A. MICHAILIDIS/DEMOTIX/CORBIS

Student protesters in Thessaloniki object to changes in university governance.

HIGHER EDUCATION

Protests delay Greek university reform

Small groups of agitators stop elections for governing boards.

BY ALISON ABBOTT

As European leaders put the finishing touches to a €130-billion (US$170-billion) rescue package for Greece's enfeebled economy, angry demonstrators are blocking university reforms that many researchers believe are crucial to the country's recovery. The protesters, mostly students but also some academics, are targeting a law passed by the Greek parliament last August that seeks to introduce more meritocracy, dynamism and accountability to Greece's rigid higher-education system. Opponents dislike the law mainly because it takes away students' rights to vote on many faculty decisions, and mandates 15-person governing boards that will have to include six members external to the university (see *Nature* **481,** 123–124; 2012).

On 22 February, demonstrators at the University of Crete in Heraklion and at the Athens University of Economics and Business disrupted elections for the governing boards by blocking the entrances to the buildings in which voting was to take place. Protesters have stopped elections at four other universities in past weeks.

The actions have caused widespread consternation. "It's frustrating," says pharmacologist Achilleas Gravanis of the University of Crete, a member of the government's scientific advisory committee. "If we can't implement a law that had been approved by an overwhelming parliamentary majority, how are we going to convince those in Europe who are bailing us out that we are capable of reform?"

Greek higher-education minister Anna Diamantopoulou says that the protesters are "holding hostage the vast majority of faculty and students". She plans to ask parliament for rapid approval of an electronic voting system to bypass the confrontations before elections at other universities — eight of which are planned for March. Nine universities have not started planning elections because their rectors disapprove of the law.

Like other opponents, Yannis Krestenitis, an oceanographer at the Aristotle University of Thessaloniki, hopes that the law will be declared unconstitutional by the Supreme Court, which is deliberating charges that it violates academic independence. "It is clearly undemocratic," he says. Krestenitis helped to lead demonstrations that blocked two attempts to hold elections at the university, on 15 and 17 February.

Many others, however, regard the protests themselves as undemocratic. "What we have been seeing in Thessaloniki runs counter to any rules of a democratic state or decently functioning university," says physicist Orestis Kalogirou, a candidate for the Aristotle University board. According to Georgios Theodoridis, an analytical chemist at the institution, students broke into the polling station and were later joined by more than 150 protesters — including 20 or so faculty members — who formed a human chain to block the main university entrance while chanting slogans. "It feels a bit like George Orwell's *Animal Farm*, where the dogs are constantly barking so others cannot speak to each other," says Theodoridis. ■

INFRASTRUCTURE

Structural biologists share their toys

European network pools resources to unpick the secrets of the cell.

BY EWEN CALLAWAY

To study the components of a cell, from proteins to organelles, scientists need a barrage of high-end equipment that no one laboratory can afford. Researchers typically access the tools they don't have at collaborating labs or national centres. But with the launch of the Instruct network on 23 February, structural biologists across Europe have teamed up to make this sharing more systematic.

Instruct links up 22 structural-biology centres, allowing researchers to access a range of equipment and expertise in a single request, says Instruct's head David Stuart, a structural biologist at the University of Oxford, UK.

It also presents an opportunity for structural biologists to solicit funding with a unified voice — just in time for Horizon 2020, the European Commission's next research-funding programme, which is gearing up to disburse an anticipated €80 billion (US$108 billion) in grants between 2014 and 2020.

Instruct emerged from Europe-wide projects that determined the crystal structures of hundreds of proteins and protein complexes. Stuart says that the project will now try to fill in details of the cell at every scale in a way that he likens to zooming towards a location using Google Earth. "The idea is to have a 'Google Cell' approach, so you can drill from the cellular context to the atomic detail," he says.

For instance, a scientist studying herpes infection might start by looking at fluorescent viruses under a light microscope. Switching to electron microscopy would reveal ▶

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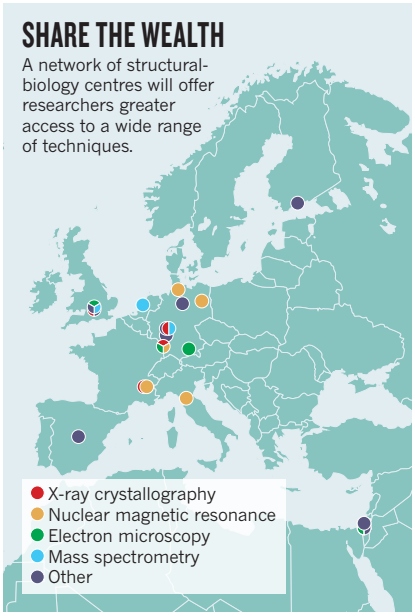
SOURCE: INSTRUCT



the subcellular compartments that the virus exploits. A crystal structure of a key molecular interaction might help to identify infection-blocking drugs.

"Only doing crystallography is not enough. Only doing electron microscopy is not enough. You often need all these technologies, and it's very hard to have them all in one house," says Albert Heck, scientific director of the Bijvoet Center for Biomolecular Research at Utrecht University in the Netherlands, which will offer mass spectrometry through Instruct.

Each of Instruct's facilities will cede up to 20% of their capacity to the programme (see 'Share the wealth'). Instruct will seek independent peer review of requests for equipment use and will approve access to various facilities, in some cases bypassing the allocation committees at individual centres.

The programme is initially using a subscription model, with eight nations, including Britain, France and Germany, agreeing to pay €50,000 per year to give their scientists access. Currently, the European Commission provides funding only for researchers to travel to these facilities. But Heck hopes that if Instruct is successful, Horizon 2020 will support both access and infrastructure for structural-biology centres, including equipment and staff, removing the need for subscriptions.

Aled Edwards, a structural biologist at the University of Toronto, Canada, is well used to juggling international resources as head of the Structural Genomics Consortium, which has solved more than 1,000 protein structures. He thinks Instruct makes sense. "It gives people access to technologies they don't have locally, it trains people," he says. "It's clearly setting itself up for Horizon 2020 funding. But they deserve it, if they can pull it off." ■

REPRODUCTIVE BIOLOGY

Egg-making stem cells found in adult ovaries

Discovery could pave the way for new fertility treatments and a longer reproductive life.

BY KENDALL POWELL

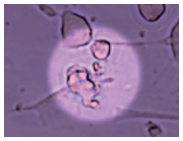
It's time to rewrite the textbooks. For 60 years, everyone from high-school biology teachers to top fertility specialists has been operating under the assumption that women are born with all the eggs they will ever produce, with no way to replenish that supply. But the discovery of human egg-producing stem cells, harvested from the ovaries of six women aged 22 to 33, puts that dogma in doubt.

The work, published online in *Nature Medicine*[1] by Jonathan Tilly and colleagues at Massachusetts General Hospital in Boston, parallels the findings of a Shanghai-based group[2] that isolated similar stem cells from mice in 2009. However, both this and Tilly's earlier work in mice[3] remained controversial, with many experts sceptical that such stem cells existed.

"This is unequivocal proof that not only was the mouse biology correct, but what we proposed eight years ago was also correct — that there was a human population of stem cells in young adult tissue," says Tilly.

To address the doubts, Tilly's team began by developing a more sensitive method for identifying and collecting mouse ovarian stem cells. Their method, based on a technique called fluorescence-activated cell sorting (FACS), attaches a fluorescently labelled antibody to a protein, Ddx4, that is present on the outer surface of the stem cells but not on the surface of the later-stage egg cells or oocytes. The FACS instrument lines up cells in single file and sorts them one by one, separating the labelled ones from the rest; it also gets rid of dead or damaged cells, such as oocytes, in which internal Ddx4 might become accessible to the antibody. This method is more selective than previous isolation methods, which did not get rid of such cells.

Once the team confirmed that it had isolated mouse ovarian stem cells by this method, it set its sights on reproductive-age human ovaries. Yasushi Takai, a former research fellow in Tilly's lab and now a reproductive biologist at Saitama Medical University in Japan, supplied frozen whole ovaries removed from sex-reassignment patients, all young women of reproductive age. "It was 9 November when we did the first human FACS sort and I knew immediately that it had worked," says Tilly. "I cannot even put into words the excitement — and, to some degree, the relief — I felt."



NATURE.COM
For a video explaining this research, see:
go.nature.com/5ub5ma

The cells they pulled out, called oogonial stem cells (OSCs), spontaneously generated apparently normal immature oocytes when cultured in the lab. To look at the development of the putative human OSCs in a more natural environment, the team labelled the cells with green fluorescent protein to make them traceable, and injected them into fragments of adult human ovarian tissue, which were then transplanted under the skin of mice. After one to two weeks of growth, the OSCs had formed green-glowing cells that looked like oocytes and that also expressed two of the genetic hallmarks of this cell type.

"I've seen these cells and how they behave. They're convincing and impressive."

"There's no confirmation that we have baby-making eggs yet, but every other indication is that these cells are the real deal — bona fide oocyte precursor cells," says Tilly. The next step, to test whether the human OSC-derived oocytes can be fertilized and form an early embryo, will require special considerations — namely, private funding to support the work in the United States (federal funding cannot by law be used for any research that will result in the destruction of a human embryo, whatever the source of the embryo) or a licence from the UK Human Fertilisation and Embryology Authority to do the work with collaborators in the United Kingdom.

Evelyn Telfer, a reproductive biologist at the University of Edinburgh, UK, was once sceptical of the mouse work, but has become a believer. "I've visited [Tilly's] lab, seen these cells and how they behave. They're convincing and impressive," she says. Telfer, who studies the maturation of human eggs *in vitro*, will work with Tilly to try to grow the OSC-derived eggs to the point at which they are ready for fertilization.

She notes that there's still no evidence that the OSCs form new eggs naturally in the body.

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