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JASON LEE/REUTERS

Former Chinese leader Deng Xiaoping had Parkinson's disease, one of the first targets of embryonic-stem-cell therapies being tested in China.

REGENERATIVE MEDICINE

Trials of embryonic stem cells to launch in China

Studies to treat vision loss and Parkinson's disease are the first to proceed under new rules.

BY DAVID CYRANOSKI

In the next few months, surgeons in the Chinese city of Zhengzhou will carefully drill through the skulls of people with Parkinson's disease and inject 4 million immature neurons derived from human embryonic stem cells into their brains. Then they will patch the patients up, send them home and wait.

This will mark the start of the first clinical trial in China using human embryonic stem (ES) cells, and the first one worldwide aimed at treating Parkinson's disease using ES cells from

fertilized embryos. In a second trial starting around the same time, a different team in Zhengzhou will use ES cells to target vision loss caused by age-related macular degeneration.

The experiments will also represent the first clinical trials of ES cells under regulations that China adopted in 2015, in an attempt to ensure the ethical and safe use of stem cells in the clinic. China previously had no clear regulatory framework, and many companies had used that gap as an excuse to market unproven stem-cell treatments.

"It will be a major new direction for China,"

says Pei Xuetao, a stem-cell scientist at the Beijing Institute of Transfusion Medicine who is on the central-government committee that approved the trials. Other researchers who work on Parkinson's disease, however, worry that the trials might be misguided.

Both studies will take place at the First Affiliated Hospital of Zhengzhou University in Henan province. In the first, surgeons will inject ES-cell-derived neuronal-precursor cells into the brains of individuals with Parkinson's disease. The only previous trial using ES cells to treat Parkinson's began last year in Australia; ►

► participants there received stem cells from parthenogenetic embryos — unfertilized eggs that are triggered in the lab to start embryonic development.

In the other Zhengzhou trial, surgeons will take retinal cells derived from ES cells and transplant them into the eyes of people with age-related macular degeneration. The team will follow a similar procedure to that of previous ES-cell trials carried out by researchers in the United States and South Korea.

Qi Zhou, a stem-cell specialist at the Chinese Academy of Sciences Institute of Zoology in Beijing, is leading both efforts. For the Parkinson's trial, his team assessed hundreds of candidates and have so far have picked ten who best match the ES cells in the cell bank, to reduce the risk of the patients' bodies rejecting the cells.

The 2015 regulations state that hospitals planning to carry out stem-cell clinical work must use government-certified ES-cell lines and pass hospital-review procedures. Zhou's team completed four years of work with a monkey model of Parkinson's, and has met the government requirements, he says.

Parkinson's disease is caused by a deficit in dopamine produced by brain cells. Zhou's team will coax ES cells to develop into precursors

to neurons, and will then inject them into the striatum, a central region of the brain implicated in the disease.

In their unpublished study of 15 monkeys, the researchers did not observe any improvements in movement at first, says Zhou. But at the end of the first year, the team examined the brains of half the monkeys and found that the stem cells had turned into dopamine-releasing cells. He says that they saw 50% improvement in the remaining monkeys over the next several years. "We have all the imaging data, behavioural data and molecular data to support efficacy," he says. They are preparing a publication, but Zhou says that they wanted to collect a full five years' worth of animal data.

MATURITY CONCERNS

Jeanne Loring, a stem-cell biologist at the Scripps Research Institute in La Jolla, California, who is also planning stem-cell trials for Parkinson's, is concerned that the Australian and Chinese trials use neural precursors and not ES-cell-derived cells that have fully committed to becoming dopamine-producing cells. Precursor cells can turn into other kinds of neurons, and could accumulate dangerous mutations during their many divisions, says Loring. "Not knowing

what the cells will become is troubling."

But Zhou and the Australian team defend their choices. Russell Kern, chief scientific officer of the International Stem Cell Corporation in Carlsbad, California, which is providing the cells for and managing the Australian trial, says that in preclinical work, 97% of them became dopamine-releasing cells.

Lorenz Studer, a stem-cell biologist at the Memorial Sloan Kettering Cancer Center in New York City who has spent years characterizing such neurons ahead of his own planned clinical trials, says that "support is not very strong" for the use of precursor cells. "I am somewhat surprised and concerned, as I have not seen any peer-reviewed preclinical data on this approach," he says.

Studer's and Loring's teams are part of an international consortium that coordinates stem-cell treatments for Parkinson's. In the next two years, five groups in the consortium plan to run trials using cells fully committed to becoming dopamine-producing cells.

Regenerative neurobiologist Malin Parmar, who heads one of the teams at Lund University in Sweden, says that the groups "are all rapidly moving towards clinical trials, and this field will be very exciting in the coming years". ■

POLITICS

UK scientists cautious over election pledges

Parties promise more money for research, but scientists fear impact of split with EU.

BY DANIEL CRESSEY

Before a UK election that will decide who leads the country's exit negotiations with the European Union, a remarkable consensus has emerged among the main national parties. All three have pledged in their manifestos to spend more money on science. Each is "putting science at the heart of their programme for the future of Britain", says Sarah Main, director of the London-based Campaign for Science and Engineering.

Yet with the uncertainty of Brexit hanging over research, these promises may seem like consolation prizes. Almost a year after the country voted to leave the EU, scientists still don't know what the split will mean for funding and collaborations — and non-British EU scientists are unclear about their future residency status.

Britain spends little on research and development (R&D) compared to other major science nations: just 1.7% of its gross domestic product

POLITICAL PATTERN

UK party manifestos mention science more now than in previous decades.

(GDP). By contrast, Germany spends 2.9%. But the governing Conservative Party, which polls suggest will win the 8 June election, has said it wants to raise UK spending to 2.4% within 10 years, with a longer-term goal of 3%. Labour,

its main rival, has promised 3% by 2030 and the Liberal Democrats, third in national polls, have a "long-term goal" to double science spending. In theory, these targets would mean billions more for research. But the proportion of GDP spent isn't necessarily an indicator of a nation's research health, says Kieron Flanagan, a science-policy researcher at the Alliance Manchester Business School. Much R&D spending comes through the private sector, over which the government has no direct control, he adds.

RESEARCH RHETORIC

In recent decades, Labour has been a champion of research and innovation, and academia has been seen as a bastion of its support. But the Conservatives have increased their focus on science. The words 'science' and 'research' (or variants of these) didn't appear in their manifesto in 2005, but garnered 28 mentions this year (see 'Political patter'). And in the past year, the party — led by Prime Minister