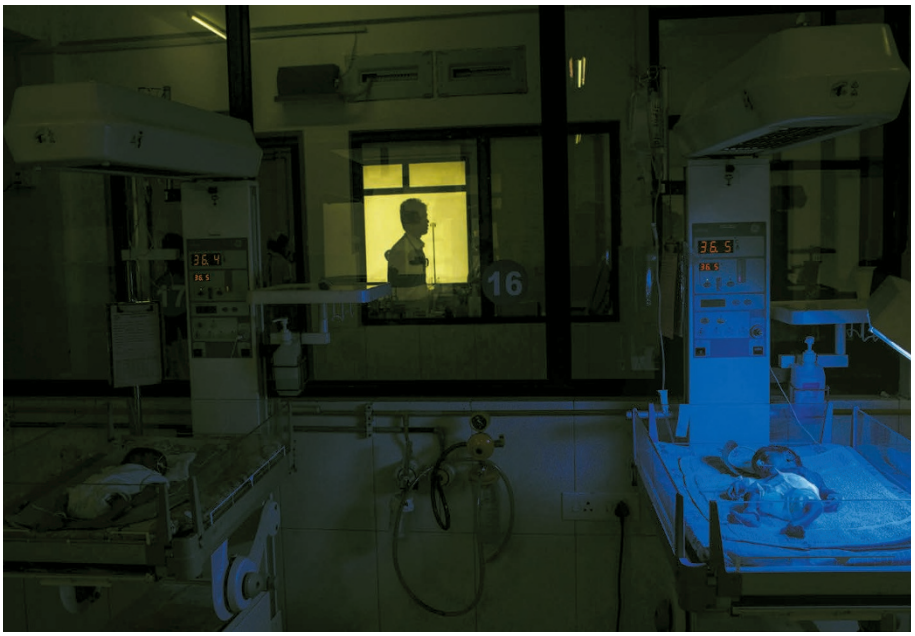
Advanced Research Projects Agency (DARPA), the Pentagon's high-risk research arm. That fund will support cross-disciplinary "collaborations between business and the UK's science base", according to the Treasury documents, and will "set identifiable challenges for UK researchers to tackle". It will be managed by Innovate UK, a government body that funds R&D primarily through businesses, and by the seven UK research councils, which mainly fund university research. The money will be allocated using an "evidence-based process", the Treasury says. Other cash will go to "innovation, applied science and research". Although the Treasury was vague on what this entailed, it said that the funding would be used "to increase research capacity and business innovation" and "to further support the UK's world-leading research base".UK Research and Innovation (UKRI) — an agency that has not yet been created, but is expected to unite the research councils and Innovate UK — will award the funding on the basis of "national excellence".

The documents make no clear reference to spending on basic research, but Main said she would be surprised if it was excluded. "I think it will be really important that this funding goes to both blue-skies and challenge-driven research. It is clear from the document that there is money there just to increase the UK's research capacity, and that this money is going to be channelled through UKRI. It will be important for UKRI to consider the balance of how that money is distributed," she said.

BREXIT AHEAD

Scientists had hoped that the speech would signal their new government's approach to science. And although it was dominated by forecasts of the country's slowed economic growth as a result of Brexit — its exit from the European Union — research and innovation also took top billing. "We do not invest enough in research, development and innovation," Hammond said.

But "sorely missing" from the statement was any reference to the impact on science from Brexit, says Stephen Curry, a structural biologist at Imperial College London and a member of the advisory board for the campaign group Science is Vital. "I'd like to know how the loss of EU funding will impact decisions on allocation of the new investments." Hammond's opposition counterpart, Labour Party shadow chancellor John McDonnell, replied by saying that the rise in R&D funding was not enough: it would lift the proportion of UK gross domestic product spent on R&D from 1.7% to only 1.8%. The Organisation for Economic Co-operation and Development recommends that developed countries should be spending 3%. ■



SANJIT DAS/PANOS

Physicians may soon have a lot more help in treating newborns.

MEDICINE

Preventing brain damage in babies

Experimental therapies could save thousands of newborns.

BY ERIKA CHECK HAYDEN

Neuroscientists and physicians have embarked on what they hope will be a revolution in treatments to prevent brain damage in newborn babies.

As many as 800,000 babies die each year when blood and oxygen stop flowing to the brain around the time of birth. And thousands develop brain damage that causes long-lasting mental or physical disabilities, such as cerebral palsy. Physicians have few tools to prevent this, but they are optimistic that clinical trials now under way will change things.

The trials were sparked by neuroscientists' realization in the 1990s that some brain injuries can be repaired. That discovery spurred a flurry of basic research that is just now coming to fruition in the clinic.

In January, a US study will start to test whether the hormone erythropoietin, or EPO, can prevent brain damage hours after birth when combined with hypothermia, in which babies are cooled to 33.5 °C. A trial in Australia is already testing this treatment. Physicians in countries including the United States, China and Switzerland are testing EPO in premature babies, as well as other treatments, such as melatonin, xenon, argon, magnesium, allopurinol and cord blood in full-term babies.

"The world has really changed for us," says neurologist Janet Soul at Boston Children's Hospital in Massachusetts.

Therapeutic hypothermia was the first success: clinical trials over the past decade have shown that it decreases the risk of death and of major brain-development disorders by as much as 60%. It is now standard treatment for babies in developed countries whose brains are deprived of blood and oxygen during birth.

"I can't tell you how great it was to be able to do something for these babies."

"I can't tell you how great it was to be able to do something for these babies rather than stand there and watch them have seizures," Soul says.

But because hypothermia does not work for all babies[1], scientists decided to see whether combining it with other treatments would help. EPO was known to boost the production of red blood cells even before its discovery[2] in mouse brain cells in 1993, and is regularly used by physicians to treat anaemia. Neuroscientist Sandra Juul at the University of ▶

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Washington in Seattle wondered what a blood-boosting hormone was doing in the brain. In subsequent animal studies, she found that the hormone stopped brain cells from dying and helped the brain to repair itself[3]. That led a few years later to the first clinical trials showing that EPO prevents brain damage in babies.

MOVING ON

In June, a study conducted by Juul and her colleagues reported the results of giving EPO or a placebo, along with inducing hypothermia, just after birth to dozens of babies at risk of brain injury. Those who received EPO were less likely than those given the placebo to show signs of brain damage on magnetic resonance imaging tests done five days later[4].

Those results led to the forthcoming clinical study. Co-led by Juul and Yvonne Wu, a paediatric neurologist at the University of California, San Francisco, the trial will enrol 500 babies at risk of brain injury from 17 hospitals across the United States during their first 24 hours of life.

All the babies will be treated with hypothermia. Half will then receive five doses of EPO over seven days; the other half will get saline injections. The US$10-million trial will measure whether the hormone boosts the children's mental and physical health at 2 years of age.

Researchers are also testing EPO in babies born as early as 23 weeks in the United States and Europe. Such premature babies are more likely to develop brain injury than are full-term babies, and smaller studies have produced conflicting results about the benefits of EPO in these very early cases.

But neonatologist Giancarlo Natalucci of the University of Zurich, who was part of a Swiss trial that found EPO didn't improve the health of two-year-olds who had been treated as premature babies[5], says that factors such as dose may account for such results. He still thinks that the treatment merits study.

The trials are difficult to conduct because it's hard to tell whether a symptom is a side effect of treatment or the result of a baby's underlying injuries.

But despite the hurdles, Juul and other researchers press on, driven by their desire to aid the world's smallest patients. "They're in such desperate need of help," Juul says. ■

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ANTARCTICA

Speedy drills start hunt for oldest ice

British team first to seek site of 1.5-million-year-old sample.

BY QUIRIN SCHIERMEIER

As the short Antarctic spring ends and long summer days approach, geoscientists are flocking to the frozen continent to start a new kind of exploration.

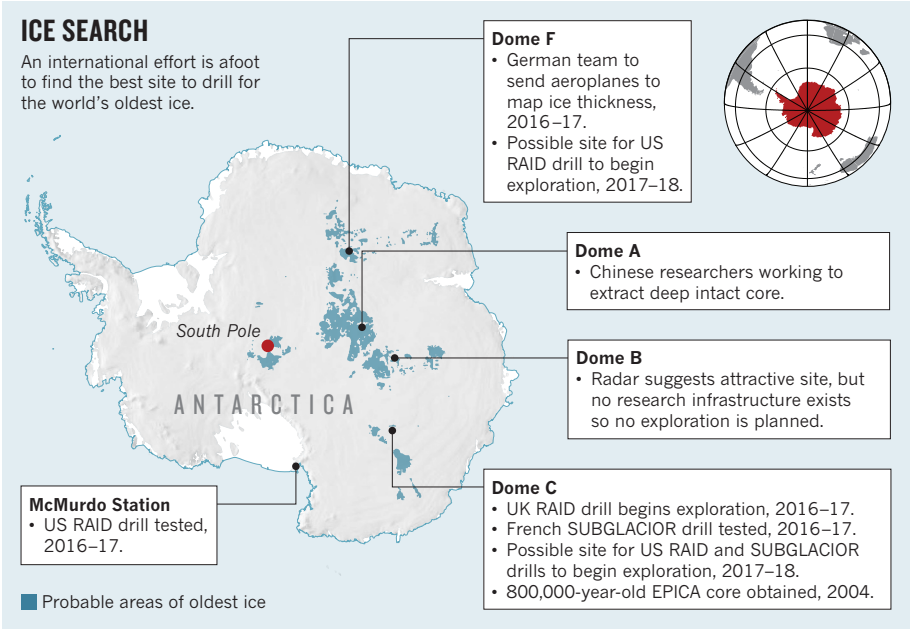
In December, the first drill designed to search for a scientifically useful sample of ice that is at least 1.5 million years old will begin its work. It is part of a broader effort to locate the best place to extract a core containing Earth's oldest ice, which would help to reveal how climate has shaped the planet's past and how to predict future fluctuations.

"This exciting field season should bring us a large step nearer to deciding where to drill the oldest-ice core," says Olaf Eisen, a glaciologist at the Alfred Wegener Institute of Polar and Marine Research in Bremerhaven, Germany, who coordinates an exploration team funded by the European Union.

More than a decade ago, the European Project for Ice Coring in Antarctica (EPICA) drilled the oldest existing core, which contains 800,000-year-old ice, from an ice dome in East Antarctica known as Dome C. The core reaches only as far back as the latter part of the Pleistocene epoch, when Earth began cycling between warm and cold periods every 100,000 years. Before 1 million years ago, the cycle occurred every 40,000 years (L. E. Lisiecki and M. E. Raymo *Paleoceanography* **20,** PA1003; 2005), so scientists want an ice core that is twice as old as EPICA to better understand this transition.

Digging such a core would cost about US$50 million and take several years, so researchers want to be sure that the location is optimal — with ice that is sufficiently deep but not melted at the bottom by geothermal activity. "It's absolutely crucial to thoroughly investigate all options," says Eisen. Enter a new breed of drill, designed to do fast, cheap reconnaissance instead of extracting a single, intact ice core, as previous deep drills have done.

One promising location, 'little Dome C', lies just 40 kilometres away from the EPICA site — and is where the £500,000 (US$620,000) Rapid Access Isotope Drill (RAID) will start boring this month, led by climate scientist Robert Mulvaney of the British Antarctic Survey in Cambridge, UK. A narrow drill, RAID will excavate to 600 metres in about 7 days — compared with 5 years for a 3.4-kilometre core such as EPICA's. And rather than extract a core, RAID will measure the ice's temperature and collect chips of ice. Scientists will then comb these for clues from isotopes as to the age and temperature of the ice at the bottom of the sheet.



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