

NEUROSCIENCE

‘Mini brains’ show human-like activity

Electrical patterns resemble those in premature babies.

BY SARA REARDON

‘Mini brains’ grown in a dish have spontaneously produced human-like brain waves for the first time — and the electrical patterns look similar to those seen in premature babies.

The advance could help scientists to study early brain development, and many are excited about the promise of these ‘organoids’. But it also raises ethical concerns about creating miniature organs that could develop consciousness.

Researchers led by neuroscientist Alysson Muotri of the University of California, San Diego, coaxed human stem cells to form tissue from the cortex — a brain region that controls cognition and interprets sensory information. The group presented the work at the Society for Neuroscience meeting in San Diego this month.

Muotri and his colleagues grew hundreds of brain organoids in culture and continuously recorded electrical patterns, or electroencephalogram (EEG) activity, across the surface of the mini brains. The scientists were surprised by the EEG patterns that they observed.

In mature brains, neurons form synchronized networks that fire with predictable rhythms. But the organoids displayed EEG patterns that resembled the chaotic bursts of synchronized electrical activity seen in the brains of premature babies born at 25–39 weeks post-conception. Muotri is quick to caution, however, that the organoids aren’t close to being human brains.

The work is preliminary, says Hongjun Song, a developmental neuroscientist at the University of Pennsylvania in Philadelphia. But the similarities to preterm-infant EEG patterns suggest that the organoids could eventually be useful for studying brain-development disorders, such as epilepsy or autism, he adds.

But not everyone agrees. Just because the organoids’ brain waves look like those in premature babies doesn’t mean they’re doing the same thing, says Sampsa Vanhatalo, a neurophysiologist at the University of Helsinki.

And the ethical questions that this project raises about whether organoids could develop consciousness will be difficult to resolve, says neuroscientist Christof Koch of the Allen Institute for Brain Science in Seattle, Washington. Researchers don’t even agree on how to measure consciousness in adults, or when it appears in infants, he says. ■



UK Prime Minister Theresa May is seeking parliamentary support for the draft Brexit deal.

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It fleshes out commitments made in a joint statement last December that Britain will be responsible for international nuclear safeguards in its own territory, in line with the existing regime overseen by Euratom.

But the document doesn’t address a key concern for some researchers: whether Britain can retain membership of the nuclear-fusion experiment, ITER, in France, which it currently has through Euratom.

Nor does it indicate whether the UK-based test bed for this project — the Joint European Torus near Oxford, which is largely EU-funded — will receive any cash after its current contract expires at the end of this year.

The agreement confirms that, during the transition period, UK scientists will remain eligible for grants under the Horizon 2020 research-funding programme until the programme ends.

And in statements following the deal’s announcement, UK Prime Minister Theresa May offered some information on the possible shape of Britain’s post-Brexit immigration system. She confirmed that ‘free movement’ between the United Kingdom and the bloc — something that researchers say has fuelled scientific collaboration — would end, and suggested that Britain would shift to a skills-based immigration system that would not offer priority to EU citizens over those from the rest of the world.

POLITICAL BACKLASH

For research, the deal “looks pretty good if we have to proceed with Brexit”, says Alastair Buchan, a pro-vice-chancellor of the University of Oxford.

However, Nobel-prizewinning geneticist Paul Nurse says that the agreement is disappointing for UK scientists. He welcomes the certainty it offers EU citizens living in the United Kingdom, but laments the lack of information about whether highly skilled EU scientists will be able to work in the country in the future.

The agreement has divided politicians, and turmoil in Parliament has cast doubt on whether it will pass the next step of approval

required by the United Kingdom — a vote in Parliament, slated for December. The potential resulting ructions would increase the prospect of Britain crashing out of the EU without any kind of agreement on a future relationship — a situation widely feared by the science community.

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“The threat of a chaotic no-deal Brexit cannot be considered an option,” says Venki Ramakrishnan, president of the Royal Society in London.

At an emergency summit of the European Council to be held on 25 November, the leaders of the 27 other EU countries are expected to formalize the agreement.

If May’s support holds, and the deal is approved by Parliament, it must then go before the European Parliament and garner the approval of a majority of member states.

If Parliament rejects the deal, Britain and the EU could go back to the negotiating table, but would have only until the departure date to agree on new terms. ■ [SEE EDITORIAL P.443](#)