



Embassy of India, Berne

# INDIA SCIENCE AND INNOVATION WEEKLY

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*Ask the right questions, and nature will open the door to her secrets  
- Dr. C.V. Raman. The Nobel Prize in Physics 1930*

## **CSIR-CCMB Researchers developed in-vivo animal models to understand NDD better**

Team of researchers from Council of Scientific & Industrial Research (CSIR)-Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad, devised multiple in-vivo animal models that could be used to study the development and disorders of the nervous system. The models could help understand the genetic and cellular basis of congenital neurodevelopmental disorders (NDD) like microcephaly (small brain), intellectual disability (ID) and autism during embryonic development. Researchers highlighted the pros and cons of studying neurodevelopment in various animal models. They also discussed new emerging animal models like Ciona, in their paper, which provided perspective on the origin of neural tissue across different life forms.

## **IISc researchers grew bone through electrical stimulation**

Researchers at the Indian Institute of Science (IISc), Bengaluru, successfully grew bone cells in a culture plate using electric stimulation, which is faster than conventional techniques. The natural bone has a property called 'piezoelectricity', which is also involved in new bone formation, bone growth, and healing. The team has developed a composite material consisting of a polyvinylidene difluoride (PVDF) base, mixed with barium titanate, and carbon nanotubes mimicking the electrical micro-environment of bone in the right way. Electrical stimulation given by the device, combined with a piezoelectric PVDF-based polymer composite has promoted the growth of new bone cells, which is a promising technique for forming bone tissue.

## **SSIR and IISc collaborated to boost nano electronic device research**

Samsung Semiconductor India Research (SSIR) and the Indian Institute of Science (IISc), Bengaluru, joined hands to promote research and development (R&D) in the field of on-chip Electrostatic Discharge (ESD) protection. ESD is the release of static electricity when two surfaces come into contact. Approximately 20% of Integrated Circuit (IC) failures are caused by ESD events, as the intense heat from the charge melts or vaporizes its tiny parts. The partnership between IISc and SSIR seeks to build cutting-edge ESD device solutions to protect ultra-high-speed serial interfaces in advanced ICs and system-on-chip (SoC) products. Solutions arising from the research by the Department of Electronic Systems Engineering (DESE) at IISc are to be deployed in Samsung's advanced process nodes.

## **ISRO launched three Small Satellite Launch Vehicles (SSLV) into orbit**

Indian Space Research Organisation (ISRO) successfully launched three satellites into their intended orbits. In its second developmental flight, the SSLV-D2 vehicle placed EOS-07, Janus-1 and AzaadiSAT-2 satellites into their intended 450 km circular orbit with an inclination of 37 degrees. SSLV is the new small satellite launch vehicle developed by ISRO to cater the launch of mini, micro, or nanosatellites up to 500 kg to Low Earth Orbits, i.e. 500 km planar orbit, on 'launch-on-demand' basis. SSLV provided low-cost access to Space, offered low turn-around time, facilitated flexibility in accommodating multiple satellites and demanded minimal launch infrastructure. India got a new launch vehicle, aimed to commercialise the small satellite launches through Industry on a demand basis. Furthermore, ISRO would cater to the global need of launching smaller satellites into space.

## **Special Update: IIT-Mandi researchers designed new technology to make military equipment invisible to radar**

Researchers at the Indian Institute of Technology (IIT) Mandi created an artificial structure/material to make stealth vehicles and covert establishments less visible to the radar. This material would absorb a wide range of radar frequencies (signals), irrespective of the direction from which the radar signal hits the target. The proposed design used an optically transparent Indium Tin Oxide (ITO)-coated Polyethylene terephthalate (PET) sheet, where the frequency-selective surface (FSS) patterns are created on this PET sheet. Thus, the proposed absorber becomes polarization insensitive and absorbs a wide range of Electromagnetic (EM) wave frequencies within C, X and Ku Band. This technology has potential applications for Radar cross-section (RCS) reduction and absorption of unwanted radiation leakages.