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## NEWS ALERT

*Forum for Indian Science Diplomacy*

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## GLOBAL

### [Who is the weakest link? A better understanding of global supply chains](#)

COVID-19 pandemic has widely disrupted the global supply chains. But how important are large, multinational companies in maintaining both local and international logistic networks and should governments be so focused on maintaining larger organisations through subsidies and bail-outs over their smaller counterparts? A new network analysis by researchers from the University of Sydney's School of Project Management and the Centre for Complex Systems within the School of Civil Engineering has found that large, multi-national organisations are not always as crucial to local supply chains, and that it is sometimes the smaller operators that can deliver the hardest logistic shocks to a community when disrupted. In the current context, the COVID-19 has already caused 'kinks' in the movement of goods and services around the globe. The researchers identified industry sectors and countries which tend to form strong communities in terms of supply chains such as finance, insurance, real estate, transportation, construction, manufacturing.

### [Improved low noise optical fiber developed](#)

A new anti-resonant hollow-core optical fiber, created by researchers at the University of Central Florida, produces thousand times less "noise" and the lowest ever recorded levels from interference caused by acoustic phonons, making the fiber a promising platform for low noise applications. The fiber uses a unique arrangement of seven hollow capillaries arranged around a hollow core inside the fiber. This results in minimal overlap between the fiber's outer layer of glass and the light traveling through the core, eliminating interference from acoustic phonons emanating from the glass. The arrangement is 10 times more effective at reducing noise than other hollow fiber designs.

### [NIST scientists get soft on 3D printing](#)

Researchers at the National Institute of Standards and Technology (NIST) have developed a new method of 3D-printing gels and other soft materials. The new method has the potential to create complex structures with nanometer-scale precision and could jump-start the production of soft tiny medical devices such as drug delivery systems or flexible electrodes that can be inserted into the human body. Using a 3D printer to fabricate an object made of gel is a bit more of a delicate cooking process. Researchers demonstrated 3D gel printing in liquids by placing an ultrathin barrier -- a thin sheet of silicon nitride -- between the vacuum and the liquid chamber. The method enabled the team to use the 3D-printing approach to create gels with structures as small as 100 nanometers (nm) -- about 1,000 times thinner than a human hair. The researchers now expect to imprint structures on the gels as small as 50 nm, the size of a small virus.

### [INRS researchers develop a new membraneless fuel cell](#)

The research team of INRS (Institut national de la recherche scientifique) has designed a green membraneless fuel cell that uses oxygen from the air. This novel solution costs less and requires fewer steps to manufacture, but it fails to address a key challenge. When the membrane is removed, the methanol or ethanol reacts with the oxygen, just like in conventional fuel cells. To prevent voltage drops, the researchers developed selective electrodes in the cathode compartment. These electrodes remain inactive in the presence of



expects the fuel cell to power portable electronics such as mobile phones and microsystems such as air pollution sensors.

## COVID-19

### COVID-19 (WORLD)

#### [Tiny antibody component highly effective against SARS-CoV-2 in animal studies](#)

The University of Pittsburgh School of Medicine scientists have isolated the smallest biological molecule to date that completely and specifically neutralizes the SARS-CoV-2 virus, which is the cause of COVID-19. This antibody component, which is 10 times smaller than a full-sized antibody, has been used to construct a drug-known as Ab8-for potential use as a therapeutic and prophylactic against SARS-CoV-2. The researchers report that Ab8 is highly effective in preventing and treating SARS-CoV-2 infection in mice and hamsters. Its tiny size not only increases its potential for diffusion in tissues to better neutralize the virus, but also makes it possible to administer the drug by alternative routes, including inhalation. Clinical trials are testing convalescent plasma as a treatment for those battling the infection, but there isn't enough plasma for those who might need it. The researchers are hoping that the antibodies they discovered would contribute to overcoming COVID-19 pandemic.

#### [A cheaper, faster COVID19 test](#)

Researchers at Karolinska Institutet, Sweden have developed a method for fast, cheap, yet accurate testing for COVID-19 infection. The method completely circumvent the RNA-extraction procedure. The method uses a virus inactivation procedure and a new formulation of the solution used to collect and transport the sample material taken from the patients enabling viral detection with high sensitivity directly from the original clinical sample, without any intermediate steps. The low-cost and simplicity of the method, makes it a particularly attractive option in situations with limited resources and with the pressing need to test for COVID-19.

#### [COVID 19: Berlin scientists lay basis for a passive vaccination](#)

Researchers at the German Center for Neurodegenerative Diseases (DZNE) and Charité -- Universitätsmedizin Berlin have identified highly effective antibodies against the coronavirus SARS-CoV-2 and are now pursuing the development of a passive vaccination. Initially, the scientists isolated almost 600 different antibodies from the blood of individuals who had overcome COVID-19, the disease triggered by SARS-CoV-2. By means of laboratory tests, they were able to narrow this number down to a few antibodies that were particularly effective at binding to the virus. Next, they produced these antibodies artificially using cell cultures. The identified so-called neutralizing antibodies bind to the virus, as crystallographic analysis reveals, and thus prevent the pathogen from entering cells and reproducing. In this process, they have also discovered that some SARS-CoV-2 antibodies bind to tissue samples from various organs, which could potentially trigger undesired side effects.

#### [Web resources bring new insight into COVID-19](#)

Researchers around the world are a step closer to a better understanding of the intricacies of COVID-19. Two new web resources have been developed by investigators at Baylor College of Medicine and the University of California San Diego. The resources are freely available through the Signalling Pathways Project (Baylor) and the Network Data Exchange (UCSD). They put at researchers' fingertips information about cellular genes whose expression is affected by coronavirus infection and place these data points in the context of the complex network of host molecular signalling pathways. Using this resource has the potential to accelerate the development of novel therapeutic strategies. For years, the



However, usually this information is not easily accessible. The resource is developed to contribute to making research about COVID-19 more accessible to the scientific community.

### [Death counts fail to capture full mortality effects of COVID-19, study finds](#)

More than 200,000 people in the U.S. have died from COVID-19. Some argue that statistics are inaccurate due to inconsistencies in how deaths are being reported. But researchers from the University of South Florida claim that even if those deaths have been correctly measured, the number doesn't fully convey the true mortality effects of COVID-19. A study published in the Journal of Public Health finds that for each person in the U.S. who died after contracting COVID-19, an average of nearly 10 years of life had been lost. Researchers claim "years of life lost" is a more insightful measure than death count since it accounts for the ages of the deceased. The research team obtained data from the Center for Disease Control and Prevention, shows that nearly 80 percent of deaths occurred among people ages 65 and older. Another significant factor is pre-existing medical conditions. Males generally have more pre-existing medical conditions than females and accounted for roughly 55 percent of deaths attributed to COVID-19.

### **COVID-19 (INDIA)**

#### ['Excellent safety' of 2 indigenous Covid vaccines revealed during Phase-1 trials: Govt](#)

Phase-I clinical trials have revealed "excellent safety" of the two candidate vaccines indigenously developed by Bharat Biotech in collaboration with ICMR and Cadila Healthcare Ltd and their immunogenicity testing is now in progress. The Central Drugs Standard Control Organisation (CDSCO) has granted test license permission for manufacture of vaccine for pre-clinical test, examination and analysis to as many as eight Indian manufacturers. Moreover, the Indian Council of Medical Research (ICMR) has informed that companies are conducting clinical trials for COVID-19 vaccines in India like an inactivated whole virion candidate vaccine (BBV152) with Phase I clinical trials and parallel studies in large animals showing excellent safety of the candidate vaccine.

#### [Indian scientists develop 'COVID-Predictor'](#)

A team of Indian scientists at the National Institute of Technical Teachers' Training and Research, Kolkata have developed a web-based COVID-Predictor to predict the sequence of viruses. The team is working on genomic sequences of SARS-CoV-2 around the world to identify genetic variability and potential molecular targets in the virus and humans to find the best possible answer to combat Covid-19. This will be based on machine learning and will analyse 566 Indian SARS-CoV-2 genomes to find the genetic variability in terms of point mutation and single nucleotide polymorphism (SNP).

#### [Establishment of r-VSV vaccine manufacturing platform in India](#)

Under the National Biopharma Mission, India's Department of Biotechnology (DBT) is supporting COVID-19 vaccine development by facilitating the establishment of the r-VSV vaccine manufacturing platform for the first time in India by Aurobindo Pharma Limited which is developing a vaccine for SARS COV-2 (COVID-19). This SARS COV-2 vaccine candidate is based on the company's proprietary replication-competent, attenuated, recombinant vesicular stomatitis (VSV, VesiculoVax™) vaccine delivery platform. Aurobindo is in the process of setting up a state-of-art manufacturing facility for viral



### **[Nearly 30 Covid vaccine candidates are under various stages of development](#)**

Five National COVID-19 Biorepositories have been established by the Department of Biotechnology (DBT) as part of the Network of 16 COVID-19 biorepositories. The repositories are collecting clinical and viral samples. So far, 44452 clinical samples and 17 viral isolates have been collected which are accessible to researchers and industry for developing diagnostics, therapeutics and vaccines. The Pan India 1000 SARS-CoV-2 RNA Genome Sequencing has been successfully completed Nationally, nearly 30 Covid vaccine candidates are under development, by both industry and academia. These vaccines are in different stages of pre-clinical and clinical development of which 3 candidates are in advanced stage of Phase I/II/III trials and 4 are in advanced pre-clinical development stage.

### **[India's first CRISPR Covid-19 test approved for use in India](#)**

The Tata CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) test, powered by CSIR-IGIB (Institute of Genomics and Integrative Biology) FELUDA, received regulatory approvals today from the Drug Controller General of India (DCGI) for commercial launch, as per ICMR guidelines, meeting high quality benchmarks with 96% sensitivity and 98% specificity for detecting the novel coronavirus. This test uses an indigenously developed, cutting-edge CRISPR technology for detection of the genomic sequence of SARS-CoV-2 virus. CRISPR is a genome editing technology to diagnose diseases. The Tata CRISPR test is the world's first diagnostic test to deploy a specially adapted Cas9 protein to successfully detect the virus causing Covid-19. The Tata CRISPR test achieves accuracy levels of traditional RT-PCR tests, with quicker turnaround time, less expensive equipment, and better ease of use.

### **[Made-in-India affordable COVID-19 test kit will show result in 1.5 hours](#)**

Indian Council of Medical Research approved another made-in-India coronavirus RT-PCR diagnostic kit for use. Dubbed as GlobalTM diagnostic kit, it has been developed by Equine Biotech, a start-up company founded by a faculty member of the Indian Institute of Science (IISc). The test takes about one and half hours to confirm the presence of SARS-CoV-2 in patient samples and is far more economical and reliable than the ones used currently, claimed the makers. This "sensitive, rapid, and affordable COVID-19 diagnostic kit" is easy to use with 100 per cent specificity, according to the start-up. The test kit shows results relatively faster than those available in the market. Equine Biotech is currently looking to licence the above kit for large scale manufacturing and sale.

### **[Norwegian university supplying COVID-19 test kits to India, Denmark](#)**

Researchers from the Norwegian University of Science and Technology (NTNU) have developed a highly sensitive COVID-19 test, which relies on magnetic nanoparticles to extract viral RNA. APS LABS (India) will benefit from the NTNU technology. According to Dr. Paritosh Shekhar, director of APS LABS, NTNU test kits are evaluated extensively and are extraordinary in performance. NTNU Technology Transfer has filed patent applications on the methods and products related to COVID-19 test to secure control of IPRs and provide access to the new test in an ethical and justifiable manner.



Birbal Sahni Institute of Palaeosciences (BSIP), a testing hub in Lucknow has recorded the shortest average time to process Covid 19 samples among institutions in the country testing with 1000 to 1200 samples. With a small team of 8 members, the lab is running 24x7 to test samples from various districts of Uttar Pradesh. The number of samples tested by BSIP has crossed 50,000, of which approximately 1600 samples were reported positive for SARS-CoV-2 with zero pendency. Keeping in light the present scenario and to aid the authorities to contain this pandemic, BSIP has provided testing reports (on daily basis) to the concerned districts in record time of 24 hours.

## INDIA – SCIENCE & TECHNOLOGY

### [SCTIMST Scientists Develop Device to Help People Avoid Thrombosis](#)

The Sree Chitra Tirunal Institute for Medical Sciences and Technology has developed a device to help blood flow in legs' veins, preventing the chances of a susceptible person developing life-threatening Deep Vein Thrombosis. The device works by compressing the legs' veins in sequence to facilitate the flow of blood out of it to heart. The compression pressure is set in such a way that the veins are compressed but not the arteries. It is equipped with closed-loop monitoring of compression pressure and also has controls through valves which are driven by an electronic circuit. A dedicated software and a control circuit are provided in the device to ensure that safe compression levels are always maintained. The device is also equipped with a power supply back-up in the case of power failure. The license for manufacturing and sale of the device has been transferred to enProducts Pvt Ltd.

### [Nano-coated magnesium alloys to repair bone fractures](#)

Alloys of magnesium are being considered as a good option for orthopaedic applications as magnesium is biocompatible, biodegradable and has other important mechanical properties. Researchers from the Indian Institute of Technology Madras (IIT Madras) have developed nano-coated magnesium alloys that can repair bone defects in rabbits. The research team is planning to study medical applications of nano-coated magnesium alloys in other animals and repairing human bones. For this study, the researchers deployed the AZ31 alloy of magnesium and used it for developing magnesium mesh cage implants.

### [Scientists from JNCASR unfurling efficient catalytic properties of the gold metal](#)

Scientists from Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), have stabilized gold in non-cubic lattice, unfurling efficient catalytic properties of the metal introducing new catalytic properties in gold by altering the most stable fcc lattice, converting it into a new avatar that can trigger gold-based catalysis for industry. Tuning of crystal structures and shapes of micro-sized noble metals or micro-crystallites has revealed novel properties that enable developments of environmentally friendly and durable nano-technological applications. In contrast to conventional bulk fcc gold, these micro-crystallites are more efficient in their catalytic activity.

### [DBT – ICAR Transfer of Technology of novel Brucella vaccine](#)

Department of Biotechnology (DBT) facilitated Transfer of Technology of novel Brucella vaccine viz. Brucella abortus S19 delta per vaccine. This vaccine was developed by ICAR-Indian Veterinary Research Institute (ICAR-IVRI), Izatnagar, through a network project on Brucellosis supported by DBT in which a gene was knocked out from Brucella abortus S19 strain. This vaccine has confirmed protection against virulent challenge in experimental mice



Brucellosis Control Programme. The technology of vaccine was transferred by BIRAC to M/s Hester Biosciences Pvt. Ltd.

## IN BRIEF

### [Gene therapy corrects the cardiac effects of Friedreich's ataxia](#)

Researchers at Weill Cornell Medical College created a unique, cardiac-specific mouse model of Friedreich's ataxia (FA) that is similar to early stage human disease in which stress-induced cardiac symptoms appear. The treated mice received a one-time intravenous dose of adeno-associated virus (AAV) gene therapy to deliver the missing frataxin gene which leads to FA. These mice exhibited exercise performance on a treadmill that was indistinguishable from their healthy littermates.

### [What is 'tech sovereignty'?](#)

As political memes go, "tech sovereignty" has become a viral phenomenon among European leaders in the past six months. Since the COVID-19 crisis started, politicians across the left-right spectrum have started pushing to reduce Europe's dependence on US or Chinese-origin technologies. From vaccine development to artificial intelligence, billions of euros are now being mobilised across the European Union; and the rhetoric has gone nuclear. Recently, French President Emmanuel Macron asserted that "If we don't build our own champions in all areas — digital, artificial intelligence," and "our choices will be dictated by others." The latest report by science-business captures the state of play in EU policy for a potentially momentous change in the way Europe funds, manages and regulates its markets for technology in healthcare, energy, aerospace, digital systems and many other fields.

### [SLAC invention could make particle accelerators 10 times smaller](#)

A team of researchers led by scientists at the Department of Energy's SLAC National Accelerator Laboratory has invented a new type of accelerator structure that delivers a 10 times larger energy gain over a given distance than conventional ones. This could make accelerators used for a given application 10 times shorter. The key idea behind the technology is to use terahertz radiation to boost particle energies. One major challenge to building these tiny cavity structures is to machine them very precisely. Instead of using the traditional process of stacking many layers of copper on top of each other, they built the minute structure by machining two halves and bonding them together. The new structure also produces particle pulses a thousand times shorter than those coming out of conventional copper structures, which could be used to produce beams that pulse at a higher rate and unleash more power over a given time period.

## RESOURCES AND EVENTS

### [Intersessional work on the conservation and sustainable use of marine biodiversity](#)

The negotiations on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction (BBNJ) that were supposed to conclude in 2020 have been postponed due to COVID-19. To maintain momentum, virtual intersessional work has been launched ahead of the next physical meeting of the Intergovernmental Conference (IGC), with a view to developing a legally binding instrument as soon as possible. The fourth IGC session is expected to be held in 2021. The virtual intersessional work programme, will be conducted using an online discussion forum. Intersessional work is not substituting for negotiations, which will take place during the still unscheduled IGC-4, but allows for clarifying positions and enhancing mutual understanding. The online forum will be open for posting for a five-day period for each working group and will be conducted with the facilitators' guidance through specific questions. Further bilateral deliberations to be held



### [6th BRICS Communication Ministers Meeting](#)

The sixth BRICS Communication Ministers Meeting, hosted by Russia was virtually held on 17th September, 2020. Broad consensus was built to continue cooperation among BRICS Countries on important areas such as, the role of Information and Communication Technologies in the fight against COVID-19, building trust and security in the use of ICTs, children online protection, granting the access and connectivity of people living in rural areas, as well as groups of persons with disabilities and the role of the digital economy in achieving Sustainable Development Goals. The Indian side also highlighted various initiatives taken by the Indian Government for COVID Management, such as, Aarogya-Setu App, Covid Quarantine Alert System (CQAS), Covid-Savdhan, ICT solutions to facilitate movement of migrant workers back to their homes, in-house development of affordable Video Conferencing Solutions to facilitate work from home and learn from home. India also shared several steps taken by Government of India to boost the growth of telecom and ICT under “Digital India”, the “Bharatnet” project to connect 250,000 villages, and other projects to connect hilly regions and remote islands.

### [DBT to strengthen clinical trial research capacity in neighbouring countries](#)

The Department of Biotechnology, Government of India through the Ind-CEPI mission (India Centric Epidemic Preparedness) for Rapid Vaccine Development and Supporting Indian Vaccine Development aims to strengthen the development of vaccines and associated competencies/technologies for the diseases of epidemic potential in India. One of the key focus areas of the mission is to support capacity building and regional networking with Low and Middle Income Countries. In the current COVID-19 Pandemic situation it is important to build capacities for clinical trials of vaccine. Keeping with the principles outlined by the Science Diplomacy initiatives, DBT has initiated the First phase of the training program to strengthen clinical trial research capacity for neighbouring countries. Through, this training program and knowledge sharing efforts, India is fulfilling its commitment of building various technical capacities in its neighbouring countries. Efforts to network with South Asia, ASEAN and African regions for this purpose would be aided through Ind-CEPI.

### [Outreach programmes for diaspora Indian researchers](#)

The Ministry of Science & Technology has formulated following outreach schemes to provide attractive avenues and opportunities to diaspora Indian researchers. These are: (1) Visiting Advanced Joint Research (VAJRA) Faculty Scheme (2) Ramanujan Fellowship (3) Ramalingaswami Re-entry Fellowship (4) Biomedical Research Career Programme (BRCP) (5) Scientists/ Technologists of Indian Origin (STIO) and (6) Senior Research Associateship (SRA) (Scientist's Pool Scheme). More details are on the Ministry's website.

### [India, Denmark launch Green Strategic Partnership](#)

Prime Minister Modi and Prime Minister Frederiksen of Denmark held an online summit and launched a Green Strategic Partnership. The Partnership seeks to expand green growth, and on implementation of the Paris Agreement and the UN Sustainable Development Goals. It will strengthen cooperation in energy and climate change, environment/water and circular economy, smart cities and stronger bilateral STI partnerships in areas such as energy, water, bio-resources and life sciences and in Arctic Council affairs.



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**Research and Information System for Developing Countries**

Core IV B 4th Floor, India Habitat Centre, Lodi Road, New Delhi 110003, India

Tel:-011- 24682176, E-mail: [science.diplomacy@ris.org.in](mailto:science.diplomacy@ris.org.in)

Website: [www.fisd.in](http://www.fisd.in)

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