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IIT Guwahati team develops energy-efficient bricks

The researchers said these bricks have been designed to keep buildings naturally cool, offering a solution for sustainable construction

A team of researchers from the Indian Institute of Technology Guwahati (IIT-G) has developed energy-efficient bricks designed to keep buildings naturally cool, offering a promising solution for sustainable construction.

The research team—Bitupan Das, Urbashi Bordoloi, Pushpendra Singh, and Pankaj Kalita—from IIT-G's School of Energy Science and Engineering and the School of Agro and Rural Technology published their findings in the latest issue of the Journal of Energy Storage.

"In modern architecture, most buildings rely heavily on air conditioning systems to maintain indoor temperatures, especially during summer. While effective, these systems consume large amounts of electricity and contribute significantly to carbon emissions and environmental degradation," the IIT-G researchers noted.

To address this issue, the team focused on reducing heat gain through roofs and walls—one of the primary reasons for increased air conditioner usage. They redesigned conventional bricks to improve thermal performance and minimize heat absorption.

Their approach involved incorporating Phase Change Materials (PCMs), substances that can absorb and release heat during phase transitions. For example, wax absorbs heat as it melts and releases it when it solidifies.

"When integrated into building materials, PCMs absorb excess heat during the day and release it as temperatures drop, helping maintain a stable indoor environment," the researchers explained.

Among the materials tested, OM35 emerged as the most suitable PCM. With a melting point of around 35°C, it is particularly effective in hot and humid climates where temperatures typically range between 28°C and 38°C.

Professor Pankaj Kalita highlighted the importance of PCM-based materials in climate-responsive construction. "The developed bio-composite-filled autoclaved aerated concrete brick is structurally stable and provides sufficient mechanical strength under hot and humid conditions, making it well-suited for infrastructure development," he said.

Addressing leakage challenges

One of the key challenges with PCMs is leakage during the melting phase. To overcome this, the researchers combined the PCM with biochar—a carbon-rich material that acts as a supporting matrix. This composite prevents leakage while also enhancing thermal conductivity.

"PCM-embedded bricks offer superior thermal management compared to conventional bricks. They absorb and store heat during the day and release it gradually as temperatures fall, resulting in more stable indoor conditions," Professor Kalita added.

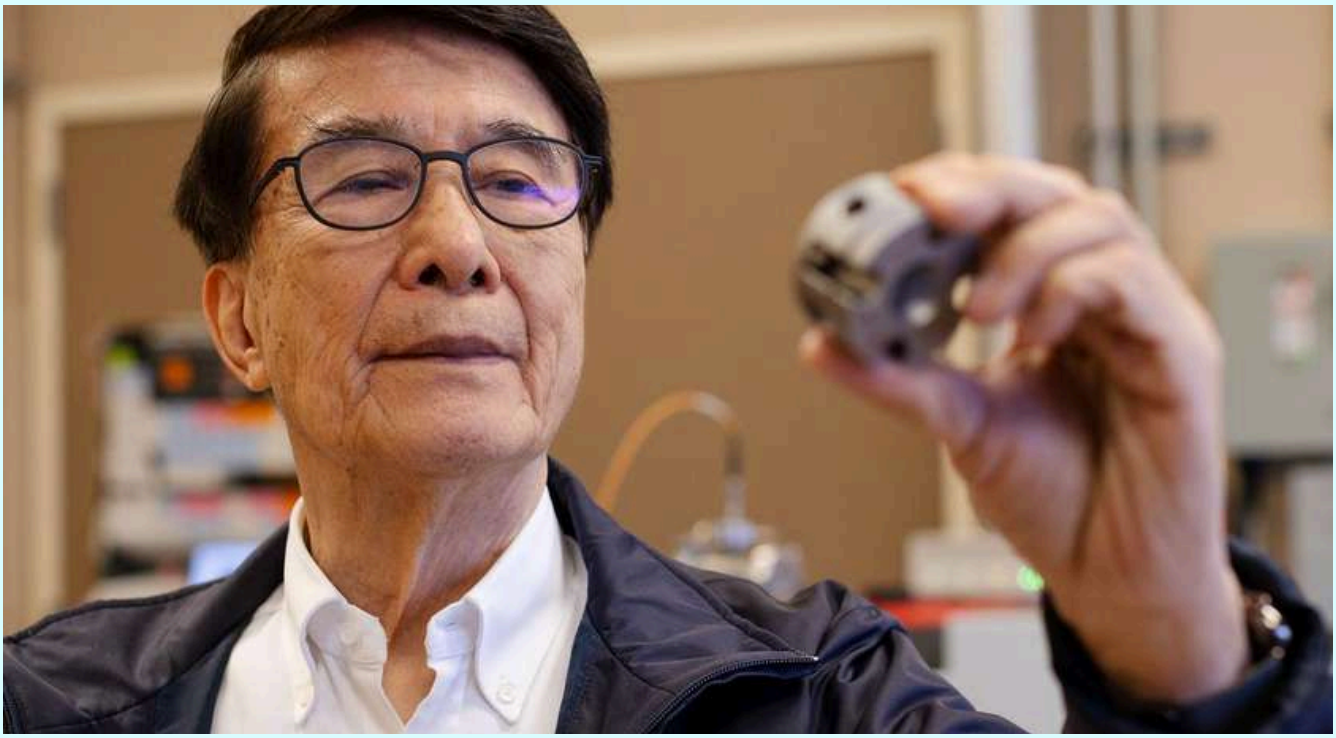
Despite their potential, PCM-based thermal bricks often struggle to reach the market. The researchers emphasized that this is not due to performance limitations but practical barriers such as high initial costs, challenges in large-scale manufacturing, lack of standardization, and low awareness among builders and developers. Additionally, the absence of real-world demonstration projects limits industry confidence.

"For successful transition from lab to market, it is essential to reduce costs, validate performance through pilot projects, obtain certifications, and foster collaboration with industry stakeholders. Policy support and awareness initiatives can further accelerate adoption," the team concluded.

Source:https://www.thehindu.com/sci-tech/science/iit-guwahati-team-develops-energy-efficient-bricks/article70792441.ece
https://www.thehindu.com

New technique helps superconductor break 33-year temperature record

While superconductivity is easy to achieve at extremely low temperature, bringing it to room temperature is a 'holy grail' of physics. Researchers have achieved much higher temperatures in recent years, up to -13 °C, but only by applying pressure equivalent to that near the earth's core



For over a century, physicists have sought materials that conduct electricity with zero resistance at room temperature. Until now, the best superconductors at normal pressure worked only at about −140 °C, while higher temperatures required extreme pressures.

A recent study in Proceedings of the National Academy of Sciences reports a breakthrough: scientists raised this temperature by 18 °C at room pressure using a method called pressure quenching. This surpasses a record set in 1993 using the same material, a copper oxide known as Hg1223.

The technique involves compressing the material under very high pressure, cooling it near absolute zero, and then rapidly releasing the pressure. This "locks in" a high-pressure structure, allowing the material to retain improved superconducting properties even at normal pressure. The team consistently achieved superconductivity between −122 °C and −134 °C, confirming the results across multiple tests.

If developed further, such materials could revolutionize energy systems by eliminating power loss in grids, improving electric motors, enabling faster MRI machines, and advancing transportation and renewable energy technologies.
Experts say the findings are credible but emphasize that more work is needed. The key question is whether this pressure-quenching method can stabilize similar properties in other materials—and potentially bring superconductivity closer to room temperature.

The study stands out in a field recently affected by controversial and unverified claims. Unlike those, this work builds on a well-studied material and shows reproducible results, making it a promising step forward in superconductivity research.

Source:https://www.thehindu.com/sci-tech/science/new-technique-helps-superconductor-break-33-year-temperature-record/article70772897.ece
https://www.thehindu.com

Researchers use deep transfer learning to study nest site fidelity in painted stork in Delhi zoo

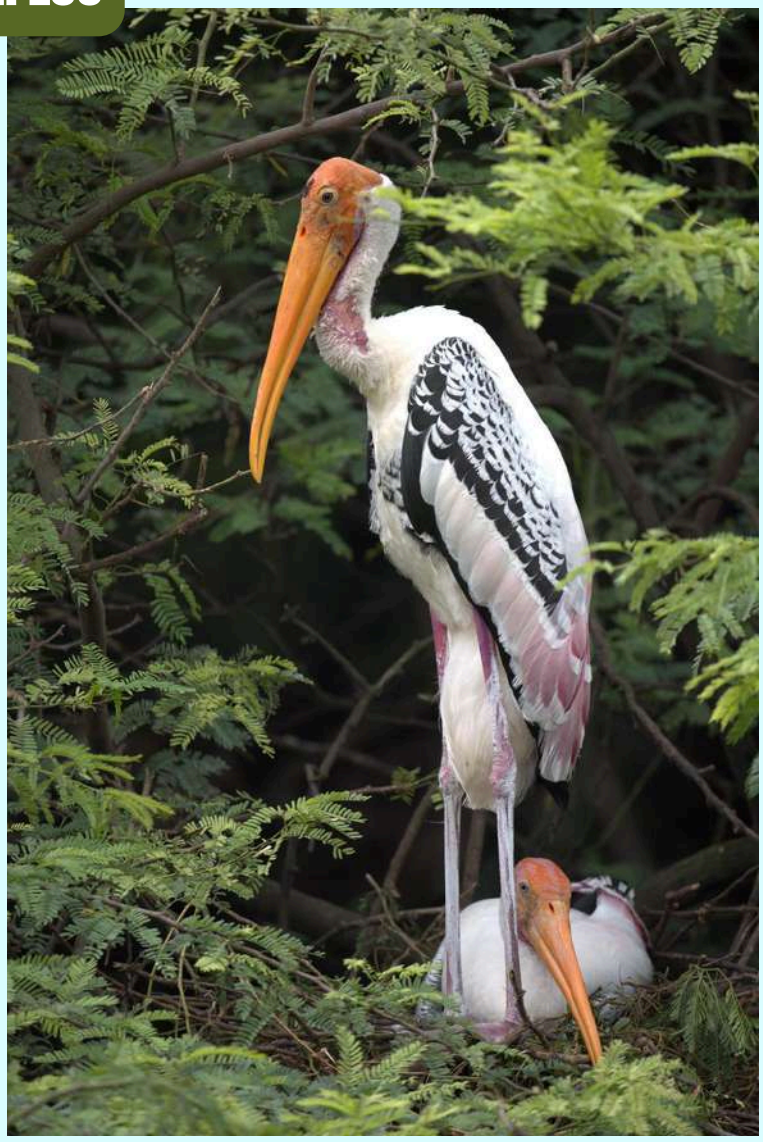
A team of researchers has successfully applied deep transfer learning (DTL), a non-invasive artificial intelligence–based approach, to study nest-site fidelity in the painted stork (Mycteria leucocephala) at the National Zoological Park in Delhi.

The study focused on a male painted stork distinguished by a prominent scar on its neck. Observed over four consecutive breeding seasons (2022–2025), the bird was monitored to assess nest-site fidelity—the tendency to return to the same nesting location across breeding cycles.

The researchers named the stork "Ringo," in tribute to Ringo Starr, the drummer of the iconic band The Beatles. For the study, they collected 2,349 high-resolution images of Ringo, capturing both sides of its body and folded wing patterns. In addition, 1,755 images of other nesting storks—showing both left and right wing profiles—were gathered. These images, collected across four breeding seasons, formed the basis for individual identification using unique visual features.

According to the study, published in Royal Society Open Science, the researchers employed a non-invasive monitoring approach using the Scale-Invariant Feature Transform (SIFT), a computer vision algorithm that extracts and matches distinctive image features. This method successfully identified Ringo based on its unique scar.

In addition, the team developed a DTL model capable of distinguishing Ringo from other storks using feather patterns as a biological "fingerprint." The model achieved 98% accuracy in identifying the bird, and repeated observations confirmed that Ringo consistently returned to the same nesting site over four years, demonstrating strong nest-site fidelity.



Painted stork Ringo photographed with its pair in their nest in the National Zoological Park, Delhi, in 2025.

The research was conducted by Abdul Jamil Urfi and Paritosh Ahmed from the Department of Environmental Studies, University of Delhi; Mylswamy Mahendiran from the Salim Ali Centre for Ornithology and Natural History, Coimbatore; and Mylswamy Parthiban from the Tamil Nadu Agricultural University, Coimbatore.

The findings highlight the potential of pattern-based recognition and deep transfer learning as powerful, non-intrusive tools for long-term monitoring of colonial waterbirds.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/researchers-use-deep-transfer-learning-to-study-nest-site-fidelity-in-painted-stork-in-delhi-zoo/article70788300.ece
https://www.thehindu.com/

New butterfly species recorded in Arunachal named after Zubeen Garg

A lone Ferruginous Pochard was found among a flock of Common Pochards at Amoor lake; the sighting of Common Pochards and later the Ferruginous Pochard as well has led to a procession of birders from Chennai visiting this lake located off Tiruporur-Thirukazhukundram Road

A new species of butterfly discovered in a forest in Leparada district has been named after Zubeen Garg, the celebrated cultural icon of Assam whose death on September 19, 2025, sparked widespread public reaction. The species, scientifically named Euthalia zubeengargi, was identified during field surveys conducted in 2025 by Roshan Upadhaya, a researcher at RIMT University, and Kalesh Sadasivan of the Travancore Natural History Society. The researchers have proposed "Basar Duke" as its common name. (Basar refers to a location in Arunachal Pradesh and is also associated with a local police constable.)

Their findings, based on observations in semi-evergreen forests at elevations of 600–750 metres, were published in the latest issue of Entomon, a quarterly journal of the Association for Advancement of Entomology. Despite several months of study, only two male individuals were documented—one collected as a specimen and another photographed in the wild—suggesting that the species may be rare or highly localised.

According to Mr. Upadhaya, the butterfly belongs to the genus Euthalia, a group widely distributed across South and Southeast Asia. These butterflies typically inhabit forested areas and are known for their earthy brown wings adorned with pale spots.

The newly identified species stands out due to its distinctive wing patterns and structural characteristics, which confirmed it as a separate species. Field observations indicate that Euthalia zubeengargi prefers cool, shaded forest interiors. It was seen resting on low vegetation, feeding on tree sap, and occasionally drawing minerals from damp surfaces near streams.

"The butterfly appears to be active mainly from late morning to early afternoon, making short, slow flights between nearby plants," the researchers noted. They also emphasised the importance of dense, moist undergrowth for its survival.

However, much about the butterfly's life cycle—including its breeding behaviour and host plants—remains unknown. Euthalia zubeengargi is among more than 80 species from the Euthalia group recorded in India's northeastern region.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/new-butterfly-species-recorded-in-arunachal-named-after-zubeen-garg/article70791708.ece
https://www.thehindu.com/

With lunar missions looming, scientists grow chickpeas in 'moon dirt'

Researchers at Texas A&M University demonstrate the potential for sustainable lunar agriculture by successfully cultivating chickpeas in soil mixtures containing up to 75% simulated moon regolith

Scientists have taken a step toward space farming by growing chickpeas in soil made mostly from simulated lunar dust. The study, based on material similar to samples from NASA's Apollo missions, suggests astronauts could one day grow their own food on the Moon.

The chickpeas, a variety called "Myles," were grown in a controlled environment using a mix of up to 75% lunar simulant and nutrient-rich compost. While plants grew successfully in these mixtures, seeds planted in 100% lunar soil failed to survive. As the amount of lunar material increased, yields dropped, though the size of the chickpeas remained unchanged.

Chickpeas are a promising space crop because they are rich in protein and nutrients. Growing food locally will be essential for long-term lunar missions, as transporting supplies from Earth is expensive and impractical.

Lunar soil, or regolith, is made of sharp, mineral-rich dust but lacks the organic matter needed for plant growth. To address this, researchers used beneficial fungi to help plants absorb nutrients and reduce toxic metal uptake. These microbes also improved soil structure, making it more suitable for agriculture.

The chickpeas have not yet been eaten, as scientists are still testing them for harmful metal content. Ensuring they are safe and nutritious is the next step.

Researchers say this experiment is an early but important move toward sustainable farming on the Moon—and potentially on Mars in the future.

Source:https://www.thehindu.com/sci-tech/science/with-lunar-missions-looming-scientists-grow-chickpeas-in-moon-dirt/article70725290.ece

Scientists unveil breakthrough tool that could help stop the world's third-biggest driver of deforestation

Scientists from the Royal Botanic Gardens, Kew, World Forest ID, the University of Sheffield, and international partners have developed a new technique to trace where soybeans are grown within about 200 km. This innovation could significantly improve efforts to reduce deforestation linked to global food supply chains.

The study, published in Communications Earth and Environment, combines chemical fingerprinting of soybeans with geospatial machine learning. By analyzing stable isotopes and trace elements in 267 soybean samples from across South America, researchers created a model that can accurately estimate where crops were harvested—far more precisely than older methods that could only identify broad regions or countries.

Soy is the third-largest driver of tropical deforestation, responsible for around 11.5% of commodity-driven forest loss, mainly due to its use in animal feed. Tracking its origin has been difficult because soy from different regions is often mixed during transport and trade. This new approach helps overcome that challenge by verifying whether a shipment's claimed origin matches where it was actually grown.

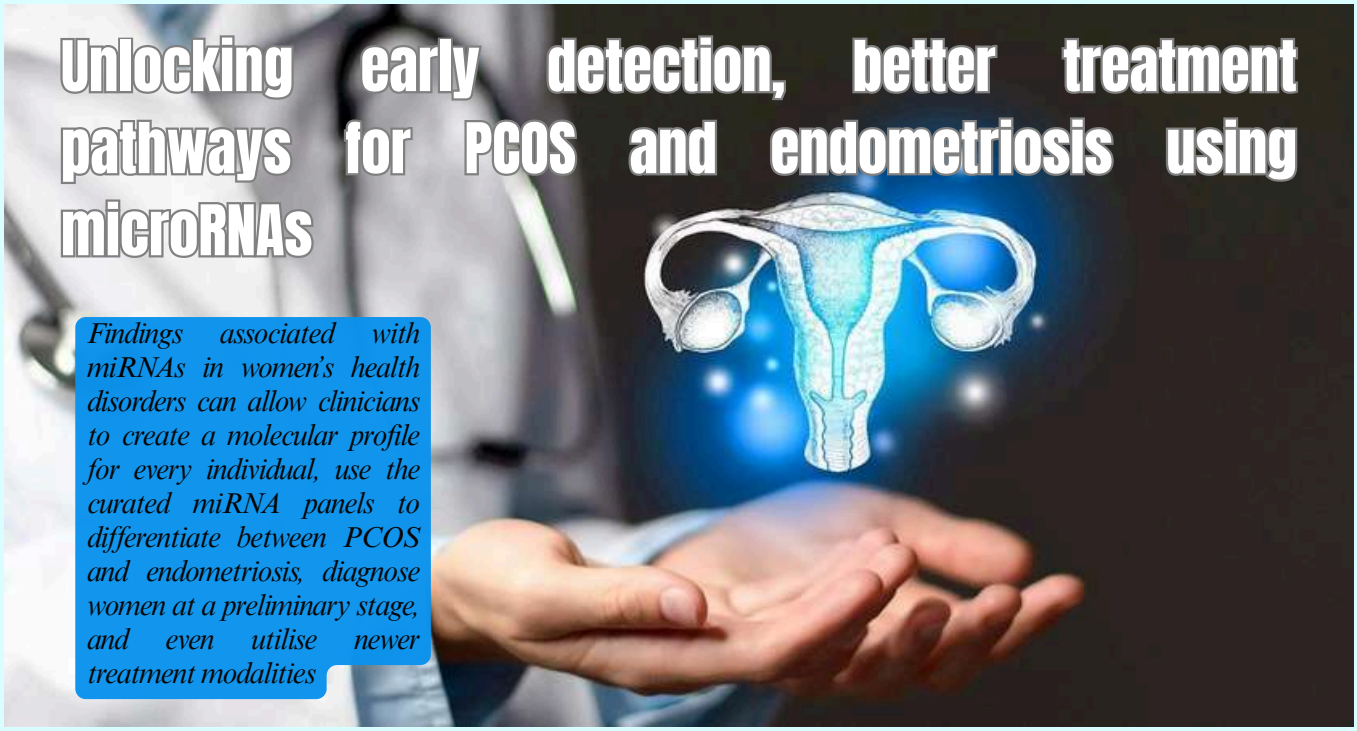
The ability to pinpoint origin more precisely is important because deforestation risk can vary even between nearby farms. Researchers describe the method as a major step forward in supply chain transparency, offering a practical way to monitor and verify agricultural commodities.

Beyond soy, the technique is already being explored for other high-risk commodities such as timber, cacao, coffee, palm oil, and rubber. It provides governments, companies, and scientists with a reliable tool to strengthen sustainability efforts and ensure compliance with environmental standards.

The research also supports upcoming regulations like the EU Deforestation Regulation, set to take effect in 2026, which will require companies to prove their products are not linked to recently deforested land. Similar rules are expected in the UK.

While not a complete solution, this method adds a powerful tool to the fight against deforestation, improving accountability and helping move global supply chains toward more sustainable practices.

Source:https://phys.org/news/2026-04-scientists-unveil-breakthrough-tool-world.html
https://phys.org/



Polycystic Ovary Syndrome (PCOS) and endometriosis are two common disorders linked to dysfunction in the reproductive and endocrine systems. Both conditions are influenced by genetic factors and disruptions in the body's biological signalling.

PCOS is a hormonal disorder characterised by irregular menstrual cycles, elevated androgen levels, and cyst formation in the ovaries. If left untreated, it can lead to complications such as insulin resistance, obesity, and increased cardiovascular risk. Endometriosis, in contrast, occurs when endometrial tissue grows outside the uterus, causing pain, inflammation, and other health issues.

A key factor connecting these conditions is microRNAs (miRNAs)—small molecules that regulate gene expression. These molecules behave differently depending on the condition. For example, miR-146a affects insulin regulation in PCOS but promotes abnormal tissue growth in endometriosis. Similarly, the miR-200 family disrupts ovarian function in PCOS while contributing to lesion formation in endometriosis.

miRNAs can be detected in body fluids such as blood, making them promising biomarkers for early, non-invasive diagnosis. This is particularly important in India, where PCOS affects a significant proportion of women due to lifestyle, genetic, and nutritional factors.

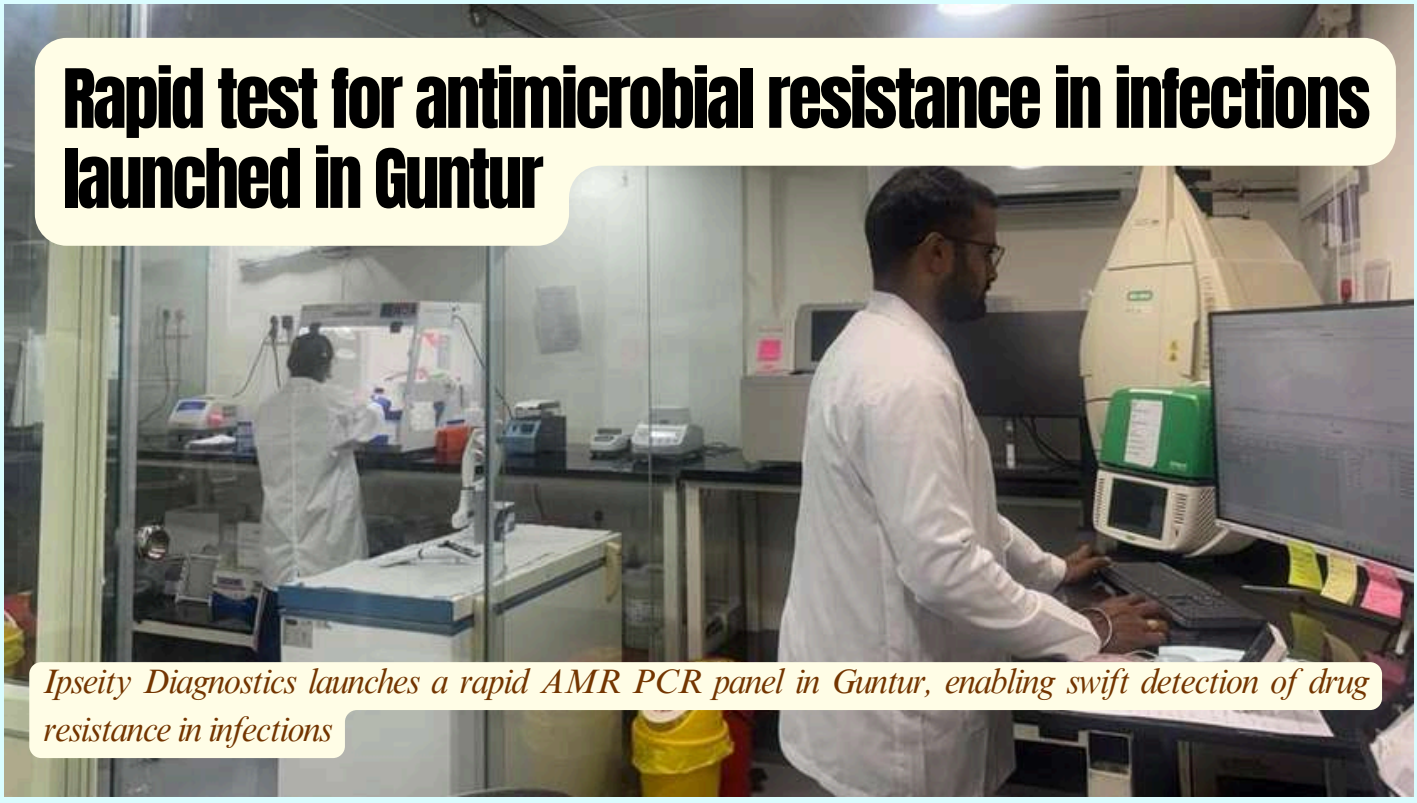
Recent research also shows overlapping miRNA patterns in both conditions, suggesting shared underlying mechanisms. Studying these patterns—especially within specific populations—can improve diagnosis and enable more personalised treatment approaches.

Overall, miRNA research is paving the way for precision medicine in women's health, allowing earlier detection, better differentiation between conditions, and targeted therapies. Early diagnosis can reduce long-term risks and improve reproductive health outcomes.

(Dr. V. Deepa Parvathi is associate professor, department of biomedical sciences Sri Ramachandra Institute of Higher Education and Research. deepaparvathi@sriramachandra.edu.in; Dr. Usha Rani G., is with the department of obstetrics and gynaecology, Sri Ramachandra Institute of Higher Education and Research. usharani@sriramachandra.edu.in)

Source:https://www.thehindu.com/sci-tech/health/unlocking-early-detection-better-treatment-pathways-for-pcos-and-endometriosis-using-micrornas/article70804003.ece
https://www.thehindu.com/

Rapid test for antimicrobial resistance in infections launched in Guntur



Ipseity Diagnostics launches a rapid AMR PCR panel in Guntur, enabling swift detection of drug resistance in infections

Lab technicians working at the Ipseity Diagnostics and Research in Guntur.

ICU patients with drug-resistant infections can now receive targeted antibiotic therapy within three hours, following the launch of a NABL-accredited Antimicrobial Resistance (AMR) PCR panel by Guntur-based Ipseity Diagnostics and Research.

Unlike conventional culture methods, which take 48 to 72 hours, this molecular test can detect key resistance markers—including CTX-M, SHV/TEM, ampC, KPC, NDM, OXA-48, mecA, and vanA/vanB—within just three hours.

Speaking at a press conference in Guntur on Tuesday (April 7, 2026), Kalyan Chakravarthy Koganti, Chief Medical Officer (General Medicine) at the research centre, said the rapid turnaround would enable clinicians to make timely decisions in critical conditions such as sepsis, pneumonia, and ICU-related infections. “Unlike conventional culture methods that take 48 to 72 hours, this PCR-based test delivers fast, actionable results, which is vital when every minute matters,” he said.

The AMR PCR panel is part of the company’s broader infectious disease diagnostic suite, which includes panels for sepsis, pneumonia, urinary tract infections, and meningitis—all equipped with AMR profiling tailored to Indian clinical needs.

Sandeep Kumar Nadendla, Chief Executive Officer of the Ipseity Group of Companies, noted that similar technologies were previously available only through European and U.S. firms. He added that the indigenous test is expected to reduce costs by nearly 70%.

Source: https://www.thehindu.com/news/national/andhra-pradesh/rapid-test-for-antimicrobial-resistance-in-infections-launched-in-guntur/article70833798.ece
https://www.thehindu.com/

Gastrointestinal cancers and the danger of delay

Delayed presentation continues to be one of the greatest challenges in managing gastrointestinal cancers

A troubling pattern is emerging in clinical practice: many patients seek care late—not due to lack of access, but because symptoms are underestimated and dismissed as "just acidity." This is not just a clinical issue; it is a public health concern.

Gastrointestinal cancers—affecting the oesophagus, stomach, liver, pancreas, colon, and rectum—are rising in India but remain under-recognised. They develop silently, without dramatic early signs, making delayed diagnosis a major challenge.

With over 2.7 lakh new cases annually, and increasing incidence among younger individuals, the burden is both growing and shifting. Yet early warning signs—mild abdominal discomfort, bowel changes, fatigue, or weight loss—are often ignored or self-treated.

In oncology, time matters. Delays frequently lead to advanced disease, making treatment more complex and outcomes less predictable. Lifestyle factors such as poor diet, inactivity, alcohol, and tobacco use, along with chronic conditions like fatty liver disease and acid reflux, further increase risk.

Despite this, preventive care is underutilised. Screening for colorectal cancer from age 45 is recommended, yet few undergo it. Healthcare remains reactive rather than preventive.

The encouraging reality is that many gastrointestinal cancers are preventable and treatable when detected early. Persistent symptoms should never be ignored, and timely medical evaluation is essential.

India must shift from silence to awareness, and from delay to early action. Health is not just the absence of severe symptoms, but the presence of awareness. Early recognition and timely care can make the difference between curative and compromised outcomes.

Source: https://www.thehindu.com/opinion/op-ed/gastrointestinal-cancers-and-the-danger-of-delay/article70831537.ece
Dated: April 07, 2026, https://www.thehindu.com/

OTHERS

Onions made me cry!

Have you ever chopped onions in your life? Have you seen people chop onions and cry? Do you know how onions always do that?

It is an ordinary day. Somehow tears pool at the bottom of your eyes, threatening to spill out the canthus any moment. How did it turn out to be like this? Your eyes sting. The more you move your hands at the chopping board, the sting worsens. Alas, there comes the tears, full and uncontrollable.

Who am I mourning? Perhaps the red bulb onion in my hands?

Lacrimosa

The stinging tears just won't stop! You could step away for a while but that's only giving you temporary relief. Come back and it's lacrimosa all over! If you think chopping shallots (smaller onion brothers) will be different, you're mistaken. Some members of the Allium family just can't be messed with.

Culinary favourites, bulb onions also called common onions (scientific name: Allium cepa), are plants in the genus Allium and are immensely valued for their flavour. In fact, they are one of the world's oldest cultivated plants. This funnily means that almost everyone, even the coldest and nonchalant of humans, has cried to an onion at least once in their life.

Well, you can cry me a river

Onion bulbs grow underground by absorbing minerals, especially sulphur, from the soil. Many of you may realise from biology class that soil is home to a wide variety of microorganisms, insects, fungi, worms, etc. The onion, hence, exhibits prudence and develops a defence mechanism, a chemical warfare to keep these organisms away from itself. It is this defence mechanism that we experience while chopping onions. It is an onion's attempt to keep away everyone who hurts it.

Source:https://www.thehindu.com/children/onions-made-me-cry/article70752808.ece
https://www.thehindu.com/

The syn

Let's break this down further. Onion cells are filled with enzymes called allinase. Once the onions absorb sulphur from the soil, they use it with amino acids, turning them to sulphur-rich amino acids. When we cut onions, we break the onion cells open and the enzyme and all the contents spill out. These react with the sulphur-rich amino acids and eventually give rise to a volatile chemical known as syn-propanethial-S-oxide. This chemical is also called lacrymatory factor (LF).

The root of our burning eyes is precisely this LF. Once formed, the molecules of syn-propanethial-S-oxide spread into air and eventually reach the nerves of the cornea of the unfortunate person chopping the onion. Not to mention, there's collateral damage too. If somebody was patiently minding their job in the kitchen while you were chopping onions, that person will cry too. Their eyes will similarly sting, though the degree might vary.

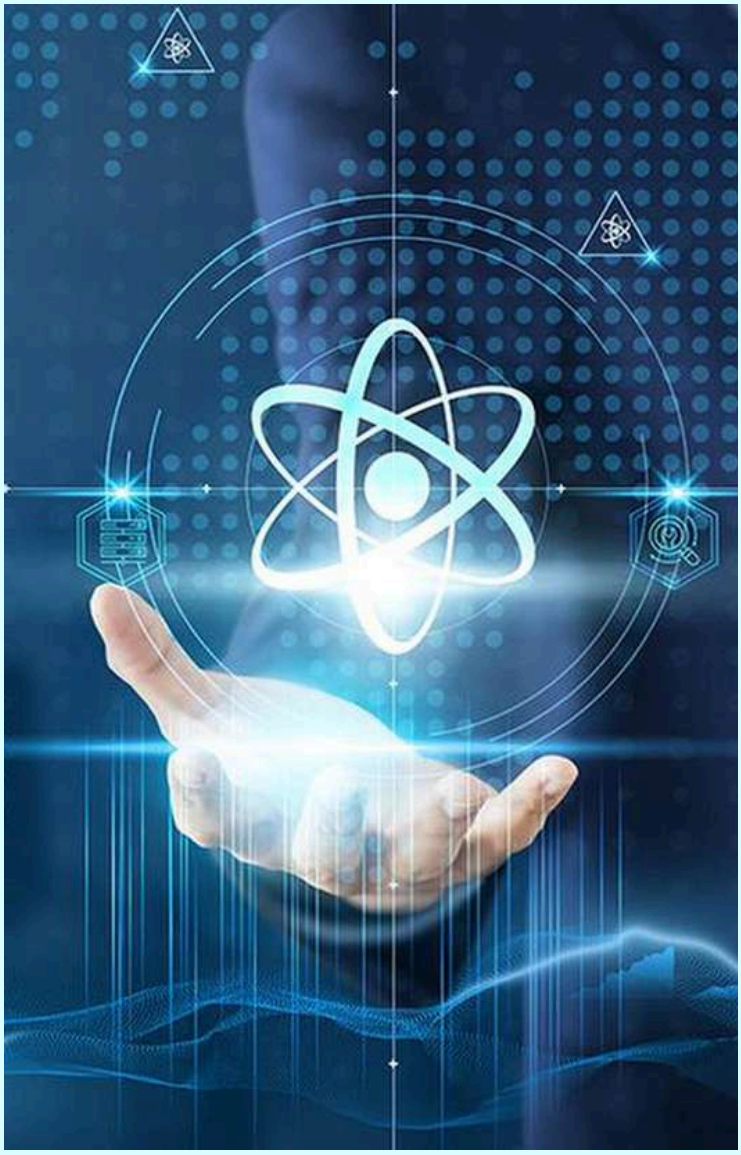
Resisting the syn

Can you prevent these tears? The answer is yes, strategically. If you can shield yourself from the molecules of syn-propanethial-S-oxide, you can stop crying. Here's what you can do:

- Keeping a fan on while chopping (have lot of air come into the kitchen),
- Wearing goggles (acts like a literal shield),
- Using sharp knives: Sharp knives cleanly cut the onion, reduces cell damage. Less mist reduces eye irritation.
- Cut it gently: When you gently cut onions, the chances of onion juices spreading a large surface area is less.

Myth: Another common theory is chilling the onion. But this was debunked by researchers from the Cornell University last year.

What is quantum entanglement?



Scientists have shown that helium atoms can be entangled through their movement. A team from Australia and the U.S. collided clouds of helium atoms together to create pairs that shared a single quantum state. The achievement showed that even 'heavy' particles could follow the same strange quantum physics rules that scientists have mostly observed so far in much lighter particles like electrons. The possibility also opens new ways for researchers to study the link between quantum physics and gravity — a famous unsolved problem in physics.

Quantum entanglement occurs when two particles become so deeply linked that they share a single existence. The study achieved momentum entanglement, where the link involves the particles' momentum. When scientists collided the atoms, the resulting pairs flew apart. Because of quantum mechanics, neither atom had a definite direction until a detector measured it. However, once they measured the momentum of one atom, they instantly determined the momentum of its partner, no matter how far apart they had travelled.

In entanglement, one atom does not disappear and reappear elsewhere. Instead, teleportation involves quantum information: when a measurement defines the first atom's state, that information effectively dictates the state of the second atom across the void. Albert Einstein famously called this "spooky action at a distance" because it defies everyday logic. In classical physics, objects usually only affect things directly next to them. Momentum entanglement proves that whole atoms can remain connected through a nonlocal bond.

Source:https://www.thehindu.com/sci-tech/science/what-is-quantum-entanglement/article70806461.ece
https://www.thehindu.com/

OTHERS

WHY DOES WATER STAY COOL IN A CLAYPOT EVEN IN PEAK SUMMERS?

A traditional clay pot is made from natural earthen clay, usually soil rich in fine mineral particles like silica and alumina.

Summer is here—and with it, an endless thirst. We find ourselves reaching for water more often, and a sip of cold water can feel almost magical in the heat.

Here's a quick fun fact: when you drink cold water, it absorbs heat from your body as it warms up, helping lower your core temperature slightly. At the same time, temperature sensors in your mouth and throat send signals to your brain, creating an instant sensation of relief and freshness.

There are many ways to chill water. But one of the simplest—and most fascinating—is the clay pot, or matka.

How does this humble, curvy vessel keep water cool without using a single unit of electricity?

What is a clay pot made of?
A traditional clay pot is crafted from natural earthen clay, typically soil rich in fine mineral particles such as silica and alumina.

This clay, often collected from riverbeds or alluvial soil, is easy to shape when wet. Once formed, the pot is air-dried and then fired in a kiln, which hardens it.

Crucially, it is left unglazed. This means the surface remains unsealed, filled with microscopic pores invisible to the naked eye. And those tiny pores are the secret.

An everyday mystery
Take a closer look at a clay pot on a hot afternoon. You may notice tiny droplets forming on its outer surface. The sides feel slightly damp to the touch—yet the water inside remains noticeably cooler than the surrounding air.

Is the pot leaking? Is it absorbing moisture from outside? Or is something else happening?

The answer lies in a process your own body uses every day.

The science: evaporation
Evaporation is the process by which a liquid turns into vapour without boiling.

The microscopic pores in the clay allow small amounts of water to slowly seep to the outer surface. When this water meets warm air, it begins to evaporate.

But evaporation requires energy. To turn into vapour, the water absorbs heat—and it takes this heat from the water inside the pot. As a result, the remaining water cools down.

In simple terms: as water evaporates from the surface, it carries heat away with it.

If the pot were glazed (like ceramic plates), these pores would be sealed. No water would seep out, and the cooling effect would not occur.

Why it works better in some places
Clay pots are most effective in hot, dry conditions. In humid air, evaporation slows down because the air is already saturated with moisture. That's why matkas work best during dry summer heat.

A smart and sustainable design
The rounded shape of the pot increases its surface area, allowing more evaporation. Air flowing around it further enhances the cooling effect. And all of this happens without electricity, chemicals, or plastic.
Long before refrigerators, people relied on simple physics to stay cool.

In a world driven by machines and energy consumption, the clay pot stands as a quiet reminder: sometimes, the smartest technology is also the simplest.

Source:https://www.thehindu.com/children/why-does-water-stay-cool-in-a-claypot-even-in-peak-summers/article70698273.ece
https://www.thehindu.com/