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# INDIA SCIENCE AND INNOVATION WEEKLY

*Ask the right questions, and nature will open the door to her secrets.*

*- Dr. C.V. Raman, The Nobel Prize in Physics 1930*

## New biomolecules to fight drug resistance in Kala-azar

Researchers at the Department of Biotechnology's National Centre for Cell Science (DBT-NCCS) in Pune have explored ways to tackle the resistance of an anti-microbial drug called, miltefosine, in parasites which cause Kala-azar. The research group designed small molecules, called peptides, which could very specifically interact with the transporter proteins of *Leishmania major* alone, and not interfere with human proteins in any way thus showing promising results to develop long-run therapeutics against drug-resistant *Leishmania* parasites.

## IIT Guwahati develop point-of-care device to detect retinopathy

Researchers at the Indian Institute of Technology (IIT) Guwahati, in collaboration with Shri Sankaradeva Nethralaya, Guwahati, have developed the first point-of-care testing device that can detect diabetic retinopathy at an early stage. The research team developed a microfluidic system, in which body fluid, was drawn into tubes, where they came in contact with gold-antibody nanoparticles, called  $\beta$ -2-microglobulin (B2M), a protein in tears and urine, which is a reliable indicator for retinopathy.

## Nanomaterials as antimicrobial agents

A research team from the Indian Institute of Science (IISc), Bengaluru has synthesized a nanomaterial that mimics an enzyme and disintegrates the cell membranes of a range of disease-causing bacteria. By targeting phospholipids, which is an essential part of the cell membrane, the nanomaterials broke the bonds holding the membrane together.

## Indian Garment Company bags NRDC license to make PPEs

National Research Development Cooperation (NRDC) signed a technology licensing agreement for manufacturing know-how of a PPE Suit named NavRakshak with an Agra-based apparel manufacturing entity, the Indian Garment Company. The prototype garment has been tested and verified and upholds ISO standards and guidelines.

## Bengaluru Airport's locally developed weather monitoring system

Bengaluru's Kempegowda International Airport is now the first in India to own a 'Made in India' Aviation Weather Monitoring System (AWMS) developed by National Aeronautics Laboratories (NAL), Bengaluru. The new technology, developed by CSIR-NAL coupled with the Drishti Transmission, will help calculate Runway Visibility Range (RVR) and help pilots with accurate data reporting. The new technology deployed at the Kempegowda International Airport records real-time data of wind speed, wind direction, temperature, humidity, and pressure. The system displays data on a single screen and is web-based which allows maintenance from any location.

## Scientists detect ionospheric irregularities that affect communication

A multi-instrument based ionospheric study of space weather storms over India by the Scientists from the Indian Institute of Geomagnetism (IIG), Mumbai has found that the occurrence of equatorial spread F (ESF) irregularities and Global Positioning Systems (GPS) scintillations are significantly affected by the geomagnetic storms depending upon the time of the onset of the geomagnetic storm. These storms are brief disturbances in Earth's magnetic field and atmosphere (aka the magnetosphere) caused by bursts of radiation and charged particles emitted from the Sun. Scientists also found that enhanced winds during geomagnetic storms can either add or suppress the existing ion densities to produce either positive or negative storms that modify the electrodynamic of the ionosphere, thereby influencing navigation and communication that form a crucial part of our lives.

## IIT Gandhinagar scientists find COVID-19 in wastewater

Scientists in IIT-Gandhinagar have for the first time detected genetic material of the SARS-CoV-2 virus in wastewater, a breakthrough that paves the way for using wastewater-based epidemiology (WBE) for real-time surveillance of COVID-19 in India. Scientists found that increased gene copies of the virus in Ahmedabad's wastewater matched the incidence of the disease in the city. According to the Scientists, WBE was an effective tool during outbreaks of other viruses such as Poliovirus and Hepatitis A. The Ahmedabad study aims at assisting concerned authorities and policymakers to formulate or upgrade COVID-19 surveillance to have an explicit picture of the phase of the pandemic.

## Special Update: Indian Institute of Geomagnetism [IIG], Mumbai

IIG conducts basic and applied research in Geomagnetism and allied fields like Solid Earth Geomagnetism/Geophysics, Magnetosphere, Space and Atmospheric Sciences. IIG has a number of active research groups involved in theoretical, experimental, and observational work. The Institute has a modern laboratory for design and fabrication of instruments used in Geomagnetism and allied fields.

Geomagnetism is a multi-disciplinary science and thus provides research opportunities for Physicists, Geophysicists, and Earth Scientists. Geomagnetism, by its very nature, is also a global science and often involves collaboration with scientists from other countries. The Institute also supports a World Data Centre for Geomagnetism (WDC, Mumbai), which is the only International centre for Geomagnetic data in South Asia and caters to the needs of Space and Earth Scientists and researchers from various universities and research institutions.

Further details can be found at: <http://iigm.res.in/>