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SCIENCE & TECHNOLOGY

IIT Bombay scientists develop water-pollutant detecting device 'AroTrack'

The device uses a protein-based biosensor to detect harmful pollutants like phenol and benzene from water samples.

AroTrack device developed at IIT Bombay

In a significant development for sustainable environmental management, scientists at the Indian Institute of Technology Bombay (IIT-Bombay) have introduced AroTrack, an economical and portable device to accurately detect harmful pollutants such as phenol or benzene in water.

Scientists claim that the device can be a game-changer given the increasing water pollution due to industrialisation, urbanisation, and unregulated effluent discharge.

AroTrack device uses proteins typically found in bacteria living in heavily polluted environments to effectively identify multiple aromatic pollutants in water. Once mixed in the water sample, the protein undergoes a highly selective ATP hydrolysis chemical reaction if an aromatic compound is present in the sample. This reaction is expressed with a change in the colour of the protein solution, which AroTrack can then detect. The device is highly robust and compact, measuring slightly smaller than a small projector.

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Professor Ruchi Anand from the Department of Chemistry, Professor Rajdip Bandyopadhyaya from the Department of Chemical Engineering and their team at IIT Bombay introduced a simple and affordable biosensing device capable of detecting harmful compounds such as, phenol, benzene, and xylenols.

The key component of the device is a biosensing module called MopR - a sensitive sensor for detecting phenol. Ms. Anand's research team engineered it from the *Acinetobacter calcoaceticus* bacteria in 2017. MopR is both selective and stable, meaning it can detect pollutants even in complex environments with a high degree of precision.

Researchers at IIT Bombay have further diversified the MopR biosensor to detect other pollutants from the benzene and xylenol groups by engineering mutations in the bacterial protein. "The protein biosensing is very specific as the protein sensing pocket is tailor-made for the ligand (ion or molecule, like phenol or benzene). We have engineered mutations in the DNA of the protein sequence that can give mutant versions of the protein that now sense different molecules, creating a battery of sensors. Each sensor is particularly designed for a ligand," Ms. Anand explains.

Once interfaced with an in-house, multi-channel monitoring apparatus, the MopR-based sensor forms the core of the newly developed aromatics tracking device—AroTrack. Talking about how the AroTrack detects the pollutants using the biosensor modules, Mr. Bandyopadhyaya explained, "AroTrack contains a light emitting diode [LED]-phototransistor assembly, that shines a light of appropriate wavelength through the sample and detects how much is absorbed. A more intense colour generates a higher absorbance."

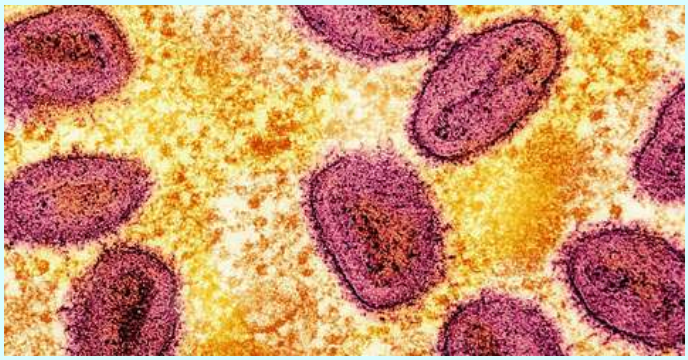
The overall cost of the device is a minimum of $ 50 [less than ₹5,000]. Mr. Bandyopadhyaya said that AroTrack was born out of the philosophy to make field-usable analytical devices, based on translating analytical capabilities generated in the laboratory into actual field-ready devices. "It is designed so that almost any user, technically trained or layman, may quickly learn and generate accurate data for traditionally difficult to measure and distinguish aromatic xenobiotic pollutants," he said.

Due to its low cost, battery-operated nature, and portability, AroTrack can be ideal for rural and low-income settings that often lack resources and have difficulty accessing expensive laboratory tests, Ms. Anand said, "We are currently trying to increase the type of pollutants to biphenyl aromatics and pollutants that are complex aromatics."

Source:https://www.thehindu.com/sci-tech/science/iit-bombay-scientists-develop-water-pollutant-detecting-device-arotrack/article68883355.ece
Dated: November 19, 2024, The Hindu

Optical Biosensor rapidly detects Monkeypox Virus

The technology could allow clinicians to diagnose the disease at the point of care rather than wait for lab results.



An undated colorized transmission electron micrograph of mpox virus particles (pink) found within an infected cell (yellow), cultured in the laboratory, captured at the National Institute of Allergy and Infectious Diseases (NIAID) Integrated Research Facility (IRF) in Fort Detrick, Maryland.

A new variant of human monkeypox has claimed the lives of approximately 5% of people with reported infections in the Democratic Republic of the Congo since 2023, many of them children. Since then, it has spread to several other countries. In addition, a different but rarely fatal monkeypox variant was responsible for an outbreak that has spread to more than 100 countries since 2022. There is an urgent need for faster and more cost-effective diagnostic tools to curb the spread of mpox and to prepare for the possibility of a future global pandemic.

Researchers from University of California San Diego School of Medicine, and Boston University have now developed an optical biosensor that can rapidly detect monkeypox, the virus that causes monkeypox disease. The technology could allow clinicians to diagnose the disease at the point of care rather than wait for lab results. The study was published on November 14, 2024 in Biosensors and Bioelectronics.

In the clinic, mpox symptoms such as fever, pain, rashes and lesions resemble those of many other viral infections. So it is not easy for clinicians to distinguish monkeypox from these other diseases by just looking at the patient. A PCR test is expensive, requires a laboratory, and can take days or weeks to get results. The Boston University lab has developed optical biosensors for detecting the viruses that cause Ebola hemorrhagic fever and COVID-19, among others.

The researchers used samples collected from the lesions of a patient with laboratory-confirmed mpox. They briefly incubated the samples with monoclonal monkeypox antibodies that bind to proteins on the surface of the virus. The virus-antibody complex was then transferred into tiny chambers on the surface of silicon chips on the sensor that were treated to fix these nanoparticles.

Shining precise wavelengths of red and blue light simultaneously on the chips caused interference, which resulted in slightly different responses when the virus-antibody nanoparticles were present. A colour camera was used to detect this small signal and count individual particles with high sensitivity. The biosensor assay easily discriminated mpox samples from these other viruses within two minutes.

Source:https://www.thehindu.com/sci-tech/science/optical-biosensor-rapidly-detects-monkeypox-virus/article68872523.ece
Dated: November 19, 2024, The Hindu

SCIENCE & TECHNOLOGY

IIT Bombay's space start-up tests its green propulsion system in space

The PSLV Orbital Experimental Module is a versatile initiative by the Indian Space Research Organisation (ISRO) designed to provide a cost-effective platform for on-orbit experiments

Space tech start-up, Manastu Space has successfully test fired their first Green Propulsion System in space on December 31, 2024

Space tech start-up, Manastu Space, started by Indian Institute of Technology (IIT) Bombay has successfully test fired their first Green Propulsion System VYOM 2U onboard PSLV C60 in space on December 31, 2024, at 8:50 p.m. in Lucknow. The Green Propulsion System is a non-toxic, environmentally friendly alternative to conventional chemical propulsion systems that are being researched to find efficient propellants that have a minimal impact on the environment and human health.

Manastu Space was founded in 2017 by alumni Tushar Jadhav from the Department of Aerospace Engineering 2014 batch and Ashtesh Kumar from the Department of Mechanical Engineering 2017 batch. Led by a team of experts in propulsion systems, satellite technology, and advanced materials, the technology has been developed in collaboration and mentoring with IIT Bombay, where many initial prototyping and critical technologies were developed under Professor Jayesh Bellare from Chemical Engineering, Professor Parag Bhargava from Metallurgical Engineering & Materials Science, and Professor Amol Gokhale from Department of Mechanical Engineering.

Tushar Jadhav, Chief Executive Officer (CEO) of Manastu Space said that the PSLV Orbital Experimental Module, or POEM, is a versatile initiative by the Indian Space Research Organisation (ISRO) designed to provide a cost-effective platform for on-orbit experiments. POEM transforms the fourth stage of the PSLV rocket into a free-flying testbed in low Earth orbit, offering startups, research institutions, and universities an affordable way to validate their technologies in space.

Source:https://www.thehindu.com/sci-tech/science/iit-bombays-space-start-up-tests-its-green-propulsion-system-in-space/article69054269.ece
Dated: January 02, 2025, The Hindu

Bioengineers develop construction kit for 'smart cell' design

Rice University bioengineers have developed a new construction kit for building custom sense-and-respond circuits in human cells. The research, **published** in the journal Science, represents a major breakthrough in the field of synthetic biology that could revolutionize therapies for complex conditions like autoimmune disease and cancer.

"Imagine tiny processors inside cells made of proteins that can 'decide' how to respond to specific signals like inflammation, tumor growth markers or blood sugar levels," said Xiaoyu Yang, a graduate student in the Systems, Synthetic and Physical Biology Ph.D. program at Rice who is the lead author on the study.

"This work brings us a whole lot closer to being able to build 'smart cells' that can detect signs of disease and immediately release customizable treatments in response."

The new approach to artificial cellular circuit design relies on phosphorylation—a natural process cells use to respond to their environment that features the addition of a phosphate group to a protein. Phosphorylation is involved in a wide range of cellular functions, including the conversion of extracellular signals into intracellular responses—e.g., transportation secretion a substance, reacting to a pathogen or gene expresion.

In multicellular organisms, phosphorylation-based signaling often involves a multistage, cascading effect like falling dominoes. Previous attempts at harnessing this mechanism for therapeutic purposes in human cells have focused on re-engineering native, existing signaling pathways. However, the complexity of the pathways makes them difficult to work with, so applications have remained fairly limited.

Thanks to Rice researchers' new findings, however, phosphorylation-based innovations in "smart cell" engineering could see a significant uptick in the coming years. What enabled this breakthrough was a shift in perspective:

Phosphorylation is a sequential process that unfolds as a series of interconnected cycles leading from cellular input (i.e. something the cell encounters or senses in its environment) to output (what the cell does in response). What the research team realized—and set out to prove—was that each cycle in a cascade can be treated as an elementary unit, and these units can be linked together in new ways to construct entirely novel pathways that link cellular inputs and outputs.

Source:https://phys.org/news/2025-01-bioengineers-kit-smart-cell.html
Dated: January 3, 2025, https://phys.org

ENVIRONMENT

IIT Kharagpur-led study says tropical rainforests could survive global warming

The study, published online in the Elsevier journal, was conducted on records of rainforests in sediments from Gujarat's Vastan coal mines deposited in coastal lagoons around 56 million years ago

Western Ghats from a view point at Agumbe, in Tirthahalli taluk of Shimoga district, which is called "Cherrapunjee of the South".

Tropical rainforests like the Amazon and Western Ghats, considered lungs of the planet, is likely to survive future global warming, according to a study led by Indian Institute of Technology, Kharagpur.

A release from the institution said that a team consisting of its scientists and also those from Calcutta University and University of Western Ontario studied detailed records of rainforests in sediments from Vastan coal mines of Gujarat deposited in coastal lagoons around 56 million years ago.

Coal layers in Vastan

The coal layers in Vastan are nothing but a spectacularly fossilised tropical rainforest containing a huge amount of plant and pollen remains as well as variety of mammals and insects that lived in these forests. India was a tropical island then, surrounded by oceans and Himalayas were yet to form. The period is known as Palaeocene-Eocene Thermal Maximum (PETM), when global carbon dioxide rose to an abnormally high level that the future global warming might reach.

"The study took several years of field and laboratory investigation. We had to date the sediments to confirm its PETM age and collected samples at centimetre intervals, analysed the pollens to understand how the tropical rainforest community evolved in response to such extreme global warming... The climate was also monitored by analysing oxygen isotopes in fossil teeth of small horse-like ungulate mammals that once roamed in these forests," Prof. Anindya Sarkar, lead researcher of IIT Kharagpur, was quoted as saying in the release.

The study has just been published online in the Elsevier journal, Global and Planetary Change. "We found a large anomaly in carbon isotopes exactly at 56 million years. This was such a characteristic signal for a super greenhouse globe with very high atmospheric carbon dioxide. The rainforest not only survived but also diversified during and after this global warming phase," lead author of the paper, Arpita Samanta, a former PhD student at IIT Kharagpur and currently assistant professor at Kolkata's Asutosh College, was quoted as saying.

Source:https://www.thehindu.com/sci-tech/science/iit-kharagpur-led-study-says-tropical-rainforests-could-survive-global-warming/article68863730.ece
Dated: November 16, 2024, The Hindu

New infectious diseases among bees threaten world's economies

More than 75% of food crops, fruits, and flowering plants need bees, wasps, beetles, flies, moths, and butterflies to yield successful harvests

A western honey bee rests on a clover flower in Frankfurt, Germany, July 12, 2024

A significant chunk of the world's agricultural productivity and nutritional security relies on small insect pollinators. More than 75% of food crops, fruits, and flowering plants need bees, wasps, beetles, flies, moths, and butterflies to yield successful harvests.

This is why threats to insect pollinators, including pesticides, pollution, and climate change, endanger the economies of entire countries. A new actor on this list is infectious diseases made worse by habitat loss.

While the declining populations of pollinators, particularly bees, has been well-documented in Europe and North America, data from biodiversity-rich regions like the Indian subcontinent are scarce. In fact, most of what scientists know about bees comes from research on managed western honey bees (Apis mellifera).

Diversity is better, again

"In many cases, wild bees are more efficient pollinators than the western honey bees. It is essential to study wild bee communities and look at their state of health," Corina Maurer, a postdoctoral researcher at ETH Zürich, wrote in an email to this reporter.

Research has uncovered the transmission of pathogens between managed honey bees and wild pollinators, a process called pathogen spillover and spillback. Western honey bees are often viral reservoirs and can infect wild species when they share habitats. These emerging infectious diseases also threaten the wider pollinator community.

Maurer and her team recently published a paper in Nature Ecology and Evolution exploring the presence of deformed wing virus and black queen virus in 19 wild bee and hoverfly species across different landscapes in Switzerland. They found higher loads of these pathogens in wild pollinators that used floral resources the honey bees accessed as well. The loads were 10-times higher among the wild pollinators in these shared habitats.

Source:https://www.thehindu.com/sci-tech/science/emerging-infectious-diseases-bees-habitat-loss-food-economies/article68878421.ece
Dated: November 18, 2024, The Hindu

ENVIRONMENT

Researchers document huge drop in African elephants in a half century

Fresh evidence of this comes in a study that documents alarming population declines at numerous sites across the continent over about a half century.

In this undated photo, an African elephant matriarch leads her calf away from danger in northern Kenya. A new study in Nature Ecology & Evolution demonstrates that elephants respond to individual names, one of the few animal species known to do so.

African elephants are Earth's largest land animals, remarkable mammals that are very intelligent and highly social. They also are in peril. Fresh evidence of this comes in a study that documents alarming population declines at numerous sites across the continent over about a half century.

Researchers unveiled what they called the most comprehensive assessment of the status of the two African elephant species - the savanna elephant and forest elephant - using data on population surveys conducted at 475 sites in 37 countries from 1964 through 2016.

The savanna elephant populations fell by about 70% on average at the surveyed sites and the forest elephant populations dropped by about 90% on average at the surveyed sites, with poaching and habitat loss the main drivers. All told, there was a 77% population decrease on average at the various surveyed sites, spanning both species.

Elephants vanished at some sites while their populations increased in other places thanks to conservation efforts. "A lot of the lost populations won't come back, and many low-density populations face continued pressures. We likely will lose more populations going forward," said George Wittemyer, a Colorado State University professor of wildlife conservation and chair of the scientific board of the conservation group Save the Elephants, who helped lead the study published in the journal Proceedings of the National Academy of Sciences.

Poaching typically involves people killing elephants for their tusks, which are sold illegally on an international black market driven mostly by ivory demand in China and other parts of Asia. Agricultural expansion is the top factor in habitat loss. The forest elephant population is estimated to be about a third that of savanna elephants. Poaching has affected forest elephants disproportionately and has ravaged populations of both species in northern and eastern Africa.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/researchers-document-huge-drop-in-african-elephants-in-a-half-century/article68858954.ece?cx_testId=81&cx_testVariant=cx_1&cx_artPos=4&cx_experienceId=EXPO56ZDYSGX&cx_experienceActionId=showRecommendations7EV8PP8TM51R64#cxrecs_s
Dated: November 12, 2024, The Hindu

Researchers develop captive breeding protocol for endangered catfish

Researchers at the Centre for Peninsular Aquatic Genetic Resources, Kochi, of the National Bureau for Fish Genetic Resources (NBFGR) claimed to have developed captive breeding protocol for the endangered black-collared yellow catfish found in the Chalakudy river.

The captive breeding programme of the fish began in 2020, and the first generation stock was successfully bred by the researchers, said Charan Ravi, a scientist at the centre.

The species, endemic to the river, has been classified as endangered in the International Union for Conservation of Nature (IUCN) Red List.

The development of the breeding technique will help in the conservation of the species, according to a communication issued by V.S. Basheer, Principal Scientist at the Centre.

NBFGR Director U.K. Sarkar noted that the development of the protocol would ensure the preservation of biodiversity in the Western Ghats, according to the communication.

Source:https://www.thehindu.com/news/national/kerala/researchers-develop-captive-breeding-protocol-for-endangered-catfish/article69058830.ece
Dated: January 04, 2025, The Hindu

ENVIRONMENT

Researchers identify another species of the genus Stellaria in West Bengal

In May, *Stellaria mcclintockiae*, a species of the same genus, was found on Nelliyampathy Hills. Like its Kerala 'cousin' Stellaria bengalensis too was discovered on muddy soil slopes at Kalimpong

Stellaria bengalensis

After a plant species of the genus Stellaria (family Caryophyllaceae) was reported from Kerala earlier this year, researchers have identified another member of the same genus at Kalimpong district in West Bengal.

Arya S., PG and Research Department of Botany, PSG College of Arts and Science, Coimbatore; and Harsh Singh, Centre for Advanced Studies in Botany, North-Eastern Hill University, Shillong, who were behind the discovery have named the annual herb *Stellaria bengalensis* after the State of West Bengal.

A paper on the finding was recently published in the journal Phytotaxa. *Stellaria bengalensis* is the second Stellaria species reported from India this year. Dr. Arya, who is from Kerala, was part of the team that had identified and described *Stellaria mcclintockiae*, a species found on the muddy slopes of the Nelliyampathy Hills in Palakkad district in May this year.

Like its Kerala 'cousin,' *Stellaria bengalensis* too was found growing on muddy soil slopes — at altitudes of 2,245-2,450 metres in the Sangser forest, Kalimpong. The plant was discovered two years ago during a revision of the family Caryophyllaceae, but the process of identifying it as a distinct species took almost two years.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/researchers-identify-another-species-of-the-genus-stellaria-in-west-bengal/article69043566.ece
Dated: December 31, 2024 , The Hindu

New research shows a quarter of freshwater animals are threatened with extinction

This extinction has been classified as vulnerable, endangered or critically endangered – due to compounding threats such as pollution, dams, climate change, and other threats

Illegal fires used to clear forests result in ash pollution of rivers, while unlicensed gold miners are dumping mercury into the water, according to Patricia Charvet.

Nearly a quarter of animals living in rivers, lakes and other freshwater sources are threatened with extinction, according to new research published.

"Huge rivers like the Amazon can appear mighty, but at the same time freshwater environments are very fragile," said study co-author Patricia Charvet, a biologist at Brazil's Federal University of Ceará.

Freshwater habitats – including rivers, lakes, ponds, streams, bogs and wetlands – cover less than 1% of the planet's surface, but support 10% of its animal species, said Catherine Sayer, a zoologist at the International Union for Conservation of Nature in England.

The researchers examined around 23,500 species of dragonflies, fish, crabs and other animals that depend exclusively on freshwater ecosystems. They found that 24% were at risk of extinction – classified as vulnerable, endangered or critically endangered – due to compounding threats from pollution, dams, water extraction, agriculture, invasive species, climate change and other disruptions.

"Most species don't have just one threat putting them at risk of extinction, but many threats acting together," said Ms. Sayer, a study-co-author. The tally, published in the journal Nature, is the first time that researchers have analysed the global risk to freshwater species. Previous studies have focused on land animals including including mammals, birds and reptiles.

Source:https://www.thehindu.com/sci-tech/energy-and-environment/new-research-shows-a-quarter-of-freshwater-animals-are-threatened-with-extinction/article69077805.ece
Dated: January 08, 2025, The Hindu

Researchers find bacteria that can clean up pesticides from soil to enhance crop yield

IIT Bombay researchers have identified bacteria that can consume toxic pollutants in the soil and produce helpful nutrients as a by-product

Image demonstrating the effects of bacterial mixture from the study.

Soil contamination is one of the major issues in the agriculture industry. These compounds are toxic, can inhibit seed germination, reduce plant growth, yield and also accumulate in seeds and plant biomass. Traditional approaches to remove these pollutants, like chemical treatments or soil removal, often turn out to be band-aid solutions – expensive and unable to tackle the problem completely.

To address this issue, a team of researchers from the Indian Institute of Technology Bombay (IIT Bombay) have identified bacteria from toxic environments. While doing so, they noticed that certain bacterial species, specifically from the genera Pseudomonas and Acinetobacter, were especially good at breaking down aromatic compounds. In a recent study published in the journal Environmental Technology and Innovation, researchers have used the power of specific bacterial species to remove organic pollutants from soil.

Professor Prashant Phale, from the Department of Biosciences and Bioengineering at IIT Bombay, under whose guidance Sandesh Papade carried out the research for his PhD. explained that these bacteria were isolated from contaminated soil and agricultural fields.

“They feed on pollutants, breaking them down into simpler, harmless, non-toxic compounds. In this way, they act as natural cleaners of polluted environments. Like feeding two birds with one scone, while breaking down aromatic pollutants, these bacteria were also found to convert insoluble forms of essential nutrients, such as phosphorus and potassium, into soluble forms and make them readily available to the plants. They also produce substances called siderophores, which help plants absorb iron in nutrient-limited environments.”

Source: https://www.thehindu.com/sci-tech/science/researchers-find-bacteria-that-can-clean-up-pesticides-from-soil-to-enhance-crop-yield/article69053410.ece
Dated: January 02, 2025 07, The Hindu

'Killer' fungal gene could provide key to control of plant diseases

A critical gene that leads to the synthesis of a protein known as Knr4 could be the key to what makes some fungal pathogens so virulent. Focusing prevention strategies on disabling or modifying this gene or the protein it encodes for, could provide new pathways for disease control.

In a new study, scientists at Rothamsted Research, in partnership with the University of Bath and the University of Exeter, used combined pathogen host modeling to map the cereal disease Fusarium interaction for the first time. This modeling looks at the genes that are active during infection and traces them to proteins that drive infection. The research is posted to the preprint server bioRxiv.

Starting with a genome of more than 14,000 genes, this targeted approach identified the protein Knr4 as a critical driver of infection for Fusarium Head Blight (FHB) and Septoria tritici blotch (STB)—two of the most common diseases of wheat. Knr4 is involved in regulating growth rate and sensitivity to stress, and appears to be necessary for full Fusarium virulence.

Knocking the gene out in Fusarium saw a complete inability of the pathogen to spread in the wheat spike and a similar deletion also resulted in a drop in virulence of Septoria.

"This protein is only found in fungi, not in plants or animals," said Dr. Erika Kroll, who led the study. "This means that if we target Knr4, we may be able to reduce the infectivity of pathogenic fungi without harming the wheat crop, ourselves, or other animals. This could be a game-changer for controlling these serious pathogens."

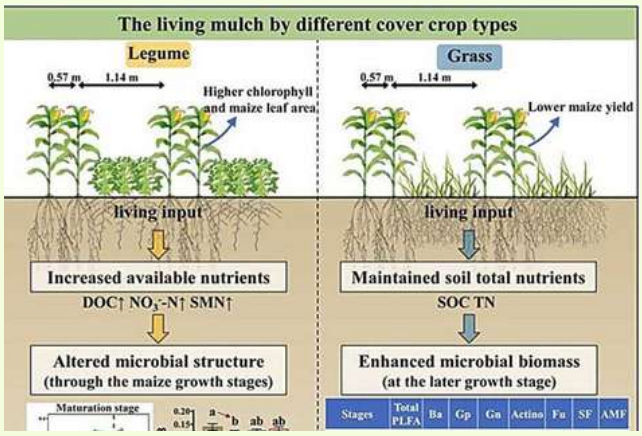
Kroll believes that this gene discovery approach is best thought of as exploring a city map, where roads connect key locations like houses, stores, workplaces and recreation areas. In a biological network, the connections represent interactions between genes.

Just as some intersections in a city are critical for traffic flow, certain genes serve as crucial "hubs" in the fungal network. If one of these essential genes is disrupted, such as Knr4, the network collapses, halting the fungus ability to survive and spread.

Source:https://phys.org/news/2025-01-killer-fungal-gene-key-diseases.html
Dated: January 9, 2025 , https://phys.org

AGRICULTURE

Cover crops as living mulch boost soil health and nutrient cycling, study finds



Researchers have discovered that using cover crops as "living mulch" between rows of maize can significantly improve soil health and nutrient cycling, offering a sustainable approach to agricultural management.

The research, conducted in Changtu County in northeastern China, investigated the effects of different types of cover crops—legumes, grasses, and a mixture of both—on soil properties and microbial communities.

Cover crops, planted during or after the main crop's growth, help prevent soil erosion, improve fertility, and increase the input of plant-derived nutrients. Soil degradation, driven by unsustainable farming practices, poses serious threats to food security and regional agricultural development.

Cover crops offer an integrated "use-and-maintain" solution to restore degraded farmland. While earlier research has focused on the effects of decaying cover crop residues, this study examined the impact of living cover crops growing alongside the main crop.

The research team from the Institute of Applied Ecology of the Chinese Academy of Sciences in Shenyang conducted a field experiment where maize was intercropped with different cover crop treatments.

The researchers found that legume cover crops increased dissolved organic carbon and available nitrogen in the soil, altering the microbial community structure and promoting carbon cycling. This alleviated microbial carbon limitation, thereby granting microbes easier access to the carbon they needed to thrive.

Grass cover crops, on the other hand, helped maintain soil carbon and total nitrogen levels while boosting overall microbial biomass, particularly among bacterial groups.

Source: https://phys.org/news/2025-01-crops-mulch-boost-soil-health.html
Dated: January 3, 2025, https://phys.org/

Investigating soil & nutrient impact on organic leafy greens crops in unheated, greenhouse-like high tunnel system

A recent study by scientists at the University of Florida sheds light on how soil and nutrient management practices significantly influence the productivity and quality of leafy green crops grown in high tunnel organic systems. The research provides valuable insights for organic farmers seeking to optimize crop yields while maintaining soil health and meeting market demands for high-quality produce.

Leafy greens, rich in essential vitamins and minerals, are increasingly in demand in the United States, with organic sales growing by over 24% between 2016 and 2021. Florida, a key producer of organic leafy greens crops, faces challenges in maintaining productivity due to subtropical conditions like temperature extremes, humidity fluctuations, and frequent rainfall. These challenges are compounded by sandy soils with low organic matter content, making water and nutrient management difficult. As high tunnel systems gain popularity among Florida growers, research is needed to evaluate their effectiveness in improving crop yields and quality under these conditions.

High tunnels, which are unheated greenhouse-like structures, are increasingly used in organic farming to extend growing seasons and protect crops from adverse weather conditions. Despite this growing interest in high tunnel organic vegetable production, limited information is available regarding optimizing nutrient management for organic leafy greens crops in Florida sandy soils.

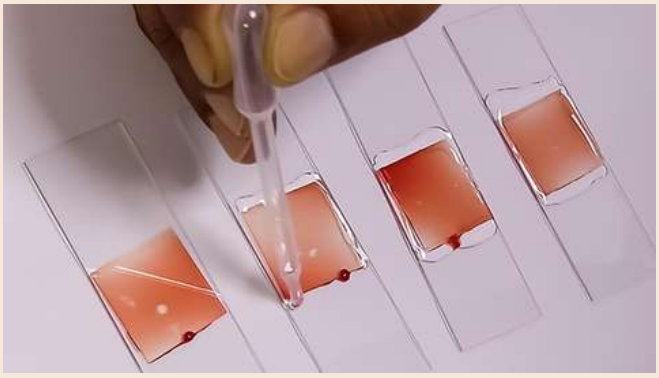
In this 3-year study, the cowpea cover crop as well as a range of soil amendments, nutrient inputs, and management techniques were examined to determine their impact on crop performance in high tunnels, within the context of crop rotation as required by organic vegetable production. The work is published in the journal HortScience.

Source:https://phys.org/news/2024-12-soil-nutrient-impact-leafy-greens.html
Dated: December 30, 2024, https://phys.org/

HEALTH

Accessible, affordable technology to detect anaemia transferred to ICMR

AnemiaPhone will enable access to rapid screening and diagnosis of iron deficiency at the point of need, Cornell University, which developed the technology, said



Iron deficiency is a leading cause of anaemia, a condition which can cause a range of symptoms

AnemiaPhone, a technology developed by Cornell University researchers to accurately, quickly, and cheaply, assess iron deficiency, has been transferred to the Indian Council of Medical Research (ICMR) for integration into its programmes for anaemia, women's health, and maternal and child health throughout the country. A release issued by Cornell University said that AnemiaPhone would enable access to rapid screening, and diagnosis of iron deficiency at the point of need.

Iron deficiency is a leading cause of anaemia, a condition which can cause a range of symptoms, from fatigue and shortness of breath to multi-organ failure and death. Anaemia affects 50%-70% of pregnant women in India.

AnemiaPhone has the potential to address current challenges in screening and diagnosis of iron deficiency anaemia within India's Anaemia Mukt Bharat programme, Bharati Kulkarni, Director, ICMR - National Institute of Nutrition, and former head of the ICMR's Reproductive, Child Health and Nutrition Division, said. She added that if it were scaled to its full capacity, it could play a pivotal role in India's healthcare landscape, where anaemia remains a significant concern, particularly among women and children.

Cornell University's statement added that the technology, a test strip that can be coupled with small, portable Wi-Fi or Bluetooth-enabled test strip readers, was developed and tested in the laboratories of Saurabh Mehta, David Erickson and Julia Finkelstein, founding director and co-directors of the Joan Klein Jacobs Center for Precision Nutrition and Health, and was formally transferred at no cost to India on November 7, 2024.

The technology requires a small finger stick, a drop of blood on a test strip similar to a COVID-19 home test, and a few minutes for the reader to assess. Then the information is uploaded to a clinical database via mobile phone, wireless tablet or computer. Healthcare workers can interpret the test and provide guidance, triage and referral, or intervention on the spot.

Source:https://www.thehindu.com/sci-tech/health/accessible-affordable-technology-to-detect-anaemia-transferred-to-icmr/article69076369.ece
Dated: January 08, 2025 , The Hindu

Loneliness and social isolation leads to alteration of specific proteins – new research

The study suggested that loneliness may lead to an increase in the levels of five specific proteins expressed in the brain; all the proteins identified as related to loneliness were "positively associated", meaning that people who feel lonely tend to have higher protein levels compared to those who do not feel lonely

The World Health Organization (WHO) has stated that about 25% of older people experience social isolation and 5%-15% of adolescents feel lonely

Human beings are inherently social. We thrive on connection, communication and shared experiences, which help shape our identities and foster a sense of belonging. Yet, in an increasingly digital and fast-paced world, feelings of loneliness and social isolation have become alarmingly common.

The World Health Organization (WHO) has stated that these feelings are widespread. About 25% of older people experience social isolation and 5%-15% of adolescents feel lonely. These figures are important since published studies have demonstrated that social isolation and loneliness are linked to increased risk of disease and death. Indeed, our own study, published in 2022, found that social isolation in older people carried a 26% increased risk of developing dementia. We also found that loneliness was associated with depression.

We wanted to follow up our previous study by understanding the underlying biological processes behind this link between social isolation and loneliness and health. Why is loneliness so bad for our bodies and minds?

Exploring proteins

In this collaborative study between the University of Cambridge and Fudan University, published in Nature Human Behaviour, we used data from 42,062 participants from the UK Biobank and studied 2,920 plasma proteins.

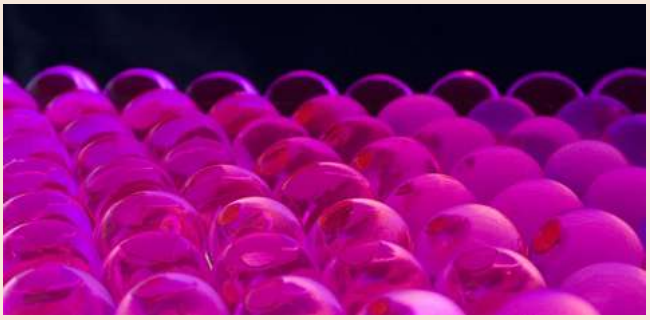
We investigated the association between proteins and self-reported loneliness and social isolation. We discovered that the proteins found to be significantly associated with loneliness and social isolation are also known to be implicated in inflammation as well as antiviral and immune responses.

Source:https://www.thehindu.com/sci-tech/health/loneliness-and-social-isolation-are-linked-to-specific-proteins-new-research/article69075578.ece
Dated: January 08, 2025, The Hindu

HEALTH

Hydrogel developed for targeted breast cancer therapy

The breakthrough is the outcome of collaborative research between the Indian Institute of Technology-Guwahati and Bose Institute, Kolkata



Rows of pink hydrogel. Researchers from the Indian Institute of Technology-Guwahati and the Bose Institute, Kolkata have developed an advanced injectable hydrogel for localised cancer treatment.

Researchers from the Indian Institute of Technology-Guwahati (IIT-G) and the Bose Institute, Kolkata have developed an advanced injectable hydrogel for localised cancer treatment.

A statement issued by the IIT-G said this hydrogel serves as a stable reservoir for anti-cancer drugs, releasing it in a controlled manner while sparing healthy cells from harm.

The findings of the research, expected to be revolutionary for breast cancer therapy, have been published in Materials Horizons, a journal of the Royal Society of Chemistry. The paper is co-authored by Debapratim Das along with his research scholars Tanushree Das and Ritvika Kushwaha from IIT-G's Department of Chemistry, and Kuldip Jana, Satyajit Halder, and Anup Kumar Misra from Bose Institute, Kolkata.

"Current treatments, such as chemotherapy and surgical interventions, often have severe limitations. Surgical removal of tumours is sometimes not feasible, particularly for internal organs. At the same time, chemotherapy's systemic delivery often results in harmful side effects by affecting both cancerous and healthy cells," the researchers said in the statement.

The team addressed these challenges by designing a hydrogel that delivers drugs precisely to the tumour site, ensuring localised action. Hydrogels are water-based, three-dimensional polymer networks capable of absorbing and retaining fluids. Their unique structure mimics living tissues, making them suitable for biomedical applications.

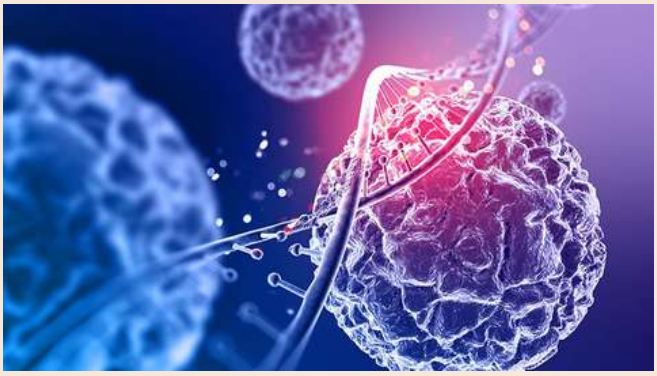
The hydrogel, composed of ultra-short peptides — biocompatible and biodegradable building blocks of proteins — is designed to remain insoluble in biological fluids, ensuring it stays localised at the injection site. It responds to elevated glutathione (GSH) levels, a molecule abundant in tumour cells.

Upon encountering high GSH levels, the hydrogel triggers a controlled drug release directly into the tumour, minimising its interaction with healthy tissues and reducing systemic side effects.

Source:https://www.thehindu.com/sci-tech/science/hydrogel-developed-for-targeted-breast-cancer-therapy/article69053846.ece
Dated: January 02, 2025, The Hindu

AIIMS, Delhi developing low cost adaptive cellular therapy for treatment of multiple myeloma

As of now, the therapy has been tested on animal models and has shown promising outcomes, the researchers said



(CAR) T - Cell therapy is a form of adaptive cellular therapy in which a patient's T cells are isolated, genetically modified and infused back in the patients body to recognise and kill cancer cells

Doctors at AIIMS, Delhi are in the process of developing a low cost antibody-based adaptive cellular therapy for the treatment of multiple myeloma, a form of blood cancer. This kind of therapy is expected to make advanced treatments like CAR-T cell therapies more affordable and accessible for patients in India.

The Chimeric Antigen Receptor (CAR) T- Cell therapy is a form of adaptive cellular therapy in which a patient's T cells are isolated, genetically modified and infused back in the patients body to recognise and kill cancer cells, said Mayank Singh, Additional Professor in the Department of Medical Oncology at Dr B R Ambedkar Institute Rotary Cancer Hospital, (BRAIRCH), AIIMS.

It is based on targeting B - Cell Maturation Antigen (BCMA) which helps to target specific tumour Antigens which are found in cancer cells especially in cases of multiple myeloma. "So the therapy developed by the AIIMS researchers recognises BCMA as a target on multiple myeloma cells to eliminate them," Dr. Singh said. As of now, the therapy has been tested on animal models and has shown promising outcomes, he said.

"We intend to take this CAR-T cell therapy for phase-1 clinical trials on humans in the near future to collect substantial evidence regarding its safety and efficacy. Our aim is to bring the cost of this therapy significantly down. There are other forms of CAR-T cell therapies, but the cost of these are very high," he said.

How do cancerous cells operate?

Cancer is characterised by the uncontrolled growth of cancerous cells. Generally, all cancer cells are derived from a single cell which has undergone a sequence of mutations that has converted it into a cancerous cell and these cancerous cells are involved in different symptoms associated with cancer, Dr. Singh explained.

Source:https://www.thehindu.com/sci-tech/health/aiims-delhi-developing-low-cost-adaptive-cellular-therapy-for-treatment-of-multiple-myeloma/article69018622.ece
Dated: December 23, 2024, The Hindu

HEALTH

Throw away that cigarette, increase life expectancy: new study underlines benefits of smoking cessation

One cigarette can steal 20 minutes of your life expectancy, researchers in the U.K. estimate

Smoking has, for long been associated with a number of health risks

The next time it feels like cigarette time, think about this fact before you take a puff: a single cigarette can potentially steal 20 minutes of your life expectancy. And the life that you do have left, is likely to be less healthy than it would be if you did not smoke. Researchers from University College London, arrived at this metric based on data from male and female mortality outcomes in the U.K., and in following up an older study from 2000. There are a number of caveats to this of course, including type of cigarette smoked, individual susceptibility, age of initiation etc, the researchers note etc.,

Smoking has, for long, been associated with a number of health risks: it is, in fact, the common risk factor when it comes to five of the top 10 causes of mortality in the world as of 2021. According to the World Health Organization (WHO), these include ischemic heart disease, stroke, chronic obstructive pulmonary disease (COPD), lower respiratory infections and trachea, bronchus and lung cancers. And yet, as per the National Family Health Survey - 5, 38% of men and nearly 9% of women in India over the age of 15 used tobacco. The WHO estimates that tobacco is one of the major causes of death and disease, in India and accounts for over 1 million deaths every year.

What does smoking do to your body?

If you think that an occasional cigarette does no harm and that it is only chain smokers who can get into trouble health-wise, think again. Smoked tobacco products contain over 7,000 chemicals including at least 250 known to be toxic or to cause cancer, the WHO states. It may start small with dry mouth, elevated blood pressure and a reduced sense of smell, but smoking can affect almost all parts of your body -- apart from the known cancers and non communicable diseases, it can also cause skin damage, hearing and vision loss, impact fertility and cause erectile dysfunction.

Source: https://www.thehindu.com/sci-tech/health/throw-away-that-cigarette-increase-life-expectancy-new-study-underlines-benefits-of-smoking-cessation/article69061139.ece
Dated: January 04, 2025, The Hindu

Millions of diabetes, heart disease cases globally linked to sugary drinks

The study estimated sugar-sweetened beverage-attributable type 2 diabetes and cardiovascular disease burdens across 184 countries in 1990 and 2020

A new study estimates that in 2020, 2.2 million new cases of type 2 diabetes and 1.2 million new cases of cardiovascular disease occur each year globally due to consumption of sugar-sweetened beverages, representing 9.8% and 3.1%, respectively, of all incident cases.

As per the study published in the journal Nature Medicine, in developing countries, the case count is particularly sobering. The highest sugar-sweetened beverage-attributable percentage burdens were in Latin America and the Caribbean and sub-Saharan Africa. In Latin America and the Caribbean, they contributed to nearly 24% of new diabetes cases and more than 11% of new cases of cardiovascular disease. In Sub-Saharan Africa, the study found that sugar-sweetened beverages contributed to more than 21% of all new diabetes cases. “From 1990 to 2020, the largest proportional increases in sugar-sweetened beverage-attributable incident type 2 diabetes and cardiovascular disease cases were in sub-Saharan Africa, 8.8% and 4.4%, respectively,” the study found.

Colombia, Mexico, and South Africa are countries that have been particularly hard hit. While more than 48% of all new diabetes cases in Colombia were attributable to consumption of sugary drinks, nearly one-third of all new diabetes cases in Mexico were linked to sugary drink consumption. In South Africa, 27.6% of new diabetes cases and 14.6% of cardiovascular disease cases were attributable to sugary drink consumption.

Sugary beverages are rapidly digested, causing a spike in blood sugar levels with little nutritional value. Regular consumption over time leads to weight gain, insulin resistance, and a host of metabolic issues tied to type 2 diabetes and heart disease, two of the world’s leading causes of death. Men are more likely than women to suffer the consequences of sugary drink consumption, as are younger adults compared to their older counterparts, the researchers say.

Source:https://www.thehindu.com/sci-tech/millions-of-diabetes-heart-disease-cases-globally-linked-to-sugary-drinks/article69085306.ece
Dated: January 13, 2025 , The Hindu

Group of 77 and China Celebrate 60th Anniversary

The Permanent Mission of Uganda to the United Nations, in its capacity as chair, organized celebrations to mark the 60th Anniversary of the Group of 77+China at the United Nations in New York.

"We celebrate our sixtieth anniversary at the time of widening financial and technological divide between developed countries and developing countries, persistent inequalities, increasing climate and disaster related risks," said H.E. Vincent Bagiire Waiswa, Permanent Secretary of Foreign Affairs of Uganda. "All these global challenges continue to negatively affect our efforts to achieve our respective national development goals and accelerate the implementation of the 2030 Agenda for Sustainable Development and achievement of the Sustainable Development Goals (SDGs)."

Established in 1964, the G77 is the largest intergovernmental organization of developing countries in the United Nations. Its name is derived from 77 founding members, but its membership has grown significantly to 134.

The theme of the 60th anniversary celebration is 60 years of Contribution of the Group of 77 and China to Global South Coalition in International Development and Politics.

The opening segment was addressed by H.E. Mr. Bagiire Vincent Waiswa, Permanent Secretary, Ministry of Foreign Affairs of Uganda; H.E. Mr. Adonia Ayebare, Ambassador, Permanent Representative of Uganda to the United Nations and Chair of G-77 and China; and H.E. Ambassador E. Courtenay Rattray, Chef de Cabinet, representing the Secretary-General of the United Nations.

"The Group of 77 has played a critical role, and advocated for the importance of the South-South cooperation modality within global discussions and Summits at the United Nations and beyond," said Mr. Samba Thiam, Senior Policy Development Advisor of the United Nations Office for South-South Cooperation, addressing a panel discussion following the opening. "Born 60 years ago in the struggles of its members for national independence, and against exploitation and oppression, the Group of 77 is the voice of the majority of the world population and its geographical location is home of a considerable share of the global natural resources, some of which play an important role in climate change mitigation." he added

Source:https://unsouthsouth.org/2024/11/04/group-of-77-and-china-celebrate-60th-anniversary/
Dated: November 4, 2024, https://unsouthsouth.org/

India-UN Fund Hosts High-Level Dialogue among Indian Parliamentarians and Partner Countries' Ambassadors

Twelve high-ranking Parliamentarians from India convened with Permanent Representatives to the United Nations from countries partnering with the India-UN Development Partnership Fund, for an interactive dialogue.

The event highlighted the Fund's achievements and provided an opportunity to jointly review the project portfolio, showcasing how it is helping partner countries advance the Sustainable Development Goals (SDGs) and address local challenges.

The India-UN Development Partnership Fund is a flagship initiative of India's commitment to South-South cooperation and sustainable development. Since its establishment in 2017 with a $150 million pledge, the Fund, managed by the United Nations Office for South-South Cooperation (UNOSSC), has supported 84 projects in 62 countries. Through Southern-owned and led, demand-driven projects, it focuses on eradicating poverty, fostering gender equality, and ensuring access to quality education, basic services, and economic opportunity across the developing world.

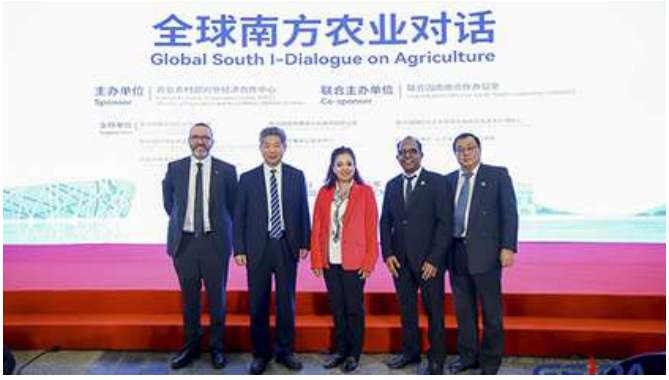
During the event, Honorable Member of the Indian Parliament, Professor Ram Gopal Yadav, affirmed "India has always been a champion of the South," underscoring India's dedication to supporting equitable sustainable development through South-South cooperation.

"Partnering with the United Nations in creating the India-UN Development Partnership Fund, we are supporting living examples of South-South cooperation. We do this from our own experiences on the ground, and how we scaled those to our 1.5 billion people," said H.E. Parvathaneni Harish, Ambassador Permanent Representative of India to the United Nations. "As India progresses, we want our friends to join us," he said, highlighting India's commitment to raise the voice of fellow countries from the South and working jointly through multilateral approaches.

In a collaborative effort to support the 2030 Agenda for Sustainable Development, the Fund operates with a strong emphasis on Least Developed Countries (LDCs), Landlock Developing Countries (LLDCs) and Small Island Developing States (SIDS), offering partnerships in various areas including climate resilience, livelihood development, health, education, agriculture, food security, and infrastructure.

Source:https://unsouthsouth.org/2024/11/07/india-un-fund-hosts-high-level-dialogue-among-indian-parliamentarians-and-partner-countries-ambassadors/
Dated: November 7, 2024, https://unsouthsouth.org

Agricultural Leaders Convene in Beijing to Strengthen South-South Cooperation



The Global South I-Dialogue on Agriculture (GSiDA), co-organized by the Foreign Economic Cooperation Center (FECC) of the Chinese Ministry of Agriculture and Rural Affairs and UNOSSC, was successfully held in Yanqing District, Beijing on November 8th. 2024

Themed around exploring new opportunities in the Global South, GSiDA built a multi-level dialogue platform for global agriculture development cooperation across more areas and in greater depth, better implementing the Global Development Initiative in the field of agriculture.

The dialogue gathered about 200 domestic and foreign representatives, from relevant domestic ministries such as the Ministry of Foreign Affairs, the Ministry of Commerce, the Ministry of Agriculture and Rural Affairs and the China International Development Cooperation Agency; international organizations such as UNOSSC, the UN's Food and Agriculture Organization (FAO), the World Food Programme (WFP) and the UN Resident Coordinator (UNRC) Office in China; and major financial institutions such as the World Bank and the African Development Bank.

Government representatives from developing countries, including Cape Verde, Morocco, Nigeria, Sri Lanka and Uganda; and representatives from departments of Agriculture and Rural Affairs of local governments, research institutes and enterprises joined the conference.

In his opening remarks, Zhang Lubiao, the director general of FECC, emphasized China's commitment to leveraging South-South cooperation as a platform to explore new models for agricultural development in the Global South. He highlighted the importance of fostering collaboration among developing nations to tackle shared agricultural challenges. FECC is willing to use this platform to expand and deepen the development cooperation in the Global South to multiple fields, including science and technology, economy and trade, and investment. It will also enhance the capacity of policy formulation and technological innovation. FECC will also promote the construction of a network platform for agriculture development cooperation in the Global South, fostering implementation of the initiatives of the United Nations Summit of the Future.

Source:https://unsouthsouth.org/2024/11/08/agricultural-leaders-convene-in-beijing-to-strengthen-south-south-cooperation/
Dated: November 8, 2024, https://unsouthsouth.org/

COP29: Catalyzing Impactful South-South and Triangular Cooperation Partnerships

A high-level global event focusing on leveraging UNOSSC's new South-South and Triangular Cooperation Solutions Lab to accelerate collaborative innovation and build coherent portfolios of new South-South and triangular cooperation solutions was held alongside COP29 in Baku, Azerbaijan.

The event aligned with the Lab's mission to address complex development challenges through co-design, incubation, financing and scaling of innovative solutions, all contributing to the 2030 Agenda for Sustainable Development. Current partners of the Lab (alphabetically) are: Gulf Organisation for Research and Development (GORD), International Atomic Energy Agency (IAEA), Masdar City, United Nations Economic Commission for Europe (UNECE), World Food Programme (WFP) and Zayed International Foundation for Environment.

Speakers highlighted the potential of collaborative innovation, coherent solution portfolios building, and building resilient development pathways.

Dr. Yousef Alhorr, Founding Chairman, Gulf Organisation for Research and Development (host of the event), said, "The path to achieving the United Nations Sustainable Development Goals is not one that can be walked alone. It requires a united effort, driven by partnerships and the sharing of knowledge, expertise, and resources across borders. By joining forces for the creation of the South-South and Triangular Cooperation Solutions Lab, we are continuing our commitment to driving innovation and fostering practical solutions that meet the unique development challenges of the Global South. As the UN rightly identifies across its 17 SDGs, collaboration is the key to transforming our collective ambitions into tangible impact. Through cooperation, we can unlock solutions that not only address the immediate needs of developing nations but also pave the way for long-term, sustainable progress across the globe."

"South-South and Triangular Cooperation are a key part of how the IAEA technical cooperation programme functions. We believe that our experience in institutionalizing mechanisms to support South-South and triangular cooperation offers valuable examples that can be replicated by other international organizations and in other settings," said Mr. Liu Hua, Deputy Director General, International Atomic Energy Agency.

Source:https://unsouthsouth.org/2024/11/14/cop29-catalyzing-impactful-south-south-and-triangular-cooperation-partnerships/
Dated: November 14, 2024, https://unsouthsouth.org/

OTHERS

How are zebrafishes able to repair damaged hearts?

Unlike humans, zebrafish grow new heart muscle cells: they have a regenerative capacity. When a zebrafish heart is damaged, it can fully restore its function within 60 days. Researchers have now successfully discovered that the protein Hmga1 plays a key role in heart regeneration in zebrafish. The Hmga1 gene is present in mice and humans too, and the Hmga1 protein is important during embryonic development when cells need to grow a lot. However, after embryonic development, the gene for this protein is turned off in mice and humans. The researchers discovered that Hmga1 in zebrafish removes molecular 'roadblocks' on chromatin, which is the structure that packages DNA. When it is tightly packed, genes are inactive. When it unpacks, genes can become active again. The Hmga1 protein clears the way allowing dormant genes to get back to work. While in human hearts, as in adult mice, the gene for the Hmga1 protein is not active after a heart attack, in zebrafish the gene for the Hmga1 protein is active during heart regeneration.

The researchers tested if the protein works similarly in mammals. They applied the Hmga1 protein locally to damaged mouse hearts and found that the Hmga1 protein stimulated heart muscle cells to divide and grow, significantly improving heart function. Surprisingly, cell division occurred only in the damaged area, precisely where repair was needed. There were no adverse effects, such as excessive growth or an enlarged heart.

Source:https://www.thehindu.com/sci-tech/how-are-zebrafishes-able-to-repair-damaged-hearts/article69058046.ece
Dated: January 04, 2025 , The Hindu

ZSI scientists discover new species of Indo-Burmese pangolin

The study was based on genetic analyses of specimens that confirmed that the Indo-Burmese pangolin diverged from the Chinese pangolin around 3.4 million years ago

The new species of Indo-Burmese pangolin (Manis indoburmanica).

Scientists of the Zoological Survey of India (ZSI) have identified a new species of Indo-Burmese pangolin (*Manis indoburmanica*) that diverged from the Chinese pangolin (*Manis pentadactyla*) approximately 3.4 million years ago.

The development of the species was likely influenced by dramatic geoclimatic changes in the Indo-Burma region, which is recognised as one of the world's biodiversity hotspots. The details of the discovery was published in the paper 'Indo-Burmese pangolin (*Manis indoburmanica*): a novel phylogenetic species of pangolin evolved in Asia' in international peer-reviewed journal Mammalian Biology.

"With the present findings, we advocate recognition of this novel lineage as Indo-Burmese pangolin, *Manis indoburmanica* - a distinct phylogenetic species of Asian pangolin. This lineage's unique evolutionary history and genetic distinctiveness, highlighted by its divergence approximately 3.4 million years ago amid significant paleo-climatic shifts, underline its vulnerability and the critical need for targeted conservation measures," the paper stated.

The discovery was led by a team of scientists led by Mukesh Thakur of the ZSI who used cutting-edge genomic tools to analyse mitochondrial genomes. "This discovery is a testament to the power of modern genetic tools in uncovering hidden diversity. The Indo-Burmese pangolin not only enriches our understanding of Asian pangolins but also emphasises the need for region-specific conservation efforts," Dr. Thakur said.

Lenrik Konchok Wangmo, a PhD scholar at the University of Calcutta and a key contributor to the discovery, played a vital role in identifying the holotype and paratype specimens from Arunachal Pradesh. "This species adds a new dimension to pangolin conservation, highlighting the importance of protecting their habitats from threats like poaching and habitat degradation," Mr. Wangmo said.

Source:https://www.thehindu.com/sci-tech/science/zsi-scientists-discover-new-species-of-indo-burmese-pangolin/article69085347.ece?cx_testId=81&cx_testVariant=cx_1&cx_artPos=3&cx_experienceId=EXPO56ZDYSGX&cx_experienceActionId=showRecommendationsX1R7QXU17VG227#cxrecs_s
Dated: January 11, 2025 , The Hindu

OTHERS

10,000 human genomes database launched This 'Genome India' database, as it is known, will now be available to researchers across the world for investigations and is housed at the Indian Biological Data Centre (IBDC), in Faridabad, Haryana

India has completed and made available a year-long compilation of 10,000 human genomes from India, representing 83 population groups, or about 2% of the country's 4,600 population groups as a database. This collection will serve a template of future investigations into disease and drug therapy.

This 'Genome India' database, as it is known, will now be available to researchers across the world for investigations and is housed at the Indian Biological Data Centre (IBDC), in Faridabad, Haryana.

A first analysis of the genomes estimates around 27 million low-frequency (or relatively rare) variants, with 7 million of them not found in similar reference databases around the world. Certain population groups show higher frequencies of alleles, or different versions of the same gene. Over the last two decades, many countries have created databases of the genomes of their population — for a variety of purposes including estimating disease risks, adverse drug reactions, establishing genealogy and DNA-profiling databases.

However, a major focus of the Indian reference genomes is to have researchers study diseases. "The discoveries from Genome India are not just scientific — they hold the potential for targeted clinical interventions, advancing precision medicine for better healthcare," said Union Minister of State (independent charge) for Science and Technology Dr. Jitendra Singh, while he announce the project.

Researchers wishing to access the genomes must send in a proposal that will be pursued by an independent committee with a commitment that will adhere to data sharing and privacy policies. Though the database stores information on population groups, this data will not be classified by the names of castes or tribes but will be numerically coded, Rajesh Gokhale, Secretary, Department of Biotechnology told *The Hindu*.

Describing the project as "historic", Prime Minister Narendra Modi, in a video address, said this paved the way for India strengthening the biotechnology economy as well as biotechnology-based manufacturing.

Source:https://www.thehindu.com/sci-tech/science/10000-human-genomes-database-launched/article69081500.ece
Dated: January 10, 2025, The Hindu

Whales can live way longer than scientists had thought, new research shows

North Atlantic right whales were also thought to have a maximum lifespan of about 70 years.

A humpback whale breaches off near Iguana Island, Panama

Southern right whales have lifespans that reach well past 100 years, and 10% may live past 130 years, according to new research published in the journal Science Advances. Some of these whales may live to 150. This lifespan is almost double the 70-80 years they are conventionally believed to live.

North Atlantic right whales were also thought to have a maximum lifespan of about 70 years. We found, however, that this critically endangered species' current average lifespan is only 22 years, and they rarely live past 50, researchers said.

These two species are very closely related – only 25 years ago they were considered to be one species – so we'd expect them to have similarly long lifespans. We attribute the stark difference in longevity in North Atlantic right whales to human-caused mortality, mostly from entanglements in fishing gear and ship strikes.

We made these new age estimates using photo identification of individual female whales over several decades. Individual whales can be recognized year after year from photographs. When they die, they stop being photographically "resighted" and disappear. Using these photos, we developed what scientists call "survivorship curves" by estimating the probability whales would disappear from the photographic record as they aged. From these survivorship curves, we could estimate maximum potential lifespans.

Twenty-five years ago, scientists working with Indigenous whale hunters in the Arctic showed that bowhead whales could live up to and even over 200 years. Their evidence included finding stone harpoon points that hadn't been used since the mid-1800s embedded in the blubber of whales recently killed by traditional whalers. Analysis of proteins from the eyes of hunted whales provided further evidence of their long lifespan. Like right whales, before that analysis, researchers thought bowhead whales lived to about 80 years, and that humans were the mammals that lived the longest.

Source:https://www.thehindu.com/sci-tech/science/whales-can-live-way-longer-than-scientists-had-thought-new-research-shows/article69080160.ece
Dated: January 09, 2025, The Hindu