Lab+Life SCIENTIST



DETECTING DRUGS IN DRINKS

NEW DNA TEST FOR MUSCLE DISEASE

HOW DIET AFFECTS COGNITIVE DECLINE

NOVEMBER 2026
VOL.37 NO.4
PP100008671

ANALYTICAL | BIOTECH | ENVIRONMENTAL | INDUSTRIAL | LIFE SCIENCES | MEDICAL



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Pregnancy predicaments

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Hello dear reader, and welcome to the final issue of *Lab+Life Scientist* for 2026. I'm your returning editor, Lauren Davis, back from a spell of maternity leave — and I have to admit that my new role as "mama" has resulted in an ongoing interest in any and all news related to pregnancy and infancy.

For example, while pregnant I followed the advice that it was a good idea to eat plenty of peanut butter, as this was apparently meant to lessen the chances of my baby developing a peanut allergy. But a landmark Australia-wide study, recently published in *The New England Journal of Medicine*, has now shown no difference in the allergy status of babies whose mothers ate diets rich in eggs and peanuts throughout pregnancy and early breastfeeding, compared to those who followed a standard diet. So, best practice remains the regular inclusion of allergens in your baby's diet once they have started solids — luckily my boy is a good eater, so no problem there!

There is however another substance being taken by pregnant women which may be putting their babies at risk: high-dose folic acid supplements.

Folic acid — a form of the B vitamin folate — is a critical nutrient before and during early pregnancy, due to its role in preventing serious birth defects. But since Australia introduced mandatory folic acid fortification of bread-making flour in 2009, scientists have been calling for more research into what constitutes the safest and most effective upper limit of folic acid intake during pregnancy.

Out of two Adelaide pregnancy cohorts, women recruited after mandatory fortification were much more likely to be taking high-dose supplements and had higher folate levels overall. Those taking at least 800 micrograms of folic acid daily were more likely to report spotting and mild vaginal bleeding during the first 16 weeks of pregnancy — with a significantly higher risk for those carrying a boy. And while vaginal bleeding does not always signal a serious problem, it has previously been linked with an increased risk of pregnancy complications; therefore, the researchers suggest that a daily dose of around 400 micrograms may be sufficient for most women in countries where food is already fortified with folic acid. Food for thought, you might say!

While I have not been able to attend many industry events since going back to work, I did make it to the grand opening of the Macquarie University Brain Institute and Clinic, which seeks to advance the fight against devastating brain diseases including motor neuron disease, Parkinson's disease and dementia. Unlike traditional research centres that operate separately from clinical services, the institute sees researchers and clinicians working side by side, meaning discoveries can more quickly inform patient care, clinical experience can generate new research questions, and patients can play a more direct role in advancing our understanding of neurological disease. Simply put, the goal of the institute is to make collaboration the default, which seems so obvious an idea it's a wonder that it hasn't happened before.

For further examples of architecture that extends beyond standalone assets towards more connected ecosystems, see this issue's lead story on page 6. For more on how diet may or may not affect our health — specifically, the health of our brains — go to page 12. For more on how high doses of certain substances can put pregnancies at risk, see page 30. Or pick a page at random and see what happens — you just might discover a new special interest.

Regards,
Lauren Davis
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Lauren Davis

Fingertip sensor identifies physical patterns linked to anxiety



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An international team of researchers has shown that measurements taken from a person's fingertip could help identify physical patterns associated with stress, anxiety and depression.

The team's study, described in the journal *Communications Medicine*, used a wearable device that shines light into the skin to measure blood flow through the smallest blood vessels as well as changes in the activity of the surrounding tissue. These measurements were then combined with machine learning to investigate whether people reporting symptoms of stress, anxiety or depression displayed recognisable physical patterns, given that stress and anxiety can affect the nervous system, heart rate, circulation and metabolism.

The study involved 132 adults aged between 18 and 94 from across 19 countries. Participants completed a widely used 21-question assessment covering depression, anxiety and stress before undergoing repeated fingertip measurements.

The device meanwhile examined how blood was flowing through the tiny vessels beneath the skin. It also measured substances associated with how cells produce and use energy, as well as skin temperature and heart rate. Machine-learning models were then used to compare the physical measurements with participants' questionnaire results.

The models were able to distinguish, with moderate success, between people who reported stress-related symptoms and those who did not. Blood-flow patterns and measurements associated with tissue metabolism made an important contribution to the results.

Professor Edik Rafailov, from the Aston Institute of Photonic Technologies in the UK, jointly supervised the research. He said the study provided early evidence that mental distress may be accompanied by measurable changes in the body; this could help other researchers investigate the relationship between mental health, circulation and cellular activity.

"This study suggests that non-invasive photonic wearable technology can detect changes in blood flow and tissue activity through the skin that may provide useful information about a person's stress-related symptoms," Rafailov said.

The researchers say the eventual aim would be to complement, rather than replace, existing mental health assessments, with the system potentially being used to help people and healthcare professionals monitor changes in wellbeing without requiring invasive medical tests. Larger studies and independent clinical validation will be needed to establish its reliability across different populations and everyday environments.

Suspicious citation numbers found in high-impact journals

The likely manipulation of citation numbers by research paper mills in high-impact cancer journals has been uncovered by an international team of researchers. Their findings, published in *PNAS*, point to an organised campaign to inflate citations on paper mill-produced journal articles published in established molecular oncology journals.

As explained by corresponding author Professor Adrian Barnett, from QUT, "Research paper mills are fraudulent organisations that produce and sell manuscripts and publishing services of faked research.

"Just as likes and shares indicate social media influencers' audience engagement, citations from other researchers are an important academic measure for evaluating scientists' research impact.

"Because citation counts are now a key measure of academic performance, they can incentivise journals and researchers to maximise citations counts."

Paper mill papers are not genuine scientific contributions, Barnett emphasised, and so highly manipulated citation counts reflect artificial amplification rather than genuine scientific engagement.

"A danger is that artificially inflated citation counts may distort the evidence base by misinforming future research and clinical translation," he said.

Co-researcher Baptiste Scancar, from L'Institut Agro in France, said the team evaluated the impact of paper mills on citation patterns in 33,159 articles published in 20 high-impact journals of molecular oncology between 2012 and 2023.

"Applying our previously developed detection model, we flagged a total of 4085 articles as potentially associated with paper mills, based on their textual similarity to the titles and abstracts of retracted paper mill articles," Scancar said.



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Suspected paper-mill articles received 50–100% more citations than non-flagged articles within one to three years of publication. However, flagged articles received fewer readers and online access counts compared with non-flagged articles.

"Having more citations but fewer readers makes no sense, as citations come from readers," Scancar said.

Flagged articles disproportionately cited and were cited by other flagged articles and were clustered in journals known to be targets of paper mills — including the *Journal of Experimental & Clinical Cancer Research* and *Molecular Cancer* — whereas other journals were only marginally affected, Scancar claimed.

According to Barnett, the documented pattern suggests widespread, coordinated manipulation of citation counts by paper mills, which could inflate journal impact factors, amplify unreliable findings and slow scientific progress. The good news is, the team's findings point to measurable signatures of citation manipulation that could support article- and journal-level screening.

Graeme Spencer, Education and Science Principal, HDR



Sovereign capability: Designing the infrastructure of translation



The Sydney Biomedical Accelerator.

HDR & Denton Corker Marshall.

Australia is entering a pivotal period in the evolution of its science, technology and manufacturing sectors. Federal investment across medical research, innovation, advanced manufacturing and sovereign capability signals a broader national shift, one focused not only on discovery but on strengthening the systems that enable research to translate into impact at scale.

Across biomedical science, synthetic biology, advanced therapeutics, defence technologies and emerging industries, Australia is generating globally recognised innovation. Realising its full value now depends on how effectively that capability is connected across industry, manufacturing, health care and national resilience.

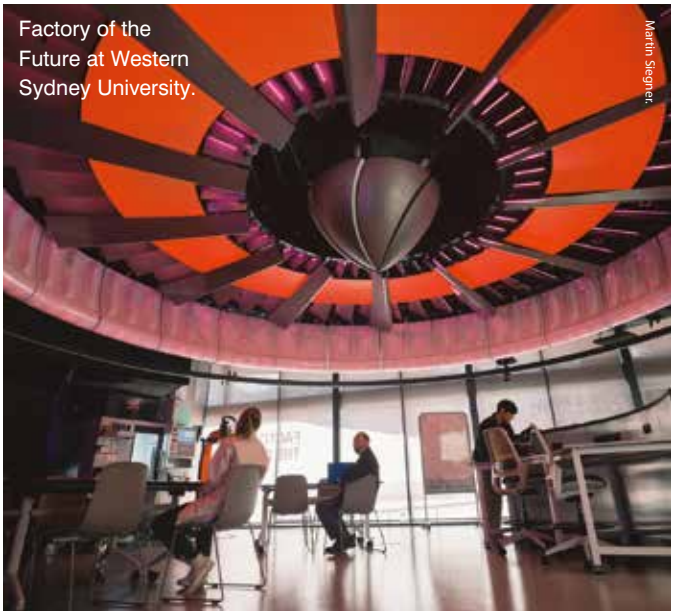
This is where infrastructure, and increasingly architecture, plays a critical role by enabling movement between research, manufacturing, computation and application within increasingly interconnected capability ecosystems. For architects, this marks a shift away from designing isolated buildings towards conceiving connected systems that support adaptation, collaboration and scale. In this context, architecture becomes part of the infrastructure of translation.

Capability shift: from buildings to ecosystems

For decades, research laboratories and scientific facilities were conceived as standalone assets — highly specialised buildings organised around fixed operational models and singular functions. Increasingly, this model no longer reflects the complexity of today's research and industry landscape.

Biomedical, artificial intelligence and advanced technology sectors are no longer operating in isolation. They now sit across connected domains of research, digital infrastructure, manufacturing, logistics, clinical translation, cybersecurity and workforce development, where knowledge moves >


The Viral Vector Manufacturing Facility.
Barton Taylor.


Factory of the Future at Western Sydney University.
Martin Siegner.

continuously between disciplines and applications rather than through a linear pipeline.

For architecture, this changes the brief. Laboratories, manufacturing environments and innovation precincts can no longer be treated as standalone assets. They need to be conceived as part of broader sovereign capability networks, designed to support agility, scale, resilience and rapid translation.

Projects such as the Viral Vector Manufacturing Facility (VVMF) at Westmead Health & Innovation District and Australia's first RNA Research and Manufacturing Facility within the Macquarie University Innovation Precinct are indicative of this evolution. Both extend beyond the conventional clinical laboratory typology by integrating research, pilot-scale manufacturing, digital systems and translational workflows within a single operational framework to create environments designed not only for discovery, but for acceleration and application.

Adaptive labs: designing for wellbeing and scale

Laboratory environments are being fundamentally reconfigured by automation, robotics, AI-driven analytics and high-throughput sequencing. The result is a new generation of hybrid settings where people, machines and data operate in constant exchange.

At the VVMF, designed by HDR for Health Infrastructure, the facility supports the production of clinical-grade viral vectors for gene and cell therapies, vaccines and advanced therapeutics. As a translational platform, it bridges scientific discovery and clinical application. The design balances technical precision with human experience, introducing daylight, clarity and improved spatial quality into highly controlled environments. This recognises that workforce attraction, retention and performance are now central to the success of advanced science infrastructure.

Australia's first RNA Research and Manufacturing Facility extends this thinking through a framework designed for continuous evolution. The facility incorporates synthetic RNA and mRNA production suites, lipid nanoparticle encapsulation, pilot-scale fill-and-finish capability and QA/QC laboratories within a highly adaptable spatial system. Set within a biophilic landscape of mature eucalyptus trees, it combines precision science with environmental and cultural context, reinforcing the role of workplace quality in sustaining high-performing teams.

In parallel, CSIRO's Australian Centre for Disease Preparedness demonstrates the sovereign dimension of scientific infrastructure. Positioned at the intersection of biosecurity, diagnostics and national response readiness, it shows how advanced facilities must also operate as protective systems, supporting preparedness for biosecurity events, zoonotic outbreaks and emerging health threats.

Across these examples, research, production, preparedness and human-centred design are no longer separate typologies. They form part of a single operational continuum. As translational science advances, architecture must do more than accommodate technical complexity. It must create environments that support adaptability, legibility, workforce performance and resilience under conditions of continuous change.

Digital science: data as critical infrastructure

Artificial intelligence is changing how scientific research is planned, tested and translated. In biomedical fields, modelling, simulation, bioinformatics, imaging and sequencing are increasingly shaping experimental pathways before physical testing occurs.

As these workflows become embedded in research and manufacturing environments, data can no longer be treated as a back-of-house technical layer. Secure connectivity, high-performance computing, cybersecurity, resilient networks and large-scale data environments are becoming core infrastructure, comparable in importance to power, water and specialist services.

This has direct implications for precinct planning. Research, manufacturing and digital systems need to be conceived as interdependent operational layers, not discrete facilities. The quality of future capability will depend not only on scientific expertise, but on the speed, security and confidence with which data can move between people, platforms and applications.

Innovation ecosystems: cities as connected systems

Innovation is increasingly being organised at the scale of precincts and cities. In Sydney's Tech Central at Camperdown, for example, biomedical and advanced manufacturing capability is increasingly defined not by individual institutions but by the strength of connected networks spanning universities, hospitals, research organisations, government agencies and industry partners operating within shared environments.

The Sydney Biomedical Accelerator exemplifies this model. Located at The University of Sydney and Royal Prince Alfred Hospital, the 36,000 m^2 facility integrates biomedical science with clinical research and innovation within a single translational environment. Delivered through a partnership between the NSW Government, Sydney Local Health District and The University of Sydney, it brings together education, research laboratories, specialist core facilities and technical infrastructure within a unified framework designed to support multidisciplinary collaboration. Its flexible spatial structure enables continuous exchange between researchers, clinicians and students, strengthening pathways from discovery to clinical application and reinforcing architecture's role in enabling integration across complex innovation ecosystems.

Effective precincts, therefore, are not defined by proximity alone, but by how deliberately they are structured to support interaction, flexibility and sustained connection.

Capability era: designing Australia's future

Over the coming decade, Australia's science and manufacturing environments will continue to converge, forming integrated systems where research, advanced manufacturing, AI infrastructure and digital technologies operate within continuously evolving precincts.

This convergence introduces both opportunity and complexity. Fields such as advanced manufacturing, synthetic biology, quantum technologies and digital systems now sit at the intersection of sovereign capability, health care and critical infrastructure. The challenge is no longer discovery alone, but translation at scale.

Australia's next generation of science infrastructure will not be judged by technical sophistication alone. Its value will be measured by how effectively it connects discovery, production, data, clinical application, workforce capability and national resilience. In this context, architecture has a larger role to play, not simply shaping buildings but helping structure the systems through which sovereign capability can translate into impact.



Guy Wilkinson.

The RNA Research and Manufacturing Facility.



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Two new DNA processing robots now operational at FSQ

To improve efficiency, reliability and safety in the laboratory, while supporting police investigations to deliver faster outcomes for victims, the Queensland Government has announced that two new DNA processing robots are now operational at Forensic Science Queensland (FSQ).

The new instruments replace aging equipment that, the government said, contributed to mass-contamination events and major evidentiary backlogs affecting approximately 13,000 cases across Queensland. The technology doubles the processing capacity of DNA samples, delivering high-quality DNA extraction while significantly reducing manual handling.

"These upgrades mean faster processing, greater capability and more reliable forensic services that support police to solve crimes and help victims get answers sooner," Queensland's Attorney-General and Minister for Justice and Minister for Integrity Deb Frecklington said about the new technology.

"These new systems significantly strengthen our forensic capability and provide safer and more efficient DNA testing processes," Director of FSQ Mick Fuller said. "Combined with the significant reduction in major crime testing delays, this demonstrates the progress being made to rebuild Queensland's forensic services and deliver timely forensic results for investigators and victims.

"Reliable DNA testing and faster turnaround times are essential to helping police solve serious crimes, support prosecutions and maintain public confidence in the justice system."

In its statement, the government said: "When the Crisafulli government took office, more than 11,700 major crime DNA samples — crimes against people — remained untested, along with 601 rape kits, delaying investigations and denying victims timely access to justice."

The government noted that the "rape kit backlog" has been eliminated, "and the major crime backlog has now been reduced by more than 80% — falling from 11,703 in November 2024 to 2240 in July 2026.

"The backlog of volume crime samples — crime such as theft — has fallen by almost 40%, from 3679 in November 2024 to 2151 in July 2026."

To restore confidence in the forensic system, the government said it has implemented a two-year outsourcing strategy and recovery plan. Through the 2026–27 Budget, more than $37 million over four years is being invested in FSQ, the government added.

Rapid blood test can detect iron deficiency in minutes

Scientists at WEHI (the Walter and Eliza Hall Institute) have developed a blood test that can detect iron deficiency in just 15 minutes, overcoming key limitations of existing point-of-care diagnostics and potentially transforming how the condition is diagnosed and treated worldwide. The finger-prick test is now being evaluated in Sub-Saharan Africa, with the goal of establishing it as the region's first validated point-of-care test for iron deficiency.

Low iron occurs when the body's iron stores become depleted, while anaemia develops later when there is insufficient haemoglobin in the blood to carry oxygen effectively. In many low-resource settings, healthcare workers only have resources to screen for haemoglobin, which can identify anaemia but cannot confirm iron deficiency.

Dr Ricardo Ataide, who will lead the field validation and implementation of the diagnostic, said the real breakthrough lies in its ability to instantly measure ferritin — the gold-standard biomarker for iron deficiency. While other rapid ferritin tests are available, WEHI's test has been designed to provide a clear visual reference at the clinically important ferritin threshold of 30 ng/mL, helping healthcare workers confidently identify iron deficiency at the point of care.

"Identifying iron deficiency in the context of, or even before it progresses to, anaemia is the critical gap this test is addressing," Ataide said.

"Too often, women with low iron stores are missed because their haemoglobin levels appear normal.

"By directly identifying low ferritin levels, our test enables clinicians to clearly identify those women who are truly iron deficient and would benefit from timely treatment."



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Because the test closely matches the accuracy of standard laboratory ferritin measurements, it can provide a reliable diagnosis without the need for a follow-up venous blood test — eliminating the need for specialised laboratory equipment. It can also be administered by a broad range of healthcare professionals, removing the need for dedicated training that can be hard to deliver in remote or under-resourced communities.

It's hoped the new point-of-care test could form a cornerstone of future maternal health programs in resource-limited settings, with iron deficiency affecting millions of pregnant women worldwide and anaemia during pregnancy linked to serious complications for both mother and baby. A 2025 trial led by WEHI and Malawi's Training Research Unit of Excellence (TRUE) found a single iron infusion in the third trimester can significantly reduce iron-deficient anaemia in pregnant women; the new test could identify who would most benefit from this treatment, ensuring limited resources like iron infusions are used where they will have the greatest impact.

Research project to produce fish-free omega-3

Researchers at Southern Cross University (SCU) have set out to halve the cost of producing omega-3 supplements, in order to make these essential nutrients more accessible to pregnant women and infants in low-income countries. The research takes a rather novel approach: instead of relying on fish oil, the team is going closer to the original source of omega-3.

Fish don't produce omega-3 themselves — rather, they accumulate it from marine microorganisms lower in the food chain. Led by Professor Dirk Erler from SCU's Faculty of Science and Engineering, the team is investigating how to grow these naturally omega-3-producing microorganisms more cheaply through precision fermentation, including by using agricultural and food-processing by-products to provide the sugars they need to grow.

Omega-3 fatty acids, particularly DHA, are important during pregnancy and early development, with DHA accumulating rapidly in the brain and retina during the third trimester. Research has also shown a link between omega-3 supplementation during pregnancy and a reduced risk of preterm birth.

"The main barrier for the uptake of omega-3s as supplements in pregnant women is the cost," Erler noted.

"The whole objective of our project is to reduce that cost and make omega-3 supplements more available."



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The research team at SCU is focused on growing omega-3-producing marine microorganisms known as thraustochytrids — or 'throstys' for short. As explained by Erler, "By growing those microorganisms on land through precision fermentation, we have an alternative way of producing omega-3s that is both reliable and highly targeted."

Precision fermentation allows the researchers to grow thraustochytrids under controlled conditions to produce omega-3 oils. The team is investigating whether expensive feedstocks used in the process can be replaced with lower-cost agricultural and food-processing by-products; their aim is to achieve at least a 50% reduction in the current production cost of omega-3 supplements.

If successful, the research could pave the way for commercialisation and wider adoption of the technology, with the potential to increase access to omega-3 nutrition in countries where cost remains a barrier. It could also reduce reliance on wild-caught fish as a source of omega-3 oil, thus creating a more reliable, scalable and local supply.

The work is being supported by Grand Challenges, an initiative of the Gates Foundation. The grant runs for 18 months.

Statins reduce heart attack and stroke risk in older people



Statins are commonly prescribed to manage high cholesterol in people up to 75 years, and are known to reduce the risk of heart attack and stroke, but it has previously been unclear whether they were effective in older people due to underrepresentation in major statin trials. Now, a clinical trial led by Monash University researchers has found the medication decreases the risk of major cardiovascular events in older people without known cardiovascular disease.

The Statins in Reducing Events in the Elderly (STAREE) trial is one of the largest cardiovascular disease prevention trials ever conducted in older people. It is also the first large randomised controlled trial to examine whether statins can be used for primary prevention in older patients — whose risk of heart attack and stroke only increases with age — to help them live longer in good health, according to lead researcher Professor Sophia Zoungas from the Monash School of Public Health and Preventive Medicine.

The double-blind trial was conducted among people aged 70 years and over with no history of clinical cardiovascular disease, diabetes or dementia, recruited from Australian general practice. In total, 9971 participants were randomised to receive either oral atorvastatin (40 mg daily) or a placebo.

Over a median follow-up of 5.9 years, the researchers demonstrated that the risk of major cardiovascular events — defined as cardiovascular death, nonfatal myocardial infarction, stroke or coronary revascularisation — was reduced by 30% in the atorvastatin group compared with the placebo group. The results were published in *The New England Journal of Medicine* and presented concurrently at the European Society of Cardiology Congress 2026, held in August.

"This was a particularly important trial because it was conducted in the community, with more than 3400 GPs taking part across Australia," said study co-author Professor Mark Nelson — a prominent general practitioner, Adjunct Professor at the Monash School of Public Health and Preventive Medicine, and Research Fellow at Menzies Institute for Medical Research at the University of Tasmania.

"In light of this new evidence, older patients should have a conversation with their GP about whether statins are an appropriate treatment for their cardiovascular health to help them remain fit and healthy."





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Artificial sweeteners and Western diet

associated with cognitive decline

As the world grapples with the growing public health challenge of dementia, there has been increasing academic interest in identifying lifestyle factors which may help maintain people's brain health as they age.

Now, an eight-year study tracking the brain health of 12,772 Brazilian adults has associated six sugar substitutes with faster declines in memory and thinking skills over time, while a separate study has suggested that diet works hand-in-hand with genetics when it comes to cognitive decline.

Ultra-processed products marketed as low in calories — including flavoured water, soft drinks, energy drinks, yoghurt and desserts — frequently add sugar substitutes, known as sweeteners. Several are also sold separately for use in coffee, tea, cooking or baking. Researchers nominated seven common sweeteners for investigation; these were aspartame, saccharin, acesulfame K, erythritol, xylitol, sorbitol and tagatose.

Participants for the study were, on average, 52 years old and monitored for approximately eight years. Participants completed detailed food questionnaires at the beginning of the study, which described what they had eaten and drunk during the previous year. According to their total sweetener intake, participants were then placed into three groups.

The lowest consumption group averaged 20 mg/day while an average of 191 mg/day was the case for the highest consumption group. In the case of aspartame, the amount consumed by the highest group was roughly equal to the aspartame in one can of diet soda. Cognitive assessments were also completed by participants at the beginning, midpoint and end of the study.

Several aspects of brain function, including verbal fluency, working memory, word recall and processing speed, were measured by the tests. For


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the purpose of the study, verbal fluency referred to the ability to quickly retrieve and produce words; working memory to the brain's short-term system for holding and using information; and processing speed to how quickly a person can understand and respond to information.

Researchers found — after accounting for age, sex, high blood pressure, cardiovascular disease and other relevant factors — that there was a clear difference between the intake groups. People who consumed the greatest amounts of sweeteners experienced a 62% faster decline in overall thinking and memory abilities compared with those who consumed the least. The researchers estimate that this difference was comparable to about 1.6 additional years of aging.

Regarding participants in the middle consumption group, that difference was comparable to approximately 1.3 years of aging — with a decline that was 35% faster than the decline observed in the lowest group. Notably, of the seven sweeteners studied, only one — tagatose — was not linked to cognitive decline. The remaining six were associated with faster declines in overall cognition, particularly memory.

"Low- and no-calorie sweeteners are often seen as a healthy alternative to sugar; however, our findings suggest certain sweeteners may have negative effects on brain health over time," said study author Claudia Kimie Suemoto, MD, PhD, of the University of São Paulo in Brazil.

Other key findings of the study were that age appeared have an influence. For participants younger than 60, those who consumed the most sweeteners experienced faster declines in verbal fluency and overall cognitive performance than those who consumed the least — the same association was not found in among participants older than 60.

There was also stronger connection between sweetener intake and faster cognitive decline among people with diabetes compared with those without the condition. "While we found links to cognitive decline for middle-aged people both with and without diabetes, people with diabetes are more likely to use artificial sweeteners as sugar substitutes," Suemoto said.

"More research is needed to confirm our findings and to investigate if other refined sugar alternatives, such as applesauce, honey, maple syrup or coconut sugar, may be effective alternatives."

Limitations of the research include that not every artificial sweetener currently used in food and beverages was included — so the findings cannot be applied to all sugar substitutes. Also, self-reported diet data can be imperfect. Dietary information was provided by the participants themselves, and people may forget foods or misjudge how much they consumed.

Most importantly, the study was observational, identifying a relationship between higher sweetener consumption and faster cognitive decline, but it could not establish that the sweeteners caused those changes. The results do not show that sweeteners directly cause cognitive decline: they reveal an association, meaning other factors could help explain the pattern.

The study was published in *Neurology*, the medical journal of the American Academy of Neurology.

Genetic risk could be a key factor

Meanwhile, a separate study led by Murdoch University and Alzheimer's Research Australia has found that an unhealthy Western-style diet is also associated with faster cognitive decline — but only in people with a genetic risk of Alzheimer's disease.

Murdoch's Dr Carolina Blagojevic Castro, lead author on the study, explained that researchers set out to investigate whether the types of food people regularly eat are associated with how their thinking abilities change as they get older.

"Diet is particularly interesting because it is often easily modifiable, but people may not respond to dietary patterns in the same way," she noted.

Using data from the Western Australia Memory Study (WAMS), the research team followed 185 older adults from Perth for more than seven years and examined whether unhealthy and healthier dietary patterns were associated with changes in different areas of their cognition as they got older, while also considering individuals' genetic risk for Alzheimer's disease.

The team grouped the participant's diets into two main groups: a Western diet (unhealthy diet), consisting of food such as red and processed meat, chips, pizza, sweets, refined grains and beer; and a Prudent diet (healthy diet), consisting of things like fruit, vegetables, leafy greens, garlic and whole grains.

None of the participants had diagnosed dementia when they entered the study, but they were tested for genetic susceptibility factors such as the apolipoprotein E (*APOE*) variant, the strongest common genetic risk factor for Alzheimer's disease. Throughout the study, participants completed a series of cognitive tests to assess their attention, memory, executive function, language, recognition memory and general cognitive ability.

"Our main finding was that among people carrying the *APOE* ε4 allele, greater adherence to a Western dietary pattern was associated with a faster decline in attention over time," Blagojevic Castro said.

"One of the most interesting findings was that the association with cognitive decline was not seen across the whole group but emerged specifically among *APOE* ε4 carriers."

"We did not find significant associations between the healthier Prudent dietary pattern and cognitive decline, or between the Western dietary pattern and cognitive decline among people who did not carry *APOE* ε4."

Blagojevic Castro said the findings — published in the journal *Nutrients* — reinforce growing evidence that the relationship between diet and brain health is complex and not the same for everyone.

"However, our study is observational, so further research is needed before these findings can be translated into specific dietary recommendations based on genetic risk."

Existing medicines could help treat deadly childhood dementia

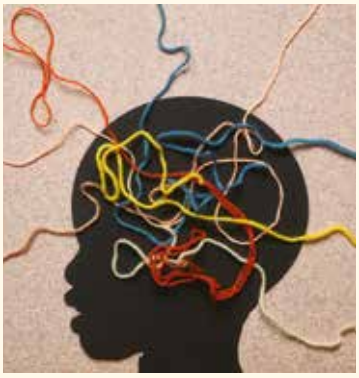
Australian researchers have identified several existing TGA-approved medicines that could help slow brain damage in children with a rare form of dementia, offering hope for more treatment options. Their findings have been published in the journal *Nature Communications*.

The research, initiated by Sanfilippo Children's Foundation and led by Flinders University in collaboration with SAHMRI, Adelaide University and Women's and Children's Hospital, focused on Sanfilippo syndrome — a devastating childhood dementia that causes progressive loss of memory, behaviour and physical abilities. There are currently no widely available treatments, with half of all children with dementia dying by the age of 10.

To model the disease, researchers reprogrammed skin cells from affected children into brain cells that mimic how the condition develops. These cells reproduced key features of the disease, including toxic build-up, inflammation and ongoing cell loss.

Using this platform, combined with advanced imaging and artificial intelligence, the researchers screened 63 existing medicines and identified nine that significantly improved cell function within two weeks. Several of the drugs reduced brain cell damage, while others restored critical signalling linked to learning and behaviour. The findings also suggest that combining treatments may produce stronger, longer-lasting effects.

Lead researcher Professor Cedric Bardy, who heads the Laboratory for Human Neurophysiology and Genetics at SAHMRI and is the founding director of Brain Organoid Therapeutics, said the approach could dramatically accelerate treatment discovery. Not only does it enable rapid testing, it also means any promising drugs can be moved into clinical trials sooner, since they are already approved for other conditions.



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In another recent *Nature Communications* study, the researchers demonstrated that brain cells from children with Sanfilippo become abnormally excited during early brain development and get stuck in overdrive. The team has now used their new platform to identify a combination of repurposed drugs that can return brain cell activity to healthy levels.

"This is really important, because if translated clinically, it may help the children manage troubling symptoms such as hyperactivity, while also protecting them from irreversible neuronal loss," Bardy said.

While further studies are needed, the findings are believed to mark an important step towards faster, more practical treatments for childhood dementia. The research also provides a powerful new platform for testing treatments for other brain disorders, including Alzheimer's disease.

NSW Govt to launch science and innovation fund



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The NSW Government will soon launch a science and innovation fund to coordinate strategic investments, deliver on government priorities and turn the state's research strengths into new businesses.

Announced by Treasurer Daniel Mookhey at the Sydney Investment Summit, the fund will bring together government, universities, researchers and investors as part of a coordinated growth agenda.

The $150 million fund will co-invest with NSW public universities before expanding to support other organisations across the innovation ecosystem, helping promising programs make the leap from the laboratory to the market.

A new research innovation framework will also:

- coordinate NSW Government equity holdings to ensure investments are managed strategically;
- strengthen capability within NSW Health, to develop innovative practices to support an effective and efficient health system; and
- bring together the wider health and medical research ecosystem, including independent, privately and charitably funded institutes, to share expertise and infrastructure and better coordinate research effort.

The establishment of the framework responds to the independent Pounder Review of the state's technology and innovation ecosystem, which found NSW has an opportunity to improve the commercialisation pipeline of research strengths — particularly in deep tech, bio medical science and environmental science.

In response to the review, the government developed the NSW Innovation Blueprint 2035 — a 10-year plan to help cement NSW's position as Australia's innovation powerhouse. A key action of the blueprint was a new strategic approach to funding, exploring ways to support innovators at all stages of growth — including through co-investment opportunities.

The new fund and framework should enable the creation of stronger connections between researchers, government, industry and investors. NSW Treasury, Investment NSW and the NSW Chief Scientist and Engineer will together work with NSW public universities to develop the fund and governance settings before launching an initial investment round in 2027.



Multi-parameter analysis of nanoparticles

For decades, Malvern Panalytical's Zetasizer has helped scientists understand particle size, surface charge and molecular interactions. What distinguishes the latest Zetasizer Advance series from conventional dynamic light scattering (DLS) systems is its combination of patented measurement technology, easy-to-use intelligent data analysis and flexible automation.

Adaptive Correlation optimises measurement acquisition to deliver results quickly, while machine-learning-based data quality guidance helps users identify potential issues and interpret results with confidence. For more complex, multimodal samples, the Zetasizer Ultra incorporates patented multi-angle dynamic light scattering (MADLS), for enhanced resolution to identify and characterise multiple particle populations within a sample. For automation, Zetasizer Sample Assistant accommodates up to 120 samples for unattended analysis.

Across the Advance range, zeta potential analysis provides insight into particle surface charge and colloidal stability, while Zetasizer Ultra also measures molecular weight using static light scattering (SLS). Low-volume measurement options also help preserve valuable samples, particularly in biopharmaceutical research and nanoparticle formulation development.

The Zetasizer Core extends this technology by combining high-throughput DLS, SLS and DSF (differential scanning fluorimetry) measurement, enabling researchers to assess particle size, molecular size and thermal stability within a single platform using low sample volumes. For laboratories working with proteins, lipid nanoparticles, polymers and other advanced materials, Zetasizer has been designed to combine trusted technology with practical workflow improvements to support efficient, confident research.

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Continuous monitoring helps safeguard research integrity



Supplied.

Remote temperature monitoring specialist Omniflex has helped South African clinical research organisation CAPRISA protect temperature-sensitive biological specimens with a continuous environmental monitoring system, helping the latter to maintain required storage conditions, respond to potential problems, and support Good Clinical Laboratory Practice (GCLP), audit readiness and laboratory efficiency.

CAPRISA manages biological specimens across -80°C freezers, liquid nitrogen storage, refrigerators, incubators and ambient environments. Its large-scale clinical research studies require robust environmental monitoring to maintain the integrity, traceability and security of specimens. If storage conditions move outside defined parameters, rapid notification can give laboratory personnel the opportunity to investigate and act before samples are compromised.

"One of the biggest risks with relying on periodic manual checks is that a problem can occur between reading," noted Ian Loudon, International Marketing & Sales Manager at Omniflex. "If a freezer develops a fault overnight, for example, it could be several hours before anyone discovers that the temperature has moved outside the required range."

CAPRISA deployed Omniflex's Continuous Temperature Monitoring System, powered by the Data2Desktop platform, across its main research laboratory, central biorepository and clinical research sites. The system provides real-time visibility, automated excursion alerts and continuous data logging across critical storage environments ranging from -80°C freezers to -196°C liquid nitrogen freezer storage.

If conditions move outside defined parameters, automated alerts enable personnel to respond without waiting for the next scheduled check. The continuous record also provides visibility of what happened before, during and after an excursion, helping laboratory teams investigate potential issues and demonstrate that required storage conditions have been maintained.

The system also removes the need for laboratory personnel to carry out routine manual readings. Data is captured automatically at the required level, while Data2Desktop automates reporting and provides centralised access to live dashboards and historical temperature records. This reduces the administrative burden on laboratory staff while providing the records needed for internal quality management and external regulatory inspections.

Continuous monitoring can also help identify emerging equipment problems. For example, a refrigerator compressor that begins to fail can enter a faster cycling pattern as it works harder to maintain temperature. Changes in this behaviour can indicate that a fault is developing, providing an opportunity to investigate before it affects storage conditions.

By combining continuous monitoring, automated alerts and historical data, the Omniflex system has strengthened CAPRISA's ability to protect biological specimens while supporting operational efficiency and audit readiness. The resulting records also support GCLP compliance by providing a traceable history of environmental conditions.

"The Omniflex system has proven to be a reliable and effective solution for continuous temperature monitoring," said Dr Natasha Samsunder, Laboratory Director at CAPRISA.

Omniflex (Australia) Pty Ltd
www.omniflex.com.au

Stéphane Marouani, Country Manager A/NZ at MathWorks



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GenAI helps unlock insights hidden

in unstructured data

Generative AI (GenAI) can help engineers diagnose issues in seconds. Or predict lab equipment failures before they happen. GenAI is making these possibilities a reality by speeding up data analysis and algorithm development, enabling engineers to apply their domain expertise and uncover actionable insights.

Engineering teams generate terabytes of data every year, with Gartner estimating that up to 80% of this information is unstructured. Service records, research papers, and technician notes contain critical institutional knowledge, but their inconsistent formats make them difficult to parse. GenAI tools help engineers combine structured and unstructured data, enabling large-scale analysis that was previously impractical for many engineering teams. For engineers, this means quicker troubleshooting, improved design workflows, and accelerated discovery.

Engineers' GenAI blind spots

Despite GenAI's versatility in reshaping engineering work, there remains a gap between what the technology can enable and how it's being used day to day. Many engineers still primarily use GenAI for low-level code generation or documentation, rather than for more advanced workflows.

To better understand engineers' attitudes toward GenAI and its real-world applications, MathWorks conducted an informal social media poll in December 2025. The responses revealed several insights, including:

- 83% of engineers use GenAI at least once a month. The most common GenAI use cases among respondents were 'Writing Code' and 'Documentation and Reporting'.
- The top concern among engineers related to GenAI is its integration into existing workflows (46%). This number rose to 75% among engineers with at least six years of experience.

This data indicates that the majority of engineers are using GenAI, but not for strategic engineering tasks. Engineers seeking to expand their GenAI knowledge should consider using it to prepare and analyse unstructured data.

Tapping global and historical scientific research to drive food science discovery

Scientific research often spans thousands of papers published over decades and across various regions, making it impractical to examine all the studies on a given topic or to uncover hidden relationships without advanced analytical tools. Food science researchers at the University of Copenhagen faced this challenge when analysing a vast amount of material to find connections between topics. Large language models (LLMs) can summarise individual documents but struggle to identify >

links across massive datasets. To overcome this, the researchers combined GenAI with classical techniques — text preprocessing and cleaning and information extraction — to impose structure on unstructured text before applying LLMs.

The University of Copenhagen team used GenAI in multiple steps throughout this process, including:

1. Cleaned and standardised thousands of PDFs with inconsistent formatting.
2. Generated missing keywords where metadata was lacking.
3. Converted the text into tokens and flagged unusually long words to identify buried chemical names.
4. Created a knowledge graph after breaking research papers into paragraphs and keywords. Each node in the graph represented a paragraph or chemical name, and the connections between nodes captured topic relationships.

The team then used MATLAB to apply graph theory to this dataset, identifying paths that linked concepts. They then processed these structured subsets using an LLM, which generated summaries and explained relationships that could take humans weeks to trace. The result was a workflow that transformed siloed research into actionable insights, accelerating discovery in food science.

Despite GenAI's value — researchers saved themselves days' worth of manual tasks using this process — the researchers' success hinged on human judgement and manual work. They invested hundreds of hours running experiments and preparing data before they could upload it to GenAI. Discovering that paragraphs provided optimal text segmentation required repeated trial and error, as GenAI could not make this decision automatically. GenAI is powerful only when paired with proper data and methodical engineering.

Turning maintenance data into foresight

Predictive maintenance (PdM) has traditionally relied on numerical sensor data, tracking everything from thermal changes to vibration and pressure, to detect patterns that precede equipment failure. Many organisations also collect valuable text-based information like maintenance logs and technician notes. These sources capture context that sensors alone cannot, revealing symptoms, documenting repair actions, and identifying suspected root causes.

This text is not a replacement for sensor data; engineers can use GenAI to make it more accessible and usable alongside traditional signals. For example, GenAI can help summarise maintenance histories, standardise inconsistent terminology, or label events such as component failures or recurring fault types. These labelled outcomes can then be aligned with time-series sensor data, providing clearer targets and context for PdM model development.

GenAI can also support the engineering workflow. Engineers can use it to draft and refine code for data cleaning, feature engineering or exploratory analysis, or to evaluate alternative modelling approaches. However, domain expertise remains critical at every step. Only experienced engineers can judge whether features are physically meaningful, whether model behaviour aligns with known system dynamics, and whether outputs reflect real failure modes or simply artefacts of the data.

As with any PdM approach, GenAI-assisted workflows require careful validation before deployment. A model that performs well in a prototype or limited test set may not generalise to real-world operating conditions. Engineers should validate results using representative datasets, stress-test models across operating regimes, and apply deterministic checks to ensure robustness. These best practices apply equally to GenAI and non-GenAI methods, reinforcing the principle that successful PdM depends not just on advanced tools, but on sound engineering judgement.

Engineers are scratching GenAI's surface

Like any tool, GenAI should be used methodically rather than applied to every problem. GenAI is most valuable when problems involve large volumes of unstructured data or require flexibility in interpreting language-based inputs. Engineers must integrate it strategically, expand their domain expertise, and examine how to apply this tool in their design methodology.

Freezing container



Available from Pacific Laboratory Products, the Servicebio Cell CryoPreservation Tube Cryobox is a PLP-9005-8P non-reagent freezing container designed to achieve optimal post-thaw cell viability.

Engineered for controlled gradient cooling, the durable container is designed to replace traditional isopropanol (IPA) freezing boxes and operates entirely reagent-free — thus eliminating spill risks, recurring chemical costs and ongoing maintenance.

The container is formulated with a proprietary solid core that delivers a standardised -1°C/min cooling rate when placed directly in a -80°C ultra-low freezer — which is the gold standard for protecting cell integrity. This makes it suitable for high-recovery cryopreservation of standard cell lines, sensitive primary cells, stem cells and delicate cell cultures.

Manufactured with an impact-resistant polycarbonate (PC) body and a durable high-density polyethylene (HDPE) lid and tube rack, the container features 18 numbered slots for standard 1.2 to 2.0 mL cryogenic vials, to ensure easy sample tracking and rapid identification.

Other features include: it requires no liquid additives or maintenance baths; prevents chemical residue; eliminates tube label degradation; and offers unlimited reuse cycles without recurring solvent costs.

With a compact, stackable design, it also has intuitive graphical operating instructions printed directly on the container body.

Pacific Laboratory Products
www.pacificlab.com.au

Ducted filter module



The Camfil Slimline RSR is a lightweight, low-profile ducted filter module designed to deliver cleanroom-level air filtration in environments where contamination control and space efficiency are essential. Developed for pharmaceutical, biotechnology, healthcare and other critical applications, the Slimline RSR helps maintain high standards of air cleanliness while supporting efficient facility operation.

Its compact design makes it well suited to installations where ceiling space is limited. The room-side replaceable HEPA filter allows maintenance to be completed without entering the ceiling void, helping to minimise downtime and maintain the integrity of controlled environments. This unique design supports consistent room air cleanliness following filter servicing, intended as an effective solution for clean processes and medical suites.

The Slimline RSR incorporates a range of performance-driven features, including a gel seal between the filter and housing, an adjustable room-side diffusion disc and a noise-reducing rounded collar. The welded housing can be installed from either the room side or top side, designed to provide flexibility during installation while supporting long-term durability and reliability. A gap-free architectural finish is designed to deliver a clean, professional appearance that integrates seamlessly into controlled environments.

By combining compact dimensions with dependable HEPA filtration performance, the Slimline RSR is designed to provide a practical solution for facilities seeking to optimise air quality, operational efficiency and maintenance accessibility. As part of a comprehensive clean air strategy, it is intended to provide confidence that critical spaces continue to receive the filtration performance required for sensitive manufacturing, research and healthcare activities.

Camfil Australia Pty Ltd
www.camfil.com.au

High-performance data management and computing platform



Bruker's Acquifer HIVE is a high-performance, modular data management and computing platform designed for research facilities that handle large, data-intensive scientific workloads. It integrates high-speed processing, scalable storage, networking and data protection within a unified on-premises architecture, enabling researchers to efficiently acquire, manage, process, analyse and visualise large microscopy and omics datasets.

By combining data storage with powerful CPU and GPU computing in a single system, the platform minimises data-transfer delays, avoids unnecessary duplication and enables rapid analysis directly at the point of storage. Its centralised, secure and vendor-agnostic environment supports multiple microscopes, instruments and users while keeping sensitive research data safely onsite.

The product supports applications including high-content imaging, 3D volumetric imaging, time-series data, multi-omics, image processing, visualisation and machine learning. Its high-speed RAID storage, tailored network integration, CPU/GPU configurations, firewall protection and integrated uninterruptible power supply provide the performance and security required for demanding research workflows.

At the heart of the system is the CORE, which provides the foundation for the modular architecture. Standard modules include DATA for secure, high-speed storage; NET for communication and 10 Gbps connectivity to microscopes and other instruments; and GPU for visualisation, accelerated processing and machine learning. The ecosystem can be extended with SAT for encapsulated computation and hardware control and BACKUP for enhanced data protection.

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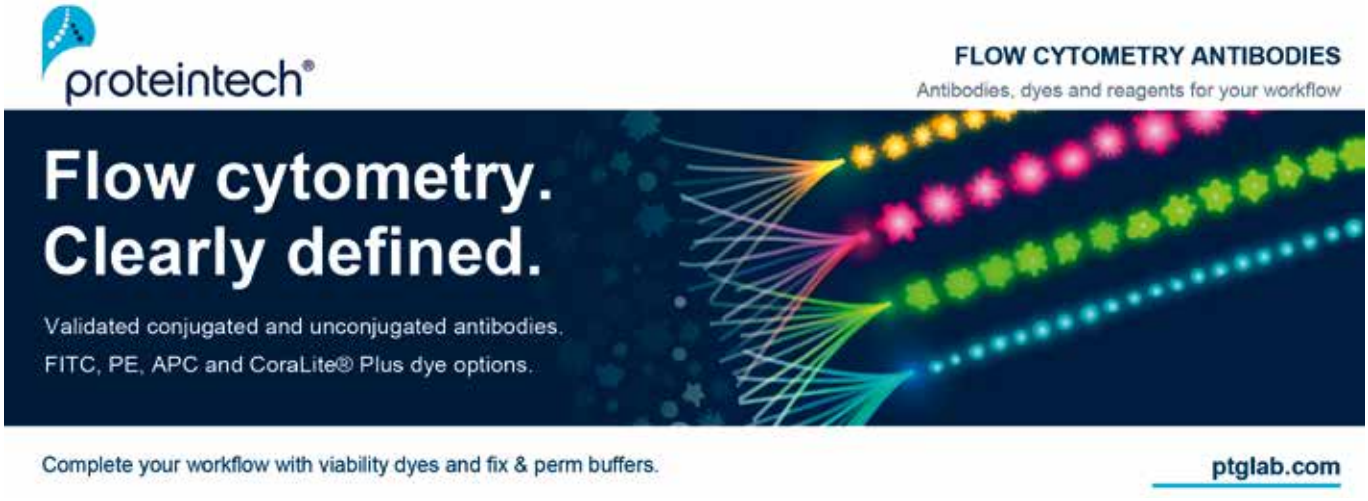

SPONSORED CONTENT



Agilent liquid chromatography systems in use at one of the company's commissioned laboratories.

Building the Labs Where Discovery Starts in Asia-Pacific

Bharat Bhardwaj, Vice President of APAC Sales, Agilent Technologies

New Australian studies detect "forever chemicals" in rain, tap water and serum. Agilent is investing in research hubs across Australia and Asia-Pacific to speed discovery of compounds that routine testing misses.

Rain falling on Melbourne carries PFAS. So does tap water in Sydney, and so does the serum sample of Australians, including young children. Detection is not the same as harm, and the concentrations reported are low. What the recent studies show is that these "forever chemicals" are more widespread, and more varied, than routine monitoring was designed to find.

What the research found

RMIT and EPA Victoria researchers detected eight PFAS in Melbourne rainwater between 2024 and 2025, with more in rain from over-land air, pointing to urban and industrial sources. They estimated rain could deliver about 10.6 kilograms of PFAS to Port Phillip Bay each year.

A Sydney tap-water study detected 31 PFAS, 21 of them new to Australian reports. Researchers also identified two PFAS in pooled serum samples that had not been previously reported, including samples from children under 5.

Detection does not mean harm. PFOS was found in 98.6% of people in the national health survey, yet levels were lower than in other countries.

Some communities face a concentrated problem. In the Blue Mountains, WaterNSW identified elevated PFAS concentrations in the upper Adams Creek catchment and three potential historical contamination sources, and further investigations continue.

The hidden gap in what we measure

Australia updated its drinking water guidelines in June 2025, including a health-based guideline of 8 nanograms per litre for PFOS. From July 2025, national restrictions prohibited the import, manufacture and export of PFOA, PFOS, and PFHxS. While the guidelines cover a list of compounds, researchers keep finding others.

Protecting communities and shaping regulation depend on knowing what's out there. That means moving beyond known contaminants to identify thousands of unregulated forever chemicals that may be in our environment.

As the picture of forever chemicals in Australia is still being drawn, the laboratories built today will help detect these compounds and generate the data needed to better understand their prevalence and potential impact.

Bharat Bhardwaj, Vice President of APAC Sales, Agilent Technologies.



At the same time, tighter environmental and water-safety standards also mean laboratories must measure more compounds, at lower levels, with more reliable results regulators can trust.

That need is not unique to Australia, and instrument makers are responding region by region.

Our goals for the region

Agilent's Asia-Pacific business was set up to achieve double-digit growth. The company is also responsible for expanding its range of software, services, and expertise that provide trusted answers to researchers' most challenging questions.

Its goal is to be the fastest-growing scientific instrument company in the region, and Agilent is making meaningful progress in building the foundations for long-term growth.

Research labs are central to that foundation. By working with academic researchers on local health, water-safety and environmental questions, Agilent aims to help more communities across the region get the answers they need. That makes investing in research an expansion decision as much as a scientific one.

Building discovery capacity in APAC

Agilent has established Centres of Excellence within flagship university campuses in South Korea, Singapore and Malaysia in the past three years. In 2025, it launched an Innovation Hub in Australia with the University of Melbourne's Australian Laboratory for Emerging Contaminants (ALEC).

Each hub pairs analytical instruments and application expertise with local academic research, shaped by national priorities such as cardiovascular disease, cancer research, environmental health, water-safety and life sciences. At ALEC, the focus is on emerging contaminants, from PFAS to microplastics and flame retardants.

The hub brings together Agilent's 6495C Triple-quadrupole LC/MS and LDIR systems to support research into emerging contaminants. These next-generation technologies have pioneered ultra-trace detection, achieving world-class breakthroughs in parts per quadrillion (PPQ)-level quantitation of PFAS and microplastics in drinking water.

Commercial case for shared science

Methods developed in a university lab, once validated and published, can become the basis for the routine methods that commercial, government and environmental laboratories adopt.

The science community benefits as well. Access to current instrumentation lets researchers pursue questions that budgets might not otherwise allow, and published methods become a shared resource.

Agilent's training is part of the value: students and early-career scientists who learn on advanced platforms carry those skills into regulators, utilities, consultancies and industry, broadening the talent pool that every laboratory in the region relies on.

The open questions

Researchers and regulators still face unresolved issues globally: where safe thresholds of forever chemicals should sit, what newer compounds do to health, and what long-term, low-dose exposure means for the population. Until those questions are answered, monitoring is likely to expand rather than narrow.

As the picture of forever chemicals in Australia is still being drawn, the laboratories built today will help detect these compounds and generate the data needed to better understand their prevalence and potential impact.



Bharat Bhardwaj and A/Prof Brad Clarke from the University of Melbourne, at the official unveiling of the Agilent Innovation Hub in Australia.

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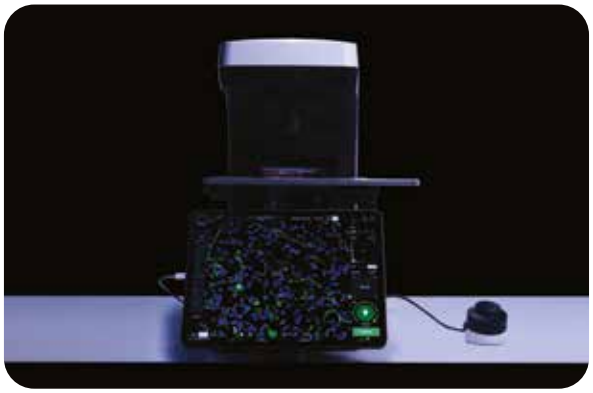

Four microscopes in one

The Revolve microscope from Discover Echo is claimed to be the world's first hybrid microscope, combining four microscopes into one. It easily transforms between upright, inverted, transmitted light and fluorescence imaging requirements, reducing equipment costs while freeing up valuable laboratory space.

The upright configuration can be used for viewing glass slides and is useful for water dipping and oil immersion applications. The inverted observation method is suitable for viewing live samples in fluidic chambers such as dishes and well plates. It also allows for easier manipulation of samples and is useful for long working distance applications.

For brightfield observations, high-level detail and vivid colour are achievable with a 12 MP colour camera. Fluorescence observations utilise a 5 MP monochrome sCMOS camera and no darkroom is required.

A 12.9″ Liquid Retina Touch display replaces eyepieces and drives cameras and illumination, thus replacing manual turrets and levers. Software updates are available via the App Store. Date transfer is easy via USB, AirDrop or file sharing. Revolve also allows users to capture and view multichannel Z stacks, with the raw data, MIP and EDF all in one dataset ready to annotate or export.

Echo's proprietary Digital Haze Reduction (DHR) software module reveals fine details by suppressing noise and reducing blur to provide clear image enhancement. Confluency AI is built directly into the microscope through the software. Designed for everyday cell culture workflows, it enables users to return a quantitative cell-coverage percentage the moment they capture an image, with no guesswork and no inconsistency.

The Revolve microscope includes a remote focus knob for fine focus, image capture and auto-exposure. It also includes a repeatable camera, LED light settings and an anti-shake feature that leverages a built-in accelerometer to minimise the effect of external vibrations prior to image capture.

Environmentally friendly, the motorised Epi-fluorescence turret offers mercury-free illumination of ultra-bright LEDs with a 50,000 h lifespan. Sample Protect Mode allows the user to control a sample's exposure to excitation light. Five imaging channels are available — four Epi-fluorescence and one transmitted light.

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www.scitech.com.au

Benchtop centrifuge



The BioRidge TD5Z centrifuge is available now from Pacific Laboratory Products (PLP). The compact and stylish benchtop centrifuge is microprocessor-controlled and has a variable-conversion motor that aims to deliver high-speed accuracy, stable operation and low noise of <65 dB(A).

The TD5Z comes as a centrifuge only; multiple different rotor options with buckets and adaptors are available. Programmable operation can be set according to the experiment's needs or stored for repeated use in the lab, with a time setting range of 1 s to 99 min and 59 s.

An intuitive touch control panel features an LED or LCD display and a user-friendly interface for simple and convenient operation. The centrifuge offers real-time conversion of speed and RCF (max RCF 5030 x g).

The TD5Z is CE marked and GMP certified. It is self-locking with lid safety mechanisms and over-speed protection including an automatic alarm. Other features of the unit include a maximum speed of 0–5000 r/min; a maximum rotor capacity of 4 x 500 mL; and overall machine power of 750 W. Its dimensions are 465 x 560 x 380 mm and its weight is 51 kg.

Pacific Laboratory Products
www.pacificlab.com.au

HEPA filtration for pharmaceutical cleanrooms



The Pharmaseal is a fully welded terminal housing designed to provide HEPA and ULPA filtration in pharmaceutical and biotechnology cleanrooms. Serving as the final stage of supply air filtration in turbulent airflow applications, it helps maintain contamination control, cleanroom performance and product protection.

Compatible with Camfil MEGALAM MG HFU HD gel seal filters and HFP HD filters with PU gaskets, the Pharmaseal features a knife-edge sealing system that delivers an immediate airtight seal, supporting the stringent requirements of critical cleanroom environments. Its robust welded construction provides long-term durability, while pivoting filter clamps with compression limiters enable fast, secure filter change-outs and simplified maintenance.

For enhanced airflow management, the housing can be configured with bubble-tight, guillotine or radial blade bow-tie dampers, allowing precise air volume control. A choice of diffuser options, including swirl, perforated, adjustable vane, four-way and nozzle designs, provides flexibility to suit a wide range of cleanroom layouts and airflow requirements.

Combining high-efficiency filtration, good sealing and practical serviceability, the Pharmaseal is designed to support the demanding needs of pharmaceutical and biotechnology facilities. Its flexible configuration options and compatibility with high-performance MEGALAM filters make it an effective solution for maintaining cleanroom integrity, operational reliability and regulatory compliance.

Camfil Australia Pty Ltd
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Onsite detection

of Devil's Breath in drinks





PhD student Isabel Poves and postdoctoral researcher Dr Enrique Azuaje-Hualde test the device.

Researchers at the University of the Basque Country - EHU have developed a microfluidic paper-based device that provides a rapid, reliable and easy way to detect the drug scopolamine and related compounds.

Described in the journal *Talanta*, and forming part of the doctoral thesis being undertaken by Isabel Poves in the Microfluidics Cluster research group, the work provides a significant advancement towards the practical, onsite detection of drug-facilitated assault agents.

Assault facilitated by drugs such as scopolamine (popularly known as Devil's Breath) is a serious public health and forensic concern. This drug is especially hazardous due to its strong amnesic, sedative and hallucinogenic effects, combined with a lack of colour, odour and taste that prevent it from being detected when ingested.

Despite its toxicological importance, there are few methods available for the rapid onsite detection of scopolamine, as the detection of these types of drugs relies on the use of instrumental analytical techniques. This means that, in order to find out whether something has been added to your drink, you have to take a sample to a specialised laboratory for analysis.

To address the lack of portable, low-cost analytical tools for detecting scopolamine without the need for a laboratory, the Microfluidics Cluster group has developed a self-powered, microfluidic paper-based device for the rapid detection of scopolamine in pharmaceuticals, plant extracts and beverages. Discreet, portable and easy to use, their system consists of a self-powered microfluidic device with a paper support on which a reaction occurs, which provides a colour change according to whether the result is positive or negative.

"The device is immersed in the sample for a few seconds, and after around 10 minutes the result can be seen with the naked eye, without the need for any other type of detector," said Poves, who served as lead author on the study.

Microfluidic technology consists of miniaturising or simplifying processes that are carried out on a larger scale in a laboratory, so that the sample does not need to be handled in any way. This enables a preliminary analysis to be conducted onsite, which should help to prevent drug-facilitated assault — "because more important than detecting it after the fact is trying to prevent it from happening in the first place", Poves noted.

The study helps bring scientists closer to the objective of developing a microfluidic platform capable of detecting multiple drugs through a single colorimetric reaction. In fact, it forms part of a larger project led by the Microfluidics Cluster group, which seeks to detect as many drugs as possible using a single device. This would involve integrating various known chemical reactions used for drug detection into microfluidic technology and improving the designs, thus taking advantage of the ability to achieve rapid results.

"We are trying to adapt the colorimetric chemical reactions to microfluidic technology in order to simplify this type of detection, to lower costs, automate the process and, in particular, to be able to see with the naked eye a colour change indicating that a beverage has been adulterated," said Ikerbasque Research Professor Lourdes Basabe-Desmonts, lead researcher of the group. In this respect, the group has recently developed another device aimed at detecting benzodiazepines (eg, Diazepam, medically used for treating conditions such as anxiety and insomnia) in beverages, with the same characteristics as the device in this study.

The researchers acknowledged that they still need to improve their devices in order to optimise the detection ranges, colour changes, etc. In the future, such analysis could potentially be conducted using existing smartphone applications that accurately analyse the colour displayed on the device.



High-speed laser cassette printer

Leica Biosystems has launched the HistoCore LIGHTNING C Laser Cassette Printer, designed to help pathology laboratories standardise critical histology workflows, improve traceability and move from sample to answer with greater speed and certainty.

Pathology laboratories are facing rising case volumes and increasing test complexity, so even small inefficiencies in early workflow steps can create large downstream delays, rework and risk. Reliable cassette identification is critical to maintaining traceability throughout the diagnostic process, yet traditional labelling methods can introduce inconsistency, manual steps and ongoing maintenance demands. As laboratories continue to advance digital pathology and explore AI-enabled tools, consistency and traceability at the front end of the workflow become increasingly important to the quality of downstream images, data and diagnostic insights.

The laser cassette printer addresses these challenges by delivering fast, consistent and durable specimen identification at the very start of the histology workflow. Designed for use with validated Leica Biosystems cassettes, the system uses high-quality UV laser printing to produce clear and durable markings, including barcodes and 2D codes, to support traceability as samples move from processing through diagnosis. With printing speeds of up to 2.5 s per cassette and capacity for up to 600 cassettes, laboratories can optimise throughput, reduce bottlenecks and maintain workflow continuity, even under growing demand.

By eliminating the need for ink and ribbons, the system helps laboratories reduce maintenance requirements, minimise downtime and lower total cost of ownership. Automated colour recognition and LIS compatibility further optimise operations by matching cassette colour to predefined templates, reducing manual intervention and helping prevent identification errors so laboratories can standardise critical foundational workflow steps.

Leica BioSystems Ltd
www.vision-bio.com



Continuous monitoring system

Critical environments demand more than reliable measurements. They require continuous visibility, trusted data and a monitoring system you can depend on.

The latest Vaisala Viewlinc Continuous Monitoring System has been designed to bring monitoring software, reliable measurement instruments and expert services together in one complete solution — built for laboratories and other critical environments.

The user can choose the monitoring approach that fits their operations. Viewlinc On-premises gives organisations full control within their own infrastructure, while the Viewlinc Cloud Suite offers flexible, trusted monitoring without the need to manage local system infrastructure.

With seamless device compatibility, solid measurements and centralised environmental monitoring, Viewlinc helps teams stay informed of changing conditions, respond to deviations and maintain confidence in their monitoring data. And because critical monitoring extends beyond software and instruments, Vaisala provides expert services and support throughout the system life cycle.

From measurement to monitoring and support, Viewlinc helps users stay in control — with confidence in their every measure.

Vaisala Pty Ltd
www.vaisala.com

Cell viability analyser software

Beckman Coulter Life Sciences, a Danaher company, has launched its Vi-CELL BLU 2.0 Viability Analyzer Software — a major upgrade that enables laboratories to modernise cell viability workflows while maintaining data continuity, compliance and operational confidence. The software supports laboratories in solving complex cell analysis challenges and accelerating the transition from research to biomanufacturing.

Built on the Vi-CELL BLU instrument, the software delivers enhanced data comparability, integrity and uptime, enabling R&D and manufacturing teams to modernise workflows without disrupting established processes. By offering improved cell-counting algorithms and configurable analysis settings designed to align results with legacy instruments, supported by validated software documentation and application guidance, the software helps labs avoid the complexity of an equipment transition.

Additional enhancements include role-based access controls, electronic signatures, audit trails and traceability features to support regulated workflows, streamline integration into GMP environments, and ensure consistency across projects, users and sites.

Beckman Coulter Australia
www.beckman.com.au

Award-winning system automates vial filling for cell therapy



Celleo's Larkem V40 closed vial filling system, with the single-use consumable and finished vials.



An operator removes finished vials from Celleo's Larkem V40.

A Melbourne company's answer to one of the bottlenecks holding back cell therapy has been named a winner in the 2026 Australian Good Design Awards, with Celleo's Larkem V40 recognised in the Product Design (Medical and Scientific) category.

Cell therapies — such as the CAR-T treatments used against leukaemia, lymphoma and multiple myeloma — have produced lasting remissions in some patients whose cancer had come back after other treatments. They are also among the hardest medicines in the world to make, as most are autologous: built from a patient's own cells, modified, grown and tested over several weeks, then returned to that one patient. Every dose is a manufacturing run of its own, and manufacturing capacity is one of the main limits on how many people are treated.

Every batch needs vials, and these are typically drawn up by hand and pipetted one at a time, inside the most stringent class of cleanroom. The process is extremely slow, varies from vial to vial, risks compromised sterility from open processing, and ties up skilled staff and resources.

By contrast, the Larkem V40 does this job automatically, inside a sealed, single-use kit. Up to 40 vials are filled at once — to a precise, consistent volume — without ever being opened to the air.

The system works by evacuating air from the closed set incorporating the vials, before displacing the vacuum with fluid. The manifolded vials are automatically sealed and separated, providing industry-standard vials for subsequent use. A 40-vial fill takes around eight minutes, as opposed to half a day for a manual batch.

Because the cells never leave the sealed kit, the system can run in a lower-grade cleanroom — which most facilities already have — instead of the specialised, heavily controlled suites that are costly to build and in short supply. This means less reliance on the most expensive room in the building, and faster, more consistent dosing for patients.

Celleo built the V40 after more than a hundred interviews with the scientists and operators who make cell therapies. The design brief was to close the process, automate it, and make it simple enough that an operator trusts it on the first day.

"Everything about the V40 design — from the nuances around single-use packaging to the high-definition user interface — evolved out of extensive voice of customer," said Mark Rob, Chief Technology Officer and co-founder of Celleo. "You know a good design in manufacturing when end users embrace it intuitively, with little more than a quick introduction."

Two independent evaluations of the Larkem V40 have been published this year. Cell and Gene Therapy Catapult evaluated the system for iPSC cell banking at its Edinburgh laboratories, creating a 200-vial cell bank with no statistical differences between five replicate runs, and equivalent cell viability, concentration, post-thaw recovery and pluripotency to manual operations. CCRM Nordic evaluated the system for QC sample provision in a CAR-T workflow at its Gothenburg facility, reporting increased volume filling accuracy compared with manual vial filling, with viability, cell concentration, phenotype and potency equivalent to manual operations.

The Good Design Awards Jury concluded that the Larkem V40 is an innovative solution addressing a critical unmet need in cell and gene therapy manufacturing.

"The platform's fully closed, automated vial filling system represents a significant technical achievement, replacing manual, contamination-prone processes with precise, scalable automation that eliminates reliance on high-grade cleanrooms," the Jury said. "The Jury commends the team for tackling a complex manufacturing challenge with the potential to reduce batch failure rates, lower contamination risk and meaningfully improve patient access to life-saving therapies, demonstrating a well-informed product package with far-reaching healthcare impact."

Celleo
https://celleo.com



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DNA test finds genetic cause of inherited muscle disease

A DNA test developed by researchers at the Garvan Institute of Medical Research has identified the genetic cause of inherited muscle disease in people who have remained without answers after years of standard testing, as revealed in a study published in the journal *Nature Communications*.

Inherited muscle diseases, which include muscular dystrophies, affect an estimated 6000 Australians. They gradually weaken and waste the muscles, often robbing people of the ability to walk, swallow, speak clearly or use their hands. They can begin in childhood or adulthood, worsen over time, and there are currently no cures.

Standard diagnostic tests for inherited muscle disease look for one kind of DNA change at a time — but these conditions can be caused by many genetic changes. Some involve single-letter errors in the DNA code, while others involve large missing or duplicated sections, unstable expansions of repeated sequences, or epigenetic chemical marks that switch genes on and off. Until now, no single test could detect all of these changes at once; furthermore, new genetic causes of muscle disease continue to be identified, and each one takes time to build into its own accredited clinical test.

What makes the new test special is its use of Oxford Nanopore Technologies' long-read sequencing, which reads much longer stretches of DNA than standard methods and can pick up complex genetic changes that older tests routinely miss. In a single experiment, it screens more than 300 genes known to cause inherited muscle disease and detects the full range of DNA changes behind them.

"Many muscle diseases have no available genetic test and for others there is a separate test for each different gene involved," said Dr Ira Deveson, Lab Head at Garvan and co-senior author on the study. "Here we've shown that it's possible to test all genes at once, and that's a game changer for someone who has been through years of inconclusive tests."

The study outlined the application of the test to 53 Australians with known or suspected inherited muscle disease, including 31 whose previous genetic testing had failed to find a cause. Over a third of those unsolved cases received a diagnosis, with the test identifying in some participants a gene variant that no Australian clinical test currently looks for. For other participants, it corrected a misdiagnosis. Either way, the results have significant practical consequences.

"Some patients had been searching for an explanation for their symptoms for over a decade, undergoing repeated investigations, including blood tests, MRI scans, neurophysiologic studies and even muscle biopsies," said neurologist Dr Dennis Yeow, a PhD candidate at The University of Sydney who co-led the study. "Being able to finally give them a name for what they have is significant, both for them and for their families."

"A confirmed genetic diagnosis changes the counselling we can offer families, opens access to supports such as the National Disability Insurance Scheme, prompts monitoring for complications such as heart problems, and allows people to enrol in clinical trials that require a known genetic cause," added Associate Professor Kishore Kumar, Group Leader at Garvan and co-senior author on the study. "Without it, many of those doors stay closed."

The team is now working with NSW Health Pathology's Molecular Medicine Laboratory at Concord Hospital to bring the test into routine care. The researchers estimate it could be available across Australia within about two years.

"Long-read sequencing generates a huge amount of complex information about a person's DNA," noted Dr Andre Reis, Senior Research Officer at Garvan and lead bioinformatician on the study. "We've turned that into clear, reliable findings that a diagnostic laboratory can act on. That is what takes it from a research technique to something that can genuinely help people."

While the study focused on muscle disease, the same test approach could be applied to other rare inherited conditions.

"The long-read technology we have applied in this test is disease-agnostic," Deveson said. "What we have shown for muscle disease could, in time, be built for many of the rare genetic conditions where people currently spend years searching for a name for what they have. That is where we want this to go."

GCI platform for binding affinity and kinetics analysis

Understanding how biomolecules interact is fundamental to drug discovery, biologics development and biochemical research — but weak, transient or low-abundance interactions can be difficult to characterise using conventional techniques.



The Creoptix WAVEsystem from Malvern Panalytical provides highly sensitive, real-time, label-free analysis of biomolecular interactions using patented grating-coupled interferometry (GCI). Unlike traditional approaches that rely on fluorescent or enzymatic labels, the WAVEsystem directly measures interactions at the sensor surface, delivering kinetic rate constants (ka and kd), affinity (K_D) and binding responses.

The system's no-clog WAVEchip microfluidics can enable analysis of complex or crude samples, reducing the need for extensive sample purification. Its high sensitivity and high signal-to-noise make the system particularly valuable for challenging applications, including small-molecule and fragment screening, weak binders, antibody characterisation, protein–protein interactions and interactions involving large ligand-to-analyte molecular weight differences. WaveRAPID can accelerate kinetic screening by determining interaction kinetics from a single sample concentration, reducing sample consumption.

The new KYMAchip has been designed to deliver fast signal transitions, faster kinetics and greater reproducibility. Its optimised channel design enables measurement of rapid association and dissociation events, while reducing transition artefacts and channel-to-channel variability. Like the WAVEchip, KYMAchip supports challenging samples while offering the flexibility to remove, store and reuse the chip — helping researchers get kinetic data from every experiment.

For researchers seeking deeper insight into molecular binding — not simply whether an interaction occurs — the Creoptix WAVEsystem provides a powerful approach to kinetic and affinity analysis.

ATA Scientific Pty Ltd
www.atascientific.com.au



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Air pollutant exposure linked to glaucoma, cataracts and suicide

People who are exposed to high levels of air pollution are more likely to develop glaucoma and cataract, and may even have a heightened risk of death by suicide, according to pooled analyses of previous research.

While there is strong evidence that being exposed to polluted air is harmful to the heart and lungs, much less is known about the effects of air pollution on the eyes, even though they are directly exposed. Dr Ahmed Alnabihi, from King Khaled Eye Specialist Hospital and Research Center in Saudi Arabia, was keen to change this.

"Every day, we see patients losing vision to conditions like glaucoma and cataract," said Alnabihi, who presented his findings at the 44th Congress of the European Society of Cataract and Refractive Surgeons (ESCRS). "These diseases are labelled as 'age related' as though aging is the only culprit, but that always felt incomplete to me. If something environmental is accelerating these conditions, that changes our thinking and suggests we could take action to reduce the risks."

The study is a systematic review and meta-analysis, meaning Alnabihi and his fellow researchers gathered together all existing research in this area and pooled the data together. This included 41 separate observational studies, drawing on data from millions of people across East Asia and the UK and including some of the largest eye health databases in the world.

The researchers looked at levels of several types of air pollution: particulate matter ($PM_{2.5}$ and PM_{10}), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3) and carbon monoxide (CO). They compared these with how many people were diagnosed with glaucoma, cataract or age-related macular degeneration.

Their results showed that the higher the levels of fine particulate matter ($PM_{2.5}$), the greater the risks of glaucoma. People living in the most polluted areas had up to 70% higher odds of glaucoma compared to those in the least polluted areas. People living in more polluted areas also face a consistently higher risk of developing cataracts — and the more pollution, the greater the risk.

"The clearest finding was for fine particulate matter — the tiny particles in smoke, vehicle exhaust and industrial pollution that are small enough to get deep into the body," Alnabihi said. "For every meaningful step up in pollution exposure, the risk of glaucoma rose by around 8% and cataract by around 4%. The evidence for age-related macular degeneration was less consistent, although some research supported a link. Other pollutants, including nitrogen dioxide and ozone, showed weaker or more mixed associations."

Providing a possible explanation for the findings, Alnabihi stated, "Fine particles are

thought to cause inflammation and oxidative stress in the body. Over years of exposure, these effects may damage the optic nerve, which is relevant to glaucoma, or the lens, which is relevant to cataract. Unlike most other organs, the eye is directly open to the environment. The ocular surface — the tear film, conjunctiva and cornea — has no barrier between it and outdoor air. That makes the biological plausibility here stronger than for some other organs.

"These findings add weight to the case for tighter air quality standards and pollution-reducing measures such as green spaces and traffic reduction in cities. Every major clean air policy has been justified primarily on the grounds of cardiovascular and lung health. Our paper adds a new organ system to that conversation."

But it's not just eye health that has researchers concerned, with a separate study — published in the *Journal of Epidemiology & Community Health* — suggesting that exposure to air pollutants may heighten the risk of death by suicide and suicidal thoughts.

While the effect of environmental factors on mental health conditions such as depression and anxiety has been extensively studied, its potential role on the risk of suicide is less well understood. To strengthen the evidence base, researchers at the Centre for Public Health, Queen's University Belfast, sought to find out whether air, noise, light and water pollution, as well as sociodemographic factors such as sex and income, might influence the risk of death by suicide and suicidal behaviours.

They scoured research databases for relevant studies published in English between January 2010 and April 2024. Out of an initial haul of 287, 45 met the eligibility criteria: 33 investigated death by suicide, while seven investigated suicidal thoughts and five investigated attempted suicide.

Pooled data analysis showed that short-term exposure to $PM_{2.5}$ (13 studies) and PM_{10} (seven studies) and long-term exposure to $PM_{2.5}$ (six studies) and NO_2 (seven studies) were statistically significantly associated with risk of death by suicide, attempted suicide and suicidal thoughts. Evidence from a narrative review of 16 studies showed potential positive associations with other air pollutants, including SO_3 and O_3 as well as noise pollution.

Pooled data analysis wasn't possible for the effects of water and light pollution, because of the limited number of studies and varying outcome measures; the narrative review findings for these exposures were inconsistent. There were no clear associations between sociodemographic factors and the risk of death by suicide or suicidal behaviours.

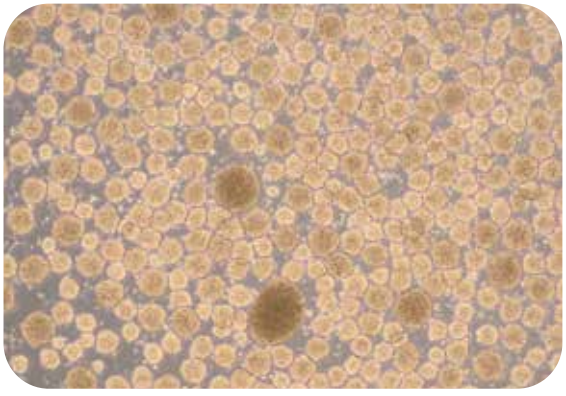
By way of an explanation for the findings, the researchers pointed out that air pollutants and water polluted with arsenic, lead, lithium or nitrate have been linked to neurological effects, including chronic inflammation and nerve damage, which can impair brain function and influence mood and stress resilience. It has also been suggested that traffic and other environmental noise and light pollution increase stress levels through disruption of the body clock.

The researchers acknowledged various limitations to their findings, including the small number of studies available on each respective outcome and the fact that the included studies varied considerably in methodology and design. Indeed, commentators have suggested the outcomes may actually reflect the fact that polluted areas are also often disadvantaged areas, with higher unemployment and poorer access to mental health care.

Nevertheless, the researchers said their findings "bring to attention the critical importance of recognising environmental exposures as modifiable risk factors within suicide prevention efforts", and suggested that integrating environmental health into mental health policy "could play a vital role in reducing suicide risk and improving overall population mental wellbeing".

If you are affected by any of the issues discussed in this article, Lifeline has a 24/7 crisis support service that can help. Please call 13 11 14.

Medium for scalable hPSC manufacturing



Amsbio announces StemFit Basic05 — a next-generation, animal origin-free medium designed for scalable human pluripotent stem cell (hPSC) manufacturing.

Compatible with both 2D adherent and 3D suspension culture, the product enables a streamlined workflow from cell expansion to process scale-up. The use of a single medium across culture modes minimises the need for process redevelopment and optimisation traditionally associated with media changes. Pluripotent stem cells cultured in the medium also retain their differentiation capability and have been confirmed to be capable of differentiation directly from 3D aggregates.

For labs looking to implement stable and scalable suspension culture and scalable processes, high cell viability and uniform spheroid formation are essential. The medium has been demonstrated to deliver high cell viability and uniform spheroid formation across multiple human iPSC lines, along with maintenance of a normal karyotype.

Offering robust and highly reproducible uniform spheroid formation, the product is a useful process development medium that can reduce process complexity and development burden. It supports flexible culture scheduling, with comparable cell expansion even when weekend feeding is omitted.

BioScientific Pty Ltd
www.biosci.com.au



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High doses of fertility drug linked to pregnancy risks

The drug clomiphene citrate has long been a mainstay of fertility treatment, but research out of Adelaide University is now raising safety concerns — with scientists finding that high doses of the drug, accumulated over multiple fertility treatment cycles, could increase the risk of pregnancy loss.

As one of the world's most widely prescribed fertility drugs, clomiphene citrate has been prescribed to millions of women worldwide since 1967 and remains a recommended first-line treatment for ovulation induction. It works by stimulating the ovaries to release eggs, thereby increasing the chance of pregnancy. Women who do not respond to lower doses, or who require multiple treatment cycles, may receive progressively higher cumulative doses over time.

Supported by the National Health and Medical Research Council and conducted in partnership with Boston University and the US Centers for Disease Control and Prevention, the study analysed 21,004 IVF embryo transfer cycles in the United States, finding that women receiving cumulative doses of 500–749 mg clomiphene citrate had a 12% higher risk of miscarriage. Women who received 750–999 mg had a 38% higher risk of miscarriage; women receiving cumulative doses of 750 mg or more were also more than twice as likely to have twins or other multiple births.

Spontaneous abortion rates increased as dose increased, but the researchers caution that the greater than tripling of stillbirth at the highest

dose was not statistically significant as the dose was rare, and larger studies are needed to confirm the association. The observation is, however, consistent with a previous publication from Adelaide University showing a doubling of neonatal death in pregnancies involving clomiphene citrate.

Significantly, higher cumulative doses of the drug did not improve the chance of a live birth, but did increase twinning, which increases the risk of adverse outcomes for both mother and child. Lead author Associate Professor Sheree Boulet said the findings — published in the journal *BMJ Open* — demonstrated a clear dose-response relationship.

"Women who received higher cumulative doses of clomiphene citrate experienced progressively greater risks of adverse pregnancy outcomes," Boulet said.

"We examined more than 21,000 embryo transfer cycles across four cumulative dose categories and found that increasing the dose did not significantly improve the chance of a live birth.

"Our findings suggest there may be a point where increasing the dose offers little additional benefit while exposing women to greater risk, highlighting the importance of carefully balancing effectiveness with safety when making treatment decisions."

The findings build on a series of studies from Adelaide University's Robinson Research Institute that linked clomiphene citrate with increased risks of pregnancy loss, stillbirth, perinatal death and some birth defects. Experimental studies in mice supported these findings, showing that higher doses reduced successful pregnancies and were associated with pregnancy loss, impaired fetal growth and developmental abnormalities.

Professor Michael Davies, senior researcher and co-author of all studies, said the latest work builds on more than two decades of Adelaide-led research examining the safety of fertility treatments.

"Clomiphene citrate has been used by many women since 1967, but it has never been comprehensively evaluated in large prospective clinical trials," he said.

"Our studies indicate that women respond differently to clomiphene citrate and that increasing cumulative doses may increase the risk of adverse pregnancy outcomes without improving the likelihood of a live birth.

"Until we can better understand these differences, it remains important that clinicians rigorously follow manufacturers' safety recommendations and avoid unnecessarily increasing cumulative doses.

"The same questions are now being asked of newer ovulation-inducing medications, so any move away from clomiphene citrate should also be guided by robust evidence rather than assumptions about safety."

Prepacked chromatography columns



Bio-Rad Laboratories has launched its process-scale Foresight Pro chromatography columns, prepacked with the company's scalable Nuvia chromatography resins, for downstream process-scale chromatography applications throughout the various stages in biological drug development and manufacturing.

The extended range includes columns packed with anion exchangers (AEX) Nuvia Q Media and Nuvia HP-Q Media; cation exchanger (CEX) Nuvia HR-S Media; and mixed-mode (MM) resins Nuvia cPrime Media, a CEX-hydrophobic interaction chromatography (CEX-HIC) resin, and Nuvia aPrime 4A Media, an AEX-HIC chromatography resin. These options expand the existing family of Foresight Pro columns packed with CHT Ceramic Hydroxyapatite Media Type I, Type II and XT, which have been incorporated into various regulatory-approved processes worldwide.

The chromatography resins use Bio-Rad's Nuvia bead technology, featuring a polyacrylamide (acrylamide polymer) base bead suitable for laboratory-scale purification, process development, pilot-scale production and commercial biomanufacturing applications. The resins are designed to have minimal non-specific binding reactions, due to the hydrophilic nature of the bead polymer, and maintain a constant dynamic binding capacity over a wide range of flow rates. The Nuvia bead allows for fast mass transfer, and is chemically and mechanically stable over a wide range of conditions.

The columns are manufactured in a controlled ISO Class 7 cleanroom, providing good manufacturing practice (GMP)-ready columns. Each column is packed using media from a single production lot, instead of blending multiple resin batches together during packing. The prepacked columns' standardised design and format can provide a more flexible solution than customer-packed columns, and columns are available in a range of diameters and bed volumes.

Columns prepacked with Nuvia resins are now available with internal diameters (ID) of 5 to 13 cm and bed heights of 10 and 20 cm. Columns with IDs of 20 to 45 cm are also in development.

Bio-Rad Laboratories Pty Ltd
www.bio-rad.com

Clinical research facility cuts core workflow time



AOVO, a private nephrology research facility on the Gold Coast, has reduced the time of core clinical trial workflows from 30–45 minutes to under five using Opti Assist, while a single morning's billing review has also surfaced tens of thousands of dollars in unclaimed items.

AOVO works with commercial sponsors and investigators across multiple trials at once, including Phase 1–3 multicentre programs. Each trial arrives with its own protocol, lab manual and pharmacy manual, each running to hundreds of pages. When someone needs a specific answer, it is in there somewhere. Finding it means searching, cross-referencing, and often waiting on a reply before anyone can act.

The same constraint applied everywhere. Patient questions during a visit meant searching documents in real time. Evaluating a new trial opportunity took long enough that it strained resources and put a barrier in front of work the team wanted to take on. Furthermore, the compliance requirement was non-negotiable: AOVO operates under GCP, TGA, Privacy Act and ICH standards, meaning every answer needs a source and every decision needs a trail.

When AOVO first saw ORCA Opti in 2025, Operations Manager Yupin Robson recognised that it could solve the site's search problem. After a period of planning and demonstrations, the site began a three-month trial in mid-2026, starting with the core problem of getting accurate, auditable answers quickly.

Three active studies were loaded into Opti Assist, including the protocol, lab manual and pharmacy manual for each. The whole team — including coordinators, pharmacists, lab staff and the investigator — could query those documents in plain language and get answers drawn from the source, with the exact passage shown alongside the response.

Outcomes of the trial included the following:

- Answering a patient question during a visit was reduced from approximately 30 minutes to approximately two minutes.
- Working through a procedural scenario was reduced from approximately 45 minutes to approximately two minutes.
- Evaluating a new trial opportunity was reduced from approximately 60 minutes to approximately five minutes.

"That time saving is … not just an hour," Robson said. "You're talking about very precious real estate in everyone's day. And if it saves me five minutes, what that five minutes possibly could mean is a week's worth of decision that gets made in that five minutes."

The audit trail built itself. Every query, answer and source reference logged automatically, meeting GCP documentation requirements that had previously taken manual effort. AOVO converted from trial to a paying customer.

A second benefit of the system concerned clinical trial billing, which is surprisingly intricate. Every trial carries its own contract and

its own terms, and reconciling what has been delivered against what has been claimed is slow, manual work.

Robson loaded a trial's invoicing material into a Knowledge Pack and asked ORCA to reconcile it: what had been billed, what was outstanding, what was missing. The review took a morning, and surfaced tens of thousands of dollars in unclaimed and mis-recorded items on that trial alone.

The clearest example came from an assumption that held on every other study the site runs but not on this one. ORCA caught the discrepancy, and it came to $6500 in reimbursements that had never been claimed. The invoice went in immediately and is now in the system for payment.

The review also surfaced items that had been recorded incorrectly and were quietly blocking claims. Once identified, they were straightforward to fix.

AOVO and ORCA are now moving from information retrieval towards automating more of the operational spine of the clinic and mapping that work to the site's compliance obligations. The work thus becomes more consistent and less time-consuming across every study — and because it is mapped to those obligations as it happens, the work itself becomes the evidence that it was done properly.

In development are the following:

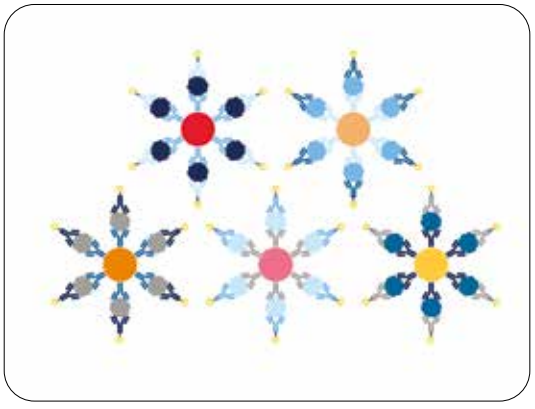
- Screening support, using existing clinical correspondence to surface potential trial participants who might otherwise be missed.
- Milestone and payment tracking, reducing the manual overhead in the invoicing cycle.
- Compliance cross-referencing, so that TGA, ICH, GCP and Privacy Act requirements sit alongside protocol answers rather than in a separate workstream.
- A glomerulonephritis patient registry, with risk stratification, a clinician review interface and an append-only audit trail.

"If you actually pack the problem up, what is the actual problem that you're solving?" Robson said. "You're solving the ability to wade through big data very quickly. So the use case is all these different examples, but the problem you're solving is actually getting through the data."

Kat Giudes, founder and Managing Director of ORCA Opti, concluded, "AOVO is the whole idea in one place: connect the documents, get answers in seconds with the source attached, and the audit trail writes itself. No migration, no IT project, just precious clinical time handed back to the team."

ORCA Opti
orcaopti.ai

CBA assay panels



Proteintech's SpeedyPLEX Assay Panels are high-sensitivity, multiplexed kits based on cytometric bead array (CBA) technology. They can be used to detect multiple analytes within a sample, making them suitable for characterising immune responses, profiling disease states and understanding biomarker expression patterns.

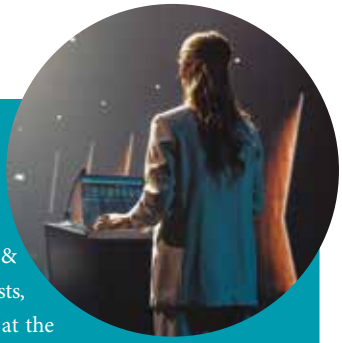
The kits are pre-figured, ready-to-use panels which are compatible with most standard flow cytometers. They require only 25 μL of sample and allow for rapid results in only 90 min.

The kits utilise fluorescent dye, colour-coded beads which are conjugated to capture antibodies. The capture beads are incubated together with sample and corresponding biotinylated detection antibodies to assemble the sandwich complex. Streptavidin-PE is then added, which is used for detecting the concentration of target analytes via flow cytometry.

Beads can be distinguished in the flow cytometer due to their unique combinations of APC and APC-Cy7 dyes, with each target being associated with only one type of colour-coded bead. The flow cytometer then collects the level of PE fluorescence from the different beads, which corresponds to analyte concentrations.

Other advantages of cytometric bead arrays include the ability to detect multiple analytes at varying concentrations in a single run.

United Bioresearch Products Pty Ltd
www.unitedbioresearch.com.au



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12th International Conference on Advanced Materials and Nanotechnology

February 8–12, Auckland

The 12th International Conference on Advanced Materials & Nanotechnology (AMN12) will bring together materials scientists, chemists, physicists, biologists and engineers for four days at the frontier of advanced materials. Attendees will be inspired by topics ranging from catalysis at the nanoscale and sustainable materials to quantum architectures and stimuli-responsive dynamic systems, fostering cross-disciplinary conversations to spark new ideas.

In addition, the event is teaming up with UPWEARS to host a symposium on Recycling & Additive Manufacturing for Sustainable & Circular Economy, as well as co-locating with the 49th Condensed Matter and Materials Conference (Wagga 2027).

Program highlights include:

- plenary lectures by world-renowned researchers setting tomorrow's research agenda;
- keynote presentations on high-impact breakthroughs;
- invited symposia and contributed sessions showcasing diverse perspectives;
- poster showcases, hands-on demos and industry exhibitions; and
- evening social events, networking dinners and behind-the-scenes lab visits.

iconevents.eventsair.com/amn12

AIMOS 2026 Conference
November 30–December 2, Wellington
www.aimos2026.org

AIP & ANZCOP Congress
December 7–11, Sydney
www.aip.org.au/Congress

Lorne Proteins 2027
February 7–11, Lorne
www.lorneproteins.org

Lorne Cancer 2027
February 11–13, Lorne
www.lornecancer.org

Lorne Genome 2027
February 14–17, Lorne
www.lornegenome.org

13th AOHUPO Congress 2027 & 32nd Annual APS Symposium
February 15–17, Melbourne
https://aohupocongress2027.org

Quantum Australia Conference 2027
February 17–18, Sydney
www.quantum-australia-conference.com

ICRER 2027
February 21–26, Melbourne
www.icrer2027.com

Pathology Update 2027
March 5–7, Christchurch
www.pathologyupdate.com

APPEX 2027
March 16–19, Melbourne
www.appex.com.au

Australian Healthcare Week 2027
March 17–18, Sydney
www.australianhealthcareweek.com/events-austhealthweek

TSANZSRS 2027
April 2–6, Gold Coast
https://tsanzsrsasm.com

ANZSNM ASM 2027
April 30–May 2, Gold Coast
https://anzsnmconference.com

ASID Annual Scientific Meeting (ASM)
May 5–8, Cairns
www.asidasm.com.au

17th International NanoMedicine Conference
June 28–30, Sydney
www.oznanomed.org

ASERA58 Conference
June 29–July 2, Melbourne
www.asera.org.au/2027-conference

The Australian Society for Microbiology Annual National Meeting
July 12–15, Sydney
www.theasmmeeting.org.au

CSANZ27 & ANZET27
August 5–8, Auckland
www.csanzasm.com

FoodTech Sydney
August 17–18, Sydney
https://foodtechsydney.com.au

ASCIA 2027 Conference
September 7–10, Canberra
www.ascia2027.com

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Printed and bound by
Dynamite Printing

Print Post Approved PP100008671

ISSN No. 2203-773X

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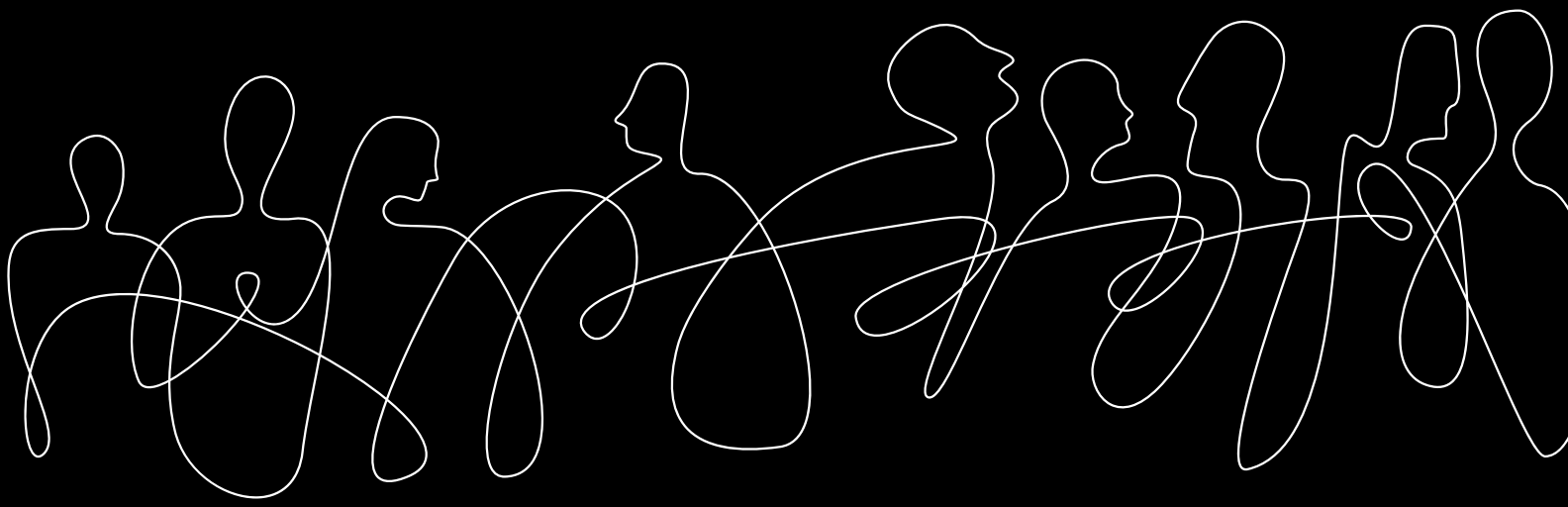

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