The Lilly trial tracked more than 2,100 people diagnosed with mild dementia due to Alzheimer's disease for 18 months. Half received monthly infusions of solanezumab, the other half a placebo. Analysis of people with comparable symptoms in earlier studies of solanezumab had seemed encouraging, but the latest trial indicated only a small cognitive benefit, not enough to warrant marketing the drug (see 'Market reaction').

PREVENTION HOPE

Lilly has also been running prevention trials to see whether solanezumab might help people at especially high risk of the disease. The company says it will now discuss with its trial partners whether to continue with those.

Sperling's trial is one of these, and tests solanezumab in people who have elevated amyloid levels in the brain but have not shown any symptoms of dementia. Researchers at Washington University in St Louis, Missouri, are also testing solanezumab, and a similar antibody made by drug company Roche, in people who are currently healthy but are genetically at high risk of developing Alzheimer's. Meanwhile, the Banner Alzheimer's Institute in Phoenix, Arizona, is testing the effects of three therapies that target amyloid production, one of which is an antibody, in people at high genetic risk of Alzheimer's. The Lilly outcome "doesn't disprove the amyloid hypothesis, and it really increases the importance of these longer prevention trials", says Eric Reiman, the Banner institute's executive director and leader of the trials.

Lilly's result may say more about the characteristics of solanezumab than about the accuracy of the underlying amyloid hypothesis, says Christian Haass, head of the Munich branch of the German Centre for Neurodegenerative Diseases. The antibody targets soluble forms of amyloid, he points out, so it "could be trapped in the blood without ever reaching the actual target in the brain in sufficient quantities".

Biogen, a company based in Cambridge, Massachusetts, is testing a different antibody called aducanumab, which targets amyloid plaques in the brain. In early clinical testing, the antibody showed signs of clearing amyloid and alleviating memory loss in people with mild Alzheimer's disease; results from phase III trials are expected in 2020.

"Until the aducanumab data read out, we have not truly put amyloid to the test," says Josh Schimmer, a biotechnology analyst at financial-services firm Piper Jaffray in New York City.

Still, the negative trial findings have emboldened critics of the amyloid theory, who are weary of its failure to yield a treatment. "The amyloid hypothesis is dead," says George Perry, a neuroscientist at the University of Texas at San Antonio. "There's no sign of anybody getting better, even for a short period, and that suggests to me that you have the wrong mechanism," adds Peter Davies, an Alzheimer's researcher at the Feinstein Institute for Medical Research in Manhasset, New York.

No matter what Lilly decides about its other solanezumab trials, the company isn't giving up on Alzheimer's. It is testing an inhibitor of an enzyme involved in the synthesis of amyloid in partnership with AstraZeneca, and is progressing with a handful of candidate therapies aimed at other targets. ■

MARKET REACTION

When company Eli Lilly announced that an Alzheimer's drug based on the amyloid hypothesis had flopped in a clinical trial, its stock plummeted.

SOURCE: NYSE

POLITICS

Bonus funds excite UK scientists

Government announces extra £4.7 billion for research and development up to 2021.

BY ELIZABETH GIBNEY

British scientists are not used to hearing about large increases in national research spending. So when Prime Minister Theresa May promised on 21 November that her government would invest an extra £2 billion (US$2.5 billion) per year in research and development (R&D) by 2020, scientists gave her speech a cautious welcome.

But the funding hike seems to be no financial sleight of hand, according to Treasury documents released on 23 November after Chancellor of the Exchequer Philip Hammond gave an address on the nation's finances. The government expects to spend an extra £4.7 billion on R&D between now and 2020–21, it says, and the final year's £2-billion boost will represent a rise of around 20% in total government R&D spending. Still, it remains unclear how the cash will be allocated, and how much will fund basic, blue-skies research.

"It is a real boost to see UK strength in science being championed by the prime minister and backed with what is the most significant investment in R&D I can remember," said Sarah Main, director of the London-based Campaign for Science and Engineering.

INDUSTRIAL CHALLENGES

Some of the money will go directly to applied R&D through a new Industrial Strategy Challenge Fund, modelled on the US Defense

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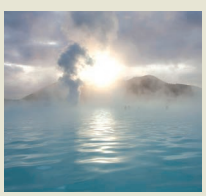

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ARNALDUR HALLDORSSON/BLOOMBERG VIA GETTY

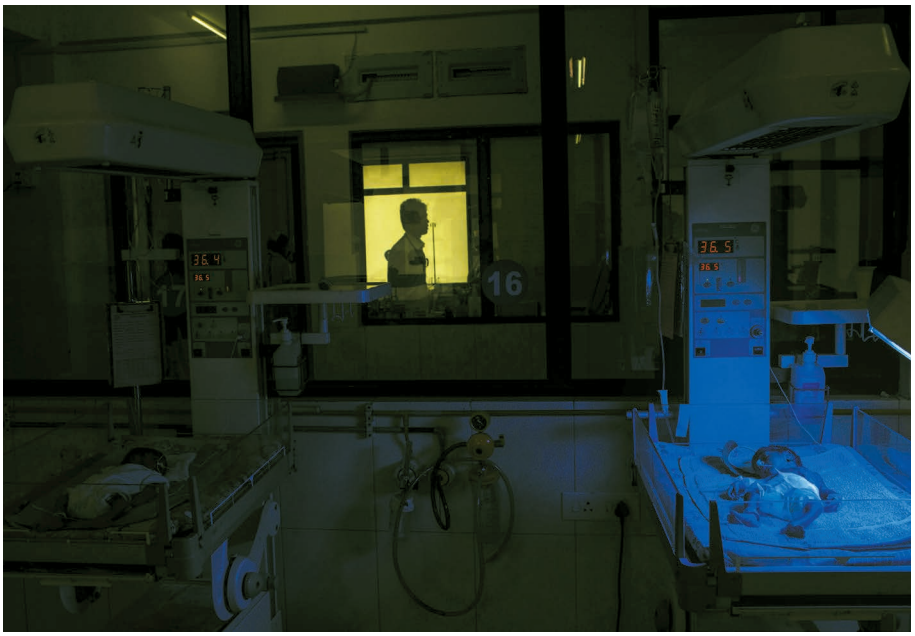
Advanced Research Projects Agency (DARPA), the Pentagon's high-risk research arm. That fund will support cross-disciplinary "collaborations between business and the UK's science base", according to the Treasury documents, and will "set identifiable challenges for UK researchers to tackle". It will be 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 ▶