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SCIENCE & TECHNOLOGY

Scientists at IIMM labs discover leads for vital medicines from 'Bhang'

Scientists at a pioneer research institute in Jammu have got some leads for important drugs from the prohibited Bhang (cannabis/marijuana) which may help to beat cancer pains apart from curing epilepsy and proving beneficial in treating many more ailments.



'Cannabis can yield miracle drugs to beat anxiety, pains etc'

Council of Industrial and Scientific Research-Indian Institute of Integrative Medicine (CSIR-IIIM)-a prominent research institute in Jammu informed that the drug can only be put to human use after manufacturing under Good Manufacturing Practice (GMP) conditions followed by certain mandatory clinical trials, which in this case requires special permission or licensing from certain quarters.

Scientists spearheading this research at the Medicinal Chemistry Research Group of CSIR-IIIM informed that important parameters for the drug like animal experimentation have also been successfully accomplished along with extraction process including chemical standardisation and markers quantification.

Others associated with this work/research informed that further progress on the drug now hinges on securing necessary approvals for the transportation of scientific materials for GMP batch manufacturing and Good Laboratory Practice (GLP) safety, toxicological and formulation studies.

When contacted, IIMM Director, Dr. Zabeer Ahmed informed: "We have applied to the Excise Department of J&K Government for the mandatory approval to transport the research material and the GMP batch manufacturing for the clinical trials and the Excise Department has also framed the rules in this regard." He further said that the Excise Department has put up the file with the Finance Department.

Source: https://www.dailyxcelsior.com/scientists-at-iim-labs-discover-leads-for-vital-medicines-from-bhang/#google_vignette

Dated: March 29, 2025, [dailyxcelsior.com](https://www.dailyxcelsior.com)

Bio-concrete from urine: Researchers develop sustainable building material



Researchers at the University of Stuttgart have used microbial processes to produce environmentally friendly bio-concrete from urine as part of a "wastewater-bio-concrete-fertilizer" value chain. With the project extension granted by the Baden-Württemberg Ministry of Science, Research, and the Arts, the focus now shifts to product optimization and practical testing.

Concrete is booming. Around 4 billion tons of cement are processed into concrete and used worldwide every year. With serious consequences for the environment. "Conventional cement is typically fired at temperatures around 1,450 degrees. This consumes a lot of energy and releases large quantities of greenhouse gases," says Professor Lucio Blandini, Head of the Institute for Lightweight Structures and Conceptual Design (ILEK) at the University of Stuttgart.

Environmentally friendly microbial production process

Researchers from three institutes at the University of Stuttgart are developing a new type of building material—bio-concrete. Thanks to its high compressive strength, it can not only replace traditional sandstone and, in some cases, cement-based concrete. It can potentially also be produced entirely from waste materials and therefore has a significantly lower ecological footprint.

The researchers are using a plentiful yet previously overlooked raw material: human urine. They have successfully tested their method in a feasibility study. The work is published in the journal *npj Materials Sustainability*.

"Bio-concrete is produced through biomineralization. This is a biotechnological process in which living organisms produce inorganic material through chemical reactions," explains Maiia Smirnova, research associate at ILEK.

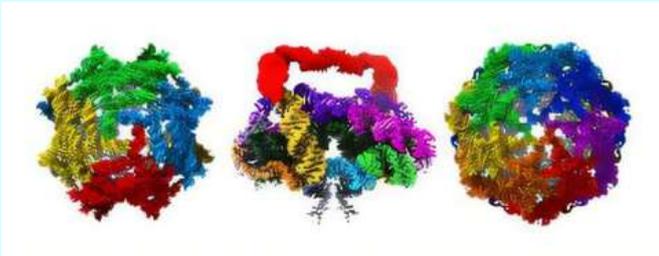
Source: <https://techxplore.com/news/2025-05-bio-concrete-urine-sustainable-material.html>

Dated: May 06, 2025, <https://phys.org/>



SCIENCE & TECHNOLOGY

Researchers discover large protein-free RNA structures



Ribonucleic acid (RNA) molecules may be best known for their job ferrying the genetic information encoded in DNA to a cell's protein factories, but these molecules aren't just a middleman for protein production. In fact, some RNA molecules don't code for proteins at all and serve various other important functions in cells, such as regulating gene expression and catalyzing chemical reactions. However, the functions of many non-coding RNAs remain mysterious.

Now, searching for hints about the roles of a trio of non-coding RNA molecules produced en masse in bacterial cells, researchers from Stanford University, the Department of Energy's SLAC National Accelerator Laboratory, and the National Institutes of Health stumbled upon unexpectedly extravagant, multistrand complexes made entirely of RNA, which the team reported in the journal *Nature*.

"We discovered that these RNAs fold into beautiful symmetric complexes without any proteins or other molecules to support them. This is something we haven't seen before in nature," said Stanford graduate student and lead author Rachael Kretsch.

The discovery expands our current understanding of how RNA assembles into large, complex structures, and it could even inspire the design of similar structures for biomedical or biotechnological purposes, the researchers said.

CryoEM reveals unexpected structures

One way researchers figure out the function of a non-coding RNA is by getting rid of it in a cell. The way the cell subsequently dies can provide information on the RNA's function. But this approach doesn't work for the three particular RNAs studied here because cells can survive without them.

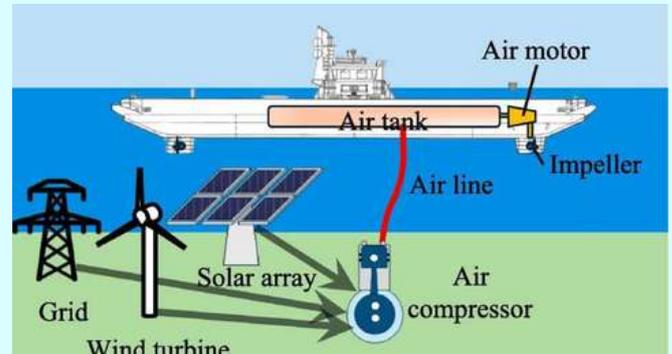
Hoping to gain more insights into their biological functions, the research team decided to analyze the 3D structures of the RNA molecules. They took their samples to SLAC, where they used cryogenic electron microscopy (cryoEM) to produce detailed images of the molecules.

For each RNA, the team expected the images to show one strand of the molecule to be folded into a compact structure. Instead, they saw unfamiliar large complexes made up of multiple strands of the same RNA—structures they didn't know were possible without the support of proteins.

Source: <https://phys.org/news/2025-05-large-protein-free-rna.html>

Dated: May 6, 2025, <https://phys.org/>

Scientists develop pneumatic propellers that could replace diesel engines in ferry boats



Scientists say they have created a methodology that could replace two diesel engines powering a ferry boat with pneumatic propellers.

The two air motors replacing the diesel engines, according to the scientists, generated 250 kW each and provided enough power to take the ferry back and forth on a predetermined route within the context of Finland's maritime transport system. The study in the journal *Energy Conversion and Management* was "conducted to evaluate the technical and economic feasibility of replacing the conventional diesel engine with a pneumatically propelled one on an existing ferry boat within the context of Finland's maritime transport needs," the scientists write.

"It is demonstrated that pneumatic propulsion, while unconventional, holds promise as a sustainable and energy-efficient alternative to conventional marine engines, particularly for short-distance ferry operations."

Diesel engines are currently the most reliable internal combustion engines in terms of power density control and robustness. However, they require large amounts of diesel fuel to power them. Moreover, they can be fairly noisy, and worse, they are a major source of pollution.

"Replacing these engines with pneumatic ones is a cleaner and more effective option as these engines can also be incorporated into the ferry body to store air either within the structure of the boat or on auxiliary tanks, which will enhance buoyancy," said Abdul Hai Alami, the lead author.

The research findings are based on experimental results and realistic calculations as the authors use polytropic relations to calculate the behavior of the air from the time it is pressurized in the tank to its flowing into the air motor used to rotate the propeller.

"Using this method for maritime vessels is attractive from economic, practical and environmental vantage points and could be easily adapted to most ferry boats even in harsh conditions," added Alami, who is also Sharjah University's professor of sustainable and renewable energy.

Source: <https://techxplore.com/news/2025-04-scientists-pneumatic-propellers-diesel-ferry.html>

Dated: April 21, 2025, <https://phys.org/>



ENVIRONMENT

India's first-ever seed germination database coming up

This initiative of the Ecological Restoration Alliance-India, offering more than 1,000 germination techniques, intends to help restoration practitioners, nursery managers, and native plant enthusiasts be more successful with their greening endeavours



Aegle marmelos

An informal network of individuals and organisations working together to foster the knowledge and practice of ecological restoration of natural ecosystems in India is releasing a first-of-its-kind seed germination database on (April 16, 2025).

This free-access database, an initiative of the Ecological Restoration Alliance-India (ERA-I), offers more than 1,000 germination techniques for 465 native plant species. It intends to “make it easier for restoration practitioners, nursery managers, and native plant enthusiasts” to be more successful with growing native plants in nurseries.

“One of the fundamental and most practical steps in the process for ecological restoration is to create a native plant nursery, which requires the knowledge base of germination protocols. This database is the first step toward that goal,” conservationist Paul Blanchflower, director, Auroville Botanical Gardens, said. Auroville Botanical Gardens is one of nine institutional partners of ERA-I. The others include the Ashoka Trust for Research in Ecology and the Environment, the Nature Conservation Foundation (NCF), and the Wildlife Trust of India.

“Most people who established nurseries of native plants have learnt about seed ecology through trial and error. Now that there is a wealth of learning and information available, a database such as this can surely make it easier for people starting new native plant nurseries or even some of the older nurseries can now perhaps grow the species that they did not manage before,” Divya Mudappa, a senior scientist at the NCF, said. Ms. Mudappa and Mr. Blanchflower are in the ERA-I's 11-member steering committee, which includes Anita Varghese, Aparna Watve, Pradip Krishen, and Rita Banerji.

India's restoration pledge

The ERA-I said India has pledged under the Bonn Challenge to restore 26 million hectares of degraded land, a major issue across the globe. The Bonn Challenge is a global initiative launched in 2011 to restore degraded and deforested lands, intending to bring 350 million hectares under restoration by 2030.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/indias-first-ever-seed-germination-database-coming-up/article69452115.ece>
Dated: April 16, 2025, The Hindu

RNA-based antiviral offers strong defence against deadly agri virus

In India, CMV is responsible for 25-30% yield losses in banana plantations. In pumpkins, cucumbers, and melons, infection rates can soar up to 70%. Affected plants develop a mosaic discoloration, stunted growth, and commercially unviable fruits



CMV infects more than 1,200 plant species, including critical food crops like cucumbers, squash, and cereals, and medicinal plants.

Every year, farmers battle an invisible, relentless, formidable enemy: plant viruses. Unlike bacteria or fungi, which can be controlled with pesticides or fungicides, there is no straightforward way to cure crops of viral infections. According to the U.N. Food and Agriculture Organisation (FAO), plant pests and diseases destroy nearly 40% of the world's annual crop, costing the world more than \$220 billion. Of that, plant viruses alone contribute to over \$30 billion in losses each year.

In response, scientists started tapping the power of RNA-based technology to help plants defend themselves better — just the way our immune system fights off viruses. At Martin Luther University Halle-Wittenberg in Germany, a team of researchers recently reported developing an RNA-based antiviral agent that confers strong protection against cucumber mosaic virus (CMV), a widespread and destructive plant virus.

CMV infects more than 1,200 plant species, including critical food crops like cucumbers, squash, and cereals, and medicinal plants. It spreads through small sap-sucking insects called aphids. With nearly 90 aphid species capable of transmitting CMV, outbreaks are often difficult to contain. In India, CMV is responsible for 25-30% yield losses in banana plantations. In pumpkins, cucumbers, and melons, infection rates can soar up to 70%. Affected plants develop a mosaic discoloration, stunted growth, and commercially unviable fruits.

HIGS and SIGS

In the new study, the researchers used RNA silencing, a natural defence mechanism found in plants. When a virus infects a plant, it introduces double-stranded RNA (dsRNA), which is a red flag for the plant's immune system.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/rna-based-antiviral-offers-strong-defence-against-cucumber-mosaic-virus/article69497221.ece>
Dated: April 28, 2025, The Hindu



Environment

Malabar Flash butterfly spotted at The Nilgiris

Malabar Flash, a reddish, dark brown butterfly makes an appearance in the Kundah slopes of the Nilgiris, making it its first ever photographic record in the hills



Butterfly pioneer Wynter Blyth MA mentions a butterfly in his book *Butterflies of the Indian Region* that came out in 1957. He talks of it as a rare one, observed in the Mettupalayam Ghats and Sri Lanka, in thick jungles often at an elevation between 1000 and 3000 ft. Later, Larsen Torben, who studied butterflies particularly in Asia and Africa, draws a reference to this butterfly in his research paper published in 1987. He mentions that it was recorded from Nadugani area in Gudalur as part of a Japanese butterfly collection.

“They are talking about the Malabar Flash or the Rapala Lankana, a butterfly belonging to the Blues family and considered very rare. It’s a dream species of any butterfly enthusiast,” says Vinod Sriramulu, founding member of Wynter Blyth Association (WBA) in the Nilgiris that creates awareness and works towards conservation of butterflies in the region. “It finds a mention only in the works of these two people so far. We have never documented this species in the last 10 years,” he says adding that he sighted it by chance along the Kundah slopes of the Nilgiris, at an elevation of 1500 ft.

“This make it the first ever photographic record of this species in the Nilgiris as of Feb, 2025,” he says, adding that it has surfaced after a long time, much to the excitement of butterfly enthusiasts.

This sighting has re-established the presence of this rare butterfly in the Nilgiris, a reminder of the thriving biodiversity of the region. “I was photographing puddling butterflies along the road leading to Kundah. All of a sudden, I noticed a bright one fly by and rest on a leaf for a few seconds, basking in the sun. It flew away shortly thereafter. I waited for a few more hours, and also revisited the forests hoping to catch another glimpse. But that never happened,” says Vinod as he draws attention to the fact that this may be just the second photographic record of the Malabar Flash in Tamil Nadu.

Source: <https://www.thehindu.com/sci-tech/energy-and-environment/malabar-flash-butterfly-spotted-at-the-nilgiris/article69474096.ece>
Dated: April 26, 2025, *The Hindu*

Arctic plant life shifts as warming drives major changes in biodiversity



Rapid climate change is upending plant life in the Arctic. A new study in *Nature* shows how one of the most fragile ecosystems on Earth is changing as warming is up to four times faster in the Arctic than on Earth on average. Scientists around the world have been studying the biological changes in more than 2,000 experimental plots in the northern polar region for 40 years. “Changes in vegetation are an early warning signal that the entire ecosystem will change, with consequential effects on wildlife, humanity and Earth’s natural ability to store carbon,” says Anne Bjorkman, researcher in plant ecology at the University of Gothenburg.

Extensive changes

The results of the study do not give clear results on which plant species are favored at the expense of others. But the researchers are certain that the treeless mountains and mountain meadows will change in appearance.

“The change in what grows on a site is extensive, with new species appearing and/or existing species disappearing on almost 60% of the experimental plots. There are many factors that determine how plant life changes at a particular site, such as how wet the soil is, or how windy it is. This alter the microclimate experienced by the plants. “In general, we see that shrubs benefit from a longer growing season, they simply steal the sunlight from species with a low growth habit,” says Robert Bjork, researcher at the Arctic Ecosystem at the University of Gothenburg.

Evergreen plants are winners

Evergreen plants such as lingonberries and crowberries, as well as some summer green plants such as willow bushes, will also have a competitive advantage when snow covers the ground fewer days a year in the Swedish mountains. Many plants on the tundra are low-growing to withstand strong winds, and if it gets warmer, more species can become established, increasing biodiversity in some places. “But where the shrubs take over, biodiversity will decrease, and then the question is where the outcompeted species will go. There are no colder regions than the Arctic, and some species may disappear completely from large areas,” says Bjorkman.

Source: <https://phys.org/news/2025-04-arctic-life-shifts-major-biodiversity.html>
Dated: April 30, 2025, , *The Hindu*



AGRICULTURE

Scientists create first 'pangenome' of Asian rice

Emphasising that not all pest problems require chemical solutions, the AEO explained that overuse of pesticides has not only reduced biodiversity but also led to frequent pest outbreaks due to monoculture practices



Farmer Ilapuram Anil Reddy and Agricultural Extension Officer Nagarajun at the former's farm at Pedda Masanpally village of Thoguta Mandal in Siddipet district.

In a move aimed at encouraging sustainable farming, Agricultural Extension Officer (AEO) of Yellareddypet cluster in Siddipet district T. Nagarjun has introduced biocontrol agents and biofertilisers to promote eco-friendly pest and nutrient management methods. The AEO recently organised demonstrations at Rythu Vedhika and on the field of farmer Ilapuram Anil Reddy in Pedda Masanpally village of Thoguta Mandal.

Mr. Nagarjun emphasised that not all pest problems require chemical solutions. "The overuse of pesticides has not only reduced biodiversity but also led to frequent pest outbreaks due to monoculture practices. Monitoring tools like pheromone, sticky traps, and light traps help detect pest thresholds before crop losses occur," he said.

During the field demonstrations, biocontrol techniques were applied to tomato, chilli, and brinjal crops. Chemical fertilisers were replaced with biofertilisers including Azotobacter (for nitrogen), phosphorus and potash-solubilising bacteria, and zinc-solubilising bacteria — microorganisms that naturally enhance soil fertility and reduce the dependency on synthetic inputs.

To control plant diseases, microbial agents such as *Trichoderma viride*, *Pseudomonas*, and *Bacillus subtilis* were used. These microbes exhibit antagonistic activity by inhibiting plant pathogens through enzymes and antibiotics.

For managing sucking pests like thrips, whiteflies, and jassids, farmers employed biopesticides including *Beauveria bassiana*, *Verticillium lecanii*, and *Isaria*. Insect pests such as caterpillars, borers, and leaf miners were tackled using *Metarhizium* and *Bacillus thuringiensis*.

Source: <https://www.thehindu.com/sci-tech/agriculture/sustainable-farming-pests-drop-to-zero-in-chilli-tomato-crops-after-adoption-of-biocontrol-agents/article69473224.ece>

Dated: April 22, 2025, *The Hindu*

Scientists unlock genetic key to higher peanut yield

A team of 19 researchers from Australia and China assessed the genome-wide diversity of 269 peanut accessions, including wild species, landraces, and improved species



Rajeev K. Varshney from Murdoch University with a clutch of peanuts.

A team of 19 researchers from Australia and China have unlocked the genetic key to developing higher-yielding varieties of peanut or groundnut, a major food and oil seed crop in India. Their pan-genome analysis, revealing the structural variation associated with seed size and weight traits in peanut (*Arachis hypogaea* L.), was published in the latest edition of *Nature Genetics*, a peer-reviewed scientific journal.

The researchers from Western Australia's Murdoch University, Henan Agricultural University, Shanghai Jiao Tong University, and the Shandong Academy of Agricultural Sciences assembled a pan-genome of peanut expected to serve as a fundamental resource for the genetic enhancement of legume crops.

A pan-genome represents the entire range of genes within a population or species, encompassing both unique and shared genetic material. The study marks three Chinese lead authors – Kunkun Zhao, Hongzhang Xue, and Guowei Li – as equal contributors. Among its other authors are Annapurna Chitikineni and Rajeev K. Varshney from Murdoch University.

The researchers studied the genome-wide diversity of 269 peanut accessions, including 61 wild species, landraces and improved species. They found significant genomic variations and highlighted two of the most critical traits that affect peanut yield: seed size and weight.

Accession refers to a distinct sample or group of plant material, typically representing a single species or cultivar, collected from a specific location at a particular time. A landrace is a local cultivar improved by traditional agricultural methods.

Source: <https://www.thehindu.com/sci-tech/science/scientists-unlock-genetic-key-to-higher-peanut-yield/article69502180.ece>

Dated: April 29, 2025, *The Hindu*



AGRICULTURE

Flower strips could save apple farmers pest control costs



Planting wildflowers in apple orchards could save farmers up to £3,000 per hectare a year, according to a new study.

lower strips create a home for a team of helpful insects—like ladybugs, hoverflies, and lacewings—that eat harmful pests such as aphids. This natural team of pest controllers helps keep apple trees healthy with less need for chemical sprays.

This study, published in the *Journal of Agricultural Economics*, builds on previous research from a University of Reading team that found flower strips can reduce damage from pests (rosy apple aphids) by up to 32% in bad pest years.

Dr. Charlotte Howard, lead author from the University of Reading, said, "Flowers attract helpful insects that work hard to keep pests under control. Farmers could save money while boosting biodiversity and letting nature do some of the heavy lifting in looking after their crops. There's still more to learn about all the benefits of planting flower strips."

Right place, right results

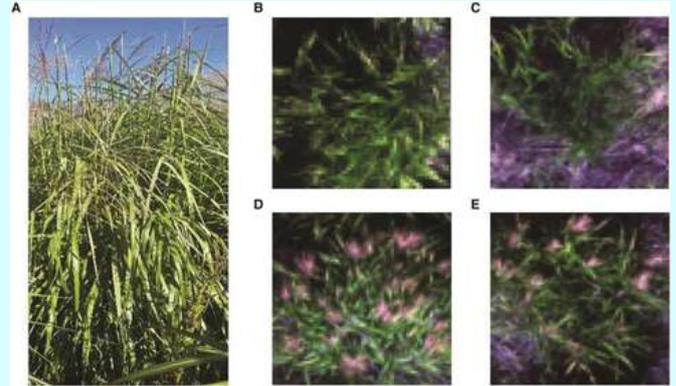
The team looked at real apple orchards over two years—some with flower strips and some without. They counted how many apples were damaged by pests and worked out how much money farmers could save by having fewer damaged apples. In years when there were lots of pests, flower strips helped save a significant amount of money after accounting for costs—up to £2,997 per hectare. Even in years with fewer pests, the flower strips still paid for themselves when planted at the edge of orchards.

The researchers tried different places to put the flower strips—including at the edge of the orchard replacing grass, or at the edge replacing apple trees.. Putting flowers in the right place was more effective at boosting orchard profits than other factors, including government payments for planting flowers, or how many years the flowers lasted before needing to be replanted.

Source: <https://phys.org/news/2025-04-apple-farmers-pest.html>

Dated: April 28, 2025, <https://phys.org/>

New approach makes AI adaptable for computer vision in crop breeding



Example cases of plant with emerging inflorescences from ground A), plants not yet heading B, C), and plants after heading D, E) from UAV imagery collected in the 2020 season. Credit: *Plant Physiology* (2025). DOI: 10.1093/plphys/kiaf132

Scientists developed a machine-learning tool that can teach itself, with minimal external guidance, to differentiate between aerial images of flowering and nonflowering grasses—an advance that will greatly increase the pace of agricultural field research, they say. The work was conducted using images of thousands of varieties of *Miscanthus* grasses, each of which has its own flowering traits and timing.

Accurately differentiating crop traits under varied conditions at different points in the growing cycle is a formidable task, said Andrew Leakey, a professor of plant biology and of crop sciences at the University of Illinois Urbana-Champaign, who led the new work with Sebastian Varela, a scientist at the Center for Advanced Bioenergy and Bioproducts Innovation, which Leakey directs. The new approach should be applicable to numerous other crops and computer-vision problems, Leakey said. The findings are reported in the journal *Plant Physiology*.

"Flowering time is a key trait influencing productivity and the adaptation of many crops, including *Miscanthus*, to different growing regions," Leakey said. "But repetitive visual inspections of thousands of individual plants grown in extensive field trials is very labor intensive."

Automating that process by collecting images via aerial drones and using artificial intelligence to extract the relevant data from those images can streamline the process and make it more manageable. But building AI models that can distinguish subtle features in complex images usually requires vast amounts of human-annotated data, Leakey said. "Generating that data is very time-consuming. And deep-learning methods tend to be very context-dependent."

This means that when the context changes—for example, when the model must distinguish the features of a different crop or the same crop at different locations or times of year—it likely will need to be retrained using new annotated images that reflect those new conditions, he said.

Source: <https://phys.org/news/2025-04-approach-ai-vision-crop.html>

Dated: April 24, 2025, www.phys.org



HEALTH

Marriage within closed communities can spike disease risk, finds out CCMB study



Left: Dr. Sarath Chandra Mouli Veeravalli, Center: Dr. Vinay K. Nandicoori, Right: Dr. K Thangaraj
bottom left: Dr Divya Tej Sowpati, bottom right: Dr Pratheusa Machha

The high incidence of a type of Spondylitis in the Reddy community living in a particular region of Andhra Pradesh has been identified by medical experts.

The disease called Ankylosing Spondylitis is a type of arthritis that causes inflammation in the joints and ligaments of the spine.

A study by the Hyderabad-based, CSIR-CCMB has identified that one of the main reasons for this high incidence is the practice of endogamy or marrying within small communities and presence of the HLA B 27:04 risk gene, a genetic variant that increases the likelihood of developing a disease.

“We found a high incidence of ankylosing spondylitis disease in the Reddy community, who dwell in a specific geographical region of Andhra Pradesh,” said Dr. Sarath Chandra Mouli Veeravalli, Rheumatologist from Krishna Institute of Medical Sciences, Hyderabad, and one of the authors of this study.

High risk marriages

Marrying close relatives or within small communities is a high risk factor for population-specific diseases, says the latest study by the Centre for Cellular and Molecular Biology (CCMB). India is a land of rich cultural and genetic diversity with numerous distinct populations. Earlier studies have shown many population-specific hereditary diseases. Such diseases are most often associated with novel genetic mutations.

Earlier studies have also shown the high risk of congenital diseases in consanguineous marriages, which is marriage between two people who are closely related by blood. This can include first cousins and second cousins. These marriages are common in South Asia, North Africa, and the Middle East.

Source: <https://www.siasat.com/marriage-within-closed-communities-can-spike-disease-risk-finds-out-ccmb-study-3190066/>
Dated: March 05, 2025, <https://www.siasat.com/>

When festive fun can turn hazardous: the hidden dangers of adulterated henna

A lot of commercially-available mehendi is adulterated with paraphenylenediamine, a synthetic compound that can cause severe allergic reactions



For centuries, mehendi has been an essential part of Indian celebrations, symbolising joy and auspicious beginnings at weddings and festivals. Traditionally made from the crushed leaves of the Lawsonia inermis plant, natural mehendi or henna, has been valued for its cooling properties and the gentle, reddish-brown stain it imparts. However, a growing body of reports about burns, allergic reactions, and even long-term skin damage after mehendi application has raised an important question: is all mehendi truly safe today?

The problem with modern mehendi

To meet the rising demand for faster, darker stains, many commercially available mehendi products are now mixed with additives and chemicals. One such chemical is as paraphenylenediamine (PPD), a synthetic compound used to intensify and quicken colour development, producing a near-black stain within hours.

“Natural henna is generally safe and gives a brown to red color. But most commercially available mehendi is adulterated with PPD,” explains D. Dinesh Kumar, president of the Tamil Nadu branch of the Indian Association of Dermatologists, Venereologists and Leprologists (IADVL) and chief dermatologist at Dr. Dinesh Skin & Hair Clinic, Chennai. “PPD can cause severe allergic reactions, leading to burns, blisters, and long-term skin sensitisation. While permitted in controlled concentrations for use in hair dyes under international regulations, it is not approved for direct application on the skin. When mixed into mehendi, often without disclosure, it turns a traditionally safe cosmetic into a potential hazard.”

Allergic reactions and burns

When adulterated mehendi containing PPD is applied to the skin, the chemical can rapidly penetrate the outer barrier and provoke a delayed hypersensitivity reaction — marked by a severe immune response. In susceptible individuals, this manifests as intense itching and burning within hours of application, swelling, redness, and inflammation along the design, formation of fluid-filled blisters or ulcers. In severe cases, permanent scarring and pigment changes can occur.

Source: <https://www.thehindu.com/sci-tech/health/when-festive-fun-can-turn-hazardous-the-hidden-dangers-of-adulterated-hennalarticle69500611.ece>
Dated: May 02, 2025, *The Hindu*



HEALTH

Persistent hoarseness or sore throat over two weeks could indicate serious vocal cord issues and require medical attention

Hoarseness or change in voice persisting for more than two weeks should never be ignored, say doctors, as a hoarse voice could be due to causes such as voice abuse or more serious conditions such as vocal cord nodules, polyps, infections, neurological conditions, or even cancer

Voice disorders span a broad spectrum, ranging from mild hoarseness to more serious conditions involving structural or neurological causes. Conditions such as vocal cord inflammation (laryngitis), where the voice box becomes inflamed and causes hoarseness or loss of voice, to laryngeal cancer (vocal cord cancer), are significant health concerns in India, contributing to a substantial burden of head and neck cancers.



In India, laryngeal cancer incidence data from population-based cancer registries and national surveys estimates 2.76 cases per 1,00,000. According to these studies, including those conducted by the National Cancer Registry Programme of India and report by the International Journal of Head and Neck Surgery, laryngeal cancer accounts for 3-6% of all cancers in men, with age-adjusted incidence rates ranging from 1.26 to 8.18 per 100,000 population. The 5-year survival rate for laryngeal cancer in India is approximately 28%.

Common causes often overlooked

Suhel Hasan, senior consultant, head of department of ENT, Mazumdar Shaw Medical Centre, Narayana Health, Bengaluru highlights the most common voice cord issues. Voice abuse -- common among teachers, singers, public speakers, and call center workers -- often leads to conditions like teacher's nodules or screamer's nodules. Both prolonged speaking and short bursts of shouting can injure the vocal cords.

According to Raghavi Vishnu Prasanna, consultant laryngologist, Shri VAS Clinic, SIMS Hospital, Vadapalani, any hoarseness or change in voice persisting for more than two weeks should never be ignored. "A hoarse voice could be due to causes like voice abuse or more serious conditions such as vocal cord nodules, polyps, infections, neurological conditions, or even cancer," she notes. Dr. Hasan emphasises that chronic coughing, throat clearing, and infections can also strain the vocal cords.

Source: <https://www.thehindu.com/sci-tech/health/persistent-hoarseness-or-sore-throat-over-two-weeks-could-indicate-serious-vocal-cord-issues-and-require-medical-attention/article69504712.ece>

Dated: April 30, 2025, The Hindu

IIT Madras-led research team develops biosensor for pre-eclampsia testing in pregnant women

The low-cost diagnostic test has the potential to be used to detect other diseases such as cancer and Alzheimer's, say researchers



A team of researchers has developed a biosensor platform to screen pregnant women for eclampsia, a serious complication marked by the onset of seizures.

Pre-eclampsia, which can lead to eclampsia if left untreated, is a life-threatening condition that occurs during pregnancy. Eclampsia poses significant risks to both pregnant women and newborns, making rapid, on-site, and affordable screening essential for timely diagnosis and early intervention.

The multi-institutional research, led by IIT Madras, has developed a point-of-care testing using fibre optics sensor technology as a possible alternative to existing technologies. The current methods to detect pre-eclampsia are time-consuming and require a lot of infrastructure and trained personnel, making them inaccessible in remote areas and resource-limited settings. A diagnostic test must be sensitive, specific, and quick.

The research team, comprising V.V. Raghavendra Sai and Ratan Kumar Chaudhary from the Department of Applied Mechanics and Biomedical Engineering; Narayanan Madaboosi from the Department of Biotechnology; Jitendra Satija, Centre for Nanobiotechnology, Vellore Institute of Technology; and Balaji Nandagopal and Ramprasad Srinivasan from Sri Sakthi Amma Institute of Biomedical Research, Sri Narayani Hospital and Research Centre, Vellore, developed the diagnostic test. The findings of their research were published in the peer-reviewed journal Biosensors and Bioelectronics.

Mr. Raghavendra Sai said, "Placental growth factor (PIGF) is an angiogenic blood biomarker used for pre-eclampsia diagnosis. We have established the plasmonic fibre optic absorbance biosensor (P-FAB) technology to detect PIGF at femtomolar level using polymethyl methacrylate-based u-bent polymeric optical fibre (POF) sensor probes."

Source: <https://www.thehindu.com/news/national/tamil-nadu/iit-madras-led-research-develops-biosensor-for-pre-eclampsia-testing-in-pregnant-women/article69500977.ece>

Dated: April 29, 2025, The Hindu



S&T COOPERATION FOR GLOBAL SOUTH

FAO and the UN Office for South-South Cooperation reaffirm joint commitments to further mainstream South-South and Triangular Cooperation



FAO's Director of the South-South and Triangular Cooperation Division (PST), Mr Anping Ye, met this week with UN Office for South-South Cooperation (UNOSSC) Director, Ms Dima Al-Khatib, to discuss new and ongoing fruitful joint collaborations on South-South and Triangular Cooperation (SSTC).

Since 1974, UNOSSC has been promoting, coordinating and supporting South-South and triangular cooperation within the United Nations system and globally.

FAO's portfolio of SSTC projects has also dramatically grown in recent years, in line with the increasing institutionalization of SSTC in the Organization's programme.

The two organizations discussed a series of important joint collaborations. UNOSSC has recently launched a new e-module Leveraging South-South and Triangular Cooperation to Accelerate Transformation Towards Sustainable Development developed with financial contributions from FAO and other key UN agencies. During the event, FAO reaffirmed its commitment to work closely with UNOSSC to further promote this key tool at regional and country levels. During the meeting, FAO, once again, expressed its appreciation of UNOSSC's dedicated work on the module.

The meeting with Ms Al-Khatib also focused on the imminent signing of two new joint project documents on Climate Smart Agriculture in the Fergana Valley, and on Irrigation Water and Land Management in the Sahel region. "This collaboration is a testament to the continued support and efficient work undertaken by both agencies to further mainstream SSTC towards the achievement of the Sustainable Development Goals," said Mr Aping Ye. "I am very glad to see that our joint efforts have resulted in the development of two key projects that will further mainstream and operationalize South-South and triangular Cooperation at country and regional levels" he added.

Source: <https://unsouthsouth.org/2025/03/05/fao-and-the-un-office-for-south-south-cooperation-reaffirm-joint-commitments-to-further-mainstream-south-south-and-triangular-cooperation/>
Dated: March 5, 2025, <https://unsouthsouth.org/>

CSW69: Elevating Voices of Grassroots Women's Organizations through South-South and Triangular Cooperation



The Beijing Platform for Action (BPfA) was adopted at a time of hope when democratic and human rights institutions were being strengthened; social movements were strong, supported and resourced; and trust in global institutions, multilateralism and the United Nations was high." This year marks its 30th anniversary amid economic uncertainty and a shifting geopolitical landscape, with growing demands for a new era of multilateralism.

Various reports feeding into the Beijing+30 Review noted uneven progress and persistent challenges. The synthesis report prepared by UNWomen raised that:

- 10% of women and girls remain in extreme poverty
- women still have only 64% of legal rights of men
- proportion of women with Internet access still low at 65%
- 2 billion women and girls still have no social protection
- half of the world's women and girls face conflict-related sexual violence
- women still carry 2.5X more unpaid care work than men
- only 4% of aid goes to programmes with gender equality as main objective

The call to action at CSW69 includes greater attention to the reality on the ground for women in the Global South, for context-specific prioritization and responses, and for greater solidarity among and for women across the North and South.

At a roundtable discussion during CSW69 with UNWomen, Huairou Commission, Oxfam and Spain, UNOSSC Director Dima Al-Khatib highlighted that the global community needs to more effectively leverage all available assets, knowledge, tools, and resources in responding to this call, with a particular focus on women at the "frontlines" – the women at the grassroots. Strengthening the linkages between Beijing+30 and BAPA+40 at the regional and grassroots level will help move goals and aspirations forward, she said.

The Second High-level United Nations Conference on South-South Cooperation, or BAPA+40 was a Summit in 2019 where Member States reviewed, reaffirmed and strengthened the Buenos Aires Plan of Action that was adopted in 1978, which elevated the immense potential of South-South and triangular cooperation for achieving development goals.

Source: <https://unsouthsouth.org/2025/03/17/csw69-elevating-voices-of-grassroots-womens-organizations-through-south-south-and-triangular-cooperation/>

Dated: March 17, 2025, https://unsouthsouth.org



S&T COOPERATION FOR GLOBAL SOUTH

World Water Day: Empowering Communities through South-South Cooperation



South-South trust fund projects – financially managed by UNOSSC and implemented by United Nations partners – are bringing clean water and sanitation to those who need it most. The impact is tangible: communities across the Global South are gaining access to safe drinking water and dignified sanitation, improving health outcomes and economic opportunities in the process. For example, in the drought-prone hills of northern Eswatini, 41-year-old Temhlanga Manana remembers when her family's only water source was a distant river. "Our area is prone to droughts," she recalls, describing how she once walked long distances to fetch water, which was often unsafe.

India, Brazil and South Africa (IBSA) Fund project implemented by UNDP, solar-powered boreholes now pump clean water to communal taps. Over 1,200 people from 171 households have safe water close to home, and two primary schools (serving 374 students and 23 teachers) are connected to a reliable water supply. For residents like Temhlanga Manana, this means better health and an end to what was a daily struggle to find water. "We have just started but already see the potential to grow our market beyond our town," she says, referring to the time and energy she can now invest in her family and soap-making business.

In the Municipality of Viana, Angola, access to water, sanitation, and hygiene (WASH) services was limited, impacting public health and quality of life. Through a South-South cooperation initiative supported by the IBSA Fund and implemented by UNICEF, a project is under implementation to enhance WASH services in the region. This initiative not only will improve access to clean water and sanitation facilities, but also set a new benchmark for WASH management in Angola. The project underscores the need for collaborative efforts in addressing critical infrastructure requirements in developing countries.

In the Federated States of Micronesia, particularly in Chuuk State, remote communities face challenges in accessing clean drinking water. To address this the India-UN Development Partnership Fund provided 15 solar water purification systems. These systems harness solar energy to purify water, providing sustainable and reliable access to safe drinking water for these communities. This initiative not only improves health outcomes but also demonstrates the potential of renewable energy solutions in addressing water scarcity.

Source: <https://unsouthsouth.org/2025/03/21/world-water-day-empowering-communities-through-south-south-cooperation/>
Dated: March 21, 2025, <https://unsouthsouth.org/>

Inclusive and Technological Innovations for Urban Disaster Risk Management and Resilience



Resilient and inclusive cities are fundamental to achieving global commitments such as the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction, and the Paris Agreement on Climate Change. These cities ensure no one is left behind by actively involving all community members, particularly marginalized groups like persons with disabilities and older persons, in resilience planning and decision-making.

In this context, the United Nations Office for South-South Cooperation (UNOSSC), the United Nations Office for Disaster Risk Reduction Global Education and Training Institute (UNDRR GETI), and the Pan American Health Organization (PAHO/WHO) co-organized the 5th Joint Certificate Training programme from 12 to 26 March 2025.

This year's training series featured three live sessions focusing on disability-inclusive urban health management, elderly and disability-inclusive disaster response, and the critical role of technology in transforming disaster risk management and urban resilience. The programme were attended by over 1,400 participants from 140+ countries and territories, with over 40% women, and 53 persons with disability.

During Opening Session 1, led by UNDRR, on 12 March, Dima Al-Khatib, Director of UNOSSC, reinforced the need for inclusive, sustainable, and resilient urban environments, highlighting the role of South-South and triangular cooperation in advancing technological and policy innovations. "Under the China-UN Global South-South Development Facility, UNOSSC strives to empower developing nations to exchange experiences, co-develop adaptive technologies, and implement localized resilience strategies," said Dima Al-Khatib.

Kamal Kishore, Special Representative of the United Nations Secretary-General (SRSG) for Disaster Risk Reduction and Head of UNDRR, emphasized the urgent need for inclusive disaster risk reduction that addresses the vulnerabilities of at-risk groups, and called for increased international cooperation to ensure the meaningful inclusion of all groups in disaster preparedness and response.

Source: <https://unsouthsouth.org/2025/03/27/inclusive-and-technological-innovations-for-urban-disaster-risk-management-and-resilience/>

Dated: March 27, 2025, <https://unsouthsouth.org/>



OTHERS

Blood of man bitten by hundreds of snakes leads to strong anti-venom

Researchers have found that a combination of antibodies in the blood and another drug could shield mice against 13 kinds of venom



Representative image. An American man named Timothy Friede has subjected himself to more than 200 snakebites and 700 injections of venom over 18 years.

For millennia, there have been stories of people who tried to make themselves immune to poison by regularly ingesting small, non-lethal doses of it. The practice is called mithridatism after the Pontic king Mithridates VI (135-63 BC), who reputedly immunised himself to various poisons this way.

Mithridatism is no longer practised today because scientists have developed safer, surer ways to protect the body against many toxins. A famous example is vaccines, which work by exposing the body to a weakened virus so that the immune system learns to fight a non-weakened virus.

U.S. researchers published a paper in *Cell* reporting that an American man named Timothy Friede had subjected himself to more than 200 snakebites and 700 injections of venom over 18 years to immunise himself against their deadly effects. Injuries and deaths due to snakebites are hard to prevent, especially in India, because they usually occur in areas with poor access to antivenoms and because each snake's venom requires a specific set of antibodies to fight.

Fortuitously, the researchers found that a combination of antibodies in Mr. Friede's blood and a drug called varespladib could shield mice against 13 kinds of venom and partially defend against six more. This is a step towards the long-sought broadly neutralising antibodies — drugs that can defend people against most, if not all, venoms.

Source: <https://www.thehindu.com/sci-tech/science/blood-of-man-bitten-by-hundreds-of-snakes-leads-to-strong-anti-venom/article69534744.ece>

Dated: May 03, 2025, The Hindu

Urban spider found building soundproof webs to keep noise out

India's urban centres are notorious for their noise pollution; the new study raises questions about what its findings mean for spiders living in such places



A funnel-weaving spider (Agelenopsis pennsylvanica). The new study raises questions about what its findings mean for animal communities living in rapidly urbanising places around the world.

The next time you sweep away a cobweb without a second thought, consider this: the silken structure is an engineering marvel. According to new research published last week in *Current Biology*, a North American spider species can change how its webs transmit vibrations. The authors have reported that spiders in urban environments can build webs that filter out loud ambient vibrations. Conversely, spiders from quieter rural spaces build webs that amplify biologically relevant vibrations they need to pick up in their noisy environment.

Webs in folklore and science

Spiders and their remarkable weaving abilities have been celebrated in folklore for thousands of years. West African folklore tales of Ananse, the trickster spider that could turn human, celebrate him as a wise creator. In Greek mythology, Arachne was a skilful woman who defeated Athena in a contest by weaving a flawless tapestry. She was turned into a spider in her afterlife, and goes on to create beautiful webs, or so the tale tells us.

Webs are tools of creation in mythology as well as material science. Spider silk is known to be an amazing natural material with unique properties. It has inspired researchers to develop materials derived from spider silk with applications in tissue engineering and regenerative medicine. They are also studying the unique combination of strength and flexibility in spider silk for use in textile production.

A few decades ago, researchers began to study how vibrations in webs transmit critical information for spiders. For the first time, however, researchers from the University of Nebraska-Lincoln, Brandi Pessman and Eileen Hebets, have shown that spiders can alter how they receive vibratory information in loud environments.

Source: <https://www.thehindu.com/sci-tech/science/funnel-weaving-spider-soundproof-webs-urban-areas-noise-pollution/article69500656.ece>

Dated: April 29, 2025, The Hindu



OTHERS

IIA researchers chart Sun's subsurface weather

According to the study, the plasma's currents shift with the Sun's magnetic heartbeat and could have a far-reaching influence on space weather and earth

An international team of solar physicists led by the Indian Institute of Astrophysics (IIA) have traced giant tides of plasma beneath the Sun's surface at a region called near-surface shear layer (NSSL).

According to a study published in the *Astrophysical Journal Letters*, the plasma's currents shift with the Sun's magnetic heartbeat and could have a far-reaching influence on space weather and earth.

"The near-surface shear layer (NSSL) extending to about 35,000 km in depth is a critical region beneath the Sun's surface. It is marked by distinct rotational behaviours that vary with depth and changes, over space and time, that relate to active region magnetic fields and the solar cycle," said the Department of Science and Technology.

It added that astronomers have probed the dynamic inner weather of the Sun — plasma currents just beneath its surface at the NSSL, that pulse in step with its 11-year sunspot cycle.

Apart from IIA, researchers from Stanford University (USA), and the National Solar Observatory (NSO, USA) have traced how these hidden flows shift over time, potentially reshaping our understanding of solar dynamics in general and how the Sun's interior connects to its outer magnetic behaviour in particular.

Employing helioseismology — an advanced technique that tracks sound waves as they travel through the Sun — the team observed changes in the movement of solar material using more than a decade of data from NASA's Solar Dynamics Observatory/Helioseismic and Magnetic Imager (SDO/HMI) and the ground-based Global Oscillations Network Group (GONG) of National Solar Observatory (NSO), USA.

Fascinating patterns

The analysis led by Professor S.P. Rajaguru and PhD student Anisha Sen from IIA revealed fascinating patterns — surface plasma flows converge toward active sunspot latitudes, but reverse direction midway through the NSSL, flowing outward to form circulation cells.

"These flows are strongly influenced by the Sun's rotation and the Coriolis force — the same force responsible for the spin of hurricanes on earth," the department said. "To validate our findings, we zoomed in on a massive sunspot region using 3D velocity maps. The localised flow patterns we observed matched the global trends — confirming both surface inflows and deeper outflows," said lead author Anisha Sen.

Source: <https://www.thehindu.com/sci-tech/science/iaa-researchers-chart-the-suns-subsurface-weather/article69522295.ece>

Dated: May 01, 2025, The Hindu

Bone collector: a macabre caterpillar

Predatory caterpillars are extremely rare and the bone collectors found in Hawaii will even eat each other, researchers said



A new carnivorous caterpillar that wears the remains of its prey has been dubbed the "bone collector".

The odd insect is only found on the Hawaiian island of Oahu. It creeps along spider webs, feeding on trapped insects and decorating its silk case with their body parts.

There are other meat-eating caterpillars that "do lots of crazy things, but this takes the cake," said study author Dan Rubinoff with the University of Hawaii at Manoa.

Scientists think the case might act as camouflage, allowing the caterpillar to feast on the spider's ensnared meals without getting caught.

A host of caterpillars native to Hawaii use silk glands to spin protective cases studded with lichen, sand, and other materials. This one is the first to use ant heads and fly wings. "It really is an astonishing type," said Steven Montgomery, an entomology consultant in Hawaii who was not involved with the new study.

The findings were published in the journal *Science* on April 24. Scientists found just 62 of the carnivorous caterpillars in over 20 years of observing.

Predatory caterpillars are extremely rare and the bone collectors found in Hawaii will even eat each other, researchers said.

The bone collector's origins date back at least 6 million years, making the caterpillars more ancient than the Hawaiian islands themselves. Today, they dwell on an isolated patch of mountain forest alongside invasive species.

Source: <https://www.thehindu.com/sci-tech/science/bone-collector-a-macabre-caterpillar/article69497208.ece>

Dated: April 27, 2025, The Hindu