SCIENCE AND SOCIETY NEWSLETTER

Innovations and Contributions by CSIR labs

In this issue:

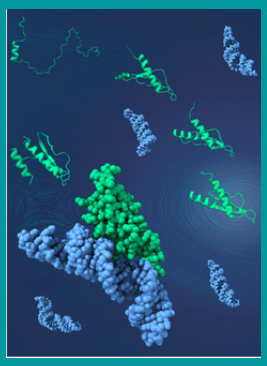

Image source: CCMB

This Discovery of Flexibility of Proteins Could Lead to Breakthroughs in Medicine

- **Scientists at CSIR – Centre for Cellular and Molecular Biology (CCMB), Hyderabad have found that proteins have flexible structures which allow them to accomplish various tasks.**
- **This new discovery can help scientists design proteins that can multitask, revolutionizing fields such as agriculture and biotechnology, and changing the way medicines are formulated currently.**
- **Scientists, using powerful techniques such as nuclear magnetic resonance, detected that around 1% of proteins had the superpower to change shapes for short periods.**
- **"By capturing the fleeting, dynamic states of these proteins, we have shown that their ability to rearrange their structure transiently gives them a functional edge in complex cellular environments," said lead author of the research paper, Mandar Deshmukh, to The Hindu.**

New Hope for Breast Cancer Patients

- **Scientists at CSIR – Central Drug Research Institute (CDRI) of Lucknow have developed a novel mechanism that increases the efficacy of an anti-cancer drug while sparing normal cells, which could perhaps provide relief to breast cancer patients.**
- **Their double-shell magnetic nanoparticles attach to a common anti-cancer drug and attack only the cancer-causing cells.**

SCIENCE AND SOCIETY NEWSLETTER

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Image Source: nio.res.in

New CSIR-NIO Study on Mandovi River and the Inter-state Dispute on its Waters

- **A new study by CSIR - National Institute of Oceanography (NIO), Goa, has found that Karnataka's plans for diversion of the Mandovi river will have less impact on Goa.**
- **The Mandovi or Mahadayi river, earlier known as the Rio de Goa, is considered the lifeline of Goa.**
- **Karnataka and Goa have been locked in a battle over the utilisation of the waters of the Mahadayi.**
- **The paper says that while the diversion from the Kalasa tributary could significantly impact the Mhadei Wildlife Sanctuary, diversion from the Bhandura Nala will not have much impact on the Mandovi's flow in Goa.**
- **Even in the wildlife sanctuary, the ecological impact can be softened by creating check dams and storage facilities, say the researchers.**

SCIENCE AND SOCIETY NEWSLETTER

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Prishniparni
Image Source: csir.res.in

CIMAP Develops New Variety of Endangered Herb

- **Scientists from CSIR – Central Institute of Medicinal and Aromatic Plants (CIMAP) in Lucknow have developed a new variety of the endangered ayurvedic herb, Prishniparni, and named it 'CIM-Rhoi Gold'.**
- **The critically-endangered and rare herb is used in ayurvedic medicines such as Chyawanprash, Dashmularishta, Amritarishta.**
- **Prishniparni is known for its wound-healing, anti-inflammatory and immune-boosting properties.**

New Tech to Recover Pure Graphite from Aluminium Waste

- **CSIR – Institute of Minerals and Materials Technology (IMMT) of Bhubaneswar and India's leading aluminium producer, Vedanta Aluminium, have come up with a technology to extract pure graphite from aluminium waste, which has been granted patent.**
- **India currently imports 70% of its graphite supply.**
- **This new technology can not only be a game changer in reducing graphite imports, but also aligns with India's circular economy goals.**
- **The graphite retrieved from this process exhibits electrical conductivity and structural properties that make it fit for use in lithium-ion battery applications.**
- **The sophisticated technology holds the potential to completely transform the landscape as India's demand for electric vehicles and high-tech electronics using lithium-ion batteries increases even more in the future.**

SCIENCE AND SOCIETY NEWSLETTER

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Image Source: csir.res.in

India's High-Altitude Platform Prototype Completes Key Test

- The subscale prototype of India's indigenous High-Altitude Platform (HAP), developed by Bangalore-based CSIR – National Aerospace Laboratories (NAL) has completed crucial pre-monsoon flight tests.
- The back-to-back flight tests were held between May 8 and 13.
- The platform, built for border patrol, is a solar-powered stratospheric vehicle.
- The tests were carried out at the Aeronautical Test Range in Challakere in Chitradurga.
- After passing the tests successfully, it now has a certified autopilot system.

Mars Analogue Found in Kachchh

- How do we know some region on the Moon or Mars is a million or a thousand years old? The technique scientists rely on currently uses the number of visible impact craters to determine the age of a region. This is like guessing someone's age by the number of wrinkles.
- Scientists have now unlocked a new way to determine the age of Martian events more accurately.
- A mineral called jarosite, found both on Earth and Mars and acting as a tiny clock recording the passage of time, may be the key.
- A team of scientists from CSIR - National Geophysical Research Institute (NGRI) of Hyderabad, Physical Research Laboratory, Ahmedabad and other institutions has found a site rich in the mineral jarosite in Kachchh, which is geologically similar to Mars, making it a good Martian analogue.
- Minerals like jarosite can trap radiation from cosmic rays and elements like uranium, thorium and potassium.
- When subjected to light or heat, the energy stored in the rock is released as light—a phenomenon called luminescence.
- The brighter the light, the more radiation the rock has absorbed, the longer it has existed.
- This technique of determining the age is called luminescence dating.

SCIENCE AND SOCIETY NEWSLETTER

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Image Source: Wikipedia

This is only a representative image from the source mentioned.

Novel CSIR-NBRI Spray to Keep Flowers Fresh Longer

- **CSIR – National Botanical Research Institute (NBRI) of Lucknow has developed a herbal spray 'FloriGuard' to keep cut flowers fresh longer depending on the variety.**
- **The spray can double the shelf life of Chrysanthemum while tripling the life of Gerbera cut flowers.**
- **It has transferred the technology to a Pune-based firm for production.**
- **The solution works by suppressing the production of ethylene in flowers by 33-56%. This slows down the natural ageing process in flowers.**

SCIENCE AND SOCIETY NEWSLETTER

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Image Source: csir.res.in

CIMAP's Cream Makes a Splash in the World of Psoriasis Treatment

- CSIR – Central Institute of Medicinal and Aromatic Plants (CIMAP) in Lucknow has developed a new herbal cream for psoriasis, a skin disease.
- CIMAP introduced PsoriaCIM, a lavender oil-based solution for safe and effective treatment of psoriasis.
- CIMAP has already transferred the technology to a Lucknow-based firm for commercial production, and is now awaiting a patent.
- 0.44%-2.8% of India's population is affected by psoriasis.
- The available treatments for psoriasis have a compound called corticosteroids, having significant side effects.

Breakthrough in Indigenous Hing Cultivation

- Efforts to cultivate hing (asafoetida) by Palampur-based CSIR – Institute of Himalayan Bioresource Technology (IHBT) have borne fruit literally, with hing plants flowering in the country for the first time.
- IHBT had launched the project in Lahaul-Spiti in 2020, and also established a Heeng Seed Production Centre in February.
- Hing plants grows in cold desert-type conditions.
- It takes around five years for the oleo-gum resin to be produced in its roots, from which hing is extracted.
- This breakthrough will go a long way in reducing India's import dependence for this valuable spice.
- India imports around 1,200 tonnes of raw hing annually from Afghanistan, Iran and Uzbekistan at a cost of USD 100 million.

SCIENCE AND SOCIETY NEWSLETTER

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Image Source: csir.res.in

DNA Test to Identify Pashmina and Shahtoosh Wool

- CSIR – Centre for Cellular and Molecular Biology (CCMB), Hyderabad, has developed a DNA test to identify pashmina from shahtoosh.
- While pashmina is derived from the soft down hair of the Changthangi cashmere goat, shahtoosh is wool derived from the endangered chiru or the Tibetan antelope, making its trade illegal.
- Shahtoosh is the finest animal wool, so soft that a shawl made from shahtoosh can be passed through a ring.
- It's very difficult to distinguish a pashmina shawl from the illegal shahtoosh one.
- To solve this problem, CCMB has come up with a DNA test, which will not only help save the endangered chiru, but also help genuine pashmina traders, who sometimes unwittingly get caught in customs net on the basis of suspicions.

Silk and Collagen-based Gel to Accelerate Wound Healing

- Chennai-based CSIR – Central Leather Research Institute (CLRI) has developed a new silk and collagen-based gel to speed up wound-healing.
- Silk fibroin, extracted from silkworm cocoons, though safe for the body, does not support cell growth well.
- To overcome this, scientists added a lab-made collagen-like protein to it. Collagen aids skin repair.
- The two proteins were bonded using riboflavin (vitamin B2) and blue light.
- The resulting hydrogel can be used for diabetic wounds and burn injuries, the researchers claim.
- It can be carried easily, applied directly and stored at room temperature.
- The gel keeps wounds cool and moist, which aids healing, while also reducing discomfort.