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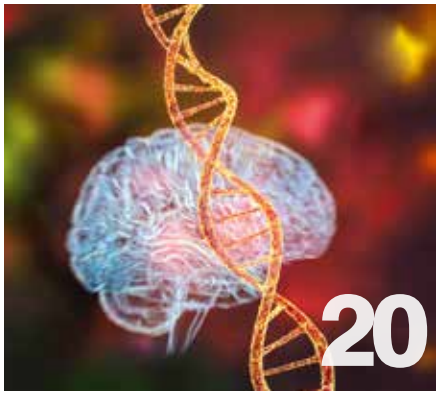

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With summer now well underway, many Australians will be doing their best to stay sun-safe — but it turns out that this may be easier said than done.

In mid-2025, laboratory testing initiated by CHOICE found that a wide range of sunscreen brands are failing to meet their stated sun protection factor (SPF) claims, with several so-called SPF 50 sunscreens returning results in the 40s, 30s, 20s, and even as low as 4. It has since been revealed that many zinc sunscreens may be similarly underperforming, emphasising the importance of testing for keeping consumers safe and informed as to exactly what they are applying to their bodies.

But that's not the only complication, as a recent population health study led by QIMR Berghofer has found that people who used SPF 50+ sunscreen daily for about a year were more likely to be vitamin D deficient than those who used it less frequently. Vitamin D plays a role in bone health and immune function, and may also influence other health outcomes.

The study from the Sun-D Trial involved 639 participants who were not regular sunscreen users. Half were instructed to apply SPF 50+ sunscreen daily for a year (excluding winter in southern regions), while the other half served as a control group. The results found that 46% of the sunscreen group were vitamin D deficient after 12 months, compared to 37% in the control group.

While UV radiation from the sun is the most natural way to get vitamin D, this of course increases skin cancer risk — so the researchers advise people to continue using SPF 50+ sunscreen regularly (especially when the UV index is forecast to reach at least 3) and to consider other sources of vitamin D such as diet and supplements. But even supplementation might not be all that simple, as separate research out of the UK has found that taking vitamin D_2 supplements can lead to a drop in the body's concentration of vitamin D_3, which is the form our bodies naturally produce from sunlight and use most effectively to raise overall vitamin D levels.

The researchers from the University of Surrey, John Innes Centre and Quadram Institute Bioscience analysed data from randomised controlled trials and found that vitamin D_2 supplementation resulted in a reduction in vitamin D_3 levels compared to those not taking a vitamin D2 supplement. In many of the studies, the vitamin D_3 levels went lower than in the control group.

The research supports a previous study, led by the University of Surrey's Professor Colin Smith, which suggests that vitamin D_2 and D_3 do not have identical roles in supporting immune function. Vitamin D_3 has a modifying effect on the immune system that could fortify the body against viral and bacterial diseases, whereas vitamin D_2 does not. The scientists concluded that further research into the different functionalities of vitamin D_2 and D_3 should be a priority in deciding whether vitamin D_3 should be the first-line choice of vitamin D supplement, subject to individual requirements.

With all that in mind, I hope you make it through the summer unscathed, and come back refreshed for another exciting year of science in 2026. We've certainly got plenty of summer reading for you, with highlights this issue including a new method for automating the manufacturing of lung organoids (page 16), the extraction of RNA from 40,000-year-old woolly mammoth tissue (page 24), and a breakthrough in gene therapy to treat Huntington's disease (page 20). As for the following issue and beyond, I don't know what that will hold, as I am currently days away from commencing maternity leave — so if you have noticed a peculiar influx of stories this year related to fertility and/or pregnancy, I may have had a hidden agenda there.

Best wishes, and I hope to be back in my editor's chair later in 2026.

Regards,
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Lauren Davis


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Hundreds of animal studies flagged for problematic images

Researchers from Radboud University Medical Center have identified over 240 scientific publications on animal models of haemorrhagic stroke that contain potentially problematic images, raising concerns about the trustworthiness of the body of literature this field. The team's findings have been published in the journal *PLOS Biology*.

Researchers often use images in their publications to provide evidence of whether a treatment works; for example, by showing the presence or absence of specific proteins or cells or changes in brain tissue. But the researchers found many instances of image duplication within publications, as well as across different publications, even when authors claimed the images came from separate experiments with different experimental conditions. This kind of duplication can cast doubt on the validity of the study's conclusions and its scientific integrity.

Originally, the team set out to systematically review animal studies on early brain injury following haemorrhagic stroke to find promising treatments suitable for clinical testing. But after noticing suspicious images in some papers in mid-2023, they set out to perform a systematic investigation of image-related problems in all 608 potentially relevant publications. The researchers found that 243 of these papers were problematic, most often for containing problematic images.

"We found a high prevalence (40%) of papers with image-related issues among preclinical literature on early brain injury after haemorrhagic stroke," the authors said.

"These findings shocked us to our core and might explain why, in spite of hundreds of animal studies published in this field, we still do not have any effective treatments for early brain injury in haemorrhagic stroke patients.

"During the summer break of 2023 we were texting each other figures from papers to collectively find image overlaps. Every time a new message came in, we knew somebody had found yet another inappropriate image overlap. It was at this moment that we knew that we had a serious problem on our hands that we needed to investigate in a systematic way."

With their findings raising concerns about the overall trustworthiness of animal-based research in this field, the authors have stressed the need for journals and publishers to investigate these issues carefully and take corrective editorial action where necessary. They said the scientific record needs to be as error-free as possible in order for scientists, clinicians and policymakers to make well-informed, evidence-based decisions that benefit patients' health.

Vaccine for elephant herpesvirus found to be safe

A vaccine trial against elephant endotheliotropic herpesvirus (EEHV) — a leading cause of death in young Asian elephants — has proved the vaccine is safe and triggers a strong virus-fighting immune response, according to an international team led by the University of Surrey, Chester Zoo, and the Animal and Plant Health Agency (APHA).

With the ability to kill elephants in just 24 hours, EEHV poses a severe threat to the survival of Asian elephants — a species already listed as Endangered on the IUCN Red List. Fatal cases have been documented across India, Nepal, Myanmar, Thailand and beyond, with the disease affecting both wild populations and vital conservation breeding programs in zoos worldwide. The virus has also been detected in African elephants.

The proof-of-concept study saw adult elephants at Chester Zoo receive a two-step vaccination: first, a viral vector carrying two EEHV proteins (EE2 and major capsid protein), then a booster with purified proteins plus an adjuvant to strengthen the response. Blood samples were then tested in various ways, including using whole transcriptome sequencing to see which immune pathways were switched on. This is understood to be the first time such systematic immune profiling has been carried out in elephants.

The study's results, published in the journal *Nature Communications*, found that the vaccine successfully activated a key part of the immune system that helps fight viruses, with no noticeable side effects observed. This suggests the vaccine could prevent deadly EEHV disease in calves — the group most at risk — and support conservation breeding programs worldwide.


Chester Zoo.

Indali Hi-Way (left), born at Chester Zoo in 2016, is one of only a handful of recorded survivors of EEHV after intensive treatment in 2019.

"This is a landmark moment in our work to develop safe and efficacious vaccines," said Professor Falko Steinbach, from the University of Surrey and APHA. "For the first time, we have shown in elephants that a vaccine can trigger the type of immune response needed to protect them against EEHV."

Specifically, the vaccine activated two key types of immune cells — $CD4^+$ and $CD8^+$ T cells (often called 'helper' and 'killer' cells) — that mediate the immune system's fight against viruses. Systems immunology analysis, carried out between the Universities of Surrey and São Paulo, confirmed the broad activation of antiviral immunity.

"Our findings give real hope that vaccination can become a practical tool for preventing severe disease and death due to EEHV," said lead author Dr Tanja Maehr, from APHA. "The next step could be to trial the vaccine in calves and in range countries, so we can begin to protect those most at risk."

Transforming health care through digitisation

*Garry Valenzisi**


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As demand for pathology services continues to grow across Australia, healthcare providers are under increasing pressure to improve inefficiencies stemming from outdated data storage systems.

Despite the need to process over 150 million pathology tests annually, many clinics both in Australia and across the globe remain burdened by archives that contain millions of physical glass slides and paper medical records.

Medical data stores consume vast amounts of physical space and often strain both time and financial resources. In these systems, staff often face challenges locating, retrieving and managing critical diagnostic materials — tasks that are not only time-consuming but also prone to human error. The manual nature of these systems can increase the risk of damage, misplacement and transcription mistakes, all of which can delay diagnoses and compromise patient care.

Often the driver of this 'time sink' is compliance. Australian health regulations require medical records to be retained for decades, creating substantial storage demands, with physical archives susceptible to degradation over time — which puts the integrity of essential patient information at risk. Without robust digital backups, the loss of such data has the potential to be permanent.

Digitisation offers a viable solution, helping to mitigate risks by converting fragile, analog pathology archives into structured, searchable digital libraries. This transformation ensures that critical research materials — such as tissue slides, patient histories and diagnostic records — are preserved and are accessible for future clinical and academic use.

The future is digital: AI's impact on pathology and patient care

Artificial intelligence is reshaping healthcare processes, helping to drive significant improvements in operational efficiency and patient outcomes. By automating routine tasks, improving diagnostic accuracy and streamlining access to information, AI can play an important role in helping medical professionals focus on diagnoses and patient care.

In digital pathology, AI-powered tools are revolutionising how clinicians detect, quantify and classify diseases. From mitotic figure counting and tumour classification to pattern recognition in complex tissues, AI is delivering diagnostic accuracy that rivals and, in some cases, even surpasses human performance. Studies show that AI can achieve a mean sensitivity of 96%, outperforming traditional pathologists by 2% and offering insights beyond the capabilities of conventional microscopy.

This technology is particularly valuable in resource-constrained settings. In many healthcare systems, diagnoses often require two consultants — a costly and time-consuming process. AI-enabled digital pathology can serve as a reliable 'second opinion', helping to alleviate workforce pressures and improve access to timely diagnoses.

Beyond pathology, AI is also enhancing radiology by accelerating the analysis of MRI and CT scans, supporting faster and more accurate clinical decisions. Early adoption of these technologies has already demonstrated improvements in diagnostic accuracy by up to 45% and efficiency by 12%.

Looking ahead, the healthcare sector is poised to embrace various forms of AI. Agentic AI will play a key role in reducing administrative burdens and enhancing patient experiences. Federated learning will be critical for maintaining data privacy and regulatory compliance and enabling collaborative AI development without compromising sensitive patient information. Meanwhile, generative AI will support the creation of personalised treatment plans, and explainable AI will be essential for building clinician trust and ensuring ethical, transparent adoption.

From archives to action: the case for healthcare asset digitisation

The convergence of asset digitisation and artificial intelligence is redefining how healthcare providers manage, analyse and act on clinical data. By converting fragile physical assets such as glass slides and paper records into high-resolution whole slide images (WSIs), healthcare institutions are laying the groundwork for a more agile, accurate and data-driven future.

Through digitisation services and technology, such as those provided by Iron Mountain, >

petabytes of pathology data are being transformed into structured, searchable digital libraries. These digitised archives not only preserve critical diagnostic materials but also enable seamless integration with AI-powered diagnostic tools. Digitised pathology libraries serve as a foundation for training advanced AI models. With access to millions of high-quality scanned slides, researchers can develop computer-aided tools capable of identifying patterns, anomalies and disease markers with remarkable precision.

The creation of robust digital image libraries also empowers machine learning algorithms to analyse vast volumes of imaging data — from MRIs to CT scans — improving research accuracy and clinical outcomes. Integrated with advanced analytics platforms, these datasets support early disease detection, personalised treatment planning, and reduced diagnostic variability across oncology, infectious diseases and chronic conditions.

As the healthcare sector continues to evolve, digitisation and AI will be critical to building a more resilient, efficient and patient-centric system — one where data is not just stored but actively used to improve lives.

Building a digitisation-ready healthcare system: steps, safeguards and strategy

Digitisation in healthcare is no longer a future ambition — it's a present-day imperative that demands a strategic, secure and scalable approach. For healthcare organisations, success hinges on three foundational pillars: data readiness, cybersecurity and platform integration.

1. Data readiness: structuring for scale and insight

The first step is preparing data for meaningful use. This means converting physical assets — glass slides, paper records, pension documentation — into structured formats that are searchable, interoperable and AI-compatible.

A recent example comes from a US healthcare organisation that faced significant financial exposure due to unstructured pension documentation. Without digitised records, the organisation was legally obligated to pay ineligible claims. By digitising over 2.5 million paper images and migrating legacy systems to Iron Mountain's InSight DXP platform, they identified duplicate payments and streamlined verification processes — saving over US$2 million annually.

This case highlights the broader value of digitisation: it's not just about clinical efficiency, but also about operational resilience and financial accountability.

2. Cybersecurity: protecting patient data at every stage

As digital pathology systems grow, so does the risk of cyber attacks and data breaches. Patient data — especially personally identifiable information (PII) — must be protected throughout the diagnoses and storage process. Iron Mountain's secure cloud storage and physical vaults offer an end-to-end chain of custody, meaning that digital images and physical slides are safeguarded against breaches and unauthorised access.

Compliance with regulations such as HIPAA and GDPR is non-negotiable. Healthcare organisations must implement encryption, access controls and audit trials to maintain trust and meet ethical standards. Leading institutions — including cancer centres and academic medical facilities — are already performing millions of secure image retrievals annually, proving that security and accessibility can coexist.

3. Platform integration: unlocking the power of the digital experience

Digitisation is not just about storage — it's about activation. Platforms like Iron Mountain's InSight DXP enable organisations to manage, analyse and act on digitised data. These platforms support AI integration, real-time collaboration and operational efficiency.

Whether verifying pension eligibility or identifying tumour markers, the ability to access and interpret data instantly is transforming healthcare workflows. InSight DXP also supports federated learning and explainable AI, ensuring that data remains private while enabling collaborative model development and transparent decision-making.

A smarter, safer, more patient-centric future

Australia's healthcare system stands at a pivotal moment. The growth of digitisation and artificial intelligence offers a powerful remedy to longstanding inefficiencies, from outdated pathology archives to administrative bottlenecks.

By embracing structured data, secure platforms and AI-enabled diagnostics, healthcare providers can not only improve clinical accuracy and operational resilience but also refocus their efforts on what matters most: solutions for patients. The path forward demands smart investment, robust safeguards and a commitment to innovation — but the reward is a healthcare ecosystem and a data foundation that's smarter, safer, and truly centred on creating a healthier Australia.

**Garry Valenzisi joined Iron Mountain in 2017, becoming Commercial Director, ANZ, soon afterwards. In 2021, Garry took the helm of Iron Mountain Australia & New Zealand as the Vice President & General Manager. Garry's management experience over 25 years has been in the areas of revenue growth and new customer acquisition, operational efficiency, logistics and customer service across Australia, New Zealand and the Pacific Islands. He has held national senior leadership positions including CEO and COO in the document automation and print arenas, manufacturing and technology industries with companies including Konica Minolta, Imagetec and Inventis Limited. Garry enjoys the challenges that come with dynamic, progressive organisations who seek sustainable growth.*

Victorian Govt and BioNTech partner on mRNA manufacturing

Victorian Minister for Economic Growth and Jobs Danny Pearson has officially opened BioNTech's research and development mRNA manufacturing facility, and also attended a topping out ceremony of the company's neighbouring state-of-the-art clinical mRNA manufacturing facility.

The milestone follows the opening of BioNTech's Innovation Centre in Melbourne in 2024 and the launch of a new Clinical Trial Oncology Platform that is improving access to certain next-generation investigational cancer treatments.

The R&D manufacturing facility will produce research-grade RNA to accelerate the translation of research into clinical use, while the clinical mRNA manufacturing facility — set to be completed by the end of 2026 — will deliver next-generation mRNA vaccines and treatments for clinical trials. The facilities are key components of Victoria's strategic partnership with BioNTech, which is set to create 1200 jobs over the next 10 years and boost economic growth across the state.

"This is a pivotal moment for Victoria as we advance our capacity to deliver cutting-edge mRNA treatments to patients faster than ever before," Pearson said.

Both facilities are located at La Trobe University's Bundoora campus — with the clinical mRNA manufacturing facility an anchor tenant of La Trobe's new University City precinct — and will enable research and

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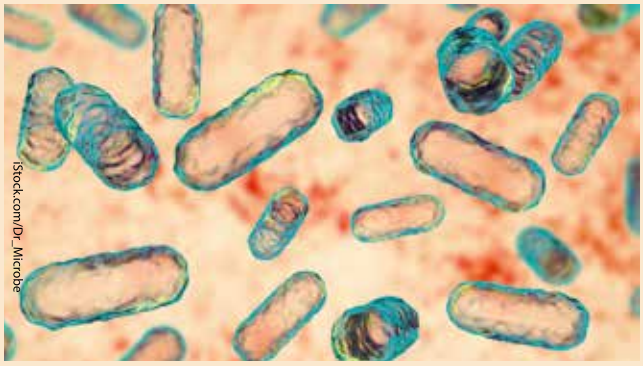
development into various diseases, supporting the translation of research into medical breakthroughs. In particular, the R&D manufacturing facility will partner with researchers and biotech companies from across Australia, the Asia–Pacific region and globally to accelerate the translation of research into clinical use.

"The opening of our R&D facility and the construction of our clinical mRNA manufacturing facility demonstrate BioNTech's commitment to turning innovative science into meaningful treatments for patients," said BioNTech Chief Operating Officer Dr Sierk Poetting. "By collaborating with Victoria's strong life sciences sector, we are building the infrastructure needed to support clinical trials and advance the development of mRNA-based medicines."

Bacteriophage cocktail to combat superbugs



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Researchers at Monash University and The Alfred are using bacterial viruses, known as bacteriophages, to combat a highly problematic, antimicrobial-resistant bacteria, in a new approach to precision medicine in hospitals battling antimicrobial resistance (AMR). Their breakthrough has been published in the journal *Nature Microbiology*.

The team's treatment, named Entelli-02, is a five-phage cocktail designed specifically to target *Enterobacter cloacae* complex (ECC), a group of bacteria responsible for severe infections. *Enterobacter* infections have emerged in hospitals around the world and have the capacity to develop resistance to many last-line antibiotics, meaning they are notoriously difficult to treat.

Using a decade's worth of bacterial isolates, Monash's Dr Dinesh Subedi said the research team developed and produced Entelli-02 through a rigorous process of phage isolation, genetics and preclinical testing.

"We initially began with three phages in our cocktail, but through iterative design, we improved the cocktail by genetically adapting the viruses to expand their host range, followed by selection of two additional phages with improved treatment outcomes," said Subedi, who served as lead author on the study.

"The final product, Entelli-02, contains five phages that can kill a broad range of *Enterobacter* isolates and reduce bacterial loads in infected mice by over 99%."

"This is the first time we've designed and developed a clinical-ready phage therapy product tailored to an AMR bacterial pathogen at a local hospital," added study leader and senior Professor Jeremy J Barr, from Monash University. "Entelli-02 is not just a scientific achievement; it's a clinical tool built for frontline use against deadly, drug-resistant, bacterial pathogens."

Entelli-02 was manufactured as a therapeutic-grade phage product at the Monash Phage Foundry, meeting sterility and safety standards for intravenous use under the Therapeutic Goods Administration Special Access Scheme. The end result, according to co-senior author Professor Anton Peleg from The Alfred and Monash University, is an off-the-shelf product to promptly support the treatment of some of our most difficult infections.

"This is a blueprint for how hospitals can respond to AMR outbreaks with precision therapies," Barr concluded. "We're bridging the gap between broad-spectrum antimicrobial treatments and personalised phage therapy to deliver a ready-to-use solution that's both targeted and scalable."

Fluorescent molecules glow in water, enhancing cell imaging

Researchers from the University of Malaga (UMA) and IBIMA Plataforma BIONAND have developed a new family of fluorescent molecules that glow in a surprising way, with promising applications in the study of living cells and the medicine of the future. Their work has been published in the journal *Advanced Materials*.

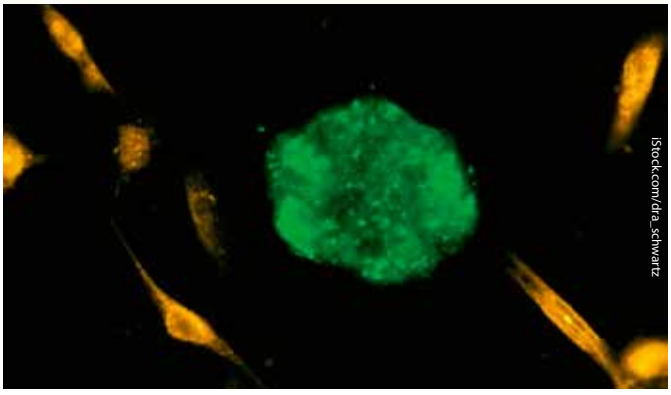
Fluorescent molecules typically lose part of their intensity or change to duller colours when dissolved in water or other biological media. However, these new molecules do just the opposite: they emit a higher fluorescence intensity because their colouration shifts to the blue region of the light spectrum.

This counterintuitive behaviour is key because it means the dyes work better in aqueous media like the inside of a cell, something essential for biomedical applications. In other words, they do not turn off when they are needed most, but rather maintain — and even enhance — their brightness in real conditions of use.

When applied to biomedicine, the dyes allow researchers to 'photograph' the inside of the cells with great precision and without damaging them, thanks to a technique called multiphoton microscopy. This method enables deeper penetration into living tissues, obtaining clearer and safer images. They also have the ability to selectively mark mitochondria, the so-called 'powerhouses of cells' responsible for supplying the energy required for life, playing a key role in diseases such as cancer or neurodegenerative pathologies.

Not only do the new molecules offer images of a quality comparable to that of fluorescence, they are also easier and cheaper to produce. This opens the door to more accessible diagnostic tools to study essential cellular processes and, in the future, improve early detection of diseases.

"These results are tremendously encouraging," said UMA Professors Ezequiel Pérez-Inestrosa and Juan Casado. "Not only do these molecules challenge an established rule in fluorescent chemistry, but they also open the door to new tools for studying diseases where mitochondria function is key. It is an example of what is achieved when fundamental chemistry meets research applied to biomedicine."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Females found to carry a higher genetic risk of depression

An international research team, led by QIMR Berghofer, has revealed genetic differences in how females and males experience depression, in findings that could pave the way for more targeted intervention and treatments.

In a study published in the journal *Nature Communications*, scientists found that genetic factors contribute more to depression risk in females than in males. The team discovered about twice as many genetic 'flags' for depression in the DNA of females compared with males.

"We already know that females are twice as likely to suffer from depression in their lifetime than males," said Dr Brittany Mitchell, senior researcher at QIMR Berghofer's Genetic Epidemiology Lab.

"And we also know that depression looks very different from one person to another. Until now, there hasn't been much consistent research to explain why depression affects females and males differently, including the possible role of genetics."

The global study saw scientists analyse DNA from hundreds of thousands of people with and without depression, including 130,000 females (people with an XX chromosome) and 65,000 males (people with an XY chromosome) with depression. The team identified about 7000 changes in the DNA that could cause depression in both sexes, and about a further 6000 DNA changes (a total of 13,000) that could cause depression in females only.

Researcher Dr Jodi Thomas said the study also pinpointed how depression could show up differently for females and males. The team found that the genetic factors linked to depression overlap more with those associated with metabolic traits in females.

"We found some genetic differences that may help explain why females with depression more often experience metabolic symptoms, such as weight changes or altered energy levels," Thomas said.

Traditionally, most drug trials and therapies are tested on males, but Mitchell and Thomas hope their work will also translate to a greater clinical understanding of female depression.

"Unpacking the shared and unique genetic factors in males and females gives us a clearer picture of what causes depression — and opens the door to more personalised treatments," Thomas said.

"The findings highlight the importance of considering sex-specific genetic influences in studying depression and other health conditions."

In the spirit of advancing scientific knowledge in this area, Thomas and Mitchell have made their results publicly available, allowing other scientists to analyse them further.

Researchers genetically engineer snake antivenom

An international team of researchers, led by the Technical University of Denmark, has used genetic engineering to create so-called 'product-ready' antivenom for snakes such as cobras and mambas. Because the antibodies are produced recombinantly rather than harvested from immunised animals, their future manufacturing will not depend on the use of animals — which should enable scalable, ethical and fully defined production with consistent quality and specificity.

Snakebite is a neglected tropical disease (NTD) causing over 100,000 deaths annually and 300,000 disabilities each year, mostly in poor rural communities. Snakebite is one of the 21 NTDs recognised by the World Health Organization (WHO), yet snakebite kills more people than the other 20 NTDs combined.

Current animal-derived antivenoms are lifesaving but flawed, showing batch variability, side effects and limited snake species coverage. Creating an antivenom that works for all bites is extremely challenging because each snake species produces a different mix of toxins that attack nerves, blood or tissues.

The researchers have now used genetic engineering to develop a recombinant nanobody-based antivenom, combining eight alpaca- and llama-derived nanobodies that neutralise seven toxin families across cobras, mambas and rinkhals snakes — all African elapids. As published in the journal *Nature*, the new therapy was found to outperform traditional serum antivenoms, preventing death and tissue damage in animal models while offering greater safety and consistency.

The work thus proves that a small, defined antibody mixture can replace complex animal-plasma products, and could lead to more inexpensive antivenoms in future. The team's next steps will include optimising large-scale production and clinical translation to make recombinant antivenoms accessible in the field.

"This research highlights the potential of biotechnology to develop antivenoms capable of neutralising toxins from multiple snake species," said study co-author Dr Stefanie Menzies, from Lancaster University. "While clinical validation will be crucial, these findings represent an important step towards improving the treatment of snakebite."

Inhaled form of blood thinner treats serious COVID infections


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A widely available and affordable drug has proven effective in treating seriously ill COVID-19 patients, according to an international study led by The Australian National University (ANU) in collaboration with King's College London. The team's results have been published in the journal *eClinicalMedicine* and were presented at the ERS Congress 2025.

Heparin has traditionally been injected and used to treat blood clots, but the new study tested it in an inhaled form, targeting the lungs directly. As noted by study co-leader Professor Clive Page, from King's College in London, "Inhaled heparin is antiviral, anti-inflammatory and anticoagulant — there's no other drug that has that unique combination."

As explained by study co-leader Professor Frank van Haren, from ANU, the study analysed data from almost 500 patients hospitalised with COVID-19 across six countries in the early stages of the pandemic. Patients who inhaled heparin were half as likely to require ventilation and had a significantly lower risk of dying compared with those receiving standard care.

"It follows our initial results which found breathing and oxygen levels improved in COVID-19 patients after they inhaled a course of heparin," Van Haren added.

Heparin is a pathogen-agnostic drug, meaning it could help treat patients with a whole range of respiratory infections, regardless of which viruses or bacteria are causing them. The drug would also be helpful for those with a compromised immune system, such as cancer patients, who develop a respiratory infection.

"It doesn't matter what kind of respiratory infection the patient is dealing with — when inhaled, the drug will stop it from infecting the patient and damaging the lungs," Van Haren said.

"We're aiming to conduct another trial in Europe to confirm its effectiveness in fighting other common respiratory infections such as influenza and RSV.

"And because it's inexpensive, it's much more accessible for those from low-income countries."

While the findings highlight the potential of inhaled heparin, further development is required before the treatment can be routinely adopted. The team is now working on an improved formulation of heparin specifically designed to be given by inhalation.

"We know it's only a matter of time until the next pandemic, and there are still COVID-19 patients who get very sick," Page noted. "This is a great weapon to have up our sleeve."


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Melanoma-causing mutation can lie dormant in healthy skin

Researchers from The University of Queensland (UQ) and The University of Utah have found that a genetic mutation that causes melanoma can lie dormant in healthy skin. It is believed that their discovery, which has been published in the *British Journal of Dermatology*, could improve screening of areas more prone to the disease.

The mutation in the *BRAF* gene was thought to only exist in moles and melanomas, with UQ Frazer Institute PhD candidate Katie Lee saying it was assumed this mutation would almost always cause a mole or melanoma to form. This is because about 50% of melanomas and up to 100% of moles commonly have a mutation in *BRAF* gene melanocytes — skin cells responsible for pigment production.

Researchers from Queensland's Dermatology Research Centre team recently examined the mutation in 97 skin samples — most taken from the participants' backs and shoulders — from a high-risk Australian cohort that appeared normal to both the naked eye and under a microscope. According to Frazer Institute Associate Professor Mitchell Stark, the mutant cells appeared to be dormant, but would likely form a tumour under certain circumstances.

"We have found many examples of the *BRAF* mutation in normal skin, including skin next to a mole and a melanoma as well as in sun-exposed and sun-protected skin," Lee said.

"Our research challenges conventional wisdom that *BRAF* is not generally found in normal skin and that it nearly always causes a melanoma or a mole to form."

Stark noted that just because a person has this mutation, it doesn't mean they'll develop skin cancer, as other external factors are needed for the cells to become malignant. That said, the findings could improve patient screening and melanoma prevention by helping researchers map areas of skin with the mutation and categorising individuals by risk level.

"We noticed our study participants often had all their melanomas and other suspicious lesions removed from the same region of the back," he said.

"If we can use our findings to show certain areas have more mutations, then we could focus treatment on those spots rather than the whole body."

Heart implant brings hope to refractory angina patients

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A team at Macquarie University Hospital has performed what they say is the first Australian procedure to implant a coronary sinus reducer (CSR) in the heart of a patient with severe angina for whom no other treatment options remained.

Angina — chest pain caused by reduced blood supply to the heart muscle — is one of the most common symptoms of coronary heart disease. For most people, a combination of medication and minimally invasive procedures such as angioplasty and placing stents in narrowed coronary arteries or coronary artery bypass surgery is able to restore blood flow to the heart and relieve symptoms.

However, a significant group of patients continue to experience disabling chest pain for which medications no longer provide relief (so-called 'refractory angina'), despite having undergone all stent procedure options or bypass surgery. Many patients with refractory angina experience pain during even light physical activity, make frequent visits to emergency departments, and face ongoing anxiety, disruption and severely reduced quality of life.

"These patients can feel like their lives are 'on hold' — painful, unpredictable and very restricted with no viable treatments — so the CSR represents a potential new pathway to relief," said interventional cardiologist Professor Martin Ng, who led the Macquarie team.

The Shockwave Reducer — manufactured by Shockwave Medical, a part of Johnson & Johnson MedTech — is a small, hourglass-shaped, stainless steel mesh device that is placed in the main vein collecting blood from the heart (the coronary sinus) via a catheter inserted in the groin or the neck. By narrowing and thus increasing the pressure in the coronary sinus vein, the CSR is understood to redistribute blood flow within the wall of the heart, improving oxygen supply in the parts of the heart muscle where it is needed most.

According to Ng, scientific evidence supporting use of the CSR has grown rapidly in recent years and the device has been tested in several high-quality randomised clinical studies. Key studies have shown that CSR significantly reduces the frequency and severity of angina, reduces hospital presentations for chest pain, enhances patients' exercise capacity and improves quality-of-life scores. Importantly, implantation of the CSR device has been shown to be relatively safe, with a very low rate of complications in this high-risk group of patients.

"The procedure to implant the CSR is minimally invasive — it doesn't require any open-heart surgery — and it usually takes less than half an hour, so most patients go home on the same day or the next day," Ng said.

The patient treated by Ng's team, 77-year-old Donald Stichter, has extensive coronary artery disease and had continued to suffer disabling chest pain and shortness of breath after exhausting all standard medical and surgical treatment options. According to Ng, the CSR represents a potential breakthrough treatment for patients like Mr Stichter who've been told nothing more can be done, offering a genuine opportunity for renewed mobility and quality of life.

Interventional cardiologist Professor Martin Ng with patient Donald Stichter.

Ng added that the CSR is backed by good clinical evidence, recognised in international guidelines, and increasingly used in major cardiac centres around the world. It is however not yet approved by the Therapeutic Goods Administration (TGA), so its current use in Australia is on a case-by-case compassionate basis.

"We look forward to being able to offer it to more Australian patients living with refractory angina," Ng said.

How librarians can help maintain image integrity

Academic librarians play a key part in preserving research integrity in an institution — they support researchers by facilitating access to information, sharing knowledge about the intricacies of research integrity, and equipping and guiding them on ethical conduct and best practice. Here Dr Dror Kolodkin Gal* outlines how librarians can use their knowledge and access to tools to champion research and image integrity to encourage best practice across an institution.

An academic librarian will regularly collaborate with research integrity officers (RIOs) to uphold the credibility of papers shared by the institution's researchers and ensure ethical guidelines are followed. Librarians achieve this by proactively sharing best practice on research integrity, which requires them to stay up to date with the latest technologies, guidelines and publishing procedures.[1]

As the volume of research published continues to grow, more advanced technologies become available and the risk of misinformation increases from emerging paper mills[2], librarians face a growing responsibility to advocate for all areas of research integrity.

Image integrity

Holden Thorp, Editor-in-Chief of *Science*, notes that in recent years "the research community has become increasingly concerned with issues involving the manipulation of images in scientific papers".[3] To combat this, librarians must consider the importance of image integrity, integrating relevant resources into the comprehensive support they provide to researchers.

Researchers often include images and figures to convey their findings, all of which must be accurate to support the written paper and ensure the reproducibility of results. However, researchers will review hundreds of similar images, which can result in hundreds of thousands of comparisons between subimages, so it can be difficult to check these images effectively by eye. While difficult, upholding image integrity is an issue prevalent in publishing — approximately a third of manuscripts in the life sciences sector are flagged for an image issue.[4]

By sharing best practice and providing useful resources, just as they do in other areas of research, librarians can support researchers in proactively improving image integrity and avoiding issues prior to publication.

Championing change

Their central position in an academic institution and regular collaboration with faculty, students and researchers means that librarians are extremely well suited to championing image integrity across an institution. Expertise in navigating scholarly resources, understanding of research methodologies and knowledge of publication standards enables them to effectively advise researchers.

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The method of delivery of best practice and tools will depend on the academic institution and its needs. One survey from the Australian Academy of Science and Springer Nature, for example, found that half of the researchers surveyed said that research integrity training should be mandatory, with 73% adding that it should be mandatory for those holding a research position.[5] By offering workshops, seminars or individual support, librarians could provide this training effectively, educating researchers on topics such as research methodologies, image capture and storage best practice and plagiarism prevention.

Onyebuchi Ekpolomo, Head of Library Services at the African University of Science and Technology, also emphasises the importance of librarians in advocating for integrating technology into research practices, stating: "Librarians are at the forefront of technological advancements, constantly exploring innovative tools that can benefit the scientific community."[6] Therefore, they are well positioned to find and understand the benefits of technologies for different areas of research integrity, urging researchers to familiarise themselves with useful tools.

When considering image integrity, automated tools such as Proofig AI[7] enable researchers to quickly analyse a large number of images using AI, comparing each image to itself and other images in the paper to flag any potential issues for the researcher to review. The RIO and other officers involved in research integrity can also use technology to review papers intended for publication before they are shared on a wider scale. Integrating AI tools into the institution's pre-submission processes not only helps researchers submit credible findings of the utmost integrity, it also gives librarians, RIOs and other stakeholders tools to protect the integrity and reputation of the institution.

Implementing small, actionable changes to research integrity practices across the institution is crucial to upholding trustworthiness and preventing reputational damage. Michael MacLeod, academic lead for research improvement and integrity at The University of Edinburgh, summed it up by saying: "If the quality of every scientist's work could be made just a little better, then the aggregate impact on research integrity would be enormous."[8]

Librarians have a difficult job in effectively supporting researchers with image integrity, but with proactive measures they can improve best practice and reduce the likelihood of including image integrity issues caused by honest mistakes.[9] By sharing best practice on image integrity and championing AI solutions for the identification of issues prior to publication, librarians can play a significant role in aiding researchers to follow good ethical standards and integrity, positively influencing the reputation of their institution.

1. https://www.linkedin.com/pulse/vital-role-librarians-supporting-promoting-scientific-ekpolomo-liojf/
2. https://www.nature.com/articles/d41586-021-00733-5
3. https://www.science.org/doi/10.1126/science.adn7530
4. https://ukrio.org/ukrio-resources/expert-interviews/jana-christopher-image-integrity-analyst/
5. https://group.springernature.com/gp/group/media/press-releases/australian-researchers-want-research-integrity-training/23130342
6. https://www.linkedin.com/pulse/vital-role-librarians-supporting-promoting-scientific-ekpolomo-liojf/
7. https://www.proofig.com/
8. https://www.nature.com/articles/d41586-021-03493-4
9. https://ukrio.org/ukrio-resources/expert-interviews/jana-christopher-image-integrity-analyst/

**Dr Dror Kolodkin Gal is the founder of automated image integrity software provider Proofig AI — a company composed of experts on life science research, computer vision and AI. Its advanced automated software is designed to streamline review processes, leading to better scientific publications. Visit Proofig AI's website to find out how it can help librarians and researchers to achieve image integrity best practice.*

Lung organoids could help test new treatments

Scientists have developed a simple method for automated the manufacturing of lung organoids — that is, clusters of cells containing the same cell types as full-sized organs. Published in the journal *Frontiers in Bioengineering and Biotechnology*, the breakthrough could provide a more effective, ethical and personalised way of testing new lung disease treatments.

Finding better treatments for lung diseases would save millions of lives worldwide. But lungs are a complex structure, difficult to model in the lab so that treatments can be tested quickly and effectively. Lung organoids are a promising option for research, but they have typically required too much painstaking manual work for them to be used in preclinical medical testing. Now scientists have found a simple, automated way of producing lots of organoids at once, using a tank full of oxygen-infused growth medium which is continuously stirred.

"You take a starting cell, in our case the stem cell, and multiply it — the cells grow in a suitable plastic dish," said first author Professor Diana Klein, from the University of Duisburg-Essen.

"Once the cells have grown sufficiently, you then detach them from the plastic dish and 'animate' the cells to form small cellular aggregates. We do this by placing a certain number of cells in an anti-adhesive dish. The cells then float together and form embryoid bodies. These structures are then treated with various growth factors; substances that are typically found in the lungs or during lung development. In the presence of these substances, the cells transform into various cell types that are found in the lungs."

The scientists put their embryoid bodies into a special tank with a continuously stirring membrane, which contained a suitable medium for growing the organoids. They also manually cultured a control set of organoids on a conventional growth plate. The organoids spent four weeks in the tank, and were then analysed using microscopy, immunofluorescence, immunohistochemistry and RNA sequencing to see how the organoids had developed, what cells had formed, and how comparable they were to conventionally grown organoids.

Analysis confirmed that both sets of organoids had developed the lung-like structures representing airways and alveoli that scientists were looking for, and RNA sequencing showed that they had developed characteristic epithelial and mesodermal lung cells. Both sets developed the same types of cells, although in slightly different proportions — for instance, manually generated lung organoids contained more alveolar cells. The organoids developed in the bioreactor seemed to be larger, with fewer alveolar spheres.

The fact that the bioreactor can produce more organoids at a time, with less manual work, could be a gamechanger for lung disease research, enabling scientists to test early-stage experimental drugs without needing to use animal material. Patients could even have personalised organoids grown from their own tissue to try out potential treatments in advance.

"The best result for now — quite simply — is that it works," Klein said. "This means that, in principle, lung organoids can be produced using an automated process. These complex structures represent the in vivo situation better than conventional cell lines and thus serve as an excellent disease model.

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"In the next step, the organoids could also be used to test potential therapeutics using high-throughput methods. Which ones are effective and at what concentration? This could accelerate the development of specific medications for patients. Furthermore, the organoids could also be used to predict patient-specific reactions to radiotherapy or other potential treatments."

More testing will however be needed to establish the best conditions for organoid development, and the organoids themselves will need to be improved to mimic real-life conditions within the body better.

"Organoids can't yet fully recapitulate the lung cellular composition," Klein noted. "Some cells are still missing for the 'big picture', such as infiltrating immune cells and blood vessels. But the organoids themselves show very good bronchiolar and alveolar structures.

"We obviously don't have blood flow, meaning the conditions are rather static. But for a patient-oriented screening platform, this may not be necessary, if important insights into the cells' fate during a certain treatment can be obtained. These systems may not yet be as complex as an entire organism, but they are human-based — we have the cells that we also find in patients.

"There is still a lot of room for optimisation," Klein concluded. "We need robust and scalable protocols for large-scale organoid production. This requires careful consideration of the bioreactor design, the cell types to be used, and the conditions under which the organoids are cultivated. But we're working on it!"

All-in-one spatial biology workflow automation

Spatial biology and flow cytometry are time-tested hallmarks of cellular biomarker discovery, immune profiling and clinical practice — but the growing complexity of highly multiplexed experiments creates a challenge for researchers to design and prepare appropriate panels (or cocktails) and associated controls.

While precise panel design is essential for successful experiments, manual preparation involves increased systematic errors, inter-operator variability, and researcher hands-on time. Such drawbacks risk repeating experiments, wasting time and reagents.

Parhelia Biosciences is addressing the challenges of manual processing with dedicated automation solutions that address gaps in laboratory efficiency and standardise the sample preparation workflow for any spatial biology assay. The Parhelia Spatial Station solves the added complexity riddle with benchtop flexibility, high-quality staining, and verified and customisable assays.

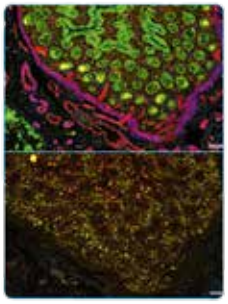
The system features a small footprint with state-of-the-art robotics, liquid handling, temperature control and quality safeguards. The user can bring their own chemistries and/or scale with single-use Skylab kits. There is also flexible throughput, with the ability to prepare one sample or up to 48 (12 with temperature control).

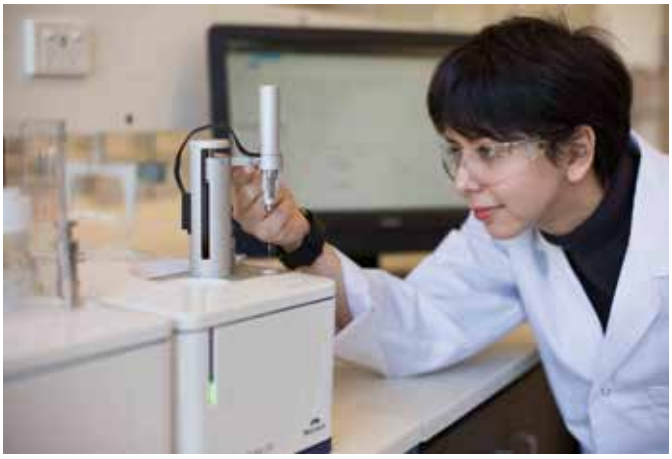
Patented capillary laminar flow technology gently and uniformly applies reagents. Flow cells can be assembled in seconds and protect precious samples. 100 μL chambers and zero dead volume yield significant reagent savings.

A growing list of plug-and-play assays has been developed with Parhelia's partners and collaborators. Protocols can be optimised quickly, with automated robotic efficiency. Users will also benefit from intuitive protocol builder software, hands-on training and a support team to guide them.

End-to-end automation of multiomics workflows removes labour-intensive and error-prone roadblocks from study design while enabling hands-free consistency and data quality.

Bio-Strategy - Part of DKSH Group
www.bio-strategy.com





Combined ITC and GCI for detecting weak interactions in drug discovery

Fragment-based drug discovery (FBDD) is a powerful approach in modern drug development. It identifies promising drug candidates by screening small molecular fragments with low molecular weights that bind weakly but specifically to biological targets. However, detecting and characterising these weak interactions presents a significant challenge. Grating-coupled interferometry (GCI) and isothermal titration calorimetry (ITC) have emerged as essential tools for overcoming these hurdles, enabling researchers to validate fragment binding and gain deep kinetic and thermodynamic insights.

The Malvern WAVEsystem uses GCI, an advanced optical technique that provides real-time, label-free detection of molecular interactions. Unlike surface plasmon resonance (SPR), GCI uses waveguide-based interference, enhancing sensitivity for low-affinity fragments that may be missed using other methods. GCI detects weak-binding fragments, measures association and dissociation rates with precision, and enables efficient screening with minimal sample consumption. By identifying fragments with desirable kinetic profiles, GCI acts as a first filter in the FBDD workflow.

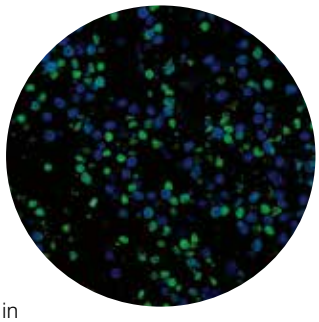
While the Malvern WAVEsystem (GCI) excels in kinetics, the Malvern PEAQ ITC provides a thermodynamic profile by measuring the heat released or absorbed during binding. It confirms hits detected by GCI and differentiates enthalpy- and entropy-driven interactions, offering insights into binding mechanisms. ITC also detects non-specific interactions and quantifies absolute binding constants, complementing GCI's kinetic data.

Individually, the Malvern WAVEsystem (GCI) and Malvern PEAQ ITC are powerful tools, but their combined use offers deep insights into fragment binding. While GCI identifies and ranks hits based on binding kinetics, ITC validates and characterises their thermodynamic properties. This combined data can guide structure-based optimisation, leading to high-affinity, drug-like molecules while reducing time to clinical candidates.

The complementary nature of these techniques means that no valuable fragment is overlooked and all critical binding characteristics are fully explored, making them useful tools for modern drug development.

ATA Scientific Pty Ltd
www.atascientific.com.au

Cellular assay kits



Cellular assay kits from CST help users monitor the senescence, viability or proliferation state of cells, enabling them to move research projects forward with ease and reduce risk in their pipeline. Rigorous in-house validation means that every CST cellular assay kit should meet the same high standards of performance and specificity as all the company's antibodies, giving users confidence in their results every time.

To monitor cellular states of activity, researchers need to measure key markers and readouts that correlate with their process of interest. Using different readouts and methods enables users to measure multiple key markers, thereby guarding against false positives and providing flexibility in selecting the marker, application and detection method that best suits their experiment.

CST assay kits offer the convenience of providing everything the user needs in a single kit. The company also offers proven protocols with each assay kit, backed by its leading techniaResearchers can streamline how they examine cell proliferation, apoptosis, cell viability, cytotoxicity, senescence and more, with CST assay kits like the Senescence β - Galactosidase Staining Kit #9860; TUNEL Assay Kit (Fluorescence, 488 nm) #25879; BrdU Cell Proliferation Assay Kit #6813; and Cyclic AMP XP Assay Kit #4339.

For research use only. Not for use in diagnostic procedures.

Cell Signaling Technology
www.cellsignal.com

Large-format biomolecular imager

From large-format phosphor screens to high-throughput imaging workflows, the Sapphire FL+ by Azure Biosystems offers a 46 x 25 cm scanning bed — a scan area spacious enough to accommodate even oversized samples. From western blots to 2D gels, microscope slides, model organism imaging, multi-well plates, tissue arrays and protein arrays, the product is designed to provide high flexibility and precise quantitation of molecular assays.

The Sapphire FL+ has been billed as one of only two scanners in its class that supports phosphor imaging — a highly sensitive assay that utilises radioactivity. It can scan storage phosphor screens up to 20 x 40 cm, delivering 24-bit dynamic range and high image quality through its use of laser excitation and photon multiplier tube (PMT) detection.

The Sapphire FL+ features a novel, patent-pending design of interchangeable and customisable laser and filter modules, enabling a virtually infinite number of spectral combinations. A broad range of excitation and emission wavelengths, as well as phosphor imaging, are supported.

The instrument offers laser options from UV to NIR wavelengths (375–900 nm), 5–1000 μm resolution scans and a Z-plane range from -1 to +6 mm. Whether imaging western blots, gels, 96-well plates or tissue slides, the adjustable Z-plane provides optimal focus for every sample.

An optional Chemiluminescence Module adds high-resolution, quantitative chemiluminescence and visible imaging. It allows users to capture proteins with femtogram sensitivity and provides the ability to capture colour marker images.

SciTech Pty Ltd
www.scitech.com.au

Gene therapy slows Huntington's disease progression

A global clinical trial of a new Huntington's disease treatment has posted positive results, with patients receiving the treatment found to experience 75% less progression of the disease overall. This is understood to be the first gene therapy to be tested in people with Huntington's, and the first time a drug trial has reported continuing, statistically significant slowing of Huntington's progression.

Huntington's disease is a fatal neurodegenerative disease caused by a single mutation in the *HTT* gene, leading to the production of an abnormally misfolded and aggregated protein called huntingtin. People with an affected parent have a 50% chance of inheriting the mutation, meaning they will develop disease symptoms — typically in mid-adulthood — affecting their movement, thinking and behaviour. The problem gene was discovered in 1993, but current therapies can only manage symptoms like movement difficulties and mood changes — they do not alter disease progression.

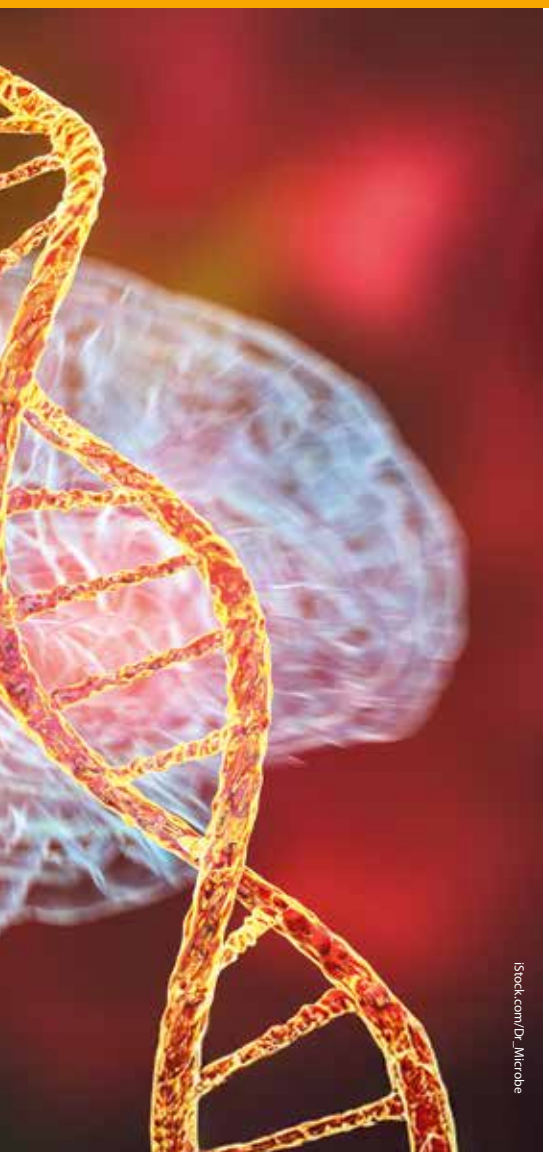
The new treatment, known as AMT-130 and developed by gene therapy company uniQure, consists of a vector and a gene encoding a microRNA (miRNA). The vector is based on a harmless, empty virus that has been changed to carry and deliver a gene encoding a miRNA that will recognise, bind and lower the human huntingtin protein. It is expected that a single dose of AMT-130 — which is delivered into the brain using a highly complex neurosurgical technique called stereotactic surgery — would last for a person's whole life.

uniQure has now announced that 29 patients have completed up to 36 months of a phase I/II clinical trial, 12 of whom were given a high dose and have a full 36 months of data. The participants' progression is being compared to an external cohort of people with Huntington's disease, who are part of a long-running natural history study called Enroll-HD, to predict the extent of disease progression that would have been expected if the patients were only receiving standard care.

The study team reported that people who were given a high dosage of AMT-130 experienced 75% less disease progression after 36 months as measured by the composite Unified Huntington's Disease Rating Scale, which incorporates motor, cognitive and functional measures, compared to a matched cohort of Enroll-HD participants. There was also a statistically significant benefit as measured by another key scale of disease progression, Total Functional Capacity, and in three other measures of motor and cognitive function.

The researchers were also measuring participants' levels of neurofilament light protein (NfL), a protein that is released into the spinal fluid when neurons are injured, as it is a useful marker of neuronal damage and is elevated in people with Huntington's disease. They found that NfL levels in the spinal fluid were lower in people treated with the drug than they had been at the start of the trial, even though NfL levels would be expected to increase by 20–30% over three years. This suggests the course of the disease has been modified and neuronal damage slowed.

"These groundbreaking data are the most convincing evidence in the field to date and



People who were given a high dosage of AMT-130 experienced 75% less disease progression after 36 months as measured by the composite Unified Huntington's Disease Rating Scale.

underscore the disease-modifying effect in Huntington's disease, where an urgent need persists," said Professor Sarah Tabrizi, lead scientific advisor on the trial, from University College London (UCL). "For patients, AMT-130 has the potential to preserve daily function, keep them in work longer, and meaningfully slow disease progression."

Professor Ed Wild, principal investigator of the UCL Huntington's Disease Centre trial site, added, "This result changes everything. On the basis of these results it seems likely AMT-130 will be the first licensed treatment to slow Huntington's disease, which is truly world-changing stuff. If that happens, we need to work hard to make it available to everyone who needs it, while working no less diligently to add more effective treatments to the list.

"My patients in the trial are stable over time in a way I'm not used to seeing in Huntington's disease — and one of them is my only medically retired Huntington's disease patient who has been able to go back to work."

Dr Walid Abi-Saab, Chief Medical Officer at uniQure, concluded, "These findings reinforce our conviction that AMT-130 has the potential to fundamentally transform the treatment landscape for Huntington's disease, while also providing important evidence supporting one-time, precision-delivered gene therapies for the treatment of neurological disorders.

"We are eager to discuss the data with the FDA at our pre-Biologics License Application meeting ... with the goal of submitting a BLA in the first quarter of 2026."

Automated cell counter

Accurate cell counting is critical in research, yet laboratories routinely face several challenges that can compromise results. Manual counting with haemocytometers is slow and subjective, often introducing variability between users and experiments. Complex or heterogeneous samples, such as high-density cultures, clumped cells, debris or mixed populations, make reliable counting difficult and time-consuming. Labs that need to process multiple samples or high-throughput assays often struggle to maintain efficiency without sacrificing accuracy.

The LUNA-FX7 Automated Cell Counter from Logos Biosystems is designed to address all of these issues. Its high-resolution imaging and advanced algorithms can deliver precise and reproducible counts, effectively eliminating the inconsistencies associated with manual methods. The system's brightfield and fluorescence channels allow for discrimination between live and dead cells, even in challenging or heterogeneous samples.

In addition, the LUNA-FX7 can simultaneously analyse multiple samples with its 1-, 3- and 8-chamber slide options, reducing hands-on time and increasing throughput. Automated focus, exposure and quality-control features enable consistent results across all samples. The intuitive touchscreen interface and software-assisted data management make the system easy to operate while supporting standardised workflows, including regulated laboratory environments.

By streamlining cell counting and removing common sources of error, the LUNA-FX7 empowers researchers to save time, work more efficiently and generate reproducible data. ATA Scientific offers demonstrations and expert support to help laboratories integrate the LUNA-FX7 into their workflows.

ATA Scientific Pty Ltd
www.atascientific.com.au

Multifunctional imaging instrument

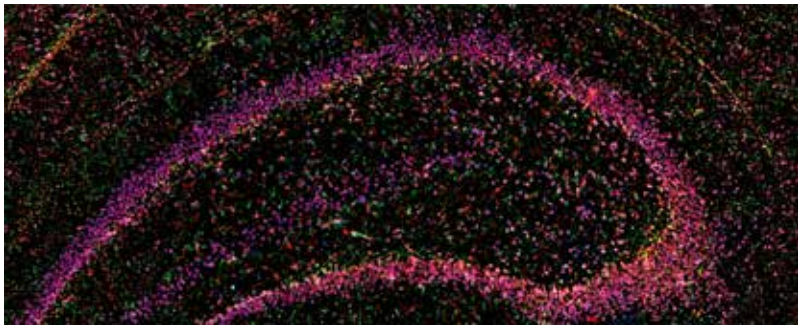
Servicebio's SCG-W6000 triple imaging system, available from Pacific Laboratory Products, is a device that uses chemiluminescence technology for imaging and also combines fluorescence and regular UV for general gel viewing. It supports independent detection of multiple fluorescence channels, including a white light channel that corresponds to bright-field images, a green fluorescence channel with a 470 nm excitation light source, a red fluorescence channel with a 530 nm excitation light source and a near-infrared (NIR) channel with a 640 nm excitation light source.

Enabling fluorescence, protein and DNA imaging, the multifunctional instrument is equipped with a high-sensitivity cooled camera with a resolution of 20 million pixels (pixel size of 2.4 x 2.4 μm). It enables fast and high-throughput detection and imaging of samples without the need for additional light sources.

The chemiluminescence imaging system has a clever AI algorithm, capable of quickly calculating the optimal exposure time. It features a deep-cooling, high-sensitivity camera capable of detecting weak signals, reducing image noise.

The unit includes standard analysis software, capable of automatically identifying and analysing lanes. A large 10.4″ touchscreen computer, also compatible with external computers, features one-button control switch and simple and intuitive operation. With resolution of 5440 x 3648 and cooling to –40°C, the unit has extensive applications in life sciences, pharmaceuticals, environmental protection and more.

Pacific Laboratory Products
www.pacificlab.com.au



Tyramide signal amplification (TSA) reagents

Proteintech's CoraLite Plus-Tyramide dyes are fluorescent labelling reagents based on TSA technology. Upon interaction with HRP, the tyramides are oxidised into free radicals, which then allows the dyes to form covalent bonds with nearby tyrosine residues on the antigen of interest.

Compared to indirect staining methods, TSA dyes can enhance the fluorescent signal by several hundred-fold due to dye accumulation and direct labelling of the target. This makes them particularly useful for the detection of low-abundance targets.

Furthermore, this system is suitable for tissue multiplexing as multiple TSA dyes can be sequentially added through cyclical antibody stripping and re-probing.

Other benefits include up to 100x more sensitivity than indirect staining methods, achieving publication-quality data at the first attempt. A wide dynamic range enables the detection of low-abundance targets and easy multiplexing with no limitations on the primary antibody host.

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

Dual-wavelength UV absorption analyser

optek's AF46 is a dual-wavelength UV analyser suited to monitoring protein concentrations (eg, monoclonal antibodies) in downstream biotechnology applications such as chromatography or filtration. Using two different wavelengths means the sensor is capable of detecting very low protein concentrations for accurate pooling and at the same time is able to monitor the whole elution peak with very high optical density (OD) using a second wavelength.

The high-precision, UV light absorption analyser is designed for inline operation to provide concentration measurements with good repeatability, linearity and resolution. Wavelength and optical path length can be individually configured to specific requirements.

Besides protein measurements, the sensor is often used to monitor nucleic acid contaminations of protein solutions. Due to the modularity, different optical path lengths (OPL) and wavelengths can be combined to measure any product absorbing in the UV range.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

Virtual pathology streamlines rapid onsite evaluation

As aging populations bring higher rates of chronic and complex diseases, the volume of patients requiring fast, accurate diagnosis is placing pathology laboratories under pressure to do more with fewer resources. Technology from Grundium, a specialist in digital imaging for pathology, has now been shown to match the diagnostic accuracy of traditional methods while decreasing turnaround times and improving patient care at Washington University in St. Louis (WashU).

Using compact scanners from Grundium, the university's pathology team transformed how rapid onsite evaluations (ROSE) and frozen sections are performed across six different locations. The initiative addresses several critical challenges in pathology today: rising cancer incidence, limited availability of qualified pathologists and cytologists, and workflows that are often too slow or fragmented to meet patient needs.

ROSE plays a vital role in ensuring that biopsy samples are adequate for diagnosis and downstream testing. However, conventional ROSE requires pathologists to travel between procedure laboratories and hospitals, spending significant time in transit, as well as downtime waiting while samples are prepared on site. For example, a facility the size of WashU includes 20 different sites across a campus covering more than one square mile.

"Traditional ROSE methods demanded a lot of waiting and travel for pathologists," said Hannah Krigman, Professor, Pathology & Immunology at Washington University School of Medicine. "In a campus the size of WashU's, I'd often spend up to a whole hour per day just walking to and from onsite evaluations. And now we have added sites up to 25 miles away in different states.

"With digital telepathology, we provide immediate input without leaving our offices. This translates into faster diagnoses, greater efficiency, and a better experience for patients who may otherwise face repeat procedures, which delay final diagnosis."

WashU's pathology department implemented Grundium's Ocus scanners to perform ROSE and frozen section reviews digitally. Slides were prepared at remote sites and scanned in real time, allowing pathologists to guide procedures, confirm adequacy, and render preliminary diagnoses while covering multiple geographically distant locations. This approach replaced hours of daily travel and waiting time with active case review, translating into the equivalent of an additional workday of diagnostic productivity each week. Furthermore, such an approach enables WashU to provide sub-speciality expertise for remote sites and smaller institutions.

"WashU's work with digital ROSE and frozen sections shows how new technology directly addresses the resource challenges impacting hospitals and pathology labs worldwide," said Todd Vanden Branden, Senior Director, Marketing and Field Applications at Grundium. "When leading institutions demonstrate that digital workflows match traditional accuracy while dramatically improving efficiency and patient experience, it signals a turning point for the entire field. The future of diagnostics will not depend on where the pathologist is located, but on how quickly expertise can be connected to the point of care."

The impact extends beyond workflow efficiency. Repeat biopsies cost thousands of dollars, delay treatment, and increase patient anxiety and inconvenience. Digital ROSE and frozen sections at WashU have reduced these risks by enabling pathologists to confirm adequacy in real time and advise clinicians on collecting additional biopsy material if needed. In many cases, preliminary diagnoses are made while the patient is still sedated, accelerating access to the appropriate treatment.

"In addition to the increasing volume of cases, pathologists are also challenged by the growing complexity of what's expected from a pathology service," said Suzanne Crumley, Associate Professor of Pathology & Immunology at Washington University School of Medicine. "With digital ROSE, we can confirm specimen adequacy in real time, guide clinicians on whether additional tissue is needed, and ensure the material collected supports advanced testing like molecular analysis. That means fewer repeat biopsies, faster access to targeted therapies, and more confidence that patients are getting the right care from the outset. For us, the ability to bring subspecialty-level expertise into every case has been particularly important."

Grundium's compact Ocus whole slide scanners automate the process of digitising microscope slides. The scanners produce high-resolution digital images of tissue and cell samples, which can then be accessed and shared online via a secure web browser. This eliminates the need for physical slide transport, reduces manual work, and enables remote collaboration among experts, streamlining the digital pathology workflow.

Another distinct advantage of the scanners is the 'live view' capability, which allows the pathologist to view and control a slide more rapidly than traditional scanning. These features enable WashU to provide the same expertise for frozen sections as they do for telecytology.

The Ocus scanners are already in use across leading medical institutions in North America and Europe, with planned expansions into markets where physician shortages pose even greater challenges to healthcare access.

Grundium
www.grundium.com

World's oldest known RNA extracted from woolly mammoth

In a significant milestone, researchers have succeeded in isolating and sequencing RNA molecules from woolly mammoths dating back to the Ice Age. These RNA sequences are understood to be the oldest ever recovered, coming from mammoth tissue preserved in the Siberian permafrost for nearly 40,000 years.

University of Copenhagen.

The team's study, published in the journal *Cell*, shows that not only DNA and proteins, but also RNA, can be preserved for very long periods of time, and provide new insights into the biology of species that have long since become extinct. The work was carried out at both Stockholm University and the University of Copenhagen, and is a collaboration between SciLifeLab and the Centre for Palaeogenetics — a joint initiative between Stockholm University and the Swedish Museum of Natural History.

"With RNA, we can obtain direct evidence of which genes are 'turned on', offering a glimpse into the final moments of life of a mammoth that walked the Earth during the last Ice Age," said lead author Emilio Mármol, formerly a postdoctoral researcher at Stockholm University and now based at Copenhagen's Globe Institute.

"This is information that cannot be obtained from DNA alone."

Sequencing prehistoric genes and studying how they are activated is important to understand the biology and evolution of extinct species. For years, scientists have been decoding mammoth DNA to piece together their genomes and evolutionary history. But RNA — the molecule that reveals which genes are active — has until now remained out of reach, as the long-held belief that RNA is too fragile to even survive a few hours after death has likely discouraged researchers from exploring these information-rich molecules in mammoths and other long-extinct species.

"We have previously pushed the limits of DNA recovery past a million years; now, we wanted to explore whether we could expand RNA sequencing further back in time than done in previous studies," said Love Dalén, Professor of

One of Yuka's legs, illustrating the exceptional preservation of the lower part of the leg after the skin had been removed, which enabled recovery of ancient RNA molecules.

Evolutionary Genomics at Stockholm University and the Centre for Palaeogenetics.

"We gained access to exceptionally well-preserved mammoth tissues unearthed from the Siberian permafrost, which we hoped would still contain RNA molecules frozen in time," Mármol added.

The researchers were able to identify tissue-specific patterns of gene expression in frozen muscle remains from Yuka, a juvenile mammoth that died almost 40,000 years ago. Among the more than 20,000 protein-coding genes in the mammoth's genome, far from all of them were active. The detected RNA molecules code for proteins with key functions in muscle contraction and metabolic regulation under stress.

"We found signs of cell stress, which is perhaps not surprising since previous research suggested that Yuka was attacked by cave lions shortly before his death," Mármol said. The researchers also found a myriad of RNA molecules that regulate the activity of genes in the mammoth muscle samples.

"RNAs that do not encode for proteins, such as microRNAs, were among the most exciting findings we got," said Marc Friedländer, Associate Professor at the Department of Molecular Biosciences, The Wenner-Gren Institute at Stockholm University and SciLifeLab.

"The muscle-specific microRNAs we found in mammoth tissues are direct evidence of gene regulation happening in real time in ancient times. It is the first time something like this has been achieved."

The microRNAs that were identified also helped the researchers confirm that the findings really came from mammoths.

"We found rare mutations in certain microRNAs that provided a smoking-gun demonstration of their mammoth origin," noted Bastian Fromm, Associate Professor at The Arctic University Museum of Norway. "We even detected novel genes solely based on RNA evidence, something never before attempted in such ancient remains."

According to Dalen, the results demonstrate that RNA molecules can survive much longer than previously thought.

"This means that we will not only be able to study which genes are 'turned on' in different extinct animals, but it will also be possible to sequence RNA viruses, such as influenza and coronaviruses, preserved in Ice Age remains," he said. In the future, the researchers hope to conduct studies that combine prehistoric RNA with DNA, proteins and other preserved biomolecules.

"Such studies could fundamentally reshape our understanding of extinct megafauna as well as other species, revealing the many hidden layers of biology that have remained frozen in time until now," Mármol concluded.

Turbidity sensor

The Triton TR82, from Electro-Chemical Devices (ECD), is a nephelometric turbidity sensor designed for use in water and wastewater. It uses an optical method for determining turbidity, in which a light beam is directed into the sample where it is scattered by suspended particles in the water. The amount of scattering depends on the amount of material in the water, the wavelength of light, and the size and composition of the suspended particles.

The product uses a near infrared LED light source and the 90° scattered light method in accordance with ISO 7027/EN 27027 to assure accurate turbidity values under standardised and comparable conditions. Its response depends on the size, shape and composition of the suspended particles. For this reason, mg/L, ppm and % solids measurements must be calibrated with suspended solids from the waters to be monitored. Turbidity measurements (NTU, FNU) can be calibrated with calibration standards such as Formazin, StablCal or SDVB beads.

The sensor is designed to work with the T80 transmitter. The T80 is a single- or dual-channel transmitter with one or two 4–20 mA outputs with Modbus RTU and three optional alarm relays or HART 7 communication.

Designed for use in environmental water, the turbidity sensor is suitable for most aqueous applications. It is not suitable for use in organic solvents or in solutions with an extreme pH value; only between 2 and 12 pH. The temperature range for the sensor is 0 to 50°C.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

Centrifuges

The OHAUS Frontier series consists of Multi Pro, Multi, Micro and Mini centrifuges to support all sample separation needs. The series covers a range of sizes and features to suit basic and advanced centrifugation applications, with the OHAUS Frontier 5000 Rotor Guide designed to help users choose the right model and rotor package for all basic and advanced centrifugation applications.

The centrifuges are designed for safe use and ease of operation, with a range of smart features. They are made of high-quality components, including chemical-resistant stainless steel, for durability in the lab. They also offer automatic rotor recognition; a rotor imbalance sensor; a splash-proof front panel; slip-free rubber feet for stability; and a maintenance-free induction motor.

Safety switches immediately stop the rotors should the lid open during use, while convenient controls and an intuitive interface allow for responsive operation while wearing gloves. Biocontainment rotors are available to enable work with hazardous samples.

Capella Science
www.capellascience.com.au

Pressure regulator for oxygen control

Protect-Air's OxyReg delivers safe oxygen regulation in medical, food and drinking water applications. Designed for environments where health and hygiene standards are critical, it is designed to provide consistent performance while eliminating the risks associated with traditional brass regulators, helping industries operate safely, efficiently and lead-free.

Built from Grivory GV-5 FWA (a high-performance, FDA-certified synthetic material) and high-grade stainless steel, the product provides a durable, lead-free solution that complies with DIN 50930-6/FDA/EU drinking water directives. Its factory-preset, tamper-proof design maintains constant outlet pressure regardless of inlet fluctuations, providing maintenance-free operation and protecting connected equipment from overpressure.

Compact and lightweight, the device is easy to use and install across a wide range of applications, including anaesthetic and respiratory systems, food preservation and nitrogen filling. Available in pressure settings from 1 to 8 bar, it is designed to provide good performance wherever precise oxygen or gas control is required.

Compressed Air Australia Pty Ltd
www.caasafety.com.au

WELL-certified V-Bank air filter

Camfil Australia has confirmed that its compact V-Bank air filter, Opakfil ES, has successfully maintained its Works with WELL designation. This program, developed by the International WELL Building Institute (IWBI), recognises products that align with WELL strategies based on IWBI licensing criteria. By achieving the Works with WELL trademarks, companies can demonstrate their commitment to advancing products and solutions that support human health and wellbeing.

Opakfil ES continues to meet stringent performance criteria, including: high energy efficiency, as it's designed to minimise energy consumption, contributing to sustainable building operations; low pressure drop, enabling efficient airflow and reducing strain on HVAC systems; and high dust-holding capacity, extending filter life and reducing maintenance needs. Compliant with ISO 16890, it is available in ePM1 and ePM10 efficiencies, for effective particulate filtration.

These features make the air filter suitable for applications where air quality and energy efficiency are important.

Camfil is now working to further expand its range of WELL-certified solutions.

Camfil Australia Pty Ltd
www.camfil.com.au

iStock.com/PeopleImages

AI-driven manufacturing:

lessons from the life sciences industry

Smriti Khera, Head of Global Life Sciences Strategy and Marketing, Rockwell Automation

The use of artificial intelligence for batch monitoring and digital twin development is redefining process control — enabling real-time deviation detection, predictive adjustments, and simulation-based optimisation to safeguard quality and reduce production risk.

It's no secret that cell and gene therapy (CGT) manufacturing is an expensive process — a single cell therapy batch can cost upwards of $500,000 to produce. When a batch fails due to minor process variations, both manufacturers and patients pay the price in dollars and treatment delays.

The cell and gene therapy market is experiencing tremendous growth. With more than 2000 ongoing clinical trials globally and dozens of therapies now moving from clinical to commercial scale, manufacturers are feeling the heat to build processes that can scale up while keeping quality high and costs in check. And with the FDA giving the green light to multiple cell and gene therapies, companies are scrambling to turn these scientific breakthroughs into realities.

That's why the manufacturing processes behind CGT manufacturing demand innovative monitoring solutions. Even minor variations can have outsized consequences in CGT manufacturing. Unlike conventional drugs, these therapies use living cells that respond dramatically to subtle >

environmental shifts. Minor temperature fluctuations of just 1–2°C can trigger cellular stress responses. Slight changes in media composition can also affect growth rates. Inconsistent centrifugation between batches can impact cell viability. These deviations compound throughout the process, compromising therapy potency and safety.

Traditional quality control methods, such as testing after production, usually come too late, with the damage to the batch already done. However, AI and predictive analytics are reforming CGT manufacturing by catching problems before they ruin a batch.

Detecting deviations before they occur

AI-powered batch monitoring systems function as tireless quality inspectors, simultaneously analysing thousands of process parameters to catch subtle patterns that human operators could miss. These systems harness several AI technologies:

- Computer vision examines bioreactor imagery to assess cell characteristics.
- Machine learning processes sensor data tracking pH, oxygen, glucose and metabolites.
- Natural language processing scrutinises batch records to find connections between procedural variations and outcomes.

AI's true power lies in detecting deviations before they affect product quality. For example, when monitoring cell cultures, AI can identify early metabolite concentration shifts that signal potential future problems, allowing operators to make real-time adjustments to temperature, pH and nutrients.

With the help of AI-powered batch monitoring systems, manufacturers get fewer batch failures, more consistent quality and less waste. These systems go beyond providing basic alarms; they can be trained to understand how various factors impact each, enabling them to distinguish between normal variations and real anomalies that need intervention.

A staged implementation approach

Successfully implementing AI and digital twins in CGT typically requires a staged approach, starting with high-ROI use cases. Everything begins with data quality — ensuring sensors and collection systems deliver accurate measurements. This often requires equipment upgrades and calibration protocols.

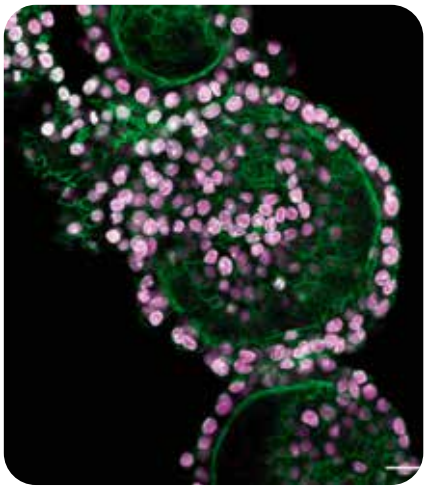
Cross-functional teams comprising engineers, quality specialists and data scientists are crucial for creating actionable insights. Shrewd organisations start with historical batch analysis before attempting real-time monitoring, building confidence as they go.

This approach helps teams get comfortable with the technology while delivering immediate value, setting the stage for more advanced applications.

From batch failures to patient breakthroughs

As cell and gene therapies break into mainstream medicine, making manufacturing more efficient becomes key to getting these treatments to more patients at prices they can afford. AI and predictive analytics align with the FDA's Quality by Design approach, which involves building quality into the process from the outset instead of simply testing at the end. With AI providing unprecedented insight into manufacturing, companies can show regulators exactly how they maintain control.

As systems get smarter, we're seeing manufacturing that learns and improves on its own. These intelligent systems don't just maintain quality — they improve it, bringing science closer to advanced therapies that work dependably in both production and patients.



Coagulation analyser

Sunbio's UG500, available from Haematex, is a mechanical + optical coagulation analyser for all types of blood clotting and chromogenic tests. It is a convenient and versatile instrument for labs engaged in haemostasis research.

The product's magnetic reciprocating ball mechanism is used for detecting clotting endpoint in four channels. It also has two channels for chromogenic tests (405 and 660 nm), such as those for heparin and the newer direct oral anticoagulants (DOACs).

Operation of the analyser is directed from a touch-sensitive LCD screen, and it can also be connected to a laboratory information system (LIS) via RS232 interface or network port. It is small in size (43 x 28 x 13 cm) and lightweight (5 kg). Haematex can also provide cuvettes, consumables and reagent test kits.

Haematex Research Pty Ltd
www.haematex.com

Allergen-specific IgE test

Siemens Healthineers has expanded its 3gAllergy assay menu with nine additional component allergens, including six targeting peanuts. Also now available are components derived from house dust mites and wheat. Component-level insights empower clinicians to distinguish between high-risk sensitisations and more benign exposures, ultimately helping to guide more personalised and informed patient care. These additions bring the total allergen count to over 500 available on the company's IMMULITE 2000 XPi Immunoassay System.

While standard allergy tests confirm the presence of an allergy, component-level insights support physicians in developing more personalised allergy management strategies. This approach helps improve quality of life by minimising potentially unnecessary restrictions. For example, instead of avoiding peanuts entirely, individuals living with allergies can make more precise choices relative to their specific risks of an adverse outcome.

The 3gAllergy assay is an allergen-specific IgE test that aids physicians in identifying, monitoring and managing patients with allergic diseases. The nine latest component allergens added to the 3gAllergy menu are CE marked and now widely available.

Siemens Healthcare Pty Ltd
www.healthcare.siemens.com

Charged aerosol detector

Waters Corporation's Charged Aerosol Detector (CAD) has been specifically designed for use with Waters Empower Software, the company's chromatography data system (CDS). It enables scientists to fully characterise the physical and chemical properties of molecules within a secure and compliant workflow.

According to Waters, customers want a better experience controlling charged aerosol detection as part of their chromatographic analysis, with 70% noting recurring dropped CDS communications when using multi-vendor LC-CAD configurations. The CAD resolves these issues with a robust, easy-to-adopt, single-vendor solution for LC-CAD methods, underpinned by Empower Software.

The aerosol detector delivers sensitive, consistent and reproducible measurement of analytes with little or no UV absorption — including sugars, lipids, impurities and excipients — often without the need for sample pre-treatment. This makes it suitable for characterising a broad range of materials, from small molecule and biopharmaceutical formulations to food additives, nutrients and environmental pollutants.

The product delivers competitive dynamic range and sensitivity, alongside optimised compatibility with MaxPeak High-Performance Surfaces that mitigate non-specific adsorption. The detector can be used with a wide range of Waters liquid chromatography systems, including the Alliance iS HPLC System, the Arc HPLC System, and all ACQUITY UPLC Systems.

The seamless integration of the CAD with Empower Software delivers an enhanced user experience, supported by Waters' support and service provision. Issues commonly seen in multi-vendor LC-CAD systems, including challenging set-up and dropped communication between detector and chromatograph — leading to interrupted sample sets and in some cases detector flooding — are reduced when using a Waters LC-CAD configured with Empower CDS. In addition, methods developed for existing CADs can be easily transferred using built-in tools.

Waters Australia Pty Ltd
www.waters.com

Antibiotic for drug-resistant bacteria found in plain sight

Chemists from the University of Warwick and Monash University say they have discovered a promising new antibiotic that shows activity against drug-resistant bacterial pathogens. The breakthrough is significant as most of the 'low-hanging fruit' has already been found when it comes to antibacterials, and limited commercial incentives deter investment in antibiotic discovery.

According to the World Health Organization's Global antibiotic resistance surveillance report 2025, antibiotic resistance rose in over 40% of the pathogen–antibiotic combinations monitored between 2018 and 2023, with an average annual increase of 5–15%. Drug-resistant Gram-negative bacteria such as *E. coli* and *K. pneumoniae* are becoming particularly dangerous worldwide — yet more than 40% of *E. coli* and over 55% of *K. pneumoniae* globally are now resistant to third-generation cephalosporins, the first-choice treatment for these infections. In the African region, resistance even exceeds 70%.

Other essential life-saving antibiotics, including carbapenems and fluoroquinolones, are losing effectiveness against *E. coli*, *K. pneumoniae*, *Salmonella* and *Acinetobacter*. Carbapenem resistance, once rare, is becoming more frequent, narrowing treatment options and forcing reliance on last-resort antibiotics. Such antibiotics are costly, difficult to access, and often unavailable in low- and middle-income countries.

Now, in a study published in the *Journal of the American Chemical Society*, researchers from the Monash Warwick Alliance Combatting Emerging Superbug Threats Initiative have described a promising new antibiotic known as pre-methylenomycin C lactone. The antibiotic was said to be 'hiding in plain sight' — as an intermediate chemical in the natural process that produces the well-known antibiotic methylenomycin A.

"Methylenomycin A was originally discovered 50 years ago, and while it has been synthesised several times, no one appears to have tested the synthetic intermediates for antimicrobial activity!" said co-lead author Professor Greg Challis, from the University of Warwick and the Monash Biomedicine Discovery Institute.

"By deleting biosynthetic genes, we discovered two previously unknown biosynthetic intermediates, both of which are much more potent antibiotics than methylenomycin A itself."

When tested for antimicrobial activity, pre-methylenomycin C lactone was shown to be over 100 times more active against diverse Gram-positive bacteria than methylenomycin A. Specifically, it was shown to be effective against *S. aureus* and *E. faecium*, the bacterial species behind Methicillin-resistant *Staphylococcus aureus* (MRSA) and Vancomycin-resistant *Enterococcus* (VRE) respectively.

"Remarkably, the bacterium that makes methylenomycin A and pre-methylenomycin C lactone — *Streptomyces coelicolor* — is a model antibiotic-producing species that's been studied extensively since the 1950s, [so] finding a new antibiotic in such a familiar organism was a real surprise," said co-lead author Dr Lona Alkhalaf, from the University of Warwick.

University of Warwick (video still)

"It looks like *S. coelicolor* originally evolved to produce a powerful antibiotic (pre-methylenomycin C lactone), but over time has changed it into methylenomycin A — a much weaker antibiotic that may play a different role in the bacterium's biology."

Importantly, the researchers could not detect any emergence of resistance to pre-methylenomycin C lactone in *Enterococcus* bacteria under conditions where vancomycin resistance is observed. Vancomycin is a 'last line' treatment for *Enterococcus* infection, so this finding is especially promising for VRE, a WHO High Priority Pathogen.

"This discovery suggests a new paradigm for antibiotic discovery," Challis said. "By identifying and testing intermediates in the pathways to diverse natural compounds, we may find potent new antibiotics with more resilience to resistance that will aid us in the fight against AMR [antimicrobial resistance]."

The next step in the development of the antibiotic will be preclinical testing. In a 2025 publication in *The Journal of Organic Chemistry*, a team funded by the Monash Warwick Alliance Combatting Emerging Superbug Threats initiative reported a scalable synthesis of pre-methylenomycin C lactone, paving the way for further research.

"This synthetic route should enable the creation of diverse analogues that can be used to probe the structureâ''activity relationship and mechanism of action for pre-methylenomycin C lactone," said Monash University's Professor David Lupton, who led the synthesis work.

On top of this scalable synthesis, pre-methylenomycin C lactone's simple structure, potent activity and difficult-to-resist profile make it a promising antibiotic candidate that could help to save some of the 1.1 million people who are the victims of AMR every year.

Laminar flow clean workstation

HEMCO's Laminar Flow Clean Workstations are engineered and built to meet critical clean requirements within the laboratory. Typical applications include liquid handling stations, compounding, high-throughput screening, sample weighing, powder handling, HPLC equipment and other related systems. The enclosure isolates the process while the HEPA filter system maintains a positive pressure and ISO 5 class 100 conditions by protecting the process from surrounding contamination.

Standard sizes range from 1.2 to 2.4 m wide, 0.6 to 1.2 m deep, and 0.9 to 1.5 m high. However, custom-sized enclosures to contain and protect larger integrated instrument systems can be constructed to meet specific size and design specifications.

The enclosures feature a powder-coated steel framework with 99.99% efficient HEPA filter, fan and speed control, clear acrylic rear and side walls, hinged safety viewing shield or horizontal slide glass door panels, fluorescent lighting, and switches. Optional worksurfaces and support tables or cabinets are available.

HEMCO Corporation
www.hemcocorp.com

Continuous-wave terahertz platform

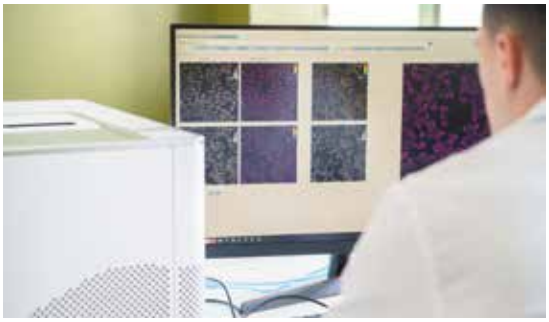
TOPTICA Photonics has launched the TeraScan ultra — an ultrahigh-precision continuous-wave (cw) terahertz platform featuring comb-locked stability and spectral resolution down to 1 Hz. It is suitable for researchers who require good frequency stability, scanning flexibility and sub-Hz phase coherence across the full THz spectrum.

The product is designed to meet the most demanding requirements in THz communications research, channel sounding, wafer inspection and high-resolution spectroscopy. With a bandwidth of up to 5 THz and ultralow phase noise, it can be used in the generation and control of tuneable THz radiation.

At the heart of the system are two diode lasers — one tuneable, one fixed — both locked to a single optical frequency comb. A photomixer emitter converts the optical beat signal into a tuneable, monochromatic THz wave. TOPTICA's proprietary 'endless frequency shifter' enables seamless frequency tuning while maintaining absolute control over phase and frequency — a crucial requirement for applications like photonic vector network analysis.

The system uses state-of-the-art InGaAs photomixers: a photodiode emitter and a Rh:InGaAs photomixer receiver, both packaged into compact, fibre-coupled modules. Operation modes include fixed frequency, sweep and triggered step scan — fully software-controlled.

Lastek Pty Ltd
www.lastek.com.au



All-in-one microscopy platform

HAWK Biosystems' Violet 3.0, an all-in-one microscopy platform for QF-Pro technology, has been designed to bring fluorescence lifetime imaging microscopy (FLIM) and Förster resonance energy transfer (FRET) to any laboratory. QF-Pro technology enables scientists to spatially map protein–protein interactions and protein post-translation modifications.

The comprehensive benchtop solution features a high-end modulated laser, a sensitive image sensor and a multichannel LED for immunofluorescence. Two stage inserts allow for the analysis of microwell plates or up to four standard microscope slides at a time. It is equipped with 10x, 20x and 40x dry objectives. It also has four LED channels — 365, 488, 585 and 635 nm — for the illumination of secondary biomarkers of interest.

One desktop licence of QF-Pro software is included, allowing users of all expertise to easily run the device and generate groundbreaking data. Users can load their samples and create maps of regions of interest (ROIs). The platform then sequentially acquires all mapped ROIs and calculates a QF-Pro score and image per region.

Post-acquisition analyses, such as the application of a threshold or change in lookup table (LUT), is automated, with the option of fine-tuning for more experienced users. All data can then be seamlessly exported into Microsoft Excel (data) or PowerPoint/PDF (images).

SciTech Pty Ltd
www.scitech.com.au

Cytokines and medium for cell and gene therapy

Lonza has launched the TheraPEAK AmpliCell Cytokines and TheraPEAK 293-GT Medium to expand its GMP solutions for cell and gene therapy. The products provide researchers and manufacturers with high-performance, scalable and regulatory-ready solutions that help streamline cell and gene therapy workflows from discovery through clinical development.

Cytokines represent a critical component in cell therapy manufacturing, supporting the expansion and maintenance of living cells. TheraPEAK AmpliCell Cytokines enable the expansion, activation and differentiation of immune cells, for an easy transition from research to manufacturing.

Produced in a mammalian expression system and engineered for high biological activity, the cytokines feature proper folding and glycosylation, delivering native-like structure and function that bacterial systems cannot match, according to the company. This enables good biological relevance, batch-to-batch consistency, and predictability in sensitive and translational applications, both in research and GMP set-ups.

TheraPEAK 293-GT Medium is a chemically defined, animal-origin-free system optimised for adeno-associated virus (AAV) production in suspension HEK293 cells, providing a scalable option for advancing gene therapy programs. Unlike off-the-shelf viral production kits that may lack flexibility, the 293-GT System (growth medium plus supplement) is a drop-in-ready solution engineered to integrate seamlessly with existing workflows.

The product is compatible with commercially available transfection reagents and AAV enhancers, delivers strong AAV titres, and supports high full-to-empty capsid ratios. It is designed to accelerate development timelines and improve consistency from research through to GMP gene therapy production.

Scientifix Pty Ltd
www.scientifix.com.au

Blood test for chronic fatigue syndrome developed

Scientists at the University of East Anglia (UEA) and Oxford BioDynamics (OBD) have created a high-accuracy blood test to diagnose myalgic encephalomyelitis, also known as chronic fatigue syndrome (ME/CFS). This debilitating long-term illness affects millions worldwide, but is poorly understood and has long lacked reliable diagnostic tools.

iStock.com/Irina Romanova

"ME/CFS is a serious and often disabling illness characterised by extreme fatigue that is not relieved by rest," explained lead researcher Professor Dmitry Pshezhetskiy, from UEA's Norwich Medical School. "We know that some patients report being ignored or even told that their illness is 'all in their head'.

"With no definitive tests, many patients have gone undiagnosed or misdiagnosed for years. We wanted to see if we could develop a blood test to diagnose the condition — and we did!"

The team used EpiSwitch 3D genomics technology from OBD to see how DNA is folded in blood samples from 47 patients with severe ME/CFS and 61 healthy controls, and discovered a unique pattern that appears consistently in people with ME/CFS that is not seen in healthy people. EpiSwitch has already been proven to deliver practical, rapid blood diagnostics accessible at scale, having shown success in identifying disease-specific blood markers in highly complex inflammatory and neurological conditions such as fast ALS (amyotrophic lateral sclerosis), rheumatoid arthritis and certain cancers.

This latest work, described in the *Journal of Translational Medicine*, looked beyond the linear DNA sequence investigated by a previously published DecodeME study — understood to be the largest genetic investigation of ME/CFS to date. By examining 3D genomic folds, UEA and OBD revealed hundreds of additional changes, including five of the eight sites identified by DecodeME, which can now provide a deeper understanding of the disease.

The analysis was found to demonstrate 92% sensitivity in identifying ME/CFS, which indicates how well the test identifies those who have the disease (a show of true positives), and 98% specificity, which indicates how well it identifies those who do not have the disease. The researchers also found signs of immune system and inflammation pathways involved in the disease, which may help guide future treatments and identify patients more likely to respond to specific therapies.

"Chronic fatigue syndrome is not a genetic disease you're born with; that's why using EpiSwitch epigenetic markers — which can change during a person's life, unlike fixed genetic code — was key to reaching this high level of accuracy," said OBD Chief Scientific Officer Alexandre Akoulitchev.

"With this breakthrough, we are proud to enable a first-in-class test that can address an unmet need for a quick and reliable diagnostic for a complex, challenging-to-identify illness."

"This is a significant step forward," Pshezhetskiy said. "For the first time, we have a simple blood test that can reliably identify ME/CFS — potentially transforming how we diagnose and manage this complex disease.

"Additionally, understanding the biological pathways involved in ME/CFS opens the door to developing targeted treatments and identifying which patients might benefit most from specific therapies."

The breakthrough could therefore lead to earlier support and more effective management for those living with ME/CFS — and it is hoped that it could pave the way for a similar blood test to diagnose long COVID.

"Post-COVID syndrome, commonly referred to as long COVID, is one example of ME/CFS, where a similar cluster of symptoms is triggered by the COVID-19 virus, rather than by other known causes such as glandular fever," Pshezhetskiy said. "We therefore hope that our research will also help pave the way for a similar test to accurately diagnose long COVID."

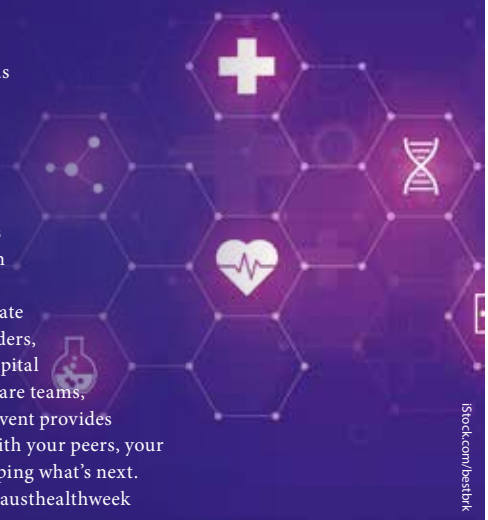
Australian Healthcare Week 2026

March 11–12, Sydney

For 15 years, Australian Healthcare Week has brought together thousands of healthcare professionals from every corner of the health ecosystem. Now, co-located with the new Healthcare 2040 Expo, the event is expanding its focus to spotlight the technologies, innovations and future models of care shaping the next decade of Australian health care.

The AHW community spans public and private sectors, frontline clinicians, government leaders, innovators and solution providers. From hospital leaders and aged care providers to primary care teams, allied health and government agencies, the event provides a rare opportunity to be in the same room with your peers, your future collaborators, and the visionaries shaping what's next.

www.australianhealthcareweek.com/events-austhealthweek



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31st Annual Lorne Proteomics Symposium
February 5–8, Lorne
www.lorneproteomics.org

Lorne Proteins 2026
February 8–12, Lorne
www.lorneproteins.org

The 48th Annual Condensed Matter and Materials Meeting and the 6th Asia-Pacific Conference on Condensed Matter Physics
February 9–13, Wagga Wagga
www.aip.org.au/CMM-Conference

Lorne Cancer 2026
February 12–14, Lorne
www.lornecancer.org

Lorne Genome 2026
February 15–18, Lorne
www.lornegenome.org

Lorne Infection & Immunity 2026
February 18–20, Lorne and online
www.lorneinfectionimmunity.org

Pathology Update 2026
March 6–8, Sydney
www.pathologyupdate.com

World Science Festival Brisbane 2026
March 20–29, Brisbane
worldsciencefestival.com.au

Science Meets Parliament 2026
March 25–26, Canberra
scienceandtechnologyaustralia.org.au/science-meets-parliament-2026

TSANZSRS 2026
March 27–31, Perth
tsanzsrsasm.com

Quantum Australia Conference 2026
April 29–30, Adelaide
www.qac2026.com/quantum-australia-2026/

AusMedtech 2026
May 19–21, Perth
www.ausmedtech.com.au

ASID Annual Scientific Meeting 2026
May 27–30, Hobart
www.asidasm.com.au

ASM National Meeting 2026
June 15–18, Melbourne
www.theasmmeeting.org.au

2026 RACI National Congress
July 5–10, Perth
www.racicongress.org.au

Accreditation Matters 2026
July 7–8, Melbourne
nata.com.au

74th CSANZ Annual Scientific Meeting
August 6–9, Sydney
www.csanzasm.com

National Science Week 2026
August 15–23, Australia-wide
www.scienceweek.net.au

Science at the Shine Dome 2026
September 15–17, Canberra
www.science.org.au/news-and-events/events/science-shine-dome/science-at-the-shine-dome-2026

AIMS National Scientific Meeting 2026
September 16–18, Perth
aimsnsm2026.com

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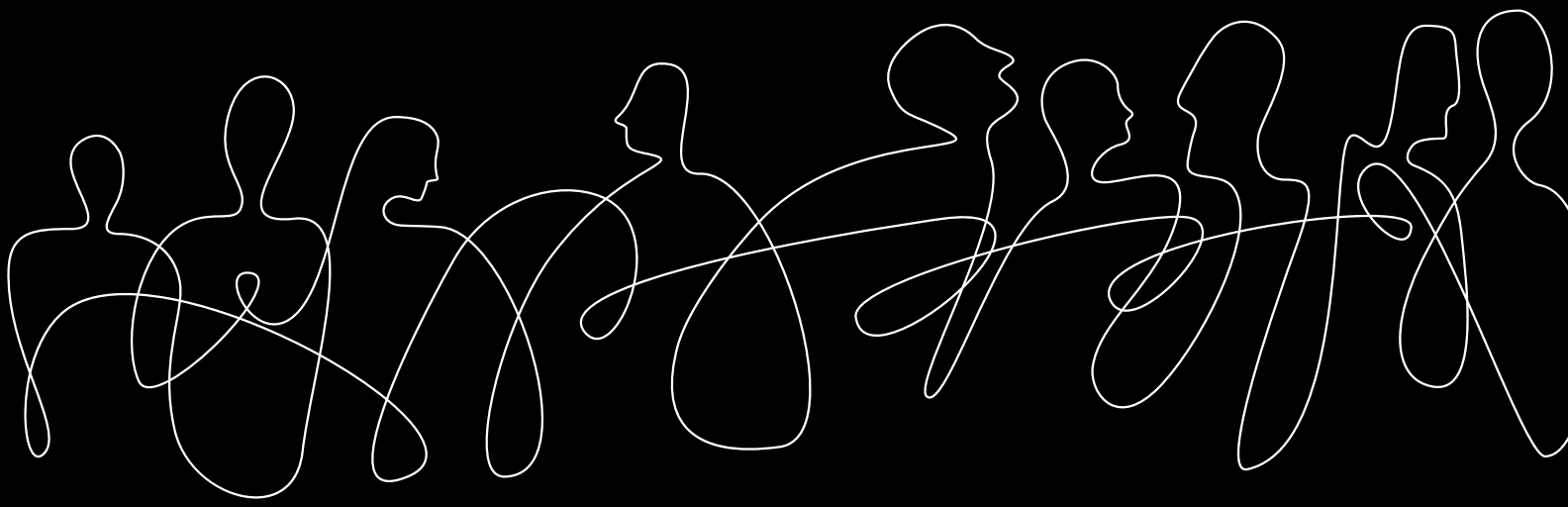

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