



# SCIENCE & TECHNOLOGY EFFORTS IN INDIA ON COVID-19

UPDATED FORTNIGHTLY

30th November 2020



Compiled by  
**VIGYAN PRASAR**  
An Autonomous Organisation of  
Department of Science & Technology,  
Government of India



सबका साथ, सबका विकास, सबका विश्वास  
Sabka Saath, Sabka Vikas, Sabka Vishwas



FOREWORD

डॉ हर्ष वर्धन  
Dr Harsh Vardhan

स्वास्थ्य एवं परिवार कल्याण, विज्ञान और प्रौद्योगिकी  
व पृथ्वी विज्ञान मंत्री, भारत सरकार

Union Minister for Health & Family Welfare,  
Science & Technology and Earth Sciences  
Government of India

The 2019 Novel Coronavirus (SARS-CoV-2) has spread rapidly throughout the world and has assumed the proportion of a Pandemic. Given the lack of an efficacious vaccine as well as non-availability of suitable chemotherapeutic interventions, mankind is experiencing an unprecedented existential crisis.

2. The Ministry of Science and Technology and the Ministry of Health & Family Welfare, with their various departments, are contributing in various ways towards the national R&D efforts for developing solutions to combat COVID-19. The Department of Science & Technology under the Ministry has launched a nationwide exercise to map and boost development of COVID-19 solutions with R&D, seed capital and scale-up support. All academic and research institutions are being reoriented to focus on the development of diagnostics, vaccines, antivirals, disease models and other R&D to enable a cure for this dreadful disease. Around 15 labs of Council of Scientific & Industrial Research (CSIR), under the Department of Scientific & Industrial Research, across the country are working in close partnership with major private sector Industries, PSUs, MSMEs and other Government departments to develop solutions for COVID-19. The Department of Biotechnology (DBT) under the Ministry has also formed a consortium to support the development of Medical equipment, Diagnostics, Therapeutics, Drugs and Vaccines to meet the Healthcare Challenges. Indian Council of Medical Research (ICMR), under the Ministry of Health & Family Welfare has already isolated the virus strain successfully, which is a first step towards vaccine research. Similarly, various other organizations under Ministry of Human Resource & Development, Ministry of Defence, Ministry of Chemicals & Fertilizers, etc. are also contributing substantively to our R&D efforts. The private sector has also come forward in a big way to supplement these efforts.

3. With a view to spreading awareness about the S&T efforts of the Government of India as well as private sector in finding solutions for COVID-19, Vigyan Prasar - an autonomous institution under Ministry of Science & Technology and engaged in large-scale science communication and popularization activities - has compiled all initiatives being undertaken in this field.

4. This document "Science & Technology Efforts on COVID-19 in India" shall serve as a ready-reckoner for policy makers, scientists, researchers, scholars and other stakeholders who might be interested in understanding and keeping themselves abreast with the latest S&T efforts being made to develop solutions to combat COVID 19.

  
(Dr. Harsh Vardhan)

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# PREFACE

The COVID-19 pandemic is unleashing a human development crisis. On some dimensions of human development, conditions today are equivalent to levels of deprivation. The crisis is hitting hard on all constitutive elements of it: economy, health and education. Most of the current strategies to reduce the risk of SARS-CoV-2 transmission are based on controlling interactions between humans, including case isolation, tracking patient contacts and screening passengers crossing borders. The pandemic has posed one of the biggest challenges to the entire humanity. In the wake of its outbreak, our lives have changed in ways we had never imagined before.

In these critical times, access to authentic information is of paramount importance. Vigyan Prasar (VP) has been covering the pandemic since the early days with the science communication perspective, ensuring that science and safety are the primary focus. For the benefit of the stakeholders and target audience, Vigyan Prasar is preparing and publishing compilation of the most relevant initiatives, efforts, and wartime protocols, engaged by the Government of India through its various Science Ministries, Departments, and Funding organizations, in the shape of daily, weekly, and now fortnightly e-Newsletter. These research-driven and technology-based interventions have been initiated on war footing to fight out the outburst of the pandemic.

The pandemic was superimposed on unresolved tensions between people and technology, between people and the planet, between the haves and the have-nots. These tensions were already shaping a new dimension of inequalities pertaining to enhanced capabilities and the new necessities of the 21<sup>st</sup> century. But the response to the crisis carries the potential to shape strategies on how those tensions can be addressed and how inequalities in human development are reduced. We hope this initiative of Vigyan Prasar shall be a handy guide to scientists, researchers and scholars, especially those who are interested in knowing various aspects of COVID-19 and contributing to the coronavirus warfare and making the nation Atmanirbhar.

Vigyan Prasar  
New Delhi

30 Nov 2020

# Digital platform for COVID vaccine delivery and monitoring is making ready in consultation with all the stakeholders

20th November 2020, New Delhi


Prime Minister, Shri Narendra Modi, reviewed the preparedness of COVID-19 vaccine delivery, distribution and administration. He appreciated the efforts of innovators, scientists, academicians and pharma companies in their efforts to develop vaccines and has directed that every effort should be made to facilitate the research, development and manufacturing of the vaccine.

Five vaccines are in advanced stages of development in India, out of which 4 are in Phase II/III and one is in Phase-I/II. Countries such as Bangladesh, Myanmar, Qatar, Bhutan, Switzerland, Bahrain, Austria and South Korea have shown keen interest in partnering for vaccine development of Indian vaccines and use thereof.



In an effort to administer the vaccine at the first available opportunity, database of healthcare and frontline workers, augmentation of cold chains and procurement of syringes, needles, etc. are in advanced stages of preparation.

The vaccination supply chain is being enhanced and non-vaccine supplies are being escalated. Medical and nursing students and faculty will be involved in training and implementation of the



vaccination programme. Every step is being steadily put in place to ensure that vaccines reach every location and person according to the prioritisation principles.

The Prime Minister has directed to work in collaboration with all reputed national and international institutions and regulators to ensure the rigour and highest global standards in Indian research and manufacturing.

National Expert Group on Vaccine Administration for COVID-19 (NEGVAC) in consultation with State Governments and all relevant stakeholders have accelerated the implementation of vaccination of priority groups in first phase.

The digital platform for vaccine administration and distribution is prepared and test runs are underway in partnership with the State- and District-level stakeholders.

The Prime Minister reviewed the aspects of emergency use authorisation and for manufacture and procurement of medicine. As the results of these Phase III trials from national and international vaccine arrive, our robust and independent regulators will speedily and rigorously examine these for according authorisation for use.

The Government has provided assistance of Rs. 900 crore under COVID Suraksha Mission to support Research & Development of COVID-19 vaccination. The Prime Minister directed that a time-bound plan be laid out for speedy regulatory clearances and timely procurement for early rollout of the vaccination drive.

The Prime Minister appreciated comprehensive efforts at vaccine development. He also emphasised that given the persisting pandemic scenario there is no place for any relaxation in preventive measures such as wearing masks, keeping distance and ensuring hygiene.

The meeting was attended by Principal Secretary to PM, Cabinet Secretary, Member (Health) NITI Aayog, Principal Scientific Advisor, Secretary Health, DG ICMR, officers of PMO, and Secretaries of related Departments of Government of India.

**Website link:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1674593>

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# Home Minister inaugurates mobile COVID-19 RT-PCR Lab jointly developed by SpiceHealth & ICMR

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23<sup>rd</sup> Nov 2020, New Delhi

On November 23, the Union Home Minister, Shri Amit Shah, inaugurated a mobile COVID-19 RT-PCR Lab at the Indian Council of Medical Research (ICMR) in New Delhi, jointly launched by SpiceHealth and ICMR. The Union Health and Family Welfare Minister, Dr Harsh Vardhan, also participated in the inauguration function. The Secretary DHR and Director General of the ICMR, Dr Balram Bhargava, the Chairman and Managing Director of SpiceJet, Shri Ajay Singh and the CEO of SpiceHealth, Ms. Avani Singh also took part in the inauguration ceremony.



This testing lab and more such labs which are planned to be set up shall help in adding more capacity to COVID-19 testing. The lab is accredited by NABL and approved by the ICMR. RT-PCR tests are most decisive and crucial for COVID-19 testing. These tests will cost Rs. 499 and the cost of testing will be borne by the ICMR. The people of Delhi will not have to bear any cost. This initiative is a step in making COVID-19 testing affordable and more accessible to the common person.

The test report would be available within 6 to 8 hours from the time of sample collection compared to the average 24 to 48 hours taken by similar test reports.

SpiceHealth has signed a Memorandum of Understanding with the ICMR for setting up testing facilities (laboratories) and collection centres across the country. To begin with, the first testing facility has been set up in Delhi. More such testing facilities will come up in different parts of the National Capital over the coming days. It is planned to set up 10 labs in the first phase. At the outset, each lab would be able to test up to 1,000 samples per day and testing would slowly be ramped up to 3,000 samples per day per lab.

**Website Link:**

<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1675139>



# Health Ministry approves new category for selection and nomination of candidates from ‘Wards of COVID Warriors’ under Central Pool MBBS/BDS seats for the academic year 2020-21

19th Nov 2020, New Delhi


Dr Harsh Vardhan, Union Minister for Health and Family Welfare on 19 November, 2020 announced the Government's decision to introduce a new category called **‘Wards of COVID Warriors’** in the guidelines for selection and nomination of candidates against Central Pool MBBS seats for the academic year 2020-21.



The Union Health Minister said that this move aims to dignify and honour the noble contribution made by the COVID Warriors in treatment and management of COVID patient. “This will honour the solemn sacrifice of all COVID warriors who served with selfless dedication for the cause of duty and humanity,” he stated.

Central Pool MBBS seats may be allocated for selection and nominations of the candidates from amongst the wards of “COVID Warriors”, who have lost life due to COVID-19 or died accidentally on account of COVID-19-related duty.

Reminding everyone that the definition of COVID Warrior has been laid down by Government of India while announcing the insurance package of ₹50 lakhs for them, the Minister said, “COVID Warriors are all public healthcare providers including community health workers, who may have to be in direct contact and care of COVID-19 patients and who may be at risk of being impacted by this. Private hospital staff and retired/volunteer/local urban bodies/contracted/daily wage/ad-hoc/outsourced staff requisitioned by States/Central hospitals/



autonomous hospitals of Central/ States/UTs, AIIMS and Institutes of National Importance (INIs)/ hospitals of Central Ministries drafted for COVID-19-related responsibilities are all included.” He added that the State/UT Government will certify the eligibility for this category.

Five Central Pool MBBS seats have been reserved for this Category for the year 2020-21.

The selection of candidates will be made by the Medical Council Committee (MCC) through online application on the basis of rank obtained in the NEET-2020 conducted by National Testing Agency.

**Website link:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1673965>



# INDEX

The e-newsletter is being published on a regular basis by collating all the inputs received till the preceding day of the release.

The older issues of e-newsletter are available in the Archival Section at <https://vigyanprasar.gov.in/covid19-newsletters/>

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## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

# DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

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### **Dignitaries deliberate on The Other Side of the Pandemic as part of DST Golden Jubilee Discourse series**

Dignitaries discussed the challenges and opportunities that the COVID-19 pandemic brought out at an online panel discussion on 'The Other Side of the Pandemic' organized as part of the DST Golden Jubilee Discourse series commemorating 50 years of DST.

"This theme has two different sides. The compelling lessons that we learn from this pandemic and how to translate them into practice of doing Science, Technology, and innovation is one, and the other is the challenges and new opportunities. The other side of pandemic could refer to the opportunities that we wish to explore together, and we have to keep leveraging these opportunities," Secretary, Department of Science and Technology, Professor Ashutosh Sharma explained.

**Website link:**

<https://dst.gov.in/dignitaries-deliberate-other-side-pandemic-part-dst-golden-jubilee-discourse-series>

### **COVID-19 on downtrend, but we need to be more careful in next 3-4 months: DST Secretary**

COVID-19 is on the downtrend, Prof Ashutosh Sharma, Secretary, DST, pointed out while praising the efforts of all sectors in COVID-19 time that helped India to take steps towards being Atmanirbhar in medical field. He added that, however, in view of the number of festivals in the coming months, there is a strong possibility of transmission.

"If we look and analyse the data and number of cases, it can certainly be said that it is on the downtrend. But this is conditional, and this is also the time people need to be more careful. We have to religiously follow the COVID-19 protocols given by the Government. People need to wear mask at all times, wash their hands regularly, take social distancing very seriously and take all the precautions," Prof. Sharma said during a lecture as part of the DST Golden Jubilee Discourse Series.

**Website link:**

<https://dst.gov.in/covid-19-downtrend-we-need-be-more-careful-next-3-4-months-dst-secretary>

### **New-age sustainable disinfectants and sanitizers may bring relief from chemical ones with side effects**

The days of suffering from dry, itching hands due to rinsing them multiple times with chemical disinfectants and soap as protection against contact infection of COVID-19 may soon be over. A number of start-ups based in different parts of India are now armed with a range

of sustainable alternatives to conventional chemical-based decontaminants that can disinfect surfaces and even microcavities.

They also include technologies for disinfection of the biomedical waste generated at hospitals and the use of novel nanomaterials and chemical process innovations for long-lasting and safe sterilization of the recurrent use surfaces.

Safe disinfection and sanitization technologies have come from a total of 10 companies supported for disinfectants and sanitizers under Centre for Augmenting WAR with COVID-19 Health Crisis (CAWACH), an initiative by the National Science & Technology Entrepreneurship Development Board (NSTEDB), DST, implemented by Society for Innovation and Entrepreneurship (SINE), IIT Bombay.

**Website link:**

<https://dst.gov.in/new-age-sustainable-disinfectants-and-sanitizers-may-bring-relief-chemical-ones-side-effects>





# SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

## DEPARTMENT OF BIOTECHNOLOGY (DBT)

### DBT-inStem promotes hashtag '#Unite2FightCorona'

The DBT-Institute for Stem Cell Science & Regenerative Medicine (DBT-inStem) is proactively promoting the hashtag #Unite2FightCorona through various in-house contents – posters, artwork, and photographs, emphasizing on the three basic rules of 'Wear A Mask', 'Hand Hygiene', and 'Physical Distancing' that must be followed till a cure has been found for COVID-19.

This follows an email from DBT dated October 08, 2020 by which it has requested its affiliated research organisations to use the hashtag #Unite2FightCorona in their various campaigns and posts on social media.

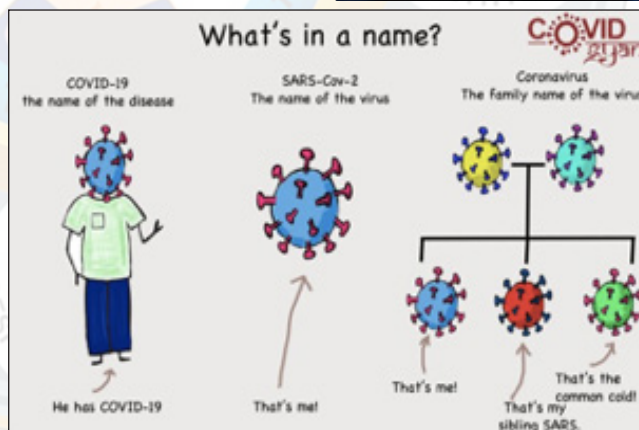
Some of the links of social media postings have also been shared by DBT, DBT Secretary, Dr Renu Swarup, and other DBT-affiliated research organisations.

Contact Info: Amrita Tripathy  
(tripathya@instem.res.in)

#### Website link:

[https://twitter.com/DBT\\_inStem/status/1319242059451043842?s=20](https://twitter.com/DBT_inStem/status/1319242059451043842?s=20)

<https://instem.res.in/>



### DBT-NCCS participates in Jan Andolan for COVID-19 appropriate behaviour

The DBT-National Centre for Cell Science (DBT-NCCS), Pune has displayed a banner at the gate of its complex that reminds everyone entering the premises to take necessary precautions to prevent COVID-19 as part of the Government of India's "Jan Andolan for COVID-19 Appropriate Behaviour" campaign.



Several posters have also been displayed across the campus of NCCS. These provide pictorial and textual instructions in Marathi, Hindi and English, summarizing the precautionary measures. In addition, the DBT-NCCS family took a pledge on 12<sup>th</sup> October, 2020 to take all necessary precautions & #Unite2FightCorona.

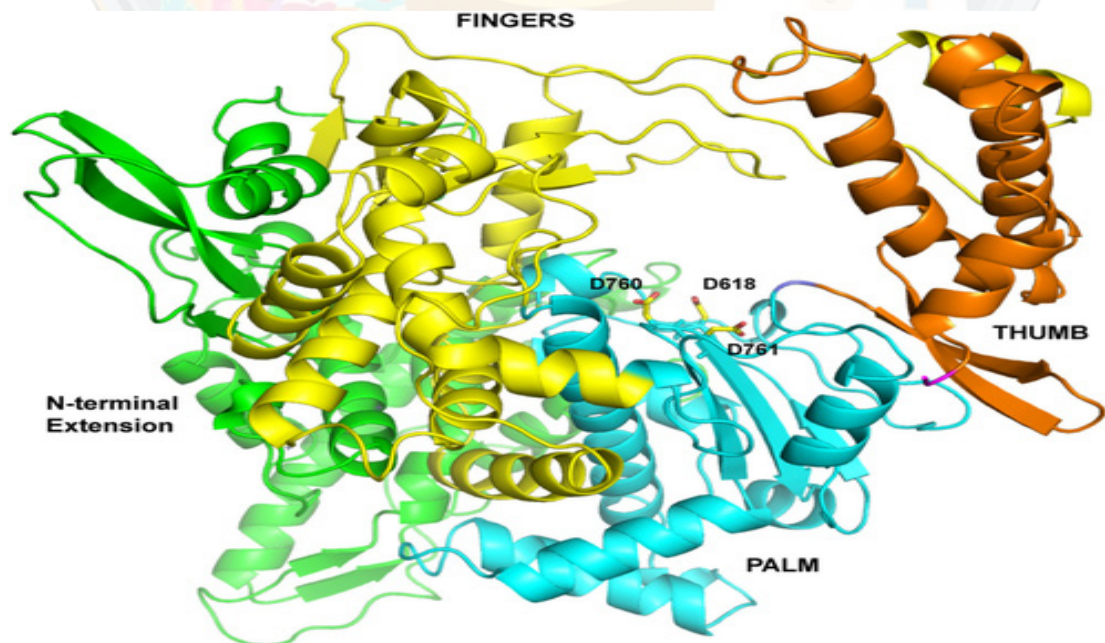
Contact Info: Jyoti Rao (jyoti@nccs.res.in)

**Website link:**  
<https://www.nccs.res.in/>

### DBT-RCB study suggests Vitamin B 12 may help fight COVID-19 pandemic

A computational study at the laboratory of Prof. Deepak Nair at DBT-Regional Centre for Biotechnology (DBT-RCB) has indicated that Vitamin B 12 may be useful in the fight against SARS-CoV-2 virus, the causative agent for the on-going COVID-19 pandemic.

The virus belongs to the Coronaviridae family. Like other members of this family, it possesses a positive sense, single-stranded RNA genome. The genome encodes for the nsp12 protein, which houses the RNA-dependent RNA polymerase (RdRP) activity responsible for the replication of the viral genome.





A homology model of nsp12 was prepared using the structure of the SARS nsp12 (6NUR). This was used to carry out *in silico* screening of various natural products, and Food and Drug Administration approved drugs to identify molecules that can potentially inhibit the activity of nsp12. This exercise showed that vitamin B12 (methylcobalamin) may bind to the active site of the nsp12 protein.

The model of nsp12 in complex with substrate RNA and incoming NTP showed that vitamin B12 binding site overlaps with that of the incoming nucleotide. A comparison of the calculated energies of binding for RNA plus NTP and methylcobalamin suggested that the vitamin may bind to the active site of nsp12 with significant affinity. It is, therefore, possible that methylcobalamin binding may prevent association with RNA and NTP and thus inhibit the RdRP activity of nsp12. Overall, these computational studies suggest that methylcobalamin form of vitamin B12 may serve as an effective inhibitor of the nsp12 protein.

The researchers have published a research article titled 'Vitamin B12 may inhibit RNA dependent RNA polymerase activity of nsp12 from the SARS-CoV-2 virus' in IUBMB Life (<https://doi.org/10.1002/iub.2359>).

Contact Info: Dr Deepika Bhaskar ([deepika.bhaskar@rcb.res.in](mailto:deepika.bhaskar@rcb.res.in)); Dr Nidhi Sharma ([nidhi.sharma@rcb.res.in](mailto:nidhi.sharma@rcb.res.in))

**Website link:**

<https://www.rcb.res.in/index.php>

## **DBT-RCB Biosafety Support Unit processes 17 COVID-related applications**

Biosafety Support Unit (BSU) of DBT-Regional Centre for Biotechnology (DBT-RCB) has received and assessed 50 applications. These contain 42 Biopharma and 08 Agriculture-related applications. These applications include import/export/transfer/receive, information items and preclinical toxicity studies for biopharma, and import/export/transfer/receive, event selection trial, biosafety research level-I trial, and report of biosafety research level-I trial for agriculture.



Regional Centre for Biotechnology offers  
MSc-PhD Biotechnology Integrated Program

The unit also processed 17 COVID-related applications under fast track mode. IBKP Team assessed new and revised IBSC submissions of which 26 IBSCs were found to be complete and registered. Five organizations were registered.

Contact Info: Dr Deepika Bhaskar ([deepika.bhaskar@rcb.res.in](mailto:deepika.bhaskar@rcb.res.in)); Dr Nidhi Sharma ([nidhi.sharma@rcb.res.in](mailto:nidhi.sharma@rcb.res.in))

**Website link:**

<https://www.rcb.res.in/index.php>



## DBT-IBSD holds webinar on Reimagine Ethnopharmacology

The Institute of Bioresources and Sustainable Development (IBSD), Imphal, jointly with Society for Ethnopharmacology (SFE), India and International Society for Ethnopharmacology (ISE), Switzerland organized the 20<sup>th</sup> session of the International Webinar Series-Reimagine Pharmacology on 24<sup>th</sup> October 2020.

**Presented by**

**Institute of Bioresources & Sustainable Development, India**  
An Autonomous Institute under Department of Biotechnology (DBT)  
Ministry of Science and Technology, Govt. of India  
Imphal, Manipur | Gangtok, Sikkim | Aizawl, Mizoram | Shillong, Meghalaya  
www.ibsd.gov.in

**Society for Ethnopharmacology, India**  
23/3, Sakligah, Jadavpur, Kolkata 700032  
www.ethnopharmacology.in

**International Society for Ethnopharmacology**  
Switzerland  
https://www.ethnopharmacology.org/

This unprecedented situation forced us to see the world from a completely novel perspective where staying home, social distancing and digital collaborations are the new normal. During this Covid-19 pandemic, Institute of Bioresources & Sustainable Development (IBSD), India is determined to contribute to the society through integrated and synergistic approach by leveraging digital platform.

Society for Ethnopharmacology (SFE)-India is committed to globalization of local knowledge and localization of global technology in the research and development of ethnopharmacology and ethnomedicine.

International Society for Ethnopharmacology (ISE) is concerned about understanding the medicinal uses of plants in traditional societies. It seeks to comprehend the cultural and the pharmacological dimensions on use of medicinal plants everywhere.

**International Webinar Series Session-20**

**Reimagine Ethnopharmacology**

**Date and Time**  
24<sup>th</sup> Oct 2020  
4:30 PM (IST)

**Moderator**

**Prof. Pulk K. Mukherjee**  
Director  
Institute of Bioresources & Sustainable Development (IBSD), An Autonomous Institute under DBT, Ministry of Science and Technology, Govt. of India

**Speakers**

**Dr. Dilip Ghosh**  
Director, Nutriconnect, Sydney  
Director, Trigonella Labs Pty Ltd, Sydney, Australia

**Prof. Jyoti Prakash Tamang**  
Professor in Microbiology  
Department of Microbiology  
Sikkim University (Central University)  
Gangtok, Sikkim, India

**Topics:**

- Scientific & technological advancements to combat Covid-19 pandemic: Hope from natural medicines
- Metagenome gene predictive for health benefits of some Indian fermented foods.

To witness the digital revolution in natural product, ethnomedicine and ethnopharmacology join us.

**Registration link:** <https://event.webinarjam.com/channel/RE-Session-20>

Dr Dilip Ghosh, Director, Nutriconnect, Sydney and Director, Trigonella Labs Pty Ltd, Sydney, Australia spoke on “Scientific & technological advancements to combat COVID-19 pandemic: Hope from natural medicines” and Prof. Jyoti Prakash Tamang, Professor in Microbiology, Department of Microbiology, Sikkim University (Central University) Gangtok highlighted the topic “Metagenome gene predictive for health benefits of some Indian fermented foods”.

Contact Info: Prof Pulk K Mukherjee ([director.ibsd@nic.in](mailto:director.ibsd@nic.in))

### Website link:

<https://ibsd.gov.in/ibsd/home/index.php>

## Outreach Programme For School Children

Dr Sriram Varahan, a Postdoctoral Fellow at Dr Sunil Laxman's laboratory at DBT-Institute for Stem Cell Science & Regenerative Medicine (inStem), Bengaluru and an Early Career Fellow of Wellcome Trust/DBT India Alliance presented a webinar titled ‘COVID:What has it taught us really?’ to high school students of P.S.Senior Secondary School, Mylpore, Chennai on October 17, 2020.

**P S SENIOR SECONDARY SCHOOL, MYLPORE, CHENNAI**

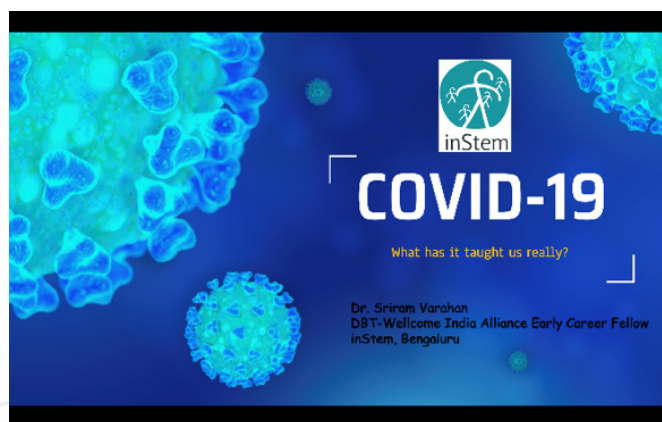
**Presents**

**Webinar by:**  
**Dr. Sriram Varahan**  
from  
**Institute for Stem Cell Science and Regenerative Medicine, Bengaluru**

**COVID: What has it taught us really?**

**Date: 17 Oct '2020**  
**Time: 2:30pm**  
**for XI Band XII B**

He started his talk by speaking about the COVID-19 virus – a zoonotic pathogen whose primary hosts are bats and secondary hosts are unknown, followed by the mechanism of entry of the COVID-19 virus wherein the spike protein binds to the ACE2 receptor. He also addressed how physical boundaries between animals and humans are crucial and how breach of these boundaries can expose to newer zoonotic pathogens.



Explaining the classic symptoms of COVID-19 in his talk, Dr Sriram also emphasized on the importance of wearing masks, hand sanitization and maintaining social distancing – the effective ways of minimizing virus spread in the human population. Furthermore, he also spoke about asymptomatic carriage of the disease and how asymptomatic people can spread the disease, thus making the epidemic spread in humans more complex.

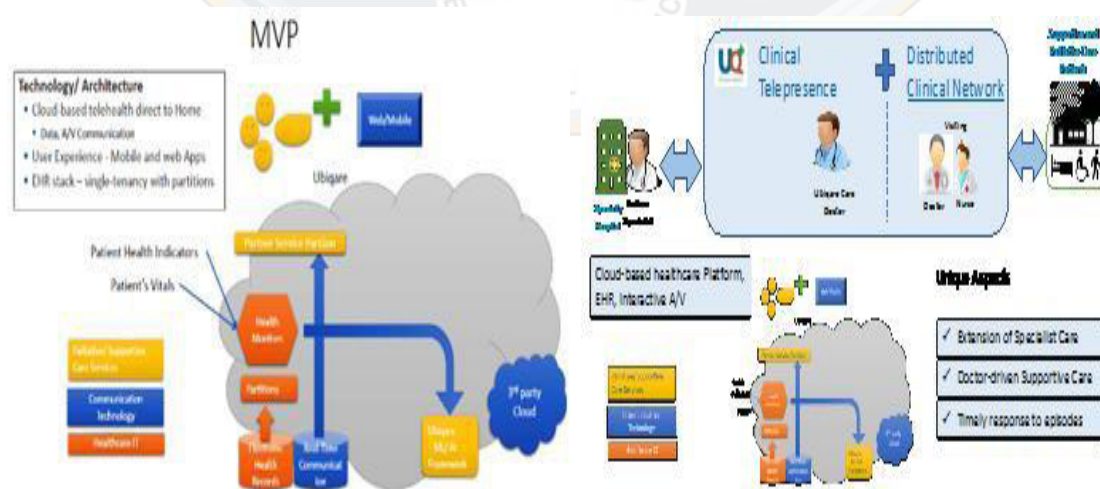
Further, Dr Sriram emphasized on how testing is important and inevitable to find and curtail the disease spread and the efforts taken by all the countries across the world to develop a vaccine. He discussed what a vaccine is, different kinds of vaccine, and the types being developed against COVID-19.

Contact Info: Amrita Tripathy ([tripathya@instem.res.in](mailto:tripathya@instem.res.in))

**Website link:**  
<https://instem.res.in/>

## **BIRAC's specialty medical supportive/palliative care to patients at home**

Millions of patients with chronic diseases are unable to receive specialist access and care at home. Ubiqare Health Pvt Ltd., a start-up supported by DBT-Biotechnology Industry Research Assistance Council (DBT-BIRAC), New Delhi has come up with a solution that seamlessly combines clinical telepresence technology, collaboration framework and last-mile clinical network of doctors, nurses and therapists. The innovation aims to build a pervasive speciality





follow-up care: virtual hospitals with beds at home. Ubiqare enables doctor-driven speciality care to patients at home, reducing hospital visits and stays and providing with all the facilities in the comfort of home. It is a collaborative care delivery model.

This model has proved to be a boon in the times of COVID crisis. The patients can be cared for at home during most of the illness trajectory - from the asymptomatic stage to mild symptoms to moderate symptoms stage. This enables the hospital infrastructure to be leveraged for only those with severe symptoms. The governments have been taking a lot of measures to ensure that the hospitals are well equipped to serve those in need. This healthcare innovation helps in ensuring all the facilities are well taken care of even if the patient chooses to stay at home and get treated.

### **How does it work for patients in different stages?**

In the asymptomatic stage and mild symptoms stage, the patient's health will be self-monitored, and the data will be uploaded to the cloud for analysis by an algorithm. This analysis will further be reviewed by the care doctor. Interventions for collecting lab samples for testing will be supported. Non-compliance to care protocols during quarantine will be detected and alerted. During this stage monitoring of family members will also be covered.

Ubiqare will support the patients in moderate stage by shifting them to an isolation ward in proximity and supported by the care doctor over the telepresence platform.

For those with severe symptoms or patients with epidemiological risks, Ubiqare will support in shifting them to hospital under specialists care.

COVID-19 patients at home, under care from Ubiqare, will get:

- Extension of care of pulmonologist/ physician and interactive clinical telepresence;
- Regular monitoring by IoT-enabled medical devices with cloud-based analytics on EHR;
- Analytics-assisted triaging and tele-consultation by Ubiqare doctor/pulmonologist/ physician;
- Sample collection or interventions by the last-mile clinical network/healthcare workers.

The subscription for this health solution ranges from Rs. 15,000 to Rs 20,000 per month.

Contact info: Dr Shirshendu Mukherjee (mdpmubmgf@birac.nic.in); Dr Hafsa Ahmad (nbm9@birac.nic.in); Ms. Ginny Bansal (pmubmgf6@birac.nic.in)

**Website link:**

<https://www.birac.nic.in/>

### **DBT-inStem hosts session on 'tapestry pooling' method for COVID testing**

The DBT's Institute for Stem Cell Science & Regenerative Medicine (DBT-inStem), Bengaluru is one of the founding partners of COVID Gyan, a pan-institutional website that has been proactive in COVID-19 outreach effort ever since the pandemic surfaced in India. The constant effort of COVID Gyan has been to create necessary awareness with proper scientific backing about COVID-19, busting the myths and bringing in the on-going research across the country.

A WebGyan #AskMeAnything session was organised, which was moderated by Dr Uma Ramakrishnan of NCBS-TIFR. It hosted Dr Dasaradhi Palakodeti of DBT-inStem and Dr Manoj Gopalkrishnan of IIT-Mumbai who spoke about their collaborative venture – 'Tapestry Pooling' for effective COVID testing.



## WebGyan: an Ask Me Anything about Tapestry Pooling for COVID-19 Testing



Manoj Gopalkrishnan



Dasaradhi Palakodeti

November 12 | 8pm IST

Tapestry Pooling is a smart pooling method for qPCR testing that has been jointly developed at IIT Bombay, NCBS Bangalore, and inStem Bangalore. It allows 10x increase in testing throughput and gives individual results in a single round! In this Ask Me Anything session, learn about Tapestry Pooling from two of the principal investigators, and **ask them all your burning questions about this method!**



**REGISTER HERE**

[tinyurl.com/TapestryCG](https://tinyurl.com/TapestryCG)



[covid-ghan.in](https://covid-ghan.in)



Tapestry Pooling is a novel quantitative non-adaptive single-step pooling scheme to test up to 1,000 samples at once using the same amount of reagents that are normally employed for running only 100 samples. The underlying molecular diagnostic test is any real-time RT-PCR diagnostic panel approved for the detection of the SARS-CoV-2 virus.

In cases where most samples are negative for the virus, Tapestry accurately identifies the status of each individual sample with a single round of testing in fewer tests than simple two-round pooling. This testing method was developed as an Android application called 'BYOM Smart Testing', which guides users through the pipetting steps required to perform the combinatorial pooling. The results of the pooled tests can be fed into the application to recover the status and estimated viral load for each individual sample.

The algorithm developed by Dr Manoj Gopalkrishnan at IIT Mumbai and Dr Sandeep Krishna of NCBS, Bangalore has been experimentally tested – involving matrices of increasing complexity and samples of known status – by Dr Dasaradhi Palakodeti, inStem. This one-hour session is available to watch on BLiSC YouTube channel and was live tweeted on DBT-inStem's Twitter handle.

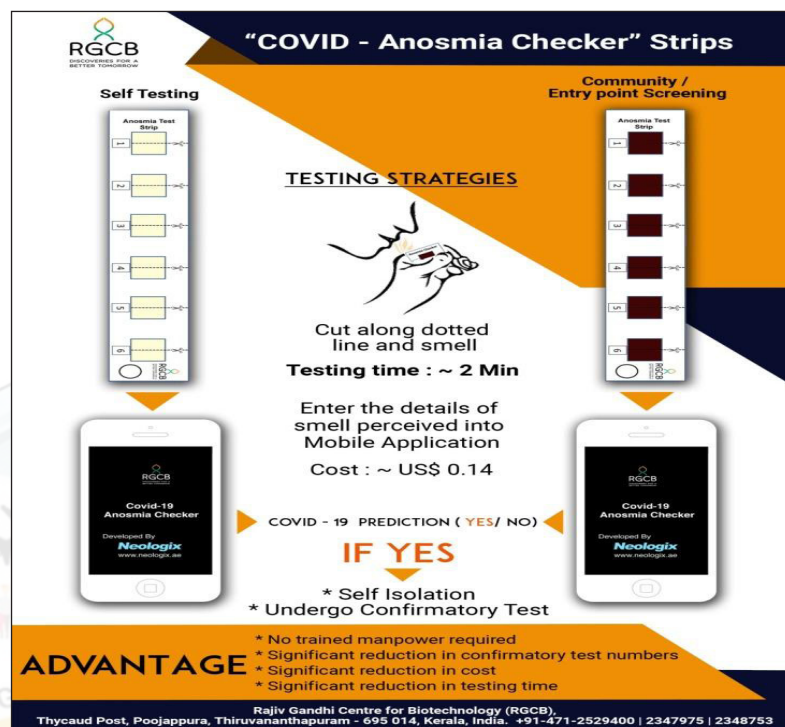
Contact Info: Amrita Tripathy ([tripathya@instem.res.in](mailto:tripathya@instem.res.in))

**Website link:**

<https://instem.res.in/>

## DBT-RGCB develops tool for COVID-19 mass screening

The COVID-19 curve can be flattened by adopting mass screening protocols with aggressive testing and isolating infected populations. The current approach largely depends on RT-PCR/rapid antigen tests that require expert personnel resulting in higher costs and reduced testing frequency. Alternatively, to effectively quantitate the loss of smell that is a prominent marker of COVID-19, Dr Jackson James and team from DBT's Rajiv Gandhi Centre for Biotechnology (RGCB), Trivandrum in collaboration with Dr Balarama Kaimal's group from Saveetha Medical College Hospital, Chennai developed a paper-based odour strip.



Named *COVID-Anosmia checker*, the tool spotted with gradients of coffee and lemon grass oil was validated in healthy and COVID-19 positive subjects. A trial screening to identify SARS-CoV-2-infected persons was also carried out to check its sensitivity and specificity. It was observed that COVID-19-positive participants were hyposmic (having partial loss of smell) instead of being anosmic (having complete loss of smell) when they were subjected to smelling higher odour concentration. The tool identified 97% of symptomatic and 94% of asymptomatic COVID-19-positive subjects. Further, it was possible to reliably predict COVID-19 infection by calculating a loss of smell score with 100% specificity.

This tool was further coupled with a mobile application, which takes the input response from the user and can readily categorize the user in the appropriate risk groups (low-risk, medium-risk and high-risk) thereby considerably reducing the testing cost. It can be used by individuals without much expertise and can be easily deployed in difficult to reach geographical locations or for screening at airports or border entry points.

An individual can repeatedly self-test at home to check for the suspected onset of COVID-19. The primary screening using the *COVID-Anosmia checker* is swift and takes only about two minutes to complete the test and costs about US dollar 0.14 for manufacturing each test strip. A pre-print version of a report on the work is hosted in the non-profit preprint server medRxiv.

Contact Info: Dr Jackson James (jjames@rgcb.res.in); Dr Anish N P (anishnp@rgcb.res.in)

### Website link:

<https://doi.org/10.1101/2020.10.28.20221200>

<https://rgcb.res.in/>

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# SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

## COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

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### **CSIR partners with TataMD for diagnostic testing for COVID-19**

Tata Medical and Diagnostics Ltd. (TataMD), the healthcare venture from Tata Group, has announced the commercial launch of TataMD CHECK, novel diagnostic testing for COVID-19. It will use FNCAS9 Editor-Limited Uniform Detection Assay (FELUDA), a CRISPR Cas-9 technology, which was developed in India by CSIR-Institute of Genomics and Integrative Biology (IGIB) for COVID-19 testing. It is the world's first CRISPR Cas-9-based diagnostic tool to be launched globally.

TataMD CHECK is a lab test. The process of collecting patient samples, RNA extraction, and amplification, etc. remains the same but uses simple, less expensive equipment and produces quicker results due to a more agile process and AI-based automated result detection. It is a paper strip-based test with image-based visual result readout. It requires standard laboratory equipment and small batches of tests can be conducted. Moreover, it has a fast reaction time of 45-50 minutes in the laboratory and the total testing time from RNA-extracted samples in the lab to result is 75 minutes only, the company said.

It has been approved by the Indian Council of Medical Research and Drug Controller General of India (DCGI) and will be available through diagnostic centres and hospitals across India shortly. Tata MD CHECK offers laboratories, hospitals, and other healthcare providers to fast-track COVID diagnosis services to more people.

Commenting on the launch, Girish Krishnamurthy, CEO, Tata Medical and Diagnostics said, "Tata MD aims to be a trusted, long-term partner and helps shape the evolution of healthcare industry towards building a more inclusive and integrated patient-centric model. With TataMD CHECK, we are committed to significantly enhance the testing experience of the consumers as well as work with laboratories and hospitals to ensure wider availability and easier access to testing."

#### **Website Link:**

<https://vigyanprasar.gov.in/isw/CSIR-partners-with-TataMD-for-diagnostic-testing-for-COVID-19.html>

### **CSIR-SERC licenses makeshift hospital's technology to L&T**

CSIR's Chennai-based constituent laboratory Structural Engineering Research Centre (SERC) has signed an agreement for licensing of technology – Portable lightweight foldable module for makeshift hospitals and other needs (PoliTal-M) with Larsen & Toubro Limited (L&T), Mumbai. The agreement was signed in the presence of Dr Shekhar C Mande, Director General, CSIR, Prof. Santosh Kapuria, Director, CSIR-SERC, and Shri M V Satish, Whole-time Director and Senior Executive Vice President, L&T.





PoliTal-M is a lightweight foldable modular unit for fast deployment in the critical need of shelters, which can be transported and erected quickly using a crane and two-three manpower. This technology is first of its kind in India and has a high potential for multi-functional use for different needs such as the fast deployment of shelters for ready-to-use makeshift hospitals, housing for affected people in case of natural disasters, temporary shelters for migrant workers in construction sites and remote areas, deployment of shelters at remote strategic locations etc.

The total weight of the unit is around one ton and it can be folded and transported easily. The module can be fabricated in the factory with simple fabrication utilizing standard steel sections welded. The fully folded modules can be taken to the site and erected after levelling the site and each module can be installed within 30 minutes. The dimension of the module is 6.0 m x 3.0 m x 2.8 m and the size can be customized as per the requirement from 3 m to 6 m in length.

**Website link:**

<https://vigyanprasar.gov.in/isw/CSIR-SERC-licenses-makeshift-hospital-technology-to-L&T.html>

### **Durable pre-fabricated isolation centre-cum-hospital facility inaugurated**

The outbreak of COVID-19 pandemic has paved way for the establishment, development and enhancement of many health facilities. In this array, CSIR-Structural Engineering Research Centre (CSIR-SERC) worked on the concept of a make-shift hospital and made modifications to its post-disaster shelter design.

Dr Harsh Vardhan, Minister of Science and Technology, Minister of Health and Family Welfare and Minister of Earth Sciences inaugurated the 'Prefabricated Isolation Centre for COVID19' and dedicated it to 04 Bn National Disaster Response Force (NDRF) campus Arakkonam, Tamil Nadu, in a modular form. CSIR-SERC and NDRF worked together with synergy and completed

the assembly of the structure within a short time. Later on 04 BN NDRF Arakkonam has completed the furnishing of the hospital.

The laboratory introduced a foldable and framed steel structure such that a single person can carry a couple of frames on his shoulder and assemble these at any site without much loss of time. Towards achieving a high technology readiness level, it was decided that CSIR-SERC shall demonstrate the concept of this make-shift hospital through setting up of a 10-bedded facility.

The system at Arakkonam is designed to have features like rapid erection, foldable, light in weight, safe, comfortable, economical, re-buildability, adequate thermal insulation and waterproofing feature and make use of locally available skills.

**Website link:**

<https://vigyanprasar.gov.in/isw/Durable-prefabricated-isolation-centre-cum-hospital-facility-inaugurated.html>

### **Animal study on Coronavirus in partnership of CSIR moves into final stages**

The first animal study in India on SARS-CoV-2 virus (the cause of COVID-19), which arose out of a collaboration between Ministry of AYUSH and Department of Bio-Technology (DBT), has moved into its final stages. One among the most sophisticated research projects in the COVID-19 context in the country, this concerns pre-clinical studies on four oral interventions that have already been taken up for clinical studies through another collaboration of the Ministry of AYUSH, the partner in this one being the CSIR.

The MoU relating to the animal study (in-vivo study) was signed between the National Medicinal Plants Board (NMPB) of the Ministry of AYUSH and the DBT, and is based on the concept of reverse Pharmacology (PH) which explores the scientific reasoning behind established medical practice like those of Ayurveda. This study is being held at the Translational Health Science and Technology Institute (THSTI), an autonomous institute of DBT located in Faridabad. The sophisticated BSL-3 level laboratories of THSTI are housing these studies, which are held on hamsters.

Through this study, the country has registered a landmark in SARS-CoV-2 virus/COVID-19 research, this being India's first in-vivo anti-SARS-CoV-2 virus study using oral interventions. The first round of experiments has just been completed and the results are awaited. In the meanwhile, the in-vitro anti-viral studies have been initiated at Regional Centre for Biotechnology (RCB), Faridabad (a statutory institute of DBT). These studies are expected to complete by 31st January 2021. The findings will provide scientific evidence on the existing oral interventions as well as generate leads on new herbal drugs. Considering that the age-old AYUSH formulations have a high level of adoption among the country's population, Ministry of AYUSH and Department of Bio-Technology (DBT) have together initiated India's first oral intervention study on four selected Ayurvedic formulations at THSTI. These four interventions are Aswagandha, Guduch-Pippali combination, Mulethi and AYUSH-64 (a poly-herbal compound).

It may be recollected that the Prime Minister in his address to the thought leaders of the Ayush Sector on 23rd March 2020 had called for substantial scientific studies on possible Ayush solutions for COVID-19. In response, the Ministry of AYUSH took up a series of steps, including both pre-clinical as well as clinical evaluation of the recipes/formulations against COVID-19 using standard protocols and methodology. An 'Interdisciplinary AYUSH R&D Task Force on COVID-19' was constituted by Ministry of AYUSH on 2nd April 2020. Initially, the



protocols for prophylaxis and empirical use of oral interventions were released. Ministry of AYUSH also initiated some serious clinical studies in collaboration with CSIR, CCRAS (Central Council for Research in Ayurvedic Sciences) and other reputed institutes. The above mentioned four oral interventions are also subjects of randomized clinical trials (Randomized Controlled Trials), and these trials are at advanced stages.

**Website link:**

<https://pib.gov.in/PressReleaseframePage.aspx?PRID=1674415>

## कोरोना के विरुद्ध कवच बनेगा नया पौष्टिक-औषध उत्पाद

कोविड-19 से लड़ने के लिए जब तक कोई प्रभावी दवा या वैक्सीन उपलब्ध नहीं होती, तब तक इस महामारी के लिए जिम्मेदार कोरोना वायरस से बचाव को ही बेहतर विकल्प माना जा रहा है। इसमें औषधीय एवं पोषक तत्वों की भूमिका अहम हो सकती है, जो शरीर की प्रतिरोधक क्षमता बढ़ाकर कोरोना वायरस से लड़ने में मदद कर सकते हैं। हैदराबाद स्थित अटल इनक्यूबेशन सेंटर – सेंटर फॉर सेल्युलर ऐंड मॉलिक्यूलर बायोलॉजी (एआईसी-सीसीएमबी) द्वारा समर्थित एक स्टार्टअप क्लोन डील्स ने कोविड-19 के खिलाफ प्रतिरक्षा बढ़ाने के लिए 'कोरोनएड' नामक नया पौष्टिक-औषध (न्यूट्रास्युटिकल) विकसित किया है।

पौष्टिक-औषध (न्यूट्रास्युटिकल), "न्यूट्रिशन (पोषण) और फार्मास्युटिकल (दवाधौषध) शब्दों से मिलकर बना है। न्यूट्रास्युटिकल उत्पाद पृथक किए गए पोषक तत्वों, आहार पूरक, विशेष आहार, आनुवंशिक रूप से तैयार खाद्य पदार्थ, जड़ी-बूटी संबंधी उत्पाद, अनाज, सूप, एवं पेय पदार्थ जैसे प्रसंस्कृत खाद्य पदार्थों के रूप में हो सकते हैं। एआईसी-सीसीएमबी द्वारा विकसित नया न्यूट्रास्युटिकल विशेष रूप से तैयार किया गया एक ऐसा खाद्य उत्पाद है, जो बीमारी की रोकथाम एवं उपचार सहित स्वास्थ्य एवं चिकित्सीय लाभ प्रदान कर सकता है।

'कोरोनएड' पूरक आहार हिमालयी क्षेत्र में पाये जाने वाले मशरूम, कॉर्डिसेप्स मिलिटेरिस से बनाया गया है, जो प्रतिरक्षा बढ़ाने और एंटी-ऑक्सीडेंट घटकों के लिए जाना जाता है। शोधकर्ताओं ने हल्दी में पाए जाने वाले एक सक्रिय घटक कुरकुमीन के साथ मशरूम चूर्ण का संयोजन करके 'कोरोनएड' एंटी-वायरल इम्युनिटी बूस्टर ओरल सस्पेंशन बनाने के लिए हैदराबाद स्थित अम्ब्रोसिया फूड कंपनी के साथ करार किया है।





मशरूम चूर्ण में पाया जाने वाला कोर्डिसेपिन नये डीएनए और आरएनए स्ट्रैंड के गठन को रोकने की क्षमता रखता है। क्लोन डील्स ने सीसीएमबी के वैज्ञानिकों के साथ मिलकर कोशिका-संवर्द्धन तंत्र में कोरोनावायरस की वृद्धि रोकने में कॉर्डिसेपिन की उपयोगिता को रेखांकित किया है। अध्ययनों में यह उभरकर आया है कि कॉर्डिसेपिन कोरोना वायरस की वृद्धि रोक सकता है। क्लोन डील्स ने औषधीय उपयोग के लिए नियंत्रित वातावरण में मशरूम का बड़े पैमाने पर उत्पादन करने में विशेषज्ञता हासिल की है। वर्तमान में, स्टार्टअप ने उत्पाद के विपणन के लिए एफएसएसएआई का अनुमोदन प्राप्त कर लिया है और नागपुर, नवी मुंबई और भोपाल स्थित अखिल भारतीय आयुर्विज्ञान संस्थान के साथ नैदानिक परीक्षण हेतु भारत सरकार के समक्ष प्रस्तुत किया है।

**Website link:**

<https://vigyanprasar.gov.in/isw/New-nutritious-drug-product-will-be-made-against-corona.html>



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## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

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BY

# INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR) AND MINISTRY OF HEALTH & FAMILY WELFARE (MOHFW)

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### **ICMR issues advisory on evidence-based molecular testing of COVID-19**

Molecular diagnosis of SARS-CoV-2 is considered to be the best diagnostic modality for early detection of the infection. Amongst molecular diagnostics, open system real-time reverse transcriptase polymerase chain reaction (rRT-PCR) was the first approach to be adopted globally. Given the need for rapidly implementing large-scale testing for SARS-CoV-2, the field of molecular diagnostics for SARS-CoV-2 has evolved rapidly. In view of this, ICMR has issued evidence-based advisory on the closed system RT-PCR, i.e., CBNAAT platforms like TrueNat, GeneXpert, US FDA-approved cartridge-based systems like Abbott and other platforms like RT-LAMP assay, CRISPR-based tests etc. are considered equivalent to the open system rRT-PCR. The available newer molecular assays as well as other evolving molecular technologies, if validated and found comparable to open system rRT-PCR, can be equally considered for use.

**Website Link:**

[https://www.icmr.gov.in/pdf/covid/labs/ICMR\\_Advisory\\_Testing\\_System\\_10112020.pdf](https://www.icmr.gov.in/pdf/covid/labs/ICMR_Advisory_Testing_System_10112020.pdf)

### **ICMR issues evidence-based advisory to address inappropriate use of Convalescent Plasma in COVID-19 Patients**

Convalescent Plasma Therapy (CPT) or passive immunotherapy has been tried in the past for treatment of viral infections like H1N1, Ebola and SARS-CoV-1 etc. However; indiscriminate use of CPT is not advisable. It is speculated that convalescent plasma having low concentration of specific antibody against SARS-CoV-2 may be less beneficial for treating COVID-19 patients as compared to plasma with high concentration of such antibodies. In this context, ICMR issued advisory to address inappropriate use of Convalescent Plasma in COVID-19 patients. In this advisory, ICMR has therefore embraced the principle that a potential donor for convalescent plasma should have sufficient concentration of antibody working against COVID-19 as narrated in the document. It also highlights that presence of antibody against COVID-19 in a potential recipient makes transfusing convalescent plasma a futile intervention.

**Website Link:**

[https://www.icmr.gov.in/pdf/covid/labs/ICMR\\_Advisory\\_Testing\\_System\\_v\\_10112020.pdf](https://www.icmr.gov.in/pdf/covid/labs/ICMR_Advisory_Testing_System_v_10112020.pdf)

## **COVISHIELD completes Phase III clinical trials enrolment in joint partnership of ICMR & Serum Institute of India**

COVISHIELD completes enrolment of Phase III clinical trials under partnership of ICMR and Serum Institute of India. In this ICMR has funded the clinical trial site fees while SII has funded other expenses for COVISHIELD. At present, SII and ICMR are conducting Phase 2/3 clinical trial of COVISHIELD at 15 different centres across the country. It has completed the enrolment of all 1600 participants on 31 October 2020. COVISHIELD has been developed at the SII Pune laboratory with a master seed from Oxford University/Astra Zeneca. The vaccine made in UK is currently being tested in large efficacy trials in UK, Brazil, South Africa and USA. The promising results of the trials so far give confidence that COVISHIELD could be a realistic solution to the deadly pandemic. COVISHIELD is by far the most advanced vaccine in human testing in India.

### **Website Link:**

[https://www.icmr.gov.in/pdf/press\\_realease\\_files/ICMR\\_Press\\_Release\\_COVISHIELD.pdf](https://www.icmr.gov.in/pdf/press_realease_files/ICMR_Press_Release_COVISHIELD.pdf)

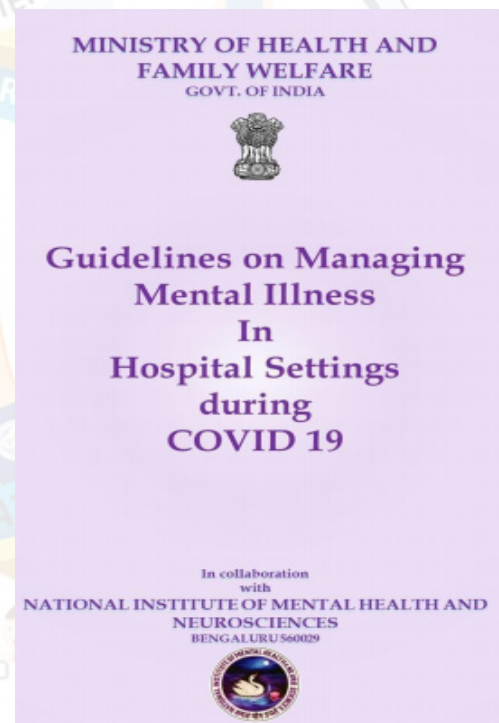
<https://www.icmr.gov.in/tender.html>

## **MoHFW issues guidelines on managing mental illness in hospital settings during COVID-19**

Ministry of Health and Family Welfare (MoHFW) issued guidelines on managing mental illness in hospital settings during COVID-19. This guideline has been prepared by experts from the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru. Like physical disorders, managing psychiatric disorders (both inside the mental health establishments) and in the community requires multiple adjustments and following the various COVID-19-related protocols. Guidelines detailed out everything; right from the moment patient enters the mental health establishment till the time he/she is there, due processes should be followed.

### **Website Link:**

<https://www.mohfw.gov.in/pdf/GuidelinesforDeliveryofMentalMentalHealthcareServicesduringtheCOVID19.pdf>





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## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

# DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)

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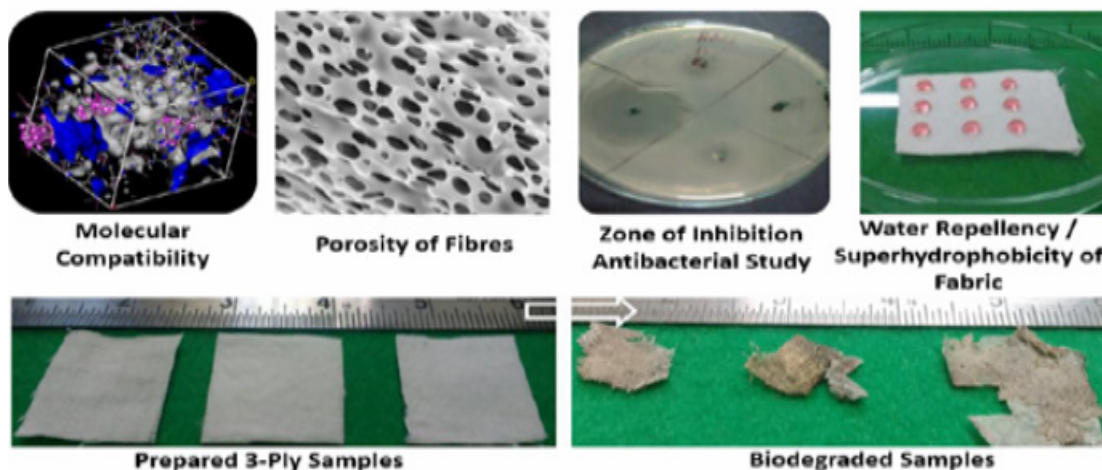
### **‘Pavitrapati’ biodegradable herbal mask develops by DRDO**

DIAT, Pune has developed a 3-layered Ayurveda-based biodegradable face mask ‘Pavitrapati’. The product is antibacterial, antifungal, antiviral, porous, super hydrophobic (outer layer), hydrophilic (inner layer) and biodegradable.

The patented invention has herbal extract obtained from *Azadirachta indica* (Neem oil), *Curcuma longa* (Turmeric), *Ocimum tenuiflorum* (Krishna Tulsi), *Trachyspermum ammi* (Ajwain), *Piper nigrum* (Black Pepper), *Acacia arabica* (Gum arabic), *Syzygium aromaticum* (Clove), *Santalum album* (Sandalwood), and *Crocus sativus* (Saffron) in the fibre that provides antibacterial and antiviral properties. These are the additives that are the immunity boosting agents for self-care as per the guidelines of Ministry of Ayush.

DRDO has completed Transfer of Technology (ToT) to M/s Siddheshwar Techtessile Pvt. Ltd., Kolhapur, Maharashtra. The company had already sold 10,000 pieces of mask in India and the product is also available in Amazon. The manufacturers have identified a marketing distributor in Europe to negotiate with Health Ministry for one million order of the three-ply mask to be distributed in Europe.

The biodegradable nanofibre mat/membrane may also find applications as a protective membrane for PPE.



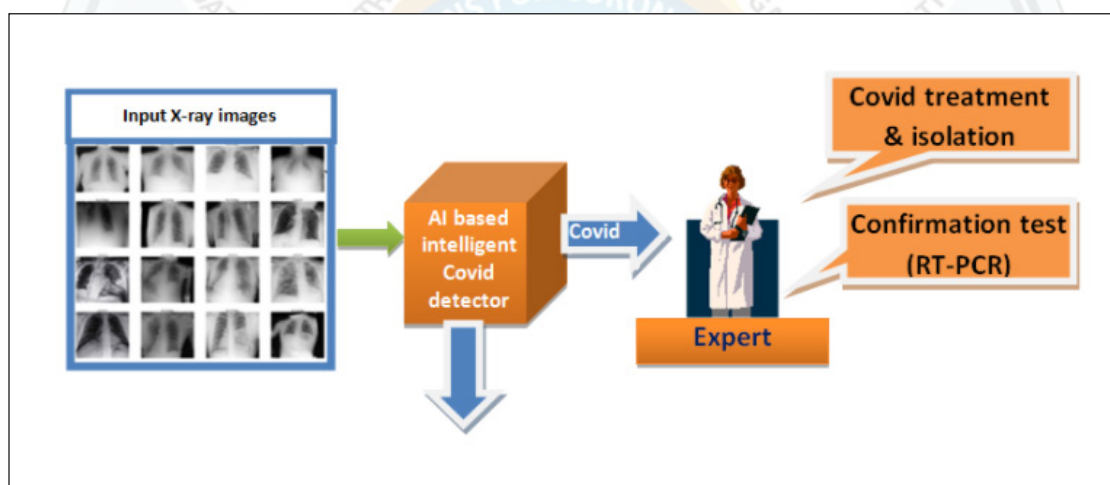
**Website link:**  
<https://drdo.gov.in/ppe>

## DRDO develops AI-based Intelligent COVID-19 detector Technology for Medical Assistance (ATMAN)

CAIR, DRDO has developed an AI-based intelligent, secure, web-based, COVID-19 detection application software, ATMAN, using Chest X-rays which can classify the images into Normal, COVID-19 and Pneumonia classes using limited number (few hundreds) of sample images. SARS-CoV-2 virus affects the lungs early even before the patient starts showing significant symptoms. Thus, compared to RT-PCR test which takes many hours, an X-ray-based diagnostic tool can detect the infection in early stages with processing time in seconds.

ATMAN backend has been built with Deep Convolution Neural Network which is tuned to accurately detect COVID-19 irrespective of limited availability of COVID X-ray images for the system to learn. The software automatically pre-processes the images before passing them to the Neural net to take care of the variant illuminations levels of the X-ray images. The software is easy to navigate and can be easily accessed over the Internet through a variety of devices like mobiles, tablets, laptops or computers.

ATMAN has been tested and validated by the doctors from M/s HCG Centre for Academics and Research, Bengaluru and M/s Ankh Life Care, Bengaluru who have also helped by providing data and relevant medical domain knowledge.



### Website link:

<https://drdo.gov.in/ai-based-intelligent-covid-19-detector-technology-medical-assistance-atman>

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## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

# SCIENTIFIC AND ACADEMIC INSTITUTIONS

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### **Pulse oximeters for ICUs developed by IIT Palakkad deployed for clinical trials**

IIT Palakkad has developed a low cost pulse oximeter to monitor the oxygen levels in the blood of patients suffering from various life-threatening diseases and to facilitate immediate intervention. This device not only reduces the cost of treatment but also provides the necessary data to prepare for follow-up treatment. It also checks the health of the blood vessels to the heart. It also helps to know the exact state of health. This device can play a crucial role in the treatment of anaemia, asthma, pneumonia, other serious lung diseases, and COVID-19. While an imported oximeter is currently of price Rs. 80,000 and a domestic one at Rs. 50,000, this one can be made available for an average of Rs. 8,000. This research was carried out with the help of the Federal Bank CSTR project. IIT is preparing for the widespread launch of the Oximeter on a commercial basis.



**Website Link:**

<https://iitpkd.ac.in/news/pulse-oximetersclinical-trials>



# SCIENCE OUTREACH & POPULARISATION EFFORTS

Since the outbreak of COVID-19 pandemic, the Ministry has supported numerous research projects and technology interventions through its various Departments, Autonomous Organisations, Professional Bodies, Statutory Bodies, and Laboratories. In this science outreach and popularisation efforts, a number of knowledge and information products have been generated and released.

## Efforts from Ministries, Departments & Scientific Organisations

### Ministry of AYUSH brings forth monthly *Ayush for Immunity Campaign Bulletin*

The Ayush for Immunity campaign was launched to increase awareness about Ayush practices that help improve health and immunity.

Ministry of AYUSH presents a monthly newsletter of the AYUSH for Immunity Bulletin. The increased interest seen globally in healthcare solutions rooted in traditional medicine and specifically in AYUSH (traditional and non-conventional systems of healthcare recognized by the Government of India) disciplines is indeed a positive development. The pandemic has led an increased realization about the need to be proactive about health. Particularly, interest has surged among people to understand practices that enhance immunity and disease-resistance. Strengthening the body's natural defence system (immunity) is important to fight any disease, and particularly so in the pandemic situation.

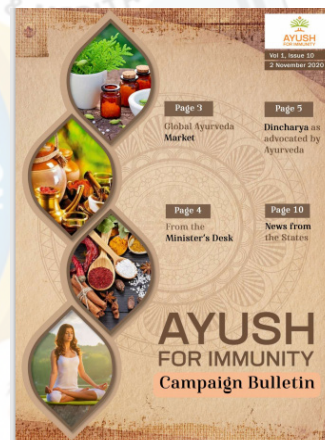
Promoting and propagating preventive measures which strengthen our immunity would be of tremendous advantage to the people in these times. The Ayush disciplines recommend many simple practices using commonly available gifts of nature, which can go a long way in maintaining healthy and happy living. The importance of awareness about oneself and the harmony each individual can achieve by uplifting and maintaining his or her immunity is emphasized across these disciplines.

In the times that we are passing through efforts for maintaining good health and enhancing immunity have become essential. The Ayush for Immunity campaign hopes to facilitate this, by providing a steady stream of information on solutions and practices that are relevant in this context.

**Website link:**

<https://main.ayush.gov.in/ayush-for-immunity-bulletin>

[Nov-News letter-final\\_compressed.pdf \(ayush.gov.in\)](#)



## Drug Discovery Hackathon 2020 launched for drug discovery against COVID-19

Drug Discovery Hackathon 2020 (DDH2020) platform welcomes all those who wish to join the open-source drug discovery Hackathon against COVID-19. DDH2020 is a joint initiative of All India Council for Technical Education (AICTE) and Council of Scientific and Industrial Research (CSIR) and supported by Office of the Principal Scientific Adviser (PSA), Government of India, National Informatics Centre (NIC) and MyGov India.

The vision and mission of DDH2020 is to establish 'Open innovation Model' for *in silico* drug discovery against COVID-19 virus and will cover the various processes in drug discovery, including but not limited to, *in silico* screening of molecules, lead optimization and identification of drug-able non-toxic targets. The targets/tools/lead molecules identified through the process of DDH2020 will be further taken forward for synthesis followed by subsequent steps in routine drug discovery programme.

Objective of the hackathon is to identify drug candidates that are effective against coronavirus SARS-CoV-2 by employing a hackathon for *in-silico* drug discovery, followed up by chemical synthesis and biological testing.

### The Hackathon consists of two major tracks:

Track-1 will primarily deal with drug design for anti-COVID-19 hit/lead molecule generation using tools such as molecular modelling, pharmacophore optimization, molecular docking, hit/lead optimization, etc.

Track-2 will deal with designing/optimizing new tools and algorithms which will have an immense impact on expediting the process of *in silico* drug discovery. Novel or refined tools/algorithms from Track-2 will help develop better models for predicting ADMET, *in silico*, thus improving screening efficiency.



Last date of submission for Phase-I: 30<sup>th</sup> November 2020

#### Website link:

<https://innovateindia.mygov.in/ddh2020/>

## Press Information Bureau releases daily bulletin on COVID-19

Press Information Bureau (PIB), Government of India releases a daily bulletin on COVID-19. The bulletin contains press releases concerning COVID-19, issued in last 24 hours, inputs from PIB field offices and fact checks undertaken by PIB. The last release is dated 26<sup>th</sup> November 2020.

#### Website Link:

<https://pib.gov.in/PressReleasePage.aspx?PRID=1676097>





## THE DAILY COVID BULLETIN FROM PIB

- 36,367 recoveries have been registered in the last 24 hours in the country
- 44,489 new confirmed COVID cases registered in the last 24 hours in the country
- India's present active caseload (4,62,344) is 4.88% of the total Positive Cases
- National recovery rate stands at 93.66% today
- India's 61% of Daily New Cases contributed by Kerala, Maharashtra, Delhi, West Bengal, Rajasthan, and Uttar Pradesh

### Government of India presents regular COVID-19 India factsheet

India's coronavirus cases have crossed 88-lakhs mark and as on 16<sup>th</sup> November 2020, 08:00 AM, stands at 88,45,127 cases out of which 82,49,579 have recovered. The recovery rate stands at 93.3% while the case fatality rate stands at 1.5%, one of the lowest in the world. Government of India, through its Open Government Data (OGD) Platform <https://data.gov.in/> has taken the initiative to present the regular factsheet related to COVID-19.



The OGD platform is aimed at supporting Open Data initiative of Government of India. The portal is used by various Ministries, Departments, and their organizations to publish datasets, documents, services, tools and applications collected by them for public use. It intends to increase transparency in the functioning of the Government and also opens avenues for many more innovative uses of Government Data to give different perspective.

#### Website Link:

<https://community.data.gov.in/covid-19-india-factsheet-as-on-16th-nov-2020-800-am/>

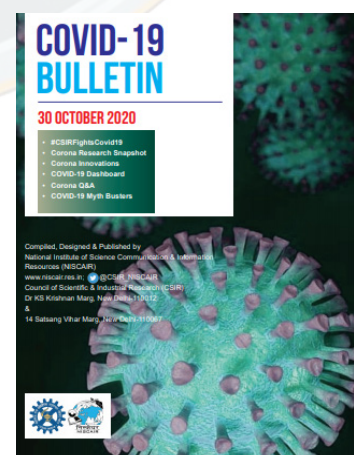
### CSIR-NISCAIR brings out fortnightly e-Newsletter on COVID-19

National Institute of Science Communication and Information Resources (CSIR-NISCAIR) is bringing out a fortnightly newsletter dedicated to the COVID-19 outbreak. The newsletter covers stories and information on various aspects, like research, technology and innovation efforts to fight the pandemic and related awareness and sensitisation information. The last edition has been published on 30<sup>th</sup> October 2020.

#### Website Link:

<https://www.niscair.res.in/covidbulletin>

<https://www.niscair.res.in/includes/images/covidbulletin/pdf/30october2020/30-october-2020.pdf>





## Efforts from Vigyan Prasar

### India Science Channel

India Science is an Internet-based Over-The-Top (OTT) Science TV channel. It is an initiative of the Department of Science and Technology (DST), Government of India, implemented and managed by Vigyan Prasar (VP), an autonomous organisation of the Department of Science and Technology. This 24x7 video platform is dedicated to science and technology knowledge dissemination, with a strong commitment to spreading scientific awareness, especially with Indian perspectives, ethos and cultural milieu. The initiative is supported by the National Council of Science and Technology Communication (NCSTC), DST.

Science and Technology are the main driving forces of the nation and fundamental to progress and growth. So, the advantages of science and technology must reach all sections of society through popular media of communication. India's large Internet user base of 500 million is split between 305 million urban Indians and 195 million rural Indians, all of whom need to be reached with authentic science and technology content. And to do so, the Internet is fast becoming the most accessible and preferred media for content delivery.

Since the occurrence of COVID-19, India Science has been working tirelessly to connect with the people, in the form of regular bulletins, documentaries, interviews, bytes and live sessions of scientists, doctors, experts, science administrators and policymakers. The following is a brief of the information products produced by India Science.

1. Weekly COVID-19 video bulletin: Produced in both Hindi and English language weekly basis from 7 July 2020, COVID-19 bulletin appraises the audience about the latest development happening in S&T in India that are helping in managing and overcoming the challenges thrown up by the pandemic. Vigyan Prasar produced daily COVID Bulletin from 11th April to 06 July 2020. Thereafter, a weekly bulletin is being produced which provides the most important S&T updates for the country related to COVID-19 front.
2. COVID-19 Explained - Short films to explain important research finding related to COVID-19 in layman's lingo produced weekly basis. The subjects chosen for this short film caters to the curiosity of common man related to COVID-19.
3. Facebook live sessions on interviews of various stakeholders and media with DST Secretary.
4. Facebook and India Science live sessions on interviews of various resources person on COVID-19.

Contact info: [kapil@vigyanprasar.gov.in](mailto:kapil@vigyanprasar.gov.in)

**Website link:**

<https://www.indiascience.in/>



## India Science, Technology and Innovation (ISTI) Web Portal

The India Science, Technology and Innovation Portal (ISTI) is a one-stop window for information about developments in India on science, technology and innovation. The portal focuses on bringing all stakeholders and Indian STI activities on a single online platform; helping efficient utilisation of resources; highlighting functioning of scientific organisations, laboratories and institutions; aggregating information on science funding, fellowship and award opportunities spanning from school to faculty level; pooling together conferences, seminars and events; and projecting science in India with its major achievements. The ISTI web portal has been developed by Vigyan Prasar, an autonomous organisation of the Department of Science and Technology (DST).

In the critical times of outbreak of COVID-19 pandemic, the web portal serves as a one-stop online information guide to bring together a collection of resources in response to COVID-19. These resources are generated by efforts made by numerous initiatives and schemes taken up by several Departments and Ministries of Government of India. These are being implemented by public-supported research institutions in India. The content presented here relies on the best available scientific understanding of the disease and its transmission.

The web portal provides all information related to COVID-19, its presentation of symptoms, transmission modes and mechanisms, and various models of protection of individuals, healthcare professionals and prevention from spreading to the community. The reasons, usefulness, and impact of social distancing have been communicated in an easy-to-understand manner. Around 2000 stories related to S&T efforts towards mitigating the COVID-19 pandemic have been captured on the portal.

The Research and Development efforts made at Ministry level and various funding organisations are enumerated here on as-and-when-available basis. The innumerable infographics have been provided here are sourced from various organisations for efficient delivery of the information and targeting the common people as the largest stakeholder. The frequently asked questions and myth busters are also answered here.

Contact Info: [kdgm@vigyanprasar.gov.in](mailto:kdgm@vigyanprasar.gov.in)

### Website link:

<http://indiascienceandtechnology.gov.in/covid-19-the-pandemic>

### Featured Science



### Featured Articles

Global endeavours to combat COVID-19

### Technologies

#### COVID-19 Technology

Total number of Record(s): 135

Area	Developing agency	Keywords
COVID-19 Technology		

Search

- Live Attenuated SARS - CoV-2 vaccine
- Deployable Isolation Hospitals
- Hybrid membrane adsorption process
- IgM/IgG rapid testing kit
- Accurate diagnostic kit
- Portable and rapid detection device
- Low cost ultra-portable thermal scanner
- Rapid & economical diagnosis kit
- Diagnosis kit
- Kiosk for sample collection
- Disinfectant, examination & sample collection booth
- Rapid point-of care detection
- Determination of biomarkers
- Reverse transcriptase loop detection
- Nano based diagnostic test



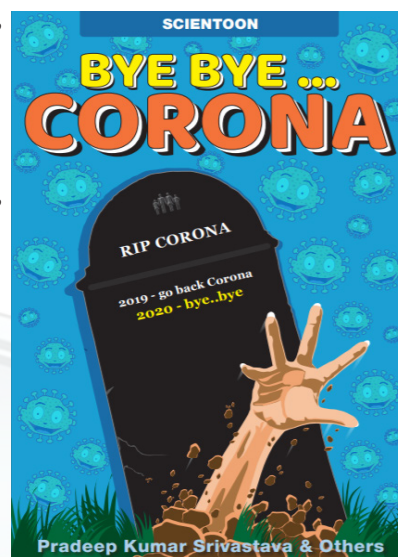
## The book, *Bye Bye Corona*, published by Vigyan Prasar of DST, makes people aware of COVID-19 in an engaging way

World's first scientoon book entitled “Bye Bye Corona”, written by ‘scientoonist’ Dr Pradeep Srivastava, former Senior Principal Scientist at CSIR-Central Drug Research Institute (CDRI), Lucknow, was released by Ms. Anandiben Patel, Governor, Uttar Pradesh. The book is published by Vigyan Prasar. Dr Nakul Parashar, Director, Vigyan Prasar, and Nimish Kapoor, scientist and head of publication division, Vigyan Prasar, are the chief editor and editor of the book, respectively.

The booklet is an attempt to show that how common man can be made aware about SARS-CoV-2 infection or COVID-19 disease with the help of colourful, interesting and eye-catching Scientoons. Since there is no drug or vaccine to cure COVID-19 till now, making people aware is the only way to save them from this disease. Awareness is the best tool for prevention, which in turn is the best way to save us from this pandemic.

**Website link:**

<https://vigyanprasar.gov.in/bye-bye-corona/>

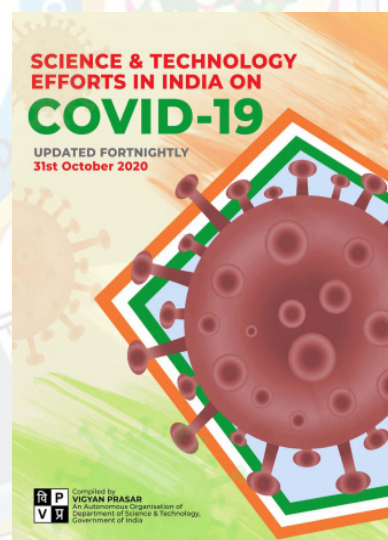


## Fortnightly Publication of e-Newsletter on COVID-19

For the benefit of its stakeholders and target audience, Vigyan Prasar is bringing out a fortnightly e-Newsletter on the most relevant initiatives and efforts taken by Government of India through its various Science Ministries, Departments, and Funding Organisations. These organisations are continuously striving for combating the outbreak of COVID-19. These research-driven and technology-based interventions have been initiated to combat the outburst of the pandemic.

The e-Newsletter aims to be a handy guide to scientists, researchers, and scholars, especially those who are interested in knowing various aspects of COVID-19 and contributing to the coronavirus warfare and making the nation Aatmanirbhar.

Contact Info: [kdgm@vigyanprasar.gov.in](mailto:kdgm@vigyanprasar.gov.in)



**Website link:**

<https://vigyanprasar.gov.in/covid19-newsletters/>

<http://www.indiascienceandtechnology.gov.in/covid-19-the-pandemic/newsletter-archive>





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