FORUM FOR INDIAN SCIENCE DIPLOMACY

SCIENCE DIPLOMACY NEWS ALERTS | 01-15 MARCH 2020| ISSUE 33 www.fisd.in

NEWS ALERT

Forum for Indian Science Diplomacy

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GLOBAL

Nanoparticles carrying Curcumin to treat Alzheimer's

The anti-inflammatory property of turmeric, especially its active compound, curcumin, has been known for long. Now, researchers from the University of South Australia (UniSA), McMaster University in Canada and Texas A&M University have shown that curcumin can be delivered effectively into human cells via a nano formulation which changes curcumin's behaviour to increase its oral bioavailability by 117 per cent. The researchers have shown in animal experiments that nanoparticles containing curcumin not only prevents cognitive deterioration but also reverses the damage. This finding paves the way for clinical development trials for Alzheimer's. The same delivery method is now being tested to show that curcumin can also prevent the spread of genital herpes.

Novel compound for treating malaria

A novel class of antimalarial compounds that can effectively kill malaria parasites has been developed by Australian and US researchers. In preclinical testing, the compounds were effective against different species of malaria parasites, including the deadly Plasmodium falciparum, and at multiple stages of the parasite lifecycle. The compounds target a previously unexplored parasite pathway and could overcome existing issues of parasite drug resistance, an ongoing and increasingly urgent problem. In preclinical testing, the lead compound WM382 inhibited growth of the malaria parasite in the host and prevented transmission back to the mosquito. WM382 not only killed malaria parasites in the blood, it also killed parasites in the liver and prevented parasites in the blood being transmitted to mosquitoes. An exciting feature of WM382 is that it kills the malaria parasite in a very different way to current antimalarial drugs. In preclinical testing, malaria parasites that were resistant to the lethal effects of current antimalarial drugs were fully susceptible to WM382. It was also very difficult to induce resistance to this compound in malaria parasites in the lab. WM382 targeted two crucial enzymes in the malaria parasite, plasmepsin IX (PMIX) and plasmepsin X (PMX), two 'master regulators' that are critical for parasite survival. As the compound hits both these targets, it is harder for parasites to develop resistance.

Potassium metal battery emerges as a rival to lithium-ion technology

Recent research from Rensselaer Polytechnic Institute demonstrate how the challenge known as dendrites can be overcome to create a metal battery that performs nearly as well as a lithium-ion battery, but relies on potassium - a much more abundant and less expensive

element. Metal deposits, called dendrites, accumulate on the anode because of non-uniform deposition of potassium metal as the battery undergoes repeated cycles of charging and discharging. By operating the battery at a relatively high charge and discharge rate, temperature inside the battery can be raised in a well-controlled manner and encourage the dendrites to self-heal off the anode. The solution could potentially see a paradigm shift to potassium-based metal batteries.

Layered solar cell technology boosts efficiency and affordability of solar power

Boulder University at Colorado has created a low-cost solar cell with one of the highest power-conversion efficiencies to date, by layering cells and using a unique combination of elements with 30 percent increase in efficiency. The researchers took a perovskite solar cell, a crystal structure that's designed to harvest higher energy photons, and layered it on top of a silicon solar cell, which captures more photons in the infrared part of the spectrum. The combination raises the 21 percent silicon solar cell up to an efficiency of 27 percent increasing it by a third. The layered solar cells, using perovskites cost less, are also inexpensive, not energy intensive to make and easy to create in the lab

Ultrathin organic solar cell is both efficient and durable

Scientists have succeeded in creating an ultrathin organic solar cell that is both highly efficient and durable. The organic cell degrades less than 5 percent over 3,000 hours and has improved solar cell performance by about 13 percent. Organic photovoltaics are a promising alternative to silicon-based conventional films, being more environmentally friendly and cheap to produce. Previous, ultrathin films also tend to degrade rapidly under the influence of sunlight, heat, and oxygen. The scientists however succeeded in showing that an ultrathin cell can be both durable and efficient. The new ultra-thin organic solar cells can be used to supply high power in a stable way over long periods of time, and can be used even under severe conditions such as high temperature and humidity. The research is expected to majorly contribute to the development of long-term stable power supply devices that can be used in wearable electronics such as sensors attached to clothes

EU launches new industrial strategy to boost Europe's industries

This week, the EU has published new industrial strategy, which identified clean hydrogen technology as a prime candidate for additional public investment. The industrial strategy proposes to bring member states and industry together for big, pan-EU industrial projects of common European Interest, which would get a special exemption from competition rules to create Airbus-like consortia developing new products and services. Among the areas proposed as suitable for such a project is the production of clean hydrogen as an alternative to using fossil fuels for heating and transport, in particular. The commission will build a public private alliance to develop the technology, modelled on the multi-billion-euro advanced battery alliance. According to EU officials, Hydrogen could become vital for energy-heavy sectors such as aviation and transport, as Europe pushes towards carbon

neutrality. Other alliances to come in the future will include low-carbon industries, cloud computing and industry access to raw materials, the commission says. EU also pledged at least €300 million for breakthrough green technologies under the European Innovation Council, which will launch fully next year, to give impetus to the commission's Green Deal plan. There will also be targeted funding for companies run by women under the InvestEU umbrella fund, and a public private fund dedicated to investing in initial public offerings of small companies.

INDIA

SCTIMST develops stents technology for the treatment of aneurysms of brain

The research team of Sree Chitra Thirunal Institute of Medical Science and Technology (SCTIMST), Thiruvanthapuram, has developed an innovative intracranial flow diverter stent for the treatment of aneurysms of the blood vessels of the brain. Flow diverters' stents when deployed in the artery in the brain bearing the aneurysms; divert blood flow away from the aneurysm, thus reducing the chances of its rupture from the pressure of blood flow. The Chitra flow diverter is designed to have better grip on the walls of arteries of complex shapes in order to reduce the risk of migration of the device. It uses Nitinol, a super elastic alloy with shape memory was acquired from National Aero Space Laboratories, Bengaluru (CSIR-NAL). With the availability of the indigenous technology from SCTIMST and Nitinol from NAL, a well established industry should be able to manufacture and sell at a much lower price. The device is expected to be transferred to the Industry very soon and will subsequently undergo testing in animal and human clinical trials before commercialization.

Eleven chairs named after Indian women scientists to be filled by women

On the occasion of International Women's Day, some of India's iconic women scientists will be brought into the spotlight. The government of India had identified 11 early 20th-century women scientists in whose honour chairs will be set up in institutes across the country. The range of fields is wide from cytogenetics to organic chemistry to social sciences. Only women researchers will take up these positions and could get research funding up to Rs 10 million. This will bolster research in the field and to inspire girls to follow scientists' paths. These 11 Chairs will be set up for an initial period of five years, which can be extended on the basis of research requirements.

A journey through the clouds to improve India's monsoon forecast

Indian scientists from IIT-Bhubaneswar and colleagues from UK flew over the Arabian Sea aboard an airborne research laboratory, a Facility for Airborne Atmospheric Measurements (FAAM) aircraft - a highly modified BAe-146 four-engine jet. The sortie over the Arabian Sea through the Western Ghats was conducted under the Indo-UK collaborative INCOMPASS project that aims to advance monsoon forecasting capability between the

two countries. INCOMPASS is the first field campaign to use a foreign-registered aircraft to take measurements over land surfaces in India and the adjacent oceans, throwing up interesting insights on the land surface, boundary layer, cloud microphysics, and its convective environment, that are now being used to check the accuracy of the weather forecasting models. An improved forecast is essential because the Indian summer monsoon supplies the majority of water for agriculture and industry in South Asia and is therefore critical to the well-being of a billion people. This Indo-UK collaborative gathers new observations over India and combines them with computer modelling in "unprecedented detail" to improve rainfall forecasts. The findings have direct implications on improving the forecast skills of the model over the Indian region in a climate change scenario. The project was funded by the U.K.'s Natural Environment Research Council and India's Ministry of Earth Science under their "Monsoon Mission" programme. Apart from improved models used for weather forecasting and climate projection, the project helped build capacity in terms of better-trained scientists for studying Indian monsoon weather and climate.

Two Indian companies in race for vaccine against Covid-19

The World Health Organization has so far listed 35 vaccine candidates that were being developed to protect against the novel coronavirus or Covid-19. This includes two Indian companies, Gujarat-based Zydus Cadila and Pune's Serum Institute, which are in collaboration with America's Codagenix on the project. While a final vaccine is some time away, the Indian companies are moving full steam ahead with their respective technologies. Zydus has announced an accelerated research programme with multiple teams in India and Europe to develop the 2019-nCoV vaccine based on the plasmid DNA vaccine, and in Europe, its research arm Etna Biotech is working on the second approach. Serum institute is using different approach to generate human antibodies against the virus in collaboration with the American biotech firm. Due to major advances in the speed and quality of genome sequencing and open-source data sharing, the nCoV genome was available to the public in a matter of days after the virus was first isolated and sequenced.

IN BRIEF

DRDO & IISc Bangalore develop new explosive detection device

RaIDer-X a new explosive detection device has been co-developed by High Energy Materials Research Laboratory (HEMRL) Pune and Indian Institute of Science, Bangalore. It has the capability to detect explosives from a stand-off distance. A data library can be built in the system to expand its capability to detect a number of explosives in pure form as well as with contaminants. Bulk explosive in concealed condition can also be detected by the device. It is a portable device that can be taken to any place. This device will help security agencies to work efficiently and safely and will also enhance the Indian Army's power in the field to work more efficiently.

Pal-V likely to start testing world's first flying car in India

Pal-V, a Dutch company that is developing the world's first commercial personal air land vehicle, is planning to soon start testing its flying car in Gujarat. The gyroplane can seat two people and run on ground as well as fly. Pal-V is working on commercially launching the product globally in the next one year for personal buyers. The gyroplane has safe emergency landing facilities and the maintenance cost is 1/10th that of a helicopter. The vehicle conforms to existing international air and land rules and can be used by police forces, coast guards and to supply medical aid and for VIP taxi services. Apart from Pal-V, Toyota, Airbus-Audi and Geely are also working on developing gyroplanes that can operate both on land and in the air, to address problems stemming from congestion, particularly in urban centres.

KPMG ranks India and China as 2nd global hubs for technological innovation

A KPMG survey ranks India along with China as second biggest global hub for technology innovation after the United States. India's jump to second position lends credence to how the country is building-up a strong innovation ecosystem. In the survey, Bengaluru has entered in the top 10 innovations hubs indicating that city is doing well in the areas of modern infrastructure, attracting skilled talent, investment funding, etc. KPMG surveyed 810 technology industry leaders globally for the study. According to the survey, the future bodes well for Indian innovation due to trends encouraging tech professionals to either return to or remain in India. This is bolstered further by the urbanisation and younger demographic trends along with the increase in venture capital that India has seen in the last two years.

RESOURCES AND EVENTS

52nd Session of the intergovernmental panel on climate change

The 52nd session of the Intergovernmental Panel on Climate Change (IPCC-52) concluded on 28 February, after agreeing on an outline for the Synthesis Report of the Sixth Assessment Report. The outline contains a stage-setting introduction and three sections: Current Status and Trends; Long-term Climate and Development Futures; and Near-term Responses in a Changing Climate. Some of the more contentious issues that came up during the discussions on the outline related to the carbon budget, timeframes, just transition, and extreme events and loss and damage, among others. The Panel engaged in detailed consideration of the organization of future work of the IPCC in light of the Global Stock-take (GST) under the Paris Agreement, on which divergent views were expressed. The Panel considered reviewing the Principles Governing IPCC Work, and whether to establish a task team to consider which elements might need reviewing, but participants did not agree on a review process, and the Panel will consider the matter at IPCC-53 to be held in Nairobi, Kenya around the end of September.

African countries discuss action on Sustainable Development

The sixth session of the Africa Regional Forum on Sustainable Development (ARFSD 2020) addressed the theme '2020-2030: A Decade to Deliver a Transformed and Prosperous Africa through the 2030 Agenda and Agenda 2063.' The Forum theme was aligned to the 2020 HLPF theme, 'Accelerated action and transformative pathways: realizing the decade of action and delivery for sustainable development.' Delegates discussed selection of the voluntary national reviews (VNRs) of the SDGs that are currently being conducted by 17 African countries for presentation at the HLPF in July 2020, as well as emerging lessons from voluntary local reviews (VLRs), which featured for the first time at the Forum. The discussions reiterated the urgency of speeding up implementation, in light of a convergence of evidence that, despite some pockets of progress, countries and partners are not on track to achieve the goals of the 2030 Agenda for Sustainable Development (2030 Agenda) and Africa's Agenda 2063. High-level panels examined performance across all 17 SDGs, clustered into the "five Ps" of the 2030 Agenda: people, prosperity, planet, peace and partnerships. The discussions focused on exploring accelerators to deliver a transformed and prosperous Africa, including through leveraging science, technology and innovation (STI), and strengthening partnerships with the UN Development System, major groups, youth, and other stakeholders

Working group of CBD discusses future global biodiversity framework

The Convention on Biological Diversity (CBD) Strategic Plan 2011-2020, is rapidly approaching its 2020 expiration date. In view of this, the fourteenth meeting of the CBD Conference of the Parties (COP 14) established an Open-ended Inter-sessional Working Group on the Post-2020 Global Biodiversity Framework to update the Strategic Plan and develop a new post-2020 global biodiversity framework (GBF) which is expected to be adopted at the UN Biodiversity Conference in October 2020, in Kunming, China. At its second meeting, in Rome, 24-29 Feb 2020, the Working Group invited the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA 24) to provide elements for the development of the GBF for consideration by the third WG meeting to be held in July 2020 in Colombia. The framework will have to deal with a variety of issues including the direct and indirect drivers of biodiversity loss and rapid species' extinction, health, socio-economic concerns, trade concerns, human rights considerations, new technologies, indigenous peoples and local communities (IPLCs), gender issues, intergenerational concerns, digital sequence information (DSI), and education.

EU science ministers calls for reciprocity in international R&D cooperation

EU science ministers have welcomed international partners in its research and innovation programme, but only if they meet criteria of reciprocity, added value and respect of EU values. Third countries wishing to participate in Horizon Europe should open their research systems to EU researchers and respect EU rules on intellectual property and freedom of movement. The criteria for how third countries are associated in Horizon Europe are not

finalised because EU member states are still to reach an agreement on the next multiannual budget of the EU. Countries in the European Free Trade Association which are members of the European Economic Area (Iceland, Liechtenstein, and Norway), candidates for EU membership, and countries covered by the EU's neighbourhood policy are associated by default to Horizon Europe. According to the draft legal text of Horizon Europe, other countries could join if they contribute to the budget, demonstrate a good capacity in science and technology, uphold democratic institutions and an open market economy, and commit to fair intellectual property protection.

Who will get hired in the AI age?

On 23 January 2020, Science|Business held a roundtable on digital skills, at Sorbonne University's Center for Artificial Intelligence (SCAI) in Paris. The experts at the roundtable opined that application of artificial intelligence and other advanced digital technologies in the real economy isn't a job for tech nerds. Instead, Europe needs more people who can combine a deep knowledge of industry sectors with some expertise in data analytics. The proceedings are published in the report entitled, "Who will get hired in the AI age?"

We welcome your comments and valuable suggestions. Please write to us for receiving publications, updates and notices regarding seminars, conferences etc.

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