SCNT-derived cell lines, hampering further clinical research. (Mitalipov maintains a separate laboratory for NIH-funded research.)

Public fears that the technology might be used to create human clones are another sticking point. The research might spark “cloning hysteria” that opponents of stem-cell research could capitalize on, says Bernard Siegel, executive director of the Genetics Policy Institute in Palm Beach, Florida. But Mitalipov has tried without success for more than a decade to produce a monkey by cloning. Tachibana says that an upcoming publication will explain why reproductive cloning of humans is not possible using their SCNT technique.

Still, Daley and most other stem-cell researchers have shifted to another method for creating genetically matched, patient-specific cell lines: reprogramming adult cells to an embryonic state to produce induced pluripotent stem (iPS) cells. First reported in 2006, the technique does not involve eggs, cloning or destruction of embryos⁴. “Honestly, the most surprising thing [about this paper] is that somebody is still doing human [SCNT] in the era of iPS cells,” says Miodrag Stojkovic, who studies iPS cells for regenerative medicine and runs a fertility clinic in Leskovac, Serbia.

But Stojkovic, like others, awaits the results of head-to-head comparisons between iPS and SCNT cells. Some research has shown that iPS cells are not completely reprogrammed and that stem cells derived from SCNT are more like embryonic stem cells derived from *in vitro* fertilization. Mitalipov and Tachibana are now conducting a study to compare iPS cells and SCNT cells derived from the same donor cell. “These results,” says Daley, “will be fascinating.” ■

1. Tachibana, M. *et al.* *Cell* <http://dx.doi.org/10.1016/j.cell.2013.05.006> (2013).
2. Byrne, J. A. *et al.* *Nature* **450**, 497–502 (2007).
3. Noggle, S. *et al.* *Nature* **478**, 70–75 (2011).
4. Takahashi, K. & Yamanaka, S. *Cell* **126**, 663–676 (2006).

Gas clouds swirl around the black hole at the Milky Way’s centre (seen here in radio emission).

ASTRONOMY

Magnetar found at giant black hole

Magnetized neutron star could test Einstein’s theory.

BY EUGENIE SAMUEL REICH

Dale Frail couldn’t resist the prospect of watching a black hole swallow its prey. Frail, who is in charge of the Very Large Array (VLA) of radio telescopes near Socorro in New Mexico, had seen a report last month about a long-lived X-ray flare emanating from the centre of the Milky Way, home to a supermassive black hole called Sagittarius A* (Sgr A*). Astronomers were speculating that the flare might be a sign that a gas cloud they had been tracking had begun its death spiral into the black hole.

Frail was sceptical. The cloud’s death was not expected until between September this year and March 2014. But Frail did not want to risk missing the action. Within hours of seeing the report, he had trained the VLA’s radio dishes on the scene, only to find

nothing remarkable. Frail was puzzled. If the flare wasn’t the arrival of the gas cloud, what was it?

An answer soon came from other telescopes watching the drama at the centre of the Galaxy: the flare was coming from a magnetar, a highly magnetized kind of pulsar, or rotating neutron star. Its position near Sgr A* makes it a precious find. The magnetar’s regular radio pulses could be used to measure the warping of space-time near the monster black hole and to test predictions of Einstein’s general theory of relativity.

“There’s huge interest in finding pulsars around supermassive black holes, and this is the first example,” says Geoffrey Bower, a radioastronomer at the University of

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California, Berkeley, who carried out the recent VLA observations. “There’s a lot we can learn from this.”

The magnetar’s accidental discovery is a by-product of astronomers’ excitement about the arrival of the gas cloud, dubbed G2. The cloud, which is about three times the mass of Earth, was first spotted near Sgr A* in 2012 (and was later found in 2002 data). Its arrival would deliver insight into how objects accrete into the swirling disk of material around a black hole, as well as offering the first chance for astronomers to measure the time that it takes for objects to be captured and swallowed up.

Every flicker of emissions from Sgr A* sparks a flurry of speculation, intensifying the usual cycle of observation and coordinated follow-up that characterizes high-energy astronomy. Many telescope directors are scheduling additional monitoring of the Galactic Centre. The VLA, for example, is already scanning radio frequencies around Sgr A* every two months, and will do so every month once G2 arrives.

“I don’t think there was ever such a large camp of telescopes looking at the Galactic Centre,” says Stefan Gillessen, an astronomer at the Max Planck Institute for Extraterrestrial Physics in Garching, Germany, who last year reported that G2 was on course for Sgr A* (S. Gillessen *et al. Nature* **481**, 51–54; 2012).

The observing frenzy is likely to jeopardize regularly scheduled observations, and some astronomers worry that the pay-off may be disappointing. Andrea Ghez, an astronomer

studying G2 at the University of California, Los Angeles, says that her infrared observations at the Keck telescopes on Mauna Kea in Hawaii suggest that G2 may not be a gas cloud, but rather a star surrounded by gas. If she is right, Sgr A* may swallow some of the gas, but the star itself would have enough momentum to escape the black hole’s grasp. The result would be a Galactic fizzle rather than fireworks. “I’m just worried that this is overblown,” she says.

Yet the focus on the Galactic Centre has paid off unexpectedly. The reported X-ray flare prompted Fiona Harrison, an astronomer who leads NASA’s Nuclear Spectroscopic Telescope Array (NuSTAR) satellite, to train the X-ray space telescope on Sgr A*. Like Frail, Harrison doubted that the flare had anything to do with G2, but she thought that NuSTAR’s ability to time events precisely might clarify the situation. Sure enough, on 26 April, NuSTAR detected an X-ray signal blinking every 3.76 seconds — the signal of a pulsar spinning at that rate. Then, on 29 April, the Chandra X-ray Observatory localized the magnetar to at least 0.12 parsecs (0.38 light years) from the black hole — close, but much farther away than G2.

On 4 May, observations by NuSTAR and Swift, the NASA space telescope that spotted the original flare, identified the object conclusively as a magnetar by showing a gradual slowing in its spin rate. This slowing is consistent with the presence of the high magnetic field that enables the star to radiate energy faster than a normal pulsar.

Fourteen magnetars, including this one, have been found in the general region of the Galactic Centre. This high number supports the idea that magnetars tend to form from the death throes of the bright, heavy stars that are common there, says Chryssa Kouveliotou, a magnetar expert at NASA’s Marshall Space Flight Center in Huntsville, Alabama.

The finding also hands astronomers a tool for studying conditions near supermassive black holes. According to Einstein’s general theory of relativity, clocks in high gravitational fields run slow, as a result of the warping of space-time. So if the mag-

netar is following an elliptical orbit around the black hole, its clock-like spin rate should speed up and slow down as its distance from the black hole varies — an effect that, with luck, could be disentangled from the gradual slow-down caused by the magnetar’s magnetic field.

Frail suggests that the magnetar’s discovery shows that all the excitement over G2 is justified. Astronomers watching G2 say that the cloud itself could deliver plenty more excitement when it finally reaches the Galactic Centre. They are undaunted by the fact that one of the first apparent signs of its arrival turned out to be something completely different. “I wish all of our failed experiments were that good,” says Frail. ■

“I don’t think there was ever such a large camp of telescopes looking at the Galactic Centre.”

GENOMICS

Chinese project probes the genetics of genius

Bid to unravel the secrets of brainpower faces scepticism.

BY ED YONG

The US adolescents who signed up for the Study of Mathematically Precocious Youth (SMPY) in the 1970s were the smartest of the smart, with mathematical and verbal-reasoning skills within the top 1% of the population. Now, researchers at BGI (formerly the Beijing Genomics Institute) in Shenzhen, China, the largest gene-sequencing facility in the world, are searching for the quirks of DNA that may contribute to such gifts. Plunging into an area that is littered with failures and riven with controversy, the researchers are scouring the genomes of 1,600 of these high-fliers in an ambitious project to find the first common

genetic variants associated with human intelligence.

The project, which was launched in August 2012 and is slated to begin data analysis in the next few months, has spawned wild accusations of eugenics plots, as well as more measured objections by social scientists who view such research as a distraction from pressing societal issues. Some geneticists, however, take issue with the study for a different reason. They say that it is highly unlikely to find anything of interest — because the sample size is too small and intelligence is too complex.

Earlier large studies with the same goal have failed. But scientists from BGI’s Cognitive Genomics group hope that their super-smart

sample will give them an edge, because it should be enriched with bits of DNA that confer effects on intelligence. “An exceptional person gets you an order of magnitude more statistical power than if you took random people from the population — I’d say we have a fighting chance,” says Stephen Hsu, a theoretical physicist from Michigan State University in East Lansing, who acts as a scientific adviser to BGI and is one of the project’s leaders.

“If they think they’re likely to get much useful data out of this study, they’re almost certainly wrong,” says Daniel MacArthur, a geneticist at Massachusetts General Hospital in Boston. He is not against intelligence ►