did those born vaginally[1]. C-section babies, which comprise more than 30% of births in the United States, are also more prone to obesity and immune diseases such as diabetes[2].

Dominguez Bello and her colleagues suspect that bacteria could be the long-sought link between birth method and long-term health. Experiments show that mice born by C-section are more prone to obesity and have impaired immune systems[3]. There are fewer factors that could account for these differences in the rodents, which can be studied in controlled conditions, than in people.

But many scientists say there is no evidence that differing exposure to vaginal microbes at birth can help to explain variation in people's health over time. "Right now, that whole concept is in very much a state of uncertainty," says David Aronoff, an infectious-disease researcher at Vanderbilt University in Nashville, Tennessee. "It's easy to make a logical argument that sounds great, but underneath it might not be solid data."

Aronoff says that differences in microbe exposure at birth and later health could be caused by other factors, such as whether a mother takes antibiotics during her surgery, and whether a baby is breastfed or has a genetic predisposition to obesity. He argues that the only way to isolate any effect from method of birth is through the sort of large, randomized, controlled clinical trials that are now under way.

Dominguez Bello's team began recruiting 50 pregnant women last August for a study that will swab C-section babies with their mothers' microbes. A second US trial, at the Icahn School of Medicine at Mount Sinai in New York City, is recruiting 120 pregnant women with a family history of allergies. Scientists will compare swabbed C-section babies with a placebo group and with infants born vaginally.

Researchers in Sweden began a similar experiment in March, with the goal of swabbing 100 C-section infants with their mothers' vaginal and anal bacteria. Gastroenterologist Lars Engstrand at the Karolinska Institute in Stockholm says that his team will monitor the babies over two years for signs of asthma and dermatitis. And a fourth trial, in China, began recruiting roughly 100 mothers last November. Scientists will seed these women's babies with vaginal bacteria and track their body mass index and allergy risk.

The researchers behind these trials are rigorously screening participating mothers for microbes such as group B streptococcus — a common vaginal bacterium that causes respiratory problems in newborns.

Still, some researchers say the experiments should not be done, given the lack of evidence that swabbing infants produces any benefit. "You'd have to be sure that you understand the mechanism and the trial is based on good science," says Jeffrey Keelan, a gynaecologist at the University of Western Australia in Perth.

Some scientists also worry that physicians and mothers will swab babies with vaginal microbes without proper oversight. Scattered reports in media and medical journals suggest that some women are trying the technique on their own. In 2017, the American College of Obstetrics and Gynecology issued guidelines stating that vaginal seeding shouldn't be performed except in the context of a clinical trial.

And gynaecologist Kjersti Aagaard of Baylor College of Medicine in Houston, Texas, says that the focus on vaginal seeding could be too narrow. She thinks that microbes' influence on long-term health can begin before birth, due to factors such as a mother's diet that influence the bacteria babies pick up. By focusing on vaginal seeding, researchers are "missing actual opportunities to improve offspring health", she said in June at the American Society for Microbiology meeting in San Francisco, California.

The scientists behind the current wave of seeding trials are pushing ahead. "We're trying to repair and partially restore something that is normally in the environment of babies being born," Dominguez Bello says. "As with everything, history will tell." ■

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2. Sevelsted, A., Stokholm, J., Bønnelykke, K. & Bisgaard, H. *Pediatrics* **135**, e92–e98 (2015).
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PEOPLE

Head of DNA lab suspended

Alan Cooper faces allegations that he bullied co-workers at Australian Centre for Ancient DNA.

BY DYANI LEWIS

The leader of Australia's premier ancient-DNA laboratory, Alan Cooper, has been suspended following an investigation into the 'culture' at the centre and amid allegations of bullying from his co-workers. Cooper is renowned for using ancient DNA to reconstruct how humans populated the planet.

On Monday, the University of Adelaide notified students and staff at its prestigious Australian Centre for Ancient DNA (ACAD) that Cooper has been suspended pending "the outcome of further processes".

Cooper's suspension comes after the university engaged an external firm to conduct a "culture check" of ACAD in July. "Following on from the information provided, the University has decided to take further action," a spokesperson for the university told *Nature*. The university did not name Cooper as a focus of the probe, and did not say what prompted it, but allegations that he had bullied students had surfaced on social media and blogs a month earlier.

JULIEN VIRY/GETTY

The University of Adelaide carried out a "culture check" of its prestigious ancient-DNA centre.

Several people who have worked for Cooper — some of whom gave evidence to the investigation and include current members of his research group — have told *Nature* that he bullied them; several more say that they observed him bullying members of his team. Cooper has declined to comment on his suspension and on the bullying accusations at the present time.

Nic Rawlence, a former student of Cooper's at ACAD, made a submission to the probe about being bullied by Cooper. Rawlence, now director of the Otago Palaeogenetics Laboratory at the University of Otago in Dunedin, New Zealand, was one of the few who spoke to *Nature* and agreed to be named. He sees Cooper's suspension as evidence that the university is taking the allegations and the evidence from the probe seriously. "I still think permanent change for the better is needed," he says.

Cooper started ACAD in 2005, after he pioneered ancient-DNA extraction techniques and championed authentication processes in a field in which contamination of ancient samples with modern DNA was rife.

The university spokesperson confirmed that Cooper had been suspended, but said the institute would not be commenting further. ■

ASTRONOMY

Haul of mysterious cosmic bursts excites astronomers

Discovery of more 'repeater' fast radio bursts should help to reveal signals' origins.

BY ELIZABETH GIBNEY

Astronomers are edging closer to finding out what causes brief, powerful flashes in the sky known as fast radio bursts (FRBs), after a Canadian telescope discovered eight more of the most intriguing type of these blasts — those that repeat their signals.

FRBs are intensely energetic events that flare for just milliseconds, seemingly all over the sky and from outside the Galaxy. But their cause has remained a mystery since the first FRB was identified in 2007. Astronomers hope that studying bursts that repeat their flashes, rather than flare just once, can help to elucidate the origins of FRBs. That's because it's easier for high-resolution telescopes to make follow-up observations of 'repeaters' and trace their origins compared with one-off blasts.

"This is a pretty exciting result," says astronomer Laura Spitler at the Max Planck Institute for Radio Astronomy in Bonn, Germany. Astronomers' priority will be to search for the galaxy from which these repeat signals come, she says. Pinpointing the host galaxies is essential to cracking the mystery of what causes FRBs.

Of the roughly 75 FRBs seen before this month's discoveries, just 2 bursts were known to be repeaters. The first of these has been extensively studied, and the Canadian Hydrogen Intensity Mapping Experiment (CHIME) telescope discovered the second repeater earlier this year. CHIME's latest results, published on the arXiv preprint server on 9 August, now show that repeaters are far from rare (B. C. Andersen *et al.* Preprint at https://arxiv.org/abs/1908.03507; 2019). In the past few weeks, another telescope, the Australian Square Kilometre Array Pathfinder, also found a repeater, bringing the total so far to 11 — although researchers are yet to publish this result.

CHIME COLLABORATION

The CHIME telescope in Canada searches the sky for energetic cosmic events called fast radio bursts.

CHIME, which began hunting for FRBs in 2018, has also found hundreds of one-off FRBs, CHIME researcher Bryan Gaensler said on Twitter on 12 August. Members of the telescope collaboration are still analysing these events, said Gaensler, an astronomer at the University of Toronto, Canada. "In 25 years of astronomy research, this is unquestionably the most exciting project I've ever worked on," he said.

ELUSIVE ENVIRONMENTS

Sketching a picture of the environments in which the blasts are born will allow researchers to whittle down some of the dozens of possible explanations for FRBs. Astronomers suggest that the bursts could be emissions from young magnetars (dense star cores spinning in a magnetic field) or from vibrating cosmic strings.

The findings mean that there are now enough repeaters to start comparing these with one-off blasts, to find out whether the two kinds of FRB are produced in similar environments, says Spitler. All FRBs could come from fundamentally similar environments, but perhaps repeat blasts avoided detection until now or their sources flare only under certain conditions. Or each type could be caused by different events — one that repeats and one that doesn't.

The CHIME team has already seen clues that could help to answer this question. The eight repeaters seem to be located in a similar range of distances to the one-off bursts. But repeater signals lasted longer on average, the collaboration reports. Spitler says that, if this trend holds, it could be a sign that two separate phenomena cause the different types of blast, because the duration of a blast reflects the underlying mechanism that produces it. ▶