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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*

Researchers Designed Energy-Efficient Desalination System

Researchers at Department of Mechanical Engineering, Indian Institute of Science, Bangalore, designed an energy-efficient solar-powered desalination unit. The most common methods for desalination are membrane-based reverse osmosis (RO) and thermal desalination. Thermal desalination systems work by heating saltwater and then condensing the vapour to obtain fresh water. But the energy required for evaporation is usually obtained from either electricity or the combustion of fossil fuels. The newly designed unit uses solar thermal energy to evaporate a small volume of water imbibed or “wicked” into the evaporator, which has a textured surface.

Researchers Devised a Low-Cost Method to Secure Long-Distance Communication

In order to counter possible data breaches and secure communication for both personal and strategic purposes like defence and national security, scientists at the Quantum Information and Computing (QuIC) lab at the Raman Research Institute (RRI) devised a low-cost method to secure long-distance communication by overcoming distortions. With this method scientists aimed to overcome distortion due to photon-polarization posed by the constant movement of satellites as well as scrambling of polarization in optical fibres and achieve secure long-distance communication without use of conventional active-polarization tracking devices which are costly.

Researchers Developed Synthetic Vitamin Cofactor

Researchers at Indian Institute of Science Education and Research, Pune developed a cofactor of Vitamin B2 that is essential for human health. As humans cannot make any of their vitamins they obtain them from either their diet or gut microbiota. Flavin adenine dinucleotide (FAD), a cofactor of Vitamin B2, helps enzymes by sitting within their active sites and acting as the electron donor/acceptor in oxidation-reduction (redox) reactions. Oxidation-reduction reactions are essential for many cellular processes, including energy production, cell signalling, and DNA repair. The study and analysis put forth the possibility of using artificial FAD analogues to probe several fundamental questions in cellular metabolism. The development of artificial cofactor analogues is a rapidly growing field of research. With continued research, it is likely that artificial cofactor analogues would play an increasingly important role in synthetic biology, cell biology, and other allied fields.

IIT-Madras Developed a Technique to Deliver Large-Sized Biomolecules Into Live Cells

Researchers at Indian Institute of Technology (IIT-Madras) developed a technique to deliver large-sized biomolecules into live cells using infrared laser pulses. The researchers created a titanium micro-ring device to be placed near the monolayer cells into which the molecules must be introduced. When the micro-ring is exposed to infrared laser, photothermal bubbles are produced on its surface. Biomolecules are essential chemicals produced and utilised by living organisms, and form the basic building blocks of life. Nucleic acids, a specific type of biomolecule, make up the genetic material (RNA and DNA) in living organisms. The introduction of nucleic acids into living cells is called 'transfection.'

Special Update: New Study Discovers 62 Desiccation-Tolerant Vascular Plant Species in India's Western Ghats

Scientists at Agharkar Research Institute (ARI) Pune, an autonomous institute of the Department of Science and Technology (DST), has identified 62 DT species in the Western Ghats, many more than the earlier known nine species. The team of researchers scrutinized outcrop species for their DT properties by seasonal field observations, followed by relative water content estimation protocols. Nine genera of DT plants are reported as new, also in a global perspective, with Tripogon capillatus representing the first record of an epiphytic DT angiosperm. The study also provides the first field observation-based proof of DT properties of the gesneriad Coralloidiscus lanuginosus.