The background of the cover features a microscopic view of COVID-19 virus particles. The top half is a green-tinted image showing several spherical particles with characteristic surface spikes. A diagonal white line separates this from the bottom half, which shows similar particles against an orange-tinted background. The text is overlaid on a white, cloud-like shape at the bottom.

# SCIENCE & TECHNOLOGY EFFORTS IN INDIA ON COVID-19

UPDATED FORTNIGHTLY  
30th September 2020

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





सत्यमेव जयते  
**FOREWORD**

## डॉ हर्ष वर्धन Dr Harsh Vardhan

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

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

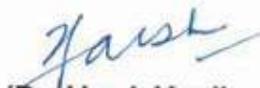
सबका साथ, सबका विकास, सबका विश्वास  
Sabka Saath, Sabka Vikas, Sabka Vishwas

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. We all are adapting to live with coronavirus and adjusting to new normal of several aspects of our day-to-day life, since there is no early tapering off of the disease.

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 and efforts taken 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. Government of India, through its various wings, has invited Calls for Proposals (CFPs) and Expressions of Interest (EoIs), announced various hackathons and challenges and reached out to general public through various apps, pledges, etc. to enhance research and development-related activities to battle the pandemic out as well as making the nation aware and self-reliant.

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. Atmanirbhar Bharat, the vision of New India, will be fulfilled with aggressive implementation of the Make in India initiatives and when we would be wholeheartedly 'Vocal for Local'.

Vigyan Prasar  
New Delhi

# Health Ministry's 'eSanjeevani' telemedicine service crosses a milestone

26<sup>th</sup> September 2020, New Delhi

eSanjeevani OPD platform of Ministry of Health and Family Welfare has completed the landmark milestone of 4 lakh tele-consultations. The top performing States, Tamil Nadu and Uttar Pradesh have logged in 1,33,167 and 1,00,124 sessions, respectively,

The other States that have registered highest consultations through eSanjeevani and eSanjeevani OPD platforms are Himachal Pradesh (36,527), Kerala (33,340), Andhra Pradesh (31,034), Uttarakhand (11,526), Gujarat (8914), Madhya Pradesh (8904), Karnataka (7684), and Maharashtra (7103). The usage trend shows that there has been a quick uptake of this service in smaller districts like Villupuram in Tamil Nadu. Over 16,000 consultations have been recorded from Villupuram, which is the topmost district in terms of tele-consultation services availed by the beneficiaries.

The top ten performing districts are as follows:

Nationally, eSanjeevani platform is being used by 26 States. Over 12,000 practitioners of various State Government health departments have been on-boarded on eSanjeevani and their services have been sought by people from 510 districts of the country.

The last 100,000 consultations have come up in 18 days, whereas the first 100,000 consultations had taken around three months. eSanjeevani OPD services have enabled patient-to-doctor telemedicine in midst of the COVID-19 pandemic. This has helped in containing the spread of COVID-19 by ensuring physical distancing and has simultaneously enabled provisions for non-COVID essential healthcare.

Around 20% patients have sought health services through eSanjeevani more than once. The trend is indicative of the fact that this digital platform for delivery of health services remotely has been adopted by both the service providers as well as the users. Few States have been providing health services for 12 hours a day and 7 days a week.

eSanjeevani OPD ( adoption in Districts)			
Sl. No.	DISTRICT	STATE	CONSULTATIONS
1	VILLUPURAM	TN	16368
2	MADURAI	TN	12866
3	MEERUT	UP	10795
4	TIRUVANNAMALAI	TN	9765
5	NAGAPATTINAM	TN	9135
6	TIRUNELVELI	TN	7321
7	MAYILADUTHURAI	TN	7131
8	BAHRAICH	UP	6641
9	VIRUDHUNAGAR	TN	6514
10	THIRUVANANTHAPURAM	KL	6351

Initially, eSanjeevani OPD was rolled out as an online platform for general OPD service, but considering its utility and the uptake by the public, State Health Departments wished to roll-out speciality OPDs as well. Accordingly, eSanjeevani OPD was enhanced to support multiple concurrent speciality and super speciality OPDs as well. Today eSanjeevani OPD is running 196 online OPDs which include 27 general OPDs and 169 speciality and super-speciality OPDs in 24 States. Premier institutions like AIIMS Bathinda, AIIMS Rishikesh, AIIMS Bibinagar, Lady Hardinge Medical College and Associated Hospitals, Regional Cancer Centre (Thiruvananthapuram), and Cochin Cancer Centre (Ernakulam) are also using eSanjeevani platform to provide speciality services to the patients across the States. Central Government Health Scheme has also set up four speciality OPDs on eSanjeevani to provide health services to their beneficiaries in New Delhi. CGHS is planning to extend these telemedicine services to their beneficiaries in other States as well.

States have also designed innovative applications of this telemedicine platform. In Kerala, eSanjeevani platform is being used for providing health services to the inmates of Palakkad District Jail. In Tamil Nadu, eSanjeevani has enabled practitioners to make life-saving interventions while patients were in their homes.

eSanjeevani platform of the Union Health Ministry has been developed by Centre for Development of Advanced Computing in Mohali. Globally, it is an innovative digital platform to be set up by the government of a country for delivering health services. eSanjeevani supports two types of telemedicine services viz. Doctor-to-Doctor (eSanjeevani) and Patient-to-Doctor (eSanjeevani OPD) Tele-consultations. The former is an important pillar of the Ayushman Bharat Health and Wellness Centre (AB-HWCs) programme. This was rolled out in November 2019. It aims to implement tele-consultation in all the 1.5 lakh Health and Wellness Centres in a 'Hub and Spoke' model by December 2022. States need to identify and set up dedicated 'Hubs' in Medical Colleges and District hospitals to provide tele-consultation services to 'Spokes', i.e., SHCs and PHCs. The Health Ministry rolled out the second tele-consultation service 'eSanjeevani OPD' enabling patient-to-doctor telemedicine on 13th April of this year owing to the COVID-19 pandemic.

eSanjeevani (HWC & OPD) Status 25 September 2020 (till 5:00PM)				
Sr. No.		Consultations		
		GRAND TOTAL (HWC + OPD)	HWC Total (HWC)	OPD Total (OPD)
	<b>INDIA</b>	<b>400026</b>	<b>91180</b>	<b>308846</b>
1	Tamil Nadu	133167	0	133167
2	Uttar Pradesh	100124	92	100032
3	Himachal Pradesh	36527	35632	895
4	Kerala	33340	3*	33337
5	Andhra Pradesh	31034	26238	4796
6	Uttarakhand	11526	1	11525
7	Gujarat	8914	8864	50
8	Madhya Pradesh	8904	7940	964
9	Karnataka	7684	6812	872
10	Maharashtra	7103	1733	5370
11	Punjab	5957	3857	2100
12	Rajasthan	4866	0	4866
13	Delhi	4707	0	4707
14	Jharkhand	1758	0	1758
15	Haryana	1375	0	1375
16	Chandigarh	1214	0	1214
17	Manipur	802	0	802
18	Assam	568	0	568
19	Telangana	221	0	221
20	Jammu & Kashmir	92	0	92
21	Goa	53	0	53
22	Mizoram	46	2	44
23	Arunachal Pradesh	29	0	29
24	Puducherry	9	0	9
25	Bihar	4	4	0
26	Chhattisgarh	2	2	0

\* Between COVID Hospital - CFLTC

**Website link:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1659282>

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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

# OFFICE OF THE PRINCIPAL SCIENTIFIC ADVISER (PSA)

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### **Guarding the Guardians: Helping India's 'Corona Warriors' to take on COVID-19 with Mentored Laboratory Training**

Currently leading the global daily numbers for new COVID-19 cases, India is rapidly scaling up its testing network to arrest the pandemic's spread. The number of private and public sector laboratories empanelled by the Indian Council of Medical Research (ICMR) for COVID-19 testing has increased from 19 in early March to 1,774 as of September 20, 2020. Together, these labs are conducting around 1 million tests every day.

However, ICMR looks to further bolster this pan-India testing apparatus. Major challenges are dearth of professionals with adequate knowledge of molecular biology methods, biosafety requirements, and practical bench skills required to work with highly-infectious diseases.

The need-gap is staggering. To begin with, it leaves the health and personal safety of the first line of India's defence against the novel coronavirus highly vulnerable. Inadvertent mistakes made during sample collection, transportation, testing, and reporting also increase the risk of accelerating the spread of the disease as well as lower the accuracy of the tests.

This is where the Mentored Laboratory Training for COVID-19 and Infectious Diseases launched by the *Foundation for Innovative New Diagnostics* – along with *Tata Institute of Fundamental Research, PanIIT Alumni Reach for India*, and *National Institute of Immunology* – steps into the picture. The multi-pronged COVID-19 diagnostic training programme aims to empower trainees with the basic knowledge and practical bench skills of molecular biology methods that can be implemented for COVID-19 diagnostics and other infectious diseases.



Live lab setup at PanIIT Centre, Jharkhand to impart hands-on expertise in COVID-19 diagnostics training



RNA Templating and Auto Extraction setup

Speaking on the need for such an intervention, Prof. K. VijayRaghavan, Principal Scientific Adviser to the Government of India added, *“With India’s ‘Corona Warriors’ leading the fight against the pandemic, it is our duty to ensure they have the requisite knowledge and skills to execute this task. Hence, we felt the need to tie up a befitting, high quality project and wish successful execution of the same across India with the help of the best in this field.”*

Enabled by the Office of the Principal Scientific Adviser, Government of India, with support from the Bill & Melinda Gates Foundation, the training will be carried out through a hybridised online/offline module and will comprise five ‘Workstreams’. These ‘Workstreams’ will include online training coursework, weekly mentoring workshops with regional and national experts across multiple associated functions, upskilling sessions at COVID-19 testing sites, pre-service training on basic molecular biology, and online query support from experts for troubleshooting.

This integrated approach will help to create a skilled laboratory workforce that can carry out sustained, high-quality COVID-19 sample processing, testing, and reporting – without compromising the accuracy of the results or the biosafety of India’s brave ‘Corona Warriors’.

For any further queries on the initiative please feel free to connect with Sapna.poti@gov.in at the office of the Principal Scientific Adviser, Government of India.

## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

# DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

### Tracking global genetic variability, predicting viral sequences to resolve COVID-19 challenge

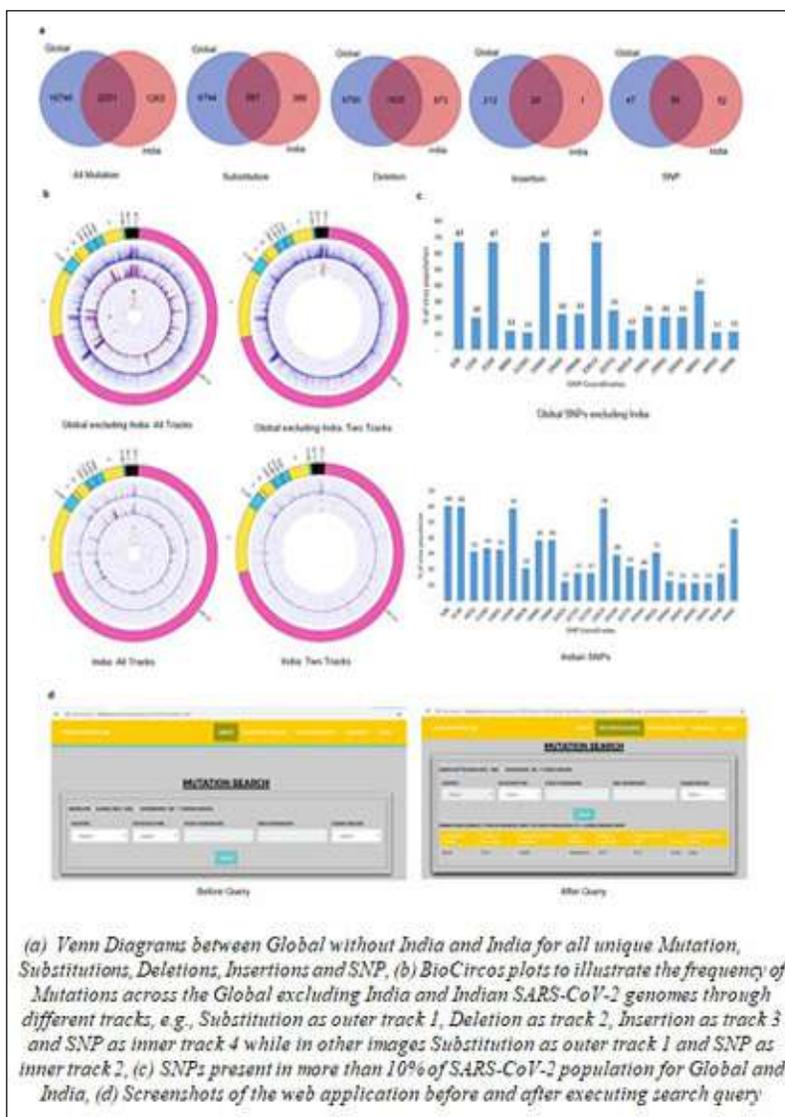
A group of scientists in India is working on genomic sequences of SARS-CoV-2 around the World, including India, to identify genetic variability and potential molecular targets in virus and human to find the best possible answer to combat the COVID-19 virus.

Breaking down the novel coronavirus challenge into many pieces to get to its root and see it from multiple directions, Dr Indrajit Saha, Assistant Professor in the Department of Computer Science and Engineering of National Institute of Technical Teachers' Training and Research, Kolkata and his team have developed a web-based COVID-Predictor to predict the sequence of viruses online on the basis of machine learning. The team has analysed 566

Indian SARS-CoV-2 genomes to find the genetic variability in terms of point mutation and Single Nucleotide Polymorphism (SNP).

**Website link:**

<https://dst.gov.in/tracking-global-genetic-variability-predicting-viral-sequences-resolve-covid-19-challenge>



## Neurons in the nose & hypothalamus may be entry points of SARS-CoV-2 virus to brain

Scientists have zeroed in on the route in which the SARS-CoV-2 virus makes its way to the brain. Neurons located in the nose that help us sense smell as well as hypothalamus, the small region located at the base the brain, could provide the port of entry for the virus into the brain, says a new study.

The study could provide a new understanding to tackle the COVID-19 patients and control the pandemic, which has caused crisis of unprecedented dimensions affecting every continent of the globe.

Dr Vincent Prevot, previously a principal investigator supported by the Indo-French Centre for the Promotion of Advanced Research (CEFIPRA), supported by the DST along with a team of Indian and French scientists, have shown that specialized glial cell called tanycytes in the hypothalamus as well as olfactory neurons could provide an opening for SARS-CoV-2 into the brain. They have also shown that hypothalamic circuits could act as a hub for the numerous risk factors as well as the physiological effects of viral infection. This work has been published in the journal 'bioRxiv'.



Authors: Prof Vincent Prevot., Dr. Sreekala Nampoothiri, and Dr. Sowmyalakshmi Rasika Development and Plasticity of the Neuroendocrine Brain Lille Neuroscience and Cognition Inserm, University of Lille, CHU Lille

**Website link:**

<https://dst.gov.in/neurons-nose-hypothalamus-may-be-entry-points-sars-cov-2-virus-brain>

# SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

## DEPARTMENT OF BIOTECHNOLOGY (DBT)

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### What if you need to only gargle and not “swab” for a COVID-19 test?

A team of scientists at DBT’s Translational Health Science and Technology Institute (THSTI), Faridabad, led by Dr Milan Surjit conducted a study to evaluate if the relatively easier process of gargle lavage could be an appropriate respiratory sample collection method for the detection of SARS-CoV-2. They also sought to find out which collection method is more acceptable to the patient.

“In collaboration with All India Institute of Medical Sciences (AIIMS), New Delhi, scientists have established a protocol to detect SARS-CoV-2 in gargle lavage of COVID-19 patients. This method is safer, economical, patient friendly and retains the efficiency of nasopharyngeal and oropharyngeal swab-based SARS-CoV-2 detection method,” wrote Dr Surjit.

A cross-sectional study at AIIMS was done on 50 confirmed COVID-19 patients. Both naso- and oropharyngeal swabs and gargle samples were taken within 72 h of their diagnosis of COVID-19. The samples underwent reverse transcription-polymerase chain reaction (RT-PCR) test to detect SARS-CoV-2. After sample collection, a 10-point scale study was administered to find out the level of discomfort with either of the collection methods among the patients.

All gargle samples were positive and comparable to their corresponding swab samples irrespective of the symptoms and duration of illness. The Ct values for gargle samples were slightly higher but comparable to those of swabs. About 72% of the patients said that they felt moderate-to-severe discomfort with swab collection, compared to 24% feeling mild discomfort with gargle collection.

Ask anyone who has recently taken a test for COVID-19. This involves, most of the time, a nasopharyngeal or oropharyngeal swab collection. A technician at a designated COVID-19 collection centre will be inside a kiosk to collect a swab from inside your mouth (an oropharyngeal swab). For those who have gone for it will tell



you it is not very patient friendly. Why? The oropharyngeal swab is taken from the posterior throat and tonsil area with a somewhat rigid cotton-tipped swab applicator. The collector inserts the cotton-tip two to three times and the experience, to simply put, is not a very pleasant one. Having said that, both nasopharyngeal and oropharyngeal swab collection are still widely accepted as preferred methods for obtaining samples to examine respiratory infections.

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<https://thsti.res.in/index.php>  
<http://www.ijmr.org.in/preprintarticle.asp?id=292776;type=0>

### DBT-NCCS scientist pens article on Coronavirus genome sequencing

Dr Yogesh Shouche of the DBT's National Centre for Cell Science (DBT-NCCS), Pune has written a popular article on genome sequencing of the SARS-CoV-2 virus, for Marathi newspaper, Maharashtra Times. It was published on 6<sup>th</sup> September, 2020.

The article served to increase public awareness about the DBT's pan-India 1000 genome sequencing initiative and acquaint the lay public on the significance of sequencing the viral genome and the outcomes of the studies on viral genome sequences from Indian patients.



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[https://twitter.com/DBT\\_NCCS\\_Pune](https://twitter.com/DBT_NCCS_Pune)

### DBT-NCCS scientist delivers public talk on genome studies on coronavirus

The global rush to sequence the genome of SARS-CoV-2, the virus that causes COVID-19 infection, has resulted in over 75,000 viral genomic sequences from across the globe being uploaded on the world-wide GISAID database. This is not surprising, since genome sequences provide valuable insights that are necessary to track and trace an outbreak, design and evaluate diagnostic tests, and identify potential intervention strategies.

The National Centre for Cell Science (DBT-NCCS) in Pune, an autonomous institute of the DBT, has been contributing to the national efforts towards these goals through virus genome sequencing as well as other ongoing diagnostics and research initiatives. It is a participant of DBT's pan-India 1000 genome consortium involved in sequencing the virus genome.

This consortium is a collaborative initiative among several national research institutions, coordinated by the National Institute of Biomedical Genomics (NIBMG). It was set up to sequence the genomes of the virus from clinical samples collected at different locations in the country and was aimed at understanding the genetic variations in the virus across the country.

DBT-NCCS has been contributing to the ongoing COVID surveillance in Maharashtra, having tested almost 20,000 samples. It also submitted 90 whole genome sequences of the COVID-causing virus to the global database, GISAID. The viral genome sequences were obtained from samples of patients from the Pune, Satara and Nashik districts, who tested positive for COVID. These sequences were compared with those reported from other Indian and global sources to identify any variations.

Although this study involved a small number of samples, some interesting preliminary observations were made. Four variations were found to be predominant, being present in most of the sequences. Mutations D641G and C5700A were found to be dominant in the genomes sequenced, and the 20A and 20B clades of the virus were found to be predominant. Some correlations were also observed between sequence variations and symptomatic status, gender and age of the patients. New and distinct patterns of mutations were observed in the viral genomes from each of the districts included in this study. These analyses thus revealed a newly emerging pattern of unique linked mutations in the genome sequences from western India, indicating that region-specific evolution of the virus genome might have occurred during the lockdown period.

This work was carried out by NCCS in collaboration with the B. J. Medical College and the Armed Forces Medical College in Pune, and with support from Dr T. P. Lahane, Director, DMER, Maharashtra. The findings of this study were uploaded on the preprint server, bioRxiv.

Dr Yogesh Shouche, senior scientist who was involved in virus genome sequencing at DBT-NCCS, shared the preliminary insights gained from this work, with the general public through a talk in Marathi, titled, 'करोना वषिणूचे महाराष्ट्रातील बदलते स्वरूप' (The changing nature of the coronavirus in Maharashtra). This talk was delivered by him on 13th September as part of the virtual Vidnyan Samvad series organized by Vidnyan Bharati, Pune. A recording of this talk is available on their Facebook page, Vidnyan Bharati Paschim Maharashtra.

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**Website link:**

<https://www.nccs.res.in/>

[https://vigyanprasar.gov.in/wp-content/uploads/vigyan\\_samachar\\_dbt\\_02S\\_21Sep2020.pdf](https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02S_21Sep2020.pdf)

## **DBT-CDFD scientists study the genetics of coronavirus in Telangana**

India is suffering from one of the worst pandemics ever. The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), also called the novel coronavirus, has infected a large number of individuals in the country with significant morbidity. After a slow progress between February and April, the state of Telangana has witnessed a rapid increase in the rate of infection.

Identifying sequence variations (called mutations) in the virus obtained from infected patients over a period of time provides a means to understand how the virus may be evolving and adapting in a particular population during infection and transmission. Constructing a genome-wide map of all mutations is also important to identify which virus strain (called clade) is prevalent in a region vis a vis other parts of the country.

Researchers at the DBT's Centre for DNA Fingerprinting and Diagnostics (DBT-CDFD), therefore, conducted whole genome sequencing of 210 independent novel coronavirus samples using state-of-the-art technology and generated a comprehensive map of all mutations in the southern State.



The study has revealed that a clade named 20B was the predominant strain in the state, similar to other states in South and West India but different from North and East India. Interestingly, several mutations were specifically identified in virus samples obtained from asymptomatic patients. They also identified mutations affecting proteins important for the virus's entry into the host cell as well as for its propagation within the host.

The data can be a starting point for the state government to conduct further studies on virus transmission and help take informed decisions. Further, the genomic mutations highlight possible mechanisms being employed by the virus as a mode of adaptation to evade the host's immune response besides indicating the trend towards increasing or decreasing pathogenicity being developed over the span of time, thus significantly impacting efforts in vaccine development.

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**Website link:**

<http://www.cdfd.org.in/>

[https://vigyanprasar.gov.in/wp-content/uploads/vigyan\\_samachar\\_dbt\\_01S\\_21Sep2020.pdf](https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01S_21Sep2020.pdf)

## Director IBSD delivered talk in webinar on 'Response of the DBT's Autonomous Institutes to COVID-19'

The Director of DBT's Institute of Bioresources and Sustainable Development (IBSD), Imphal, Prof. Pulok Mukherjee has delivered a talk on the steps taken up by institute on combating COVID-19 in a webinar that was organized by the DBT in association with DBT/Wellcome Trust India Alliance. The webinar was organized on 11<sup>th</sup> September 2020 on the topic 'Response of the DBT's Autonomous Institutes to COVID-19 (Part –II)'.

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[https://vigyanprasar.gov.in/wp-content/uploads/vigyan\\_samachar\\_dbt\\_01BB\\_21Sep2020.pdf](https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01BB_21Sep2020.pdf)



## COVID-19 initiatives taken up by DBT's IBSD

The DBT's Institute of Bioresources and Sustainable Development (DBT-IBSD), Imphal, has started a new initiative on “*Phytopharmaceuticals Mission and Centre of Excellence for Phytopharmaceuticals*”. IBSD is extensively working on exploration and documentation of large number of medicinal plants of NE India for scientific intervention for the characterization of bioactive compounds having antiviral activity. The institute is planning to establish phyto-markers library useful as standard reference compounds for evaluation of phytopharmaceuticals.



Contact Info: Prof. Pulok K Mukherjee (director.ibsd@nic.in)

**Website link:**

<http://ibsd.gov.in/ibsd/home/index.php/site/index>

[https://vigyanprasar.gov.in/wp-content/uploads/vigyan\\_samachar\\_dbt\\_02BB\\_21Sep2020.pdf](https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02BB_21Sep2020.pdf)

## RCB signed the MoA with two companies to identify the scope of services for the antiviral activity testing against SARS-CoV-2

To meet the growing need for the *in vitro* antiviral assays for the new drug candidate/test substance (TS), DBT's Regional Centre for Biotechnology (RCB), Faridabad is providing antiviral activity testing against SARS-CoV-2 in the cell culture model at a non-cytotoxic concentration of the TS, while Cosmic IVML Enterprises, Mumbai and Evoluto Biotech, Bengaluru shall be reimbursing the cost of services.



United Nations  
Educational, Scientific and  
Cultural Organization



क्षेत्रीय जैव प्रौद्योगिकी केंद्र  
Regional Centre  
for Biotechnology



# Regional Centre for Biotechnology Notification

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

**Website link:**

[https://vigyanprasar.gov.in/wp-content/uploads/vigyan\\_samachar\\_dbt\\_03BB\\_21Sep2020.pdf](https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_03BB_21Sep2020.pdf)

[https://vigyanprasar.gov.in/wp-content/uploads/vigyan\\_samachar\\_dbt\\_04BB\\_21Sep2020.pdf](https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_04BB_21Sep2020.pdf)

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

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## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

# COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

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### **CSIR and Aurobindo Pharma collaborate to develop COVID-19 vaccine**

Efforts are going on across the globe to develop vaccine for novel coronavirus. In a significant development, CSIR and Aurobindo Pharma Limited have joined hands to develop SARS-CoV-2 vaccine in India. Three CSIR labs, namely, Centre for Cellular and Molecular Biology (CCMB), Hyderabad; Institute of Medical Technology (IMTECH), Chandigarh; and Indian Institute of Chemical Biology (IICB), Kolkata are developing vaccine candidates using different technology platforms. Aurobindo Pharma Limited will undertake clinical development and commercialization of the vaccines.

Commenting on this partnership, Dr Shekhar C. Mande, Director General, CSIR, said “Joining of hands of premier CSIR labs with industry for the development of vaccines will amplify India’s efforts in indigenous vaccine development and also help in preparedness for future pandemics.”

“Our labs are working on novel proteins for vaccine development that has the potential to address the need for a second-generation vaccine. We are happy to partner with Aurobindo who has proven manufacturing and commercialization capabilities,” said Dr Rakesh Mishra, Director, CSIR-CCMB while commenting on the development strategies for the vaccines.

Mr N. Govindarajan, Managing Director, Aurobindo Pharma Limited, told “We are proud to join hands with CSIR for developing vaccines to combat the COVID-19 pandemic. This collaboration further strengthens our COVID-19 vaccine development efforts. We are already setting up a large-scale facility in Hyderabad for manufacturing COVID-19 vaccine and other viral vaccines.”

Apart from this collaboration, Aurobindo is already developing a vaccine for SARS-COV-2 through its wholly-owned US subsidiary Auro Vaccines. The SARS-COV-2 vaccine candidate is based on the company’s proprietary replication-competent, attenuated, recombinant vesicular stomatitis (VSV, VesiculoVax™) vaccine delivery platform.

**Website Link:**

<https://vigyanprasar.gov.in/isw/CSIR-and-Aurobindo-Pharma-collaborate-to-develop-COVID-19-vaccine.html>

### **Indian, global COVID-19 clade 70% same, one vaccine may work: CCMB**

In a development that could result in the use of a common vaccine or drug to fight the novel coronavirus, the Centre for Cellular & Molecular Biology (CCMB) scientists said the clade or genetic group circulating in India has 70% similarity with the major strain around the world.

Viruses have different clades and they need different vaccines or drugs to target them. If the clade is common, then one vaccine or drug is sufficient to fight it. The clade that is now dominant in India is A2a, which has a similarity with 70% of genomes studied worldwide. The earlier dominant clade in India, A3i, has waned, resulting in the increase of A2a genetic group of the pandemic virus.

According to scientists of the CCMB, who analysed the genomes of the novel coronavirus, the similarity in viral genome globally means a vaccine or a drug targeting the mutation in A2a clade will work with the same effectiveness all over the world.

“At present about 70% of all Indian as well as global SARS-CoV-2 (novel coronavirus) genomes fall into this clade (A2a). As expected for a strain which is more infectious, A2a clade quickly became dominant in India just like everywhere else,” said CCMB director Dr Rakesh K Mishra.

Mishra, who is a co-author of the CCMB study, however, said there was no evidence to state that this mutation is clinically a more difficult one. “No clade at present has been conclusively shown to be associated with a more severe form of COVID-19 or an increased risk of death,” he said.

The findings of the study, carried out with scientists from Institute of Integrative Biology as collaborators, are now peer-reviewed and published in the journal *Open Forum Infectious Diseases* published by the Oxford University Press.

Earlier in June, the team had revealed the presence of a distinct virus population among Indians. This was named the clade I/A3i and is recognised by the presence of four specific variations in their genetic makeup.

**Website Link:**

<https://www.csir.res.in/slider/indian-global-covid-19-clade-70-same-1-vaccine-may-work-ccmb>

## **Scientists analyse 2,000 coronavirus genomes from India: The genomic landscape of SARS-CoV-2**

Scientists at the CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad have analysed more than 2,000 SARS-CoV-2 genomes (an organism’s complete set of DNA) from India, available in the public domain to understand the various strains in circulation.

Earlier in June, the team had revealed the presence of a distinct virus population among Indians. This was named the clade\* I/A3i, and was recognised by the presence of four specific variations in their genetic makeup (genomes).

At that time, 41 per cent of all Indian SARS-CoV-2 genomes belonged to this clade. The current analysis showed that the proportion of the I/A3i clade dropped to 18 per cent.

“One of the four distinct variations that define the A3i clade is present in a key viral enzyme called RDRP, involved in making new copies of the viral RNA (the role of RNA is to convert the information stored in DNA into proteins). This variant was predicted to be bad for the virus, and if the prediction is indeed correct, we expected A3i clade to slowly disappear with time... This is exactly what we see now,” said Dr Divya Tej Sowpati, Scientist at CCMB, who is leading this study.

The decrease in the proportion of A3i clade is accompanied by an increase of the A2a clade, also referred to as the G clade or the 20A/B/C clades in other nomenclatures. Viruses of the

A2a or the G clade carry the D614G mutation in their spike protein which is shown to be associated with increased infectivity.

At present 70 per cent of all Indians, as well as global SARS-CoV-2 genomes, fall into this clade. “As expected for a strain which is more infectious, A2a clade quickly became the dominant clade in India just like everywhere else. There is no evidence to state that this mutation is clinically a more difficult one. The similarity in viral genome globally should be considered positive news because a vaccine or a drug targeting this mutation will work with the same effect all over the world,” said Dr Rakesh K Mishra, Director, CCMB and a co-author of the study.

It is, however, important to note that no clade at present has been conclusively shown to be associated with a more severe form of coronavirus or an increased risk of death.

**Website Link:**

<https://www.csir.res.in/slider/scientists-analyse-2000-coronavirus-genomes-india-genomic-landscape-sars-cov-2>

## कोविड-19 के खिलाफ मिलकर लड़ेंगे सीएसआईआर और माइलन

देश के प्रमुख शोध एवं विकास संस्थान – वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) ने कोविड-19 के प्रबंधन के लिए उन्नत चिकित्सीय विकल्प विकसित करने के लिए एक प्रमुख अंतरराष्ट्रीय दवा कंपनी माइलन लैबोरेटरीज लिमिटेड के साथ साझेदारी की घोषणा की है।

इस साझेदारी के तहत, सीएसआईआर की हैदराबाद स्थित घटक प्रयोगशाला इंडियन इंस्टीट्यूट ऑफ केमिकल टेक्नोलॉजी (सीएसआईआर-आईआईसीटी) और माइलन लैबोरेटरीज कोविड-19 के लिए संभावित उपचारों की पहचान करने के लिए साथ मिलकर काम करेंगे।

भारत में कोविड-19 महामारी के प्रबंधन को केंद्र में रखकर नवोन्मेषी समाधान खोजने के लिए इस पहल के अंतर्गत चिकित्सीय परीक्षणों की श्रृंखला आयोजित की जाएगी। यह चिकित्सीय परीक्षण एक त्रि-स्तरीय अध्ययन होगा, जिसमें कोविड-19 के हल्के, मध्यम और गंभीर रूप से संक्रमित मरीजों को शामिल किया जाएगा।

सीएसआईआर के महानिदेशक डॉ. शेखर सी मांडे ने कहा है कि “माइलन के साथ यह साझेदारी एक मील का पत्थर साबित हो सकती है। वर्तमान महामारी के दौरान सीएसआईआर ने उद्योग जगत के साथ मिलकर प्रभावी दवाओं के चिकित्सीय परीक्षण को प्राथमिकता दी है, ताकि कोविड-19 के खिलाफ विविध चिकित्सीय विकल्प विकसित किए जा सकें।”

सीएसआईआर-आईआईसीटी के निदेशक डॉ. चंद्रशेखर ने कहा है कि ज्ञान और वैज्ञानिक साझेदार के रूप में माइलन के साथ जुड़कर हमें खुशी है। नैदानिक परीक्षणों और व्यावसायीकरण में माइलन के व्यापक अनुभव को देखते हुए हम कंपनी के साथ काम करने के लिए तत्पर हैं। उल्लेखनीय है कि माइलन कुछ समय पूर्व भारत में एक नए ब्रांड के तहत कोरोना की रेमडेसिविर दवा भी लॉन्च कर चुकी है।

इस नई पहल के अंतर्गत चिकित्सीय परीक्षणों से संबंधित विनियामक मंजूरी प्राप्त करने के लिए ड्रग कंट्रोलर जनरल ऑफ इंडिया के पास आवेदन भेजा जा चुका है। सीएसआईआर-महानिदेशक के मानद सलाहकार और जम्मू स्थित इंडियन इंस्टीट्यूट ऑफ इंटीग्रेटिव मेडिसिन (सीएसआईआर-आईआईआईएम) के पूर्व निदेशक डॉ राम विश्वकर्मा को इस साझेदारी का नेतृत्व करने के लिए संरक्षक के रूप में नियुक्त किया गया है।

माइलन के प्रमुख संचालन अधिकारी संजीव सेठी ने कहा है कि “सीएसआईआर के साथ हमारी यह रणनीतिक साझेदारी कोविड-19 के खिलाफ प्रभावी उपचार की पहचान के लिए की गई है। यह साझेदारी कई ऐसे तत्वों की पहचान करने में भी मददगार हो सकती है, जो अन्य संक्रामक बीमारियों का उपचार विकसित करने में उपयोगी हो सकते हैं।”

उन्होंने कहा कि इस महामारी से लड़ने को लेकर माइलन अपनी जिम्मेदारी के प्रति सजग है। हम अपने शोध तथा विकास, नैदानिक अनुसंधान, विनियामक गतिविधियों, विनिर्माण और आपूर्ति श्रृंखला से युक्त वैश्विक संसाधनों व क्षमताओं के साथ इस दिशा में कार्य करने के लिए तैयार हैं।

**Website Link:**

<https://vignyanprasar.gov.in/isw/CSIR-and-Mylan-to-fight-together-against-covid-19-hindi.html>

## कोविड-19 संक्रमण का पता लगाने के लिए तैयार स्वदेशी 'फेलूदा'

नये कोरोना वायरस (एसएआरएस-सीओवी-2) के प्रकोप को नियंत्रित करने से जुड़े प्रयासों में एक महत्वपूर्ण कड़ी होती है कोविड-19 से संक्रमित रोगियों की पहचान। इस दिशा में लगातार काम कर रहे वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) के शोधकर्ताओं द्वारा विकसित की गई कोविड-19 परीक्षण किट अब उपयोग के लिए तैयार है। इस नई विकसित कोविड-19 त्वरित परीक्षण किट को अब ड्रग कंट्रोलर जनरल ऑफ इंडिया (डीसीजीआई) से व्यावसायिक उपयोग के लिए विनियामक मंजूरी मिल गई है।

सीएसआईआर से संबद्ध नई दिल्ली स्थित जिनोमिकी और समवेत जीव विज्ञान संस्थान (आईजीआईबी) के वैज्ञानिकों द्वारा विकसित यह एक पेपर-स्ट्रिप आधारित परीक्षण किट है, जिसकी मदद से कम समय में कोविड-19 के संक्रमण का पता लगाया जा सकता है। यह किट प्रेग्नेसी का पता लगाने वाली किट की तरह है, जिसका उपयोग बेहद आसान है। इस पेपर स्ट्रिप किट में उभरी लकीरों से पता चल सकेगा कि कोई व्यक्ति कोरोना वायरस से संक्रमित है या नहीं। किट में ऐसे परीक्षण प्रोटोकॉल का उपयोग किया गया है, जिससे अन्य परीक्षण प्रोटोकॉल्स की तुलना में अपेक्षाकृत कम समय में परिणाम चिकित्सकों को मिल सकता है।

इस किट का विकास वैज्ञानिक समुदाय और उद्योग जगत के बीच एक प्रभावी साझेदारी का परिणाम है। भारतीय वैज्ञानिकों द्वारा विकसित इस परीक्षण को टाटा समूह द्वारा लॉन्च किया जाएगा। इसे सीएसआईआर-आईजीआईबी, आईसीएमआर और टाटा समूह ने साथ मिलकर विकसित किया है। उल्लेखनीय है कि इस किट के विकास और व्यावसायीकरण के लिए सीएसआईआर-आईजीआईबी और टाटा संस के बीच इस वर्ष मई के आरंभ में एक समझौते पर हस्ताक्षर किए गए थे।

इस परीक्षण किट के नाम के साथ भी एक दिलचस्प बात जुड़ी है। बांग्ला फिल्मों के जासूसी किरदार के नाम पर इसको 'फेलूदा' नाम दिया गया है, शायद यह सोचकर कि किसी जासूस की तरह यह किट कोविड-19 संक्रमण का पता लगा सकती है। 'फेलूदा' किट वैज्ञानिकों की अपेक्षाओं पर खरी उतरी है। भारतीय आयुर्विज्ञान संस्थान (आईसीएमआर) के दिशा-निर्देशों के अनुसार नये कोरोना वायरस का पता लगाने के लिए 'फेलूदा' किट को 96 प्रतिशत संवेदशनीलता और 98 प्रतिशत विशिष्टता के मापदंडों के अनुरूप पाया गया है।

यह पेपर स्ट्रिप-आधारित परीक्षण किट आईजीआईबी के वैज्ञानिक डॉ. सोविक मैती और डॉ. देबज्योति चक्रवर्ती की अगुवाई वाली शोधकर्ताओं की एक टीम द्वारा विकसित की गई है। शोधकर्ताओं का कहना है कि फेलूदा परीक्षण किट, पारंपरिक आरटी-पीसीआर परीक्षणों की सटीकता के स्तर को प्राप्त कर सकता है। परीक्षण को विकसित करने वाले वैज्ञानिकों का कहना है कि यह किट एक घंटे से भी कम समय में नये कोरोना वायरस (एसएआरएस-सीओवी-2) के वायरल आरएनए का पता लगा सकती है। आमतौर पर प्रचलित परीक्षण विधियों के मुकाबले यह किट काफी सस्ती है।

**Website Link:**

<https://vignyanprasar.gov.in/isw/Indigenous-feluda-ready-to-detect-covid-19-infection-hindi.html>

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## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

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

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### **ICMR launches free ICMR–NvCCP Online Prescribing Skills Course 2020 for Indian Medical Graduates (IMG)**

ICMR launched an online course on Prescribing Skills for Indian Medical Graduates (pursuing or completed internship) on September 17, 2020 on the occasion of Patient Safety Day. The course is meant for improving prescription practices among Indian Medical Graduates and will be run by National Institute of Epidemiology (ICMR-NIE), Chennai. The course will improve prescription practices among medical graduates.

Contact Info: [director.nie@icmr.gov.in](mailto:director.nie@icmr.gov.in), [sharma.lk@icmr.gov.in](mailto:sharma.lk@icmr.gov.in)

**Website Link:**

[https://www.icmr.gov.in/pdf/press\\_realease\\_files/ICMR\\_Pressrelease\\_17092020.pdf](https://www.icmr.gov.in/pdf/press_realease_files/ICMR_Pressrelease_17092020.pdf)

### **ICMR invites letter of intent for participation in National Clinical Registry of COVID-19**

There is a pressing need for collection of systematic data on clinical signs and symptoms, laboratory investigations, management protocols, clinical course of COVID-19 disease, disease spectrum and outcomes of patients. Such data will serve as an invaluable tool for formulating appropriate patient management strategies, predicting disease severity, patient outcomes etc. In view of this, Ministry of Health & Family Welfare (MoHFW), ICMR, New Delhi and All India Institute of Medical Sciences (AIIMS), New Delhi has proposed to launch a National Clinical Registry for COVID-19 (NCRC). The NCRC will aim at collecting good quality real-time clinical data to inform evidence-based clinical practice, research, formulating guidelines and policy making. In view of this, ICMR invites a letter of intent from institutions and hospitals identified as dedicated COVID Hospitals or dedicated COVID Health Centres under the project to establish National Clinical Registry of COVID-19.

**Website Link:**

[https://www.icmr.gov.in/pdf/covid/techdoc/Letter\\_of\\_Intent\\_National\\_Clinical\\_Regisrtry\\_of\\_COVID19\\_v1.pdf](https://www.icmr.gov.in/pdf/covid/techdoc/Letter_of_Intent_National_Clinical_Regisrtry_of_COVID19_v1.pdf)  
<https://www.icmr.gov.in/tender.html>

### **ICMR invites expression of interest for validation of rapid antigen detection assays for COVID-19**

ICMR invites applications for validation of rapid antigen detection tests for COVID-19 from all manufacturers who have developed such test. The gold standard RT-PCR diagnostic test for COVID-19 has limitations in terms of widespread availability. In view of this, there is urgent

requirement of reliable and convenient rapid point-of-care antigen detection assays with high sensitivity and specificity. Such assays could be used as potential diagnostic tests in all possible public and private healthcare settings and made available for mass testing.

Contact Info: [guptanivedita.hq@icmr.gov.in](mailto:guptanivedita.hq@icmr.gov.in)

**Website Link:**

[https://www.icmr.gov.in/pdf/tender/Revised\\_EOI\\_for\\_Ag\\_kit\\_validation\\_19082020\\_v1.pdf](https://www.icmr.gov.in/pdf/tender/Revised_EOI_for_Ag_kit_validation_19082020_v1.pdf)

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

## **IJMR brings third edition of special issue on COVID-19**

Indian Journal of Medical Research (IJMR), a publication of ICMR, is a peer-reviewed online journal with monthly print-on-demand compilation of issues. The COVID-19 pandemic has created opportunities to build an improved response mechanism for future pandemics. Concerted, well-funded, comprehensive, planned, and all-encompassing activities should facilitate building sustained institutional capacity to provide a swift and effective nationwide response to disease outbreaks. This could be done through access to appropriate technologies and improved logistics for efficient supply chains. These will also promote developing multi-sectoral stakeholder consortia at national and state levels to coordinate actions and launch a comprehensive whole-of-the-society response to emerging infections. Overall and long-term target should



be to encourage and ensure convergence of all stakeholders for human health, animal health and environment to collaborate in implementing the One Health approach and protecting human life, reduce misery and avoid damage to the national economy. These are doable actions. The national will and determination are vital to mitigate the severe impact of pandemics, such as COVID-19 in India. India's COVID-19 Containment Strategy has been aligned with WHO's Strategic Preparedness and Response Plan for COVID-19. During the ongoing pandemic, India could successfully and rapidly scale-up several important interventions.

Contact Info: [editorial@ijmr.in](mailto:editorial@ijmr.in)

**Website Link:**

<http://www.ijmr.org.in/currentissue.asp?sabs=n>

## **MoHFW releases preventive measures to contain spread of COVID-19 in various institutions**

Government of India is following a phase-wise unlocking of activities. In days to come, this would also involve resumption of activities in skill or entrepreneurship training institutions, higher educational institutions conducting doctoral courses and post graduate studies in technical and professional programmes requiring laboratory/experimental work. This SOP aims to enable safe resumption of teaching/training activities in skill or entrepreneurship training institutions, higher educational institutions conducting doctoral courses and post graduate studies in technical and professional programmes requiring laboratory/experimental work. This SOP outlines various generic precautionary measures to be adopted in addition to specific measures to be taken at these institutes to prevent spread of COVID-19.

**Website Link:**

<https://www.mohfw.gov.in/pdf/FinalSOPonSkillinstitutions&PGinstitutes08092020.pdf>

## **MoHFW releases SOP for partial reopening of Schools for students of 9<sup>th</sup> to 12<sup>th</sup> classes on a voluntary basis, in the context of COVID-19 pandemic outbreak**

Government of India is following a phase-wise unlocking of activities. In days to come, this would also involve partial resumption of activities in schools for students of classes 9<sup>th</sup> to 12<sup>th</sup> on a voluntary basis, for taking guidance from their teachers. This would be allowed from 21<sup>st</sup> September 2020. In this context, Ministry of Health & Family Welfare (MoHFW) has released an SOP for partial reopening of Schools for students of 9<sup>th</sup> to 12<sup>th</sup> classes on a voluntary basis, for taking guidance from their teachers. This SOP outlines various generic precautionary measures to be adopted in addition to specific measures to be taken when schools are permitting students (for 9<sup>th</sup> to 12<sup>th</sup> class) in the specific context to prevent spread of COVID-19. All States/UTs are expected to comply with the COVID-19-related guidelines issued by Ministry of Home Affairs and Ministry of Health & Family Welfare.

**Website Link:**

<https://www.mohfw.gov.in/pdf/FinalSOPonpartialresumptionofactivitiesinschools8092020.pdf>

## **Revised SOP released by MoHFW on preventive measures to be followed while conducting examinations to contain spread of COVID-19**

Examination centres are frequented by large number of students (as well as their parents) and staff till the entire duration of the exam and therefore it is vital to plan and conduct these examinations, while following specific preventive measures. MoHFW has released revised SOP on preventive measures to be followed while conducting examinations to contain spread of COVID-19. The generic measures include simple public health measures that are to be followed to reduce the risk of COVID-19. These measures need to be observed by all (staff, students and parents) in these places at all times.

**Website Link:**

[https://www.mohfw.gov.in/pdf/](https://www.mohfw.gov.in/pdf/RevisedSOPonpreventivemeasurestobefollowedwhileconductingexaminationstocontainspreadofCOVID19.pdf)

[RevisedSOPonpreventivemeasurestobefollowedwhileconductingexaminationstocontainspreadofCOVID19.pdf](https://www.mohfw.gov.in/pdf/RevisedSOPonpreventivemeasurestobefollowedwhileconductingexaminationstocontainspreadofCOVID19.pdf)

## **MoHFW issued Post-COVID management protocol**

COVID-19 disease caused by SARS-CoV-2 is a relatively new disease, with fresh information being known on a dynamic basis about the natural history of the disease, especially in terms of post-recovery events. After acute COVID-19 illness, recovered patients may continue to report wide variety of signs and symptoms including fatigue, body ache, cough, sore throat, difficulty in breathing, etc. As of now there is limited evidence of post-COVID sequelae and further research is required and is being actively pursued. A holistic approach is required for follow-up care and well-being of all post-COVID recovering patients. This document provides an integrated holistic approach for managing patients who have recovered enough from COVID for care at home. It is not meant to be used as preventive/curative therapy. The recovery period is likely to be longer for patients who suffered from more severe form of the disease and those with pre-existing illness.

**Website Link:**

<https://www.mohfw.gov.in/pdf/PostCOVID13092020.pdf>

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## SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

# DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)

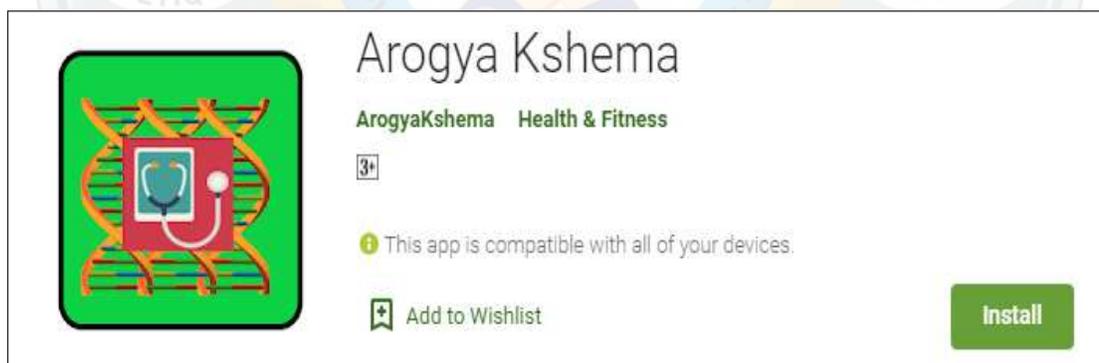
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### DRDO develops ArogyaKshema App for COVID-19 Infection Self Assessment Test

The ArogyaKshema application is developed for COVID-19 Infection Self Assessment Test. The app can be installed on any Android Phones. The app is user friendly and does not require extensive training. The app is multi-lingual and supports Indian and Foreign languages. The app has been developed in consultation with medical doctors and is based on the guidelines issued by ICMR and WHO.

The App is a standalone one developed using Android Studio. The app has 13 Multiple Choice questions which are designed to collect the user's symptoms and health conditions. The app generates diagnostic messages with colour codes which assist the user in availing appropriate medical advice. It is useful for individuals, doctors, medical staff, healthcare workers etc. in the current COVID-19 Pandemic.

Download and install the ArogyaKshema Android App from Google Play Store: Arogya-Kshema App for Android Smart Phones



**Website link:**

<https://www.drdo.gov.in/arogyakshema-app-covid-19-infection-self-assessment-test>

### DRDO builds 500-bed COVID Hospital in Patna

A 500-bed COVID Hospital with 125 ICU beds set up by the DRDO in Patna was inaugurated recently. The hospital located in the newly constructed ESIC Hospital at Bihta, has been built on the lines of the 1000-bed Sardar Vallabhbhai Patel Hospital at Delhi Cantonment built by DRDO.

Prime Minister's Citizen Assistance and Relief in Emergency Situations (PM CARES) Trust has allocated funds for the hospital. Another such hospital will be set up soon in Muzaffarpur.

The infrastructure facilities for the hospital include the already existing seven-storied ESIC hospital with Power, air conditioning, Water supply, Fire Fighting and Diesel Generator Backup, Oxygen piping to each bed, Lifts and Morgue.

DRDO has provided infrastructure for the hospital such as the Administrative Block including Doctor's room, Triage Area, Visitors Area and Reception; ICU Beds with Ventilators, monitors: 125 Nos; Normal Beds: 375 Nos; 10 KL Cryogenic Liquid Medical oxygen Vessel; Oxygen supply to every bed; PPE Kits and Sanitizers; CCTV Surveillance System; Housekeeping Services including consumable items; Pharmacy, Medical Pathology Lab, Catering Services, Laundry Services, Ambulance Service; Computerized Hospital Management System; Professional Manning & Maintenance Staff for specialised services like Electrical System, Air conditioning System, DG Sets, etc.

Doctors, nurses, and other supporting medical staff etc. for the hospital have been provided by the Directorate General Armed Forces Medical Services (DG-AFMS).



**Website link:**

<https://pib.gov.in/PressReleaseframePage.aspx?PRID=1648263>

### **DRDO establishes COVID-19 Testing Facility at DIHAR, Leh**

DRDO has established a COVID-19 testing facility at the Leh-based laboratory Defence Institute of High Altitude Research (DIHAR) to enhance the rate of testing to identify the COVID-19 cases in the Union Territory of Ladakh. The testing facility will also help in keeping close watch of the infected persons. The facility meets the safety standards and guidelines of Indian Council of Medical Research (ICMR).

The testing facility at DIHAR is capable of screening 50 samples per day. The facility can also be utilized for training manpower for COVID-19 testing and will be of great help to address future bio-threats and carrying out R&D activities pertinent to agro-animals diseases.

DIHAR is one of the life sciences laboratories of DRDO working on cold arid agro-animal technologies. The laboratory is screening and identifying the medicinal and aromatic plants to exploit them for use for defence purposes and also on greenhouse technologies for high altitude and cold desert areas.

**Website link:**

<https://drdo.gov.in/press-release/drdo-establishes-covid-19-testing-facility-dihar-leh>

<https://pib.gov.in/PressReleasePage.aspx?PRID=1640600>

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# SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

# MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY)

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## MietY invites start-ups to apply for 'SASACT' Call For Proposals 2020

Scheme for Accelerating Startups around Post COVID Technology Opportunities (SASACT) initiative is part of Ministry of Electronics and Information Technology's (MeitY's) slew of measures to respond to today's changing environment in reiterating the need and importance of quick and reliable technology solutions in accordance with local needs. SASACT envisages supporting electronics hardware/ICT-based tech start-ups for developing or re-purposing technologies, tools, systems, and solutions to respond to the post-COVID-19 scenario with action areas identified as smart/digital manufacturing including 3D printing, Digital health/Medtech, Edutech, Fintech, Work From Home (WFH) and other solutions deemed fit for post COVID-19 world. Rs. 9.6 Crore is provisioned for supporting eligible start-ups to augment and deploy into the market select technology products in a span of 11 months from 1<sup>st</sup> October 2020. The scheme does not envisage support to ideation stage start-ups. Start-ups (Scaling Stage) who have already tested their prototypes (hardware/software innovations) with or without any user agency and are seeking further validations before becoming market-ready with a demonstrable demand are therefore encouraged to apply.



The image shows a promotional banner for the 'Call for Proposal under SASACT scheme'. The banner is primarily blue and white. At the top left, it features the logos of the Ministry of Electronics and Information Technology, MeitY Startup, and STPI. The main text reads 'Call for Proposal under SASACT scheme'. Below this, it states 'Apply Before: 30<sup>th</sup> September 2020'. On the right side, there are logos for various partner incubators including FORGE, NASSCOM, and others. The bottom section of the banner is a darker blue and contains the following text: 'Inviting Startups to apply for SASACT Scheme for Accelerating Startups Around Post COVID Technology Opportunities'. It specifies 'Who can apply? Electronics Hardware & ICT Startups working on solutions for Post-COVID era.' and 'Win Grants upto INR 40 Lakhs\*'. The 'Last Date: 30<sup>th</sup> September 2020' is highlighted with a star icon, and the application URL 'Apply Now - https://meitystartup.in' is provided. Logos for partner incubators are also present at the bottom right.

Last date of submission of proposals: 30<sup>th</sup> September 2020

Contact Info: [meity-sthub@gov.in](mailto:meity-sthub@gov.in)

**Website link:**

<https://www.meity.gov.in/content/Creative-1st-ICT-Grand-Challenge>

<https://app.thebizplanner.com/public/application/inc/5f507f4ea5345dcd07e8770>

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# SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

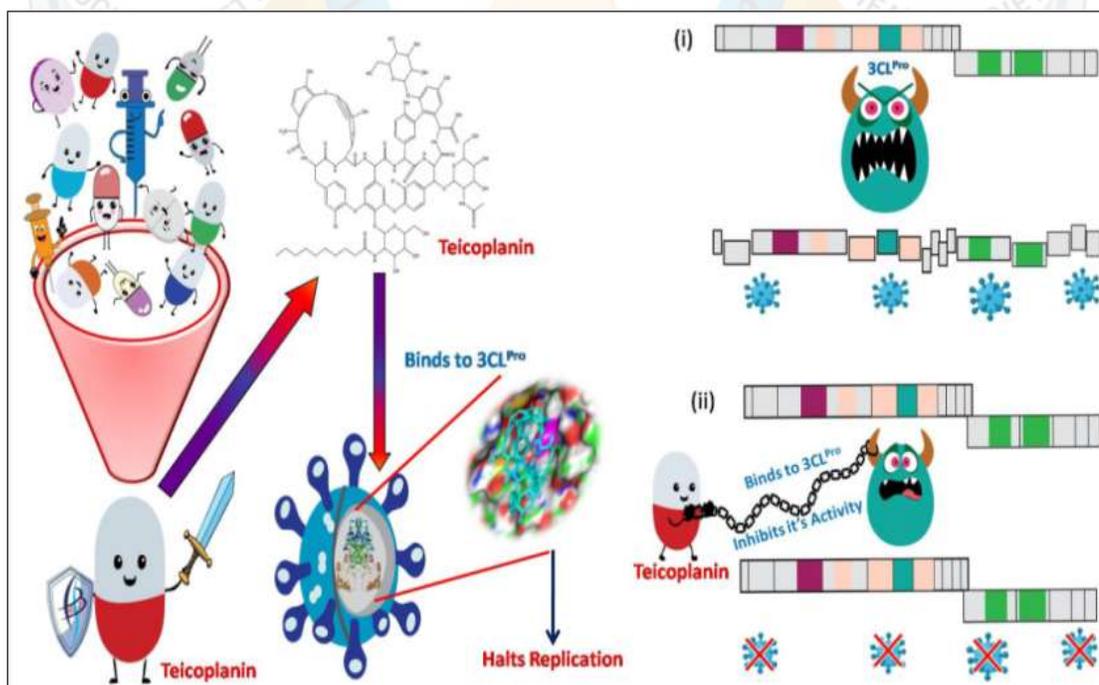
## SCIENTIFIC AND ACADEMIC INSTITUTIONS

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### FDA-approved drug Teicoplanin found effective against main protease of novel coronavirus, says IIT Delhi study

An interesting research study at Kusuma School of Biological Sciences, IIT Delhi conducted by the research group of Prof. Ashok Kumar Patel, which was recently published in the International Journal of Biological Macromolecules has proposed the clinically approved drug Teicoplanin as a potential therapeutic option against SARS-CoV-2.

This study screened an assemblage of 23 approved drugs, which have shown leads towards being therapeutic options for COVID-19 for those having an inhibitory effect towards the main protease of the virus 3CL<sup>Pro</sup> and among them, the drug Teicoplanin showed the most promising inhibition of the proteolytic activity of this main viral protease. The 3CL<sup>Pro</sup> protease (3-chymotrypsin-like protease), also called the main protease of the virus, is necessary for processing the viral polyproteins and therefore has emerged as an exciting premise for the development of drugs targeting the virus.



**Website Link:**

<https://home.iitd.ac.in/news-teicoplanin.php>

## IIT Delhi-developed facial protection equipment COVLOCK receives financial support for mass production

As the number of COVID-19 cases continues to rise, the demand for protective gear is also increasing. The Indian Institute of Technology (IIT) Delhi has come up with several products for this purpose, and one such product has received financial support from Clifford Chance Business Services.



‘COVLOCK’ addresses the critical need to manufacture facial protection equipment which can effectively inhibit person-to-person transmission of the contagious virus with respiratory droplets, produced when an infected person coughs or sneezes, via the mouth, nose, or eyes. It is an innovative ergonomic face shield, which can be comfortably worn for prolonged hours just like a pair of glasses. Rapid prototyping will be employed to mass produce COVLOCK at IIT Delhi for frontline workers and organisations at an ultra-low cost.

### Website Link:

<https://home.iitd.ac.in/news-covlock.php>

## IIT Kharagpur develops AI and IoT-based diagnostic device for COPD

IIT Kharagpur has developed an affordable diagnostic intervention for Chronic Obstructive Pulmonary Disease (COPD), based on the internet-of-things medical devices (IoT-MD) integrated with artificial intelligence (AI). Prof. Dipak Kumar Goswami and his research team have developed SenFlex.T, a smart mask synced with an android monitoring app through Bluetooth that can continuously monitor breathing patterns, rate, heart rate, oxygen saturation level in blood. The app is connected to a cloud computing server, where AI has been implemented to predict the severity of COPD through machine learning.

COPD has been a top cause of death, second to only deaths due to heart diseases. The threat from COPD has become more acute under the COVID situation, with increased co-morbidity rates. A recent survey confirmed that the severity and mortality rates among COPD patients to be affected by the COVID-19 virus are over 63%. Moreover, the patients affected in the COVID-19 virus are more susceptible to build up various lung disorder-related diseases like COPD, Asthma etc.



### Website Link:

<https://kgpchronicle.iitkgp.ac.in/new-ai-diagnostics-for-lung-diseases/>

# 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

### CSIR-NISCAIR comes up with information handbook on COVID-19 in Urdu language

National Institute of Science Communication and Information resources (CSIR-NISCAIR) has published an information handbook on COVID-19 in Urdu language. The handbook contains information on frequently asked questions & answers, myths & facts, various ongoing research and innovations, and CSIR's efforts towards the mitigation of COVID-19 disease.

**Website Link:**

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

<https://www.niscair.res.in/includes/images/urducompedium/urducompedium.pdf>



### 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: 31<sup>st</sup> October 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 24<sup>th</sup> September 2020.

- India reports steady trend of higher New Recoveries than New Cases for the 6th successive day
- 13 States/UTs reporting higher number of new recoveries than the new cases
- Recovery Rate has crossed 81.55%.
- 75% of new confirmed cases found concentrated in 10 States/UTs
- PM interacts with CME of seven states to review status and response to COVID-19; exhorts the States to assess the efficacy of local lockdowns of 1-2 days in controlling the spread of the virus
- eSanjeevani OPD of Health Ministry completes 3 lakh tele-consultations within six months of launch

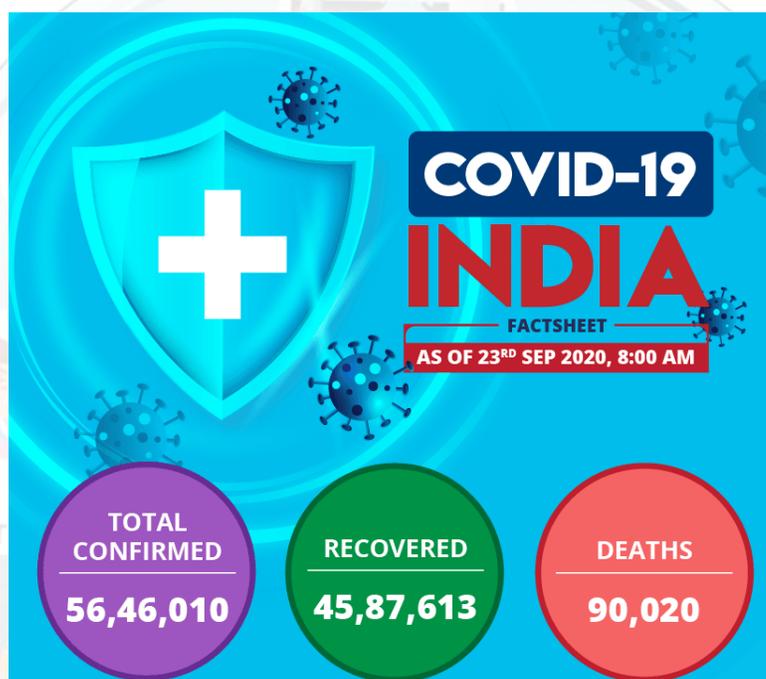
**Website Link:**

<https://pib.gov.in/PressReleasePage.aspx?PRID=1658753>

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

India's coronavirus cases have crossed 56-lakhs mark and as on 23<sup>rd</sup> September 2020, 8:00 AM, stands at 56,46,410 cases out of which 45,87,613 have recovered. The recovery rate stands at 81.25% while the case fatality rate stands at 1.6%, 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 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-23rd-sep-2020-800-am/>

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

National Institute of Science Communication and Information Resources (CSIR-NISCAIR) is bringing out a regular 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 15<sup>th</sup> September 2020.

### Website Link:

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

<https://www.niscair.res.in/includes/images/covidbulletin/pdf/15september2020/15-september-2020.pdf>

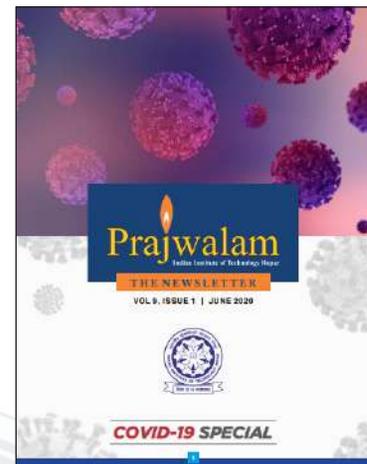


## IIT Ropar brings out quarterly newsletter Prajwalam as COVID-19 Special

IIT Ropar has taken the double-prong strategy of protecting the health and academic interests of its community on the one hand and contributing to the national and local needs through innovation, research and collaboration. The current quarterly issue of their newsletter Prajwalam presents some of the innovations that the faculty and students of IIT Ropar have come up with, while a lot many are being worked upon. It is also heartening to observe that many of these innovations are being commercialized or being transferred directly to healthcare authorities making IIT Ropar's mission of "Contributing to Society" and "Contributing to Nation" a reality.

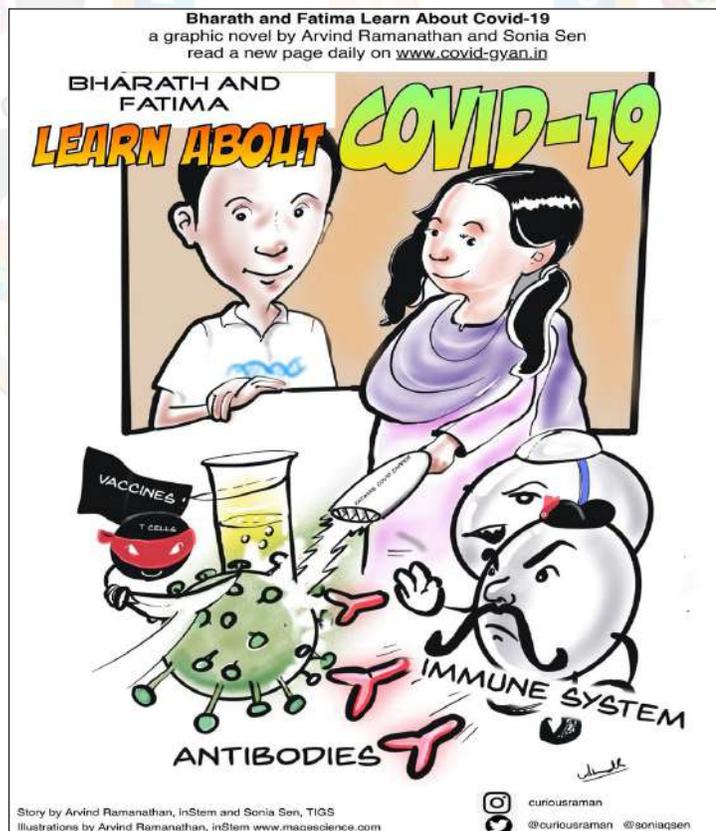
### Website link:

[http://www.iitrpr.ac.in/sites/default/files/Prajwalam%20Volume%209%2C%20Issue%201%2C%20June%202020\\_0.pdf](http://www.iitrpr.ac.in/sites/default/files/Prajwalam%20Volume%209%2C%20Issue%201%2C%20June%202020_0.pdf)



## Bharath and Fatima learn about COVID-19: A graphic novel to sensitize the broader audience

'Bharath and Fatima learn about COVID-19' is a graphic novel authored by Arvind Ramanathan from Institute For Stem Cell Science and Regenerative Medicine (inStem) and Sonia Sen from Tata Institute for Genetics and Society (TIGS). To explore more, read a new page daily on [www.covid-gyan.in](http://www.covid-gyan.in). They already brought out two parts of the graphic novel.



### Website link:

<https://covid-gyan.in/>

## 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 the 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 on 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-19 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.

2. COVID-19 Explained - Short films to explain important research finding related to COVID-19 in layman's lingo produced on weekly basis. The subjects chosen for these short films 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.

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.

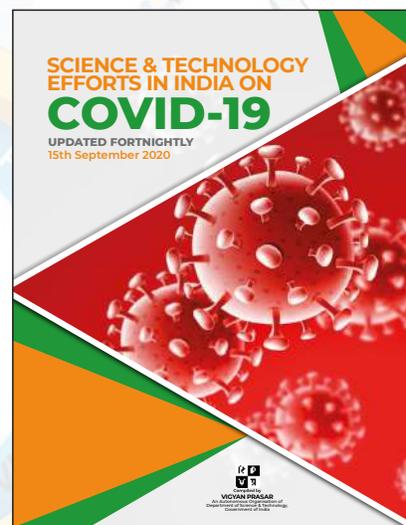
Contact Info: [kdgm@vigyanprasar.gov.in](mailto:kdgm@vigyanprasar.gov.in)

**Website link:**

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

### 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 Atmanirbhar.



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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