



**SCIENCE & TECHNOLOGY
EFFORTS IN INDIA**
ON
COVID-19



VIGYAN PRASAR

[AN AUTONOMOUS ORGANISATION OF
DEPARTMENT OF SCIENCE & TECHNOLOGY]
GOVERNMENT OF INDIA

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सत्यमेव जयते
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

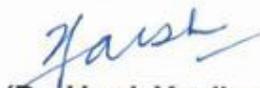
सबका साथ, सबका विकास, सबका विश्वास
Sabka Saath, Sabka Vikas, Sabka Vishwas

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



At the fag end of 2019, China informed the World Health Organization (WHO) regarding the occurrence of cases of pneumonia of an unknown cause in Wuhan City in Hubei province. On January 9, 2020, WHO issued a statement saying Chinese researchers have made the preliminary determination of the virus as a novel coronavirus. Since then, several lakhs of positive cases and more than one lakh deaths have been reported due to COVID-19 across the world. Lockdowns, curfews, sealing of hotspots of outbreak area, massive airport screenings, quarantines, and social distancing have become the norm across the globe.

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 and journalistic flavour, ensuring that science and safety are the primary focus. VP is a national level organization of the Department of Science and Technology, Government of India, engaged in science communication and popularization. The principal objective of VP is to serve India's science popularization agenda. This is achieved through several strategically important two-way, stakeholder-specific approaches to communicate about principles and practices of science and technology and implications for development and quality of life. Science popularization therefore serves as a robust knowledge-led tool to fulfil various mutually reinforcing public policy objectives.

For the benefit of the stakeholders, we have prepared a compilation of the most relevant initiatives and efforts taken by the Government of India through its various Science Ministries, Departments, and Funding organizations. These organizations are geared for combating the epidemic of COVID-19. 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, like Science Ministries, Departments, and Funding organizations, has invited Calls for Proposals (CFPs) and Expression of Interest (EoIs) to enhance research and development-related activities to battle the pandemic out.

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 in whatever minuscule way and people at large.

Vigyan Prasar
New Delhi



DR. HARSH VARDHAN EXHORTS CSIR SCIENTISTS TO DEVELOP COVID-19 MITIGATION SOLUTIONS TO EFFECTIVELY COMBAT THE DISEASE

12th April 2020, New Delhi

- Genetic sequencing was crucial in eradicating Polio; it will help in COVID-19 mitigation also, said Dr. Harsh Vardhan
- These are times of war, deliver solutions before war ends, not a routine research project, states Dr. Harsh Vardhan
- COVID-19 will give boost to country's resilience and self-reliance and enhance indigenous capacity in developing critical healthcare equipment

Today Dr. Harsh Vardhan, Union Minister for Science & Technology held a review with DG CSIR, Dr. Shekhar C. Mande and all the CSIR lab directors through video conference of the steps undertaken by CSIR and its constituent 38 labs towards mitigation of Corona Virus outbreak in the country.

DG CSIR Dr. Shekhar C. Mande informed that Core Strategy Group (CSG) has been set up in CSIR and the five verticals have been identified under which the COVID-19-related activities are being carried out. These include: Digital and Molecular Surveillance; Rapid and Economical Diagnostics; New Drugs / Repurposing of Drugs and associated production processes; Hospital Assistive Devices and PPEs; and Supply Chain and Logistics Support



Dr Harsh Vardhan during video conferencing on research and developments initiatives on Covid-19 with the directors of CSIR labs



CHITRA GENELAMP-N MAKES CONFIRMATORY TESTS RESULTS OF COVID-19 POSSIBLE IN 2 HOURS

Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, an institute of national importance of the Department of Science and Technology (DST), has developed a diagnostic test kit that can confirm COVID-19 in 2 hours at low cost.

The confirmatory diagnostic test, which detects the N Gene of SARS-CoV-2 using reverse transcriptase loop-mediated amplification of viral nucleic acid (RT-LAMP), will be one of the world's first few, if not the first of its kinds, in the world.



The test kit, funded by the DST called Chitra GeneLAMP-N, is highly specific for SARS-CoV-2 N-gene and can detect two regions of the gene, which will ensure that the test does not fail even if one region of the viral gene undergoes mutation during its current spread.

The tests performed at NIV Alappuzha (authorized by ICMR) show that Chitra GeneLAMP-N has 100% accuracy and match with test results using RT-PCR. This has been intimated to ICMR, the authority to approve it for COVID-19 testing in India, following which license needs to be obtained from CDSCO for manufacturing.

Current PCR kits in India enable detection of E gene for screening and RdRp gene for confirmation. Chitra GeneLAMP-N gene testing will allow confirmation in one test without the need for a screening test and at much lower costs.

The detection time is 10 minutes and the sample-to-result time (from RNA extraction in swab to RT-LAMP detection time) will be less than 2 hours. A total of 30 samples can be tested in a single batch in a single machine allowing a large number of samples to be tested each day.

“Development of a novel, inexpensive, rapid confirmatory for the diagnosis of COVID-19 by Sree Chitra in record time is a compelling example of how a creative team of clinicians and scientists working together seamlessly can leverage knowledge and infrastructure to make relevant breakthroughs. Establishment of a Technology Research Centre at SCTIMST and four other DST institutions has brought rich dividends by conversion of basic research into important technologies,” said Prof Ashutosh Sharma, Secretary, DST.

The testing facility can be easily set up even in the laboratories of district hospitals with limited facilities and trained laboratory technicians. The results can be read from the machine from



the change in fluorescence. The cost with the new device for LAMP testing and the test kit for 2 regions of N gene (including RNA extraction) will be less than Rs 1000 per test for the laboratory.

Sree Chitra has also additionally developed the specific RNA extraction kits along with GeneLAMP-N test kits and testing devices. The technology was transferred for manufacture to M/S Agappe Diagnostics Ltd, Ernakulam, a leading company in in-vitro diagnostics with national and international operations.

Dr. Anoop Thekkuvetttil, a senior scientist of the Biomedical Technology Wing of the Institute and Scientist-in-charge of the division of molecular medicine under the Department of Applied Biology and his team developed the kit in the last 3 weeks.

For more details, please contact: Ms. Swapna Vamadevan, PRO, SCTIMST, Mob: 9656815943, Email: pro@sctimst.ac.in

Website link:

<https://dst.gov.in/chitra-genelamp-n-makes-confirmatory-tests-results-covid-19-possible-2-hours>

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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 TO DEAL WITH COVID-19 BY

OFFICE OF THE PRINCIPAL SCIENTIFIC ADVISER (PSA)

Expanding testing facilities in the country

The Empowered Committee on R&D has worked towards enhancing the testing facilities to meet COVID-19-related challenges by leveraging the existing resources (instruments and human resources) in Government of India laboratories. It has enabled ICMR to issue the required notification allowing institutions under DST, DBT, CSIR, DAE, DRDO and Indian Institute of Science (IISc) to self-assess and prepare their BSL labs for research and testing of coronavirus.

The O/o PSA has developed a “Handbook for COVID-19 testing in Research Institutions” which allows more such labs to self-assess its preparedness in terms of equipment, staff and expertise required for COVID-19 testing. A detailed checklist has been outlined, which can be used by a research lab to self-assess and indicate their preparedness for declaring the lab as a research and testing facility for COVID-19 after ICMR approval. (This handbook has been assembled by a group of young researchers whose efforts are gratefully acknowledged).

Website link:

<http://psa.gov.in/information-related-covid-19/handbook-covid-testing-research-laboratories>

Novel Coronavirus Disease 2019 (COVID-19): Guidelines on rational use of Personal Protective Equipment

The guideline is for healthcare workers and others working in points of entries (POEs), quarantine centres, hospitals, laboratories and primary healthcare & community settings. The guideline uses the setting approach to guide on the type of personal protective equipment to be used in different settings.

Website link:

<http://psa.gov.in/sites/default/files/pdf/GuidelinesonrationaluseofPersonalProtectiveEquipment.pdf.pdf>

Foot-Operated Washing Station implemented at IAO

Foot-operated Washing Station, implemented at the Indian Astronomical Observatory (IAO), Hanle, Ladakh, provided as an example for implementation in the ‘Guidelines for hygiene and



sanitation in densely populated areas, during the COVID-19 pandemic' released by the Office of PSA. IAO has one of the world's highest located sites for optical, infrared and gamma-ray telescopes. It is operated by the Indian Institute of Astrophysics (IIA), Bengaluru.

Website link:

<https://pib.gov.in/PressReleaseDetailm.aspx?PRID=1614064>

Detailed Guidelines:

http://164.100.117.97/WriteReadData/userfiles/PSA_DenseAreaGuidelines_Version8.pdf.pdf





SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

Interview of DST Secretary Prof. Ashutosh Sharma

BIG 'DESI' development on a rapid test for COVID-19 has now been discovered by the Thiruvananthapuram-based government Lab. They have developed a new confirmatory diagnostic test for the coronavirus that gives results in minutes. Once scaled up, this will lessen the burden of importing test kits. In a special interview with Pallava Bagla, Prof. Ashutosh Sharma, Secretary of Department of Science & Technology, talked about this very important development.

Website link:

<https://youtu.be/v0I2d4g32Co>

RRI scientists explain the relevance of the mathematical model

Scientists of the Raman Research Institute (RRI), an autonomous institute of the Department of Science and Technology, have analysed the importance of mathematical models that are being used by scientists for prediction of COVID-19 pandemic for planning future actions and the relevance of these models for the common public.

RRI scientists Joseph Samuel (RRI, ICTS) and Supurna Sinha (RRI) have reached out to the common people and explained the relevance of mathematical models in decision making for citizens and policymakers who may not be from scientific backgrounds.

They have addressed key questions like what one can learn from these models, how seriously they should be taken, why the predictions from different models may differ, and how these models are constructed.

The article seeks to remove the confusion that may be prevailing about mathematical models due to the varied predictions they make. It also elucidates how models have been used by many countries in taking decisions. The scientists have explained that simple models can capture qualitative features well and make predictions based on the value of a few parameters (for instance, the doubling time), which can be gleaned from the past data. As the models get more



complicated and realistic, the number of parameters also increases. This results in a new kind of uncertainty stemming from our ignorance of a large number of parameters. Small changes in the parameters can lead to large changes in the outcomes over a period of time. For more details please contact Prof. Joseph Samuel, sam@rri.res.in, Mob: 9900130049

The article by the scientists is attached here:

<https://drive.google.com/file/d/1wEovHajcX-YXIP1brV9qPrVzqSpn3zej/view?usp=sharing>

Indian industries respond enthusiastically to TDB's invitation for proposals for fighting COVID-19

The Indian industry and the start-up ecosystem have responded enthusiastically to the invitation by the Technology Development Board (TDB), a statutory body of the Department of Science and Technology (DST), for proposals from Indian companies and enterprises for supporting technologically innovative solutions towards fighting COVID-19.

TDB provides financial support to Indian companies for the commercialization of indigenous technology or adaptation of imported technology and had invited proposals on March 20, 2020, to strengthen the nation's core capacities in fighting COVID-19. It covers key areas like surveillance, laboratory support, infection prevention and control, logistics, risk communication, and, in particular, to strengthen the capabilities in terms of isolation and management of critically ill patients for containing and preventing the spread of the pandemic.

Website link:

<https://dst.gov.in/indian-industries-respond-enthusiastically-tdbs-invitation-proposals-fighting-covid-19>

SAMHAR-COVID-19 Hackathon under National Supercomputing Mission

Centre for Development of Advanced Computing (C-DAC) under the aegis of the National Supercomputing Mission (NSM), a Ministry of Electronics & Information Technology (MeitY) and Department of Science & Technology (DST) initiative, in association with NVIDIA & OpenACC, announces the SAMHAR-COVID19 Hackathon.



Website Link:

<https://samhar-covid19hackathon.cdac.in/>

Integrated geospatial platform to help area-specific strategies & decisions in COVID-19 outbreak

The Department of Science and Technology (DST), Government of India, has created an Integrated Geospatial Platform out of available geospatial datasets, standards-based services, and analytic tools to help decision making during the current COVID-19 outbreak and aid devising area-specific strategies to handle the socio-economic impact in the recovery phase.



The platform is initially expected to strengthen the public health delivery system of the State and Central Governments and subsequently provide the necessary geospatial information support to citizens and agencies dealing with the challenges related to health, socio-economic distress, and livelihood challenges. The mobile application SAHYOG as well as the web portal (<https://indiamaps.gov.in/soiapp/>) prepared and managed by the Survey of India (Sol) has been customized to collect COVID-19-specific geospatial datasets through community engagement to augment the response activities by Government of India to the pandemic. Information parameters required as per the Govt. of India strategy and containment plan for large outbreaks have been incorporated in the SAHYOG application. This mobile application will complement the “AAROGYA SETU” mobile application launched by the Government of India for Contact tracing, Public awareness, and Self-assessment objectives. State Spatial Data Infrastructure (SSDI) in Madhya Pradesh, Odisha, Punjab, and Jammu & Kashmir have been providing collateral standards-based geospatial data services to the State and District Level authorities in the respective States through State Geoportals for integration with related health datasets towards combating COVID-19 pandemic.

Website link:

<https://dst.gov.in/integrated-geospatial-platform-help-area-specific-strategies-decisions-covid-19-outbreak>

Special Call under SATYAM to fight against COVID-19

Department of Science and Technology invites concept note under ‘Science and Technology of Yoga and Meditation (SATYAM)’ for the appropriate intervention of yoga and meditation to fight against COVID-19 and other similar kinds of viruses. This special call aims to provide assistance to our society in today’s critical condition arising due to the pandemic COVID-19. The project may address on improving immunity, improving respiratory system, stress, anxiety, depression and others.

The concept note may be submitted at e-PMS (onlinedst.gov.in) till April 30, 2020.

Website link:

<https://dst.gov.in/callforproposals/special-call-under-satyam-fight-against-covid-19>

Call for Expression of Interest - 2nd Set of Products

Sree Chitra Tirunal Institute for Medical Science and Technology (SCTIMST), Thiruvananthapuram, an institute of national importance under the Department of Science & Technology, Government of India, has developed designs and know-how for several products to combat the COVID-19 pandemic crisis. The institute is interested in transferring these designs and know-how to entities that can manufacture and make them available to the users. Expression of Interest (EoI) is invited from interested entities for this purpose.

Website link:

<https://www.sctimst.ac.in/resources/Rev-EOI%20COVID%2019%20-%202008.04.2020.pdf>

Expression of Interest for developing and manufacturing devices for the fast track Programme for COVID-19 pandemic

Sree Chitra Tirunal Institute for Medical Science and Technology (SCTIMST), Thiruvananthapuram invites manufacturers/startups/social groups who are interested in working with the Institute to co-develop and manufacture medical devices on a fast track mode to support the distressing situation created by the epidemic COVID-19. The call is for the development of Ambu bag-based Ventilators, Ventilator Sharing Kit, Battery-operated Assistive Breathing Unit, Isolation Pods, Disposable Safety Face Shield and Deployable Field Units.

Website link:

<https://www.sctimst.ac.in/RESOURCES/EOI%20COVID%2019%20-%202029.03.2020.pdf>

Proposals invited on COVID-19 & related respiratory viral infections

Science & Engineering Research Board (SERB), a statutory body of the Department of Science & Technology, invites proposals as part of special call under IRHPA (Intensification of Research in High Priority Area) scheme designed explicitly for COVID-19 and related respiratory viral infections to ramp up national R&D efforts for new antivirals, vaccines, and affordable diagnostics.

Website link:

<https://dst.gov.in/pressrelease/proposals-invited-covid-19-related-respiratory-viral-infections>

Call for Proposals: Indo-U.S. Virtual Networks for COVID-19

The Indo-U.S. Science and Technology Forum (IUSSTF) announces a Call for Proposals for COVID-19 Indo-U.S. Virtual Networks. IUSSTF encourages proposals that convincingly demonstrate the benefits and value of the Indo-U.S. partnership to advance research and address critical challenges related to COVID-19. Virtual Networks would allow Indian and U.S. scientists and engineers currently engaged in COVID-related research to carry out joint research activities through a virtual mechanism, leveraging existing infrastructure and funding. These network projects could be of two types: Knowledge R&D Networks and Public-Private Virtual Networks.

Last date of submission: May 15, 2020

Website link:

<https://iusstf.org/announcements-and-events>

United States - India Science and Technology Endowment Fund COVID-19 Ignition Grants

IUSSTEF would select and support promising joint U.S.-India S&T-based entrepreneurial initiatives that address the “development and implementation of new technologies, tools, and systems to address COVID-19-related challenges including monitoring, diagnosis, health and safety, public outreach, information and communication”. These initiatives can originate from government, academic, non-governmental or commercial entities and any combination thereof, provided they focus on applied R&D and have commercial potential. USISTEF would also consider proposals related to technologies/products that can be re-purposed to address COVID-19 in the current scenario. USISTEF encourages projects that demonstrate a high degree of innovation leveraging advances in science and technology.

Last date of submission: May 15 2020

Website link:

<https://iusstf.org/announcements-and-events>





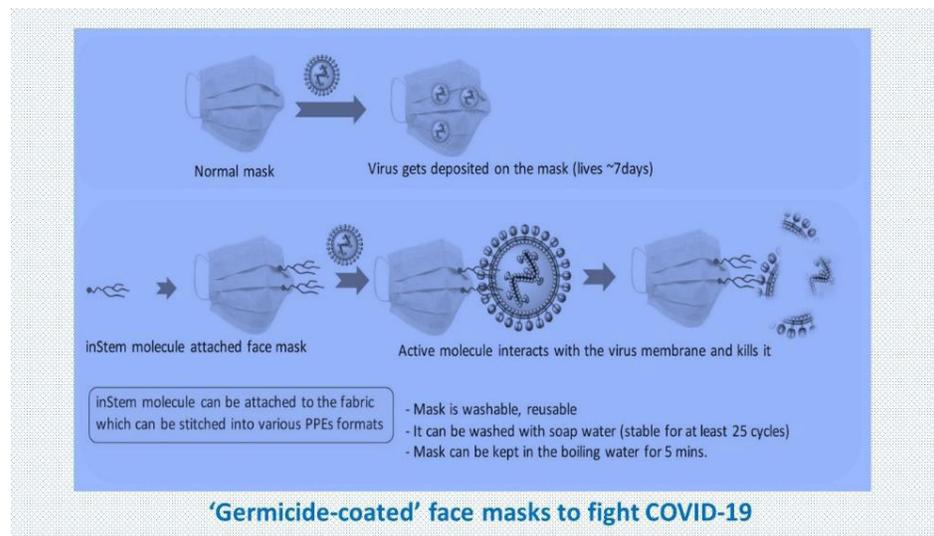
SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF BIOTECHNOLOGY (DBT)

DBT-InStem develops germicidal protection for PPE

Dr. Praveenvemula's lab at DBT-Institute for Stem Cell Science and Regenerative Medicine (inStem) has developed a proprietary germicidal molecule, which could be used to produce anti-germ facemasks and other personal protection material (PPE). This molecule can be covalently attached to any type of cotton fabric including household cotton and the fabric can then be stitched into PPE such as a facemask. The molecule is effective against both Gram-positive and Gram-negative bacteria and even enveloped viruses. Research and testing has concluded that this compound remains attached to the fabric for up to 25 cycles of standard detergent wash (industrial grade) at least. One can use such 'germicidal' masks efficiently and repeatedly without much fear by just cleaning them with regular soap wash at home or dipping them in boiling water for five minutes and drying, thus resulting in better waste management and environmental pollution. This compound can be scaled at the industrial level.



Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/DBT-InStem-develops-germicidal-protection-for-PPE-17apr20.pdf>

Webinar on Covid-19: Role of Language in a Pandemic

Department of Biotechnology's Faridabad-based associated institution Translational Health Science and Technology Institute (THSTI), India Alliance, IAVI and Nature India organised the fourth webinar on COVID-19 "Ask the Experts" on April 17th, 2020 at 4pm. The webinar was titled Role of Language during a Pandemic.



WEBINAR ON
COVID-19
ASK THE EXPERTS - Part IV

Role of Language during a Pandemic

17TH APRIL
2:00-3:00 PM IST

Register:
bit.ly/COVID19_ExpertsWebinar4

thsti | iavi | nature india | IndiaAlliance DBT wellcome

Website link:

https://vigyanprasar.gov.in/wp-content/uploads/Webinar-on-Covid-19-_-role-of-language-in-a-pandemic-17apr20.pdf

BIRAC partners with Invest India for CSR funds for its research consortium

Department of Biotechnology's public sector undertaking Biotechnology Industry Research Assistance Council (BIRAC) has entered into a partnership with Invest India to seek CSR Funds for its COVID-19 Research Consortium.

The consortium has been set up with a view to accelerate development of diagnostics, vaccines, novel therapeutics and re-purposing of drugs for this novel coronavirus. There is limited current level of knowledge about the new virus. Critical research questions need to be answered urgently and ways have to be found to fund priority research that can contribute to curtail this outbreak and prepare for future outbreaks.

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/BIRAC-partners-with-Invest-India-for-CSR-funds-for-its-research-consortium-16apr20.pdf>

IHF's quest to support innovations to tackle respiratory diseases, including COVID-19

As Governments across the world grapple with containing COVID-19, the India Health Fund (IHF) is looking to support innovations that can fight respiratory and airborne infections through its nationwide search, Quest 2020. The quest will provide an opportunity for innovators, scientists and entrepreneurs across sectors to share novel prototypes, which could be game changers in the fight against these diseases, IHF added. Quest 2020's nationwide search for



innovations is already open, and innovators have time till April 22, 2020, to send in their applications. The primary aim of this initiative is to support the government's ambitious goal to eliminate tuberculosis in India by 2025 and join the fight against the deadly new coronavirus.

Website link:

<https://www.thehindubusinessline.com/companies/ihsf-quest-to-support-innovations-to-tackle-respiratory-diseases-including-covid-19/article31344254.ece>

BIRAC supported Twenty In-Market Startup Products

India Fights Corona: Details of 20 In-Market products from BIRAC supported Startups as potential COVID solutions can be found in the following link.

Fetal Lite: It is an instrument devised to monitor the fetal heart rate for the women-in-labour.
LUNGIQ: It is an instrument devised to review precision insights from Lung CTs.

Website link:

https://birac.nic.in/webcontent/1585918972_covid_solution_v2.pdf

COVID GYAN

Covid Gyan serves as a hub to bring together a collection of resources in response to the COVID-19 outbreak. These resources are generated by research institutions in India and several associated programmes. The content presented on the website provides a scientific understanding of the disease and its transmission. The main objective of the website is to create public awareness and bring in a holistic approach to the understanding of COVID-19 disease and potential means to mitigate it.



Various autonomous institutions associated with the Department of Biotechnology (DBT) are resource providers to this initiative, like the Institute for Stem Cell Science and Regenerative Medicine (InStem) and the Centre for Cellular And Molecular Platforms (C-CAMP).

Website link:

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

A new kit to detect COVID-19 infection

Researchers at the Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram are in the final stages of developing a kit that promises to help detect SARS CoVID-19 infection as early as four days post-infection of the virus. The kit will be able to detect two types of antibodies - Immunoglobulin M (IgM) and Immunoglobulin G (IgG).

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/A-new-kit-to-detect-COVID-14apr20.pdf>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

सीएसआईआर की एक और प्रयोगशाला में कोरोना वायरस की जीनोम सीक्वेंसिंग

कोशकीय एवं आणविक जीवविज्ञान केंद्र (सीसीएमबी) और जीनोमिक एवं समेकित जीवविज्ञान संस्थान (आईजीआईबी) के बाद वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) की एक और प्रयोगशाला में नये कोरोना वायरस के संपूर्ण जीनोम अनुक्रमण (ळमदवउम 'मुनमदबपदह) का कार्य शुरू किया जा रहा है। चंडीगढ़ स्थित सीएसआईआर-सूक्ष्मजीव प्रौद्योगिकी संस्थान (इम्टेक) ने भी कोविड-19 की चुनौती से निपटने के लिए महत्वपूर्ण पहल करते नये कोरोना वायरस का संपूर्ण जीनोम अनुक्रमण शुरू कर दिया है।

इम्टेक के निदेशक डॉ संजीव खोसला ने कहा है कि "इस अनुक्रमण से प्राप्त जीनोमिक संसाधन कोविड-19 के लिए जरूरी निदान और दवाओं के लक्ष्यों की पहचान करने में कारगर हो सकते हैं। जीनोम अनुक्रमण के नमूनों को अंतरराष्ट्रीय मान्यता प्राप्त संग्रह में जमा किया जाएगा।" दूसरे सूक्ष्मजीवों की तुलना में वायरस के रूपांतरित होने की दर अधिक होती है, और उनकी आनुवंशिक सामग्री तेजी से बदलती रहती है, क्योंकि वायरस संख्या तेजी से बढ़ती रहती है। संपूर्ण जीनोम अनुक्रम की जानकारी होने से शोधकर्ता वायरस की उत्पत्ति, भारत में मौजूद उसके रूपों और हमारे देश में इसके फैलने बारे में जानकारी प्राप्त कर सकेंगे।

Website link:

<https://vigyanprasar.gov.in/isw/Another-CSIR-lab-to-start-genome-sequencing-of-novel-coronavirus-hindi.html>

Another CSIR lab to start genome sequencing of novel coronavirus

After the Centre for Cellular and Molecular Biology (CCMB) and the Institute of Genomics and Integrated Biology (IGIB), one more institute of the Council of Scientific and Industrial Research (CSIR) has started whole-genome sequencing of the novel coronavirus. Chandigarh-based Institute of Microbial Technology (IMTech) has taken up the task of large-scale genome sequencing of the virus.

Viruses have a higher mutation rate compared to that of microbes, and their genetic material keeps on changing quickly as they replicate rapidly. "These genome sequencing samples will be submitted to the international recognised repository," said Dr Sanjeev Khosla, Director, IMTech while speaking with India Science Wire.



सुरक्षा सामग्री का उत्पादन बढ़ाने के लिए सीईसीआरआई ने तेज की मुहिम

कोविड-19 के बढ़ते प्रकोप के कारण निजी सुरक्षा उपकरणों की माँग भी तेजी से बढ़ रही है। निजी सुरक्षा उपकरणों की जरूरत को देखते हुए तमिलनाडु के करैकुडी में स्थित केंद्रीय विद्युत रसायन अनुसंधान संस्थान (सीईसीआरआई) निजी सुरक्षा उपकरणों के उत्पादन को बढ़ावा देने के लिए इंडस्ट्री के साथ मिलकर काम कर रहा है। संक्रमण को रोकने के लिए सैनिटाइजर, अस्पतालों के सहायक उपकरण और निजी सुरक्षात्मक उपकरण बेहद जरूरी हो गए हैं। सीईसीआरआई द्वारा बनाए जा रहे निजी सुरक्षा



से संबंधित सामग्री में विश्व स्वास्थ्य संगठन (डब्ल्यूएचओ) के दिशा-निर्देशों के अनुसार बना हैंड सैनिटाइजर, हैंडवॉश सॉल्यूशन और स्वास्थ्यकर्मियों तथा डॉक्टरों की सुरक्षा के लिए फेस शील्ड शामिल हैं। सीईसीआरआई निजी सुरक्षा उपकरणों का उत्पादन बड़े पैमाने पर करने के लिए इंडस्ट्री के साथ साझेदारी भी कर रहा है। फेस शील्ड के उत्पादन के लिए सीईसीआरआई ने बंगलूरु की थ्रीडी लाइकैन कंपनी के साथ करार किया है। संस्थान की कोशिश कम समय में सूक्ष्मजीव प्रतिरोधी फेस शील्ड के बेहतर संस्करण तैयार करने की है, ताकि इसे कोविड-19 से संक्रमित मरीजों की देखभाल में जुटे स्वास्थ्यकर्मियों और डॉक्टरों तक पहुँचाया जा सके।

Website link:

<https://vigyanprasar.gov.in/isw/CECRI-drives-fast-to-increase-production-of-safety-material-hindi.html>

कोविड-19 से लड़ने में सीएसआईआर के साथ खड़ा है उद्योग जगत

कोविड-19 से लड़ने के लिए वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) ने पाँच स्तरीय रणनीति अपनायी है, जिस पर अमल करने के लिए उसे उद्योग जगत का भी व्यापक समर्थन मिल रहा है। यह जानकारी सीएसआईआर के महानिदेशक डॉ शोखर सी. मांडे ने प्रदान की है। वह सीएसआईआर की 38 प्रयोगशालाओं के निदेशकों के साथ कोविड-19 से जुड़ी रणनीति पर चर्चा के लिए आयोजित एक ऑनलाइन जूम मीटिंग को संबोधित कर रहे थे। कोविड-19 से निपटने के लिए सीएसआईआर की प्रयोगशालाएं पाँच स्तरों पर काम कर रही हैं। इन रणनीतियों को अमली जामा पहनाए जाने के लिए कुछ कंपनियों से करार किया गया है। इन कंपनियों में भारत हैवी इलेक्ट्रिकल्स लिमिटेड (बीएचईएल), सिप्ला, टीसीएस, भारत बायोटेक, रिलायंस, टाटा सन्स, यूनिलीवर, इंटेल, टीसीएस, कैडिला और भारत इलेक्ट्रॉनिक्स लिमिटेड (बीईएल) शामिल हैं। डॉ मांडे ने बताया कि सीएसआईआर को इन कंपनियों का भरपूर सहयोग मिल रहा है। सीएसआईआर की कोर टीम, जिसमें इसकी प्रयोगशालाओं के आठ निदेशक शामिल हैं, महानिदेशक, डॉ शोखर मांडे के नेतृत्व में कोविड-19 से लड़ने के लिए काम कर रहे हैं।

Website link:

<https://vigyanprasar.gov.in/isw/Industry-stands-with-CSIR-in-fighting-Kovid-19-hindi.html>

NRDC invites proposals for maturing Lab Scale COVID-19 technologies for tracking, testing and treating

To fight COVID19 combinedly in the country, National Research Development Corporation (NRDC) invites proposal from the innovators under its two scheme, i.e., Techno-Commercial Support and Priority projects.

Last date of submission: 15 May 2020

Website link:

<http://www.nrdcindia.com/LatestDetail/34>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

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

Updated containment plan for large outbreaks of COVID-19

The risk assessment, guidelines, and containment measures are being reviewed regularly, and preventive measures are being identified and implemented by Ministry of Health and Family Welfare (MoHFW), Government of India.

Website link:

<https://www.mohfw.gov.in/pdf/UpdatedContainmentPlanforLargeOutbreaksofCOVID19Version2.0.pdf>

Call for Letter of Intent for participation in Therapeutic Plasma Exchange in COVID-19: Protocol for a Multi-centre, Phase II, Open Label, Randomized Controlled Study

ICMR is inviting a letter of intent from institutions with the equipment and infrastructure available to participate in a clinical trial to study the safety and efficacy of therapeutic plasma exchange for COVID-19 patients, after obtaining necessary approvals and clearances.

Website Link:

https://icmr.nic.in/sites/default/files/upload_documents/LOI_TPE_I2042020.pdf

Call for Letter of Intent for Participation in a Phase II, Open Label, Randomized Controlled Study to assess the safety and efficacy of Convalescent Plasma to limit COVID-19-associated complications

ICMR is inviting letter of intent from institutions with the equipment and infrastructure available to participate in a clinical trial to study the safety and efficacy of convalescent plasma in COVID-19 patients, after obtaining necessary approvals and clearances.

Website Link:

https://icmr.nic.in/sites/default/files/upload_documents/LOI_CPL_I2042020.pdf



Advisory for effective management & availability of safe drinking water during lockdown due to COVID-19

COVID-19 has taken pandemic proportions in many countries and in view of the seriousness of the matter, Government of India and State Governments have taken several pre-emptive measures to contain this disease in the country. Frequent washing of hands with frothing soaps is recognized as most efficient and effective measure in the listed preventive measures for controlling the spread of the virus. Thus, there is an urgent need to ensure that safe potable water is available to all citizens particularly in the rural areas where facility of medical sanitizers may not be available.



Website link:

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

Guidance note for enabling delivery of essential health services during the COVID-19 outbreak

The COVID-19 outbreak has placed unprecedented demands on our health system. Focusing on COVID-19-related activities and continuing to provide essential services, it is important not only to maintain people's trust in the health system to deliver essential health services but also to minimise any increase in morbidity and mortality from other health conditions. This note is released by ICMR that is intended to guide states to deliver essential health services for the duration of the COVID-19 outbreak. It elucidates a set of basic principles categorized by health systems elements and provides guidance on the essential services with details annexed. Essential services for all areas include reproductive, maternal, new-born and child health, prevention and management of communicable diseases, treatment for chronic diseases to avoid complications, and addressing emergencies.

Website link:

<https://www.mohfw.gov.in/pdf/EssentialservicesduringCOVID19updated0411201.pdf>

Advisory on feasibility of using pooled samples for molecular testing of COVID-19

An advisory has been issued by Indian Council of Medical Research (ICMR), the apex body of medical research in India, to increase the capacity of the laboratories for screening increased numbers of samples using molecular testing for COVID-19 for the purpose of surveillance.

Website link:

https://icmr.nic.in/sites/default/files/upload_documents/Advisory_on_feasibility_of_sample_pooling.pdf





SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)

Enclosure for Intubation Procedure/ Aerosol Containment Box

The Enclosure for Aerosol Containment by Research Centre Imarat (RCI), Hyderabad is useful while taking samples from a suspected patient during intubation, observation or during treatment to completely avoid droplets and aerosols emanating from them due to cough and sneeze.

Website link:

<https://drdo.gov.in/counter-covid-19-technologies>



From Gaganyaan to COVID-19: DFRL provides quick meals for healthcare workers

With the whole country engaged in fighting COVID-19, Defence Food Research Laboratory (DFRL) has now prepared and distributed over 10,000 Ready-to-Eat (RTE) meals for healthcare professionals in Kochi and Mysuru. The meals included tomato rice, vegetable pulao, sooji halwa, khichdi, combo meals like white rice and dal, and ready-to-drink packets of pineapple juice. All these have been distributed in the last two days.



Website link:

<https://www.drdo.gov.in/sites/default/files/drdo-news-documents/NPC%20I%20April%202020.pdf>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MEITY)

Development and technology transfer of polymer swab for testing of COVID-19

Considering the acute shortage of testing kits in the country, Centre for Materials for Electronics Technology (CMET), Pune, under the aegis of scientific society of Ministry of Electronics and Information Technology (MeitY) has developed polymer swabs. These swabs are made up of polymer rod/stick and polymer fibres with locally-sourced materials. The polymer rod is developed with thermoplastic polypropylene materials through injection moulding. Polymer fibers are then crimp pressed on the polymer rod. Sri Research for Tissue Engineering Pvt Ltd, Bengaluru has been chosen to carry out clinical and ethical trials, in which satisfactory results have been observed. Additive Manufacturing Society of India, Bengaluru is now considering the production of these indigenous kits in the country.



Website link:

<https://meity.gov.in/content/c-met>

Synthesis of nanoparticles and its coatings on cotton/ polyester fibres for having antiviral and antibacterial properties

Centre for Materials for Electronics Technology (CMET), Pune, under the aegis of scientific society of Ministry of Electronics and Information Technology (MeitY) has developed antiviral and antibacterial masks with metal/metal-semiconductor nanoparticles as a cost-effective alternative of N95 masks for the Indian market. Yshawantrao Chavan Institute of Science,



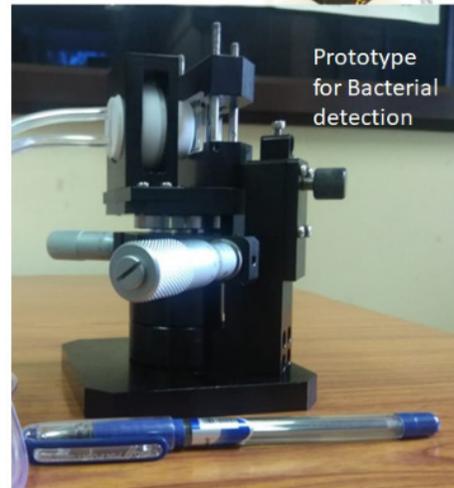
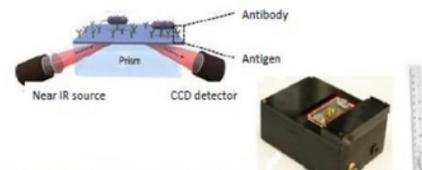
(YCIS), Satara, Maharashtra, has been chosen to carry out testing of the masks for antibacterial properties and pathogen tests, which has shown encouraging results.



Website link:
<https://meity.gov.in/content/c-met>

Cost-effective portable plasmonic sensor for random testing of novel coronavirus at the community level

Centre for Materials for Electronics Technology (CMET), Thrissur, Kerala, under the aegis of scientific society of *Ministry of Electronics and Information Technology (MeitY)*, has developed a point-of-care plasmonic portable sensor with disposable semiconductor-based chips to detect antibody with the presence of COVID-19 virus in the blood. The sensor was tested for food-borne pathogens by Rajiv Gandhi Centre for Biotechnology (RGCN), Thiruvananthapuram. Functionalization of the sensor and the docking efficiency analysis are being carried out on the designed bio-receptors with different pathogenic strains. First version of the biosensor is under validation at RGCN. This technology is now being modified for antibody testing in blood for COVID-19 patients. Such portable devices would be beneficial for the random testing of patients at an affordable cost.



Website link:
<https://meity.gov.in/content/c-met>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

OTHER SCIENTIFIC AND ACADEMIC INSTITUTIONS

NIT Manipur Langol campus setting up 100-bedded quarantine centre

To combat the pandemic outbreak of COVID-19, NIT Manipur, Langol, has set up of 100-bedded quarantine centre using classrooms and hostels of the institute inside the campus.

Website Link:

http://www.nitmanipur.ac.in/images/01Quarantine_13042020.JPG

IIT Bhilai fights against COVID-19: Faculty members makes novel face mask and swab

In this war against novel corona virus (COVID-19), IIT Bhilai promises to stand by our nation and to fight this war with our fellow citizen with its full capacity and perseverance. Under the able guidance of Director Prof. Rajat Moona, the researchers, faculty members and staffs of IIT Bhilai have dedicated themselves to develop novel technologies to help the medical doctors and the healthcare personnel.



Website Link:

https://www.iitbhilai.ac.in/index.php?pid=faceMask_swab

ITI Limited Palakkad signs MoU with IIT Palakkad to create technological solutions for combating Covid-19

Public Sector Undertaking, ITI Limited Palakkad, has entered into an agreement with IIT Palakkad for jointly developing Electronics & Controls of Portable Emergency Ventilator and Pulse Plethysmograph for Intensive Care Units (ICUs). This prototype will be fine-tuned to make it compatible for ICUs. ITI Limited will also work with IIT Palakkad in developing the Electronics & Controls of Portable Emergency Ventilator.

Website Link:

<https://iitpkd.ac.in/news/iti-limited-palakkad-signs-mou-iit-palakkad-create-technological-solutions-combating-covid-19>



IIT Palakkad and Kanjikode Industries Forum sign MoU for developing Portable Emergency Medical Ventilator

IIT Palakkad has signed an MoU with Kanjikode Industries Forum (KIF) for jointly developing affordable portable emergency ventilator that can be used in the care of patients with COVID-19. The ventilator will provide control over respiratory rate, pressure, tidal (breath) volume, inspiratory time, expiratory time and ventilator modes.



Website Link:

<https://iitpkd.ac.in/news/iit-palakkad-and-kanjikode-industries-forum-sign-mou-developing-portable-emergency-medical>

COVID-19-related research and development at IIT Delhi

IIT Delhi faculty members and researchers of different departments have taken various initiatives to combat COVID-19. In alignment with the combating the coronavirus outbreak, related R&D in many areas have been conducted to develop various technological products. These include production of 3-layered good quality surgical masks for hospitals & healthcare professionals, production of high efficiency face masks (N95), development of antimicrobial fabric for protection against hospital-acquired infection, detection assay for COVID-19, 3-ply mask, laminated knitted textile-based coverall, etc.

Website Link:

<http://www.iitd.ac.in/covid-19/research/development/Product%20Developed>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

PRIVATE SECTOR ENTERPRISES

Mumbai-based pharmaceuticals Roche India ensuring supply chain business continuity amidst the coronavirus pandemic

Roche India pledged to remain committed to its patients as strongly as ever in the prevailing situation due to the outbreak of COVID-19 pandemic. These are indeed unique times, thus their steps to tackle COVID-19 situation has multiple aspects to ensure that patients are not impacted. Taking urgent steps to minimise disruption in the supply of the medicines across the country, several steps have been taken to continue the battle against healthcare challenges.

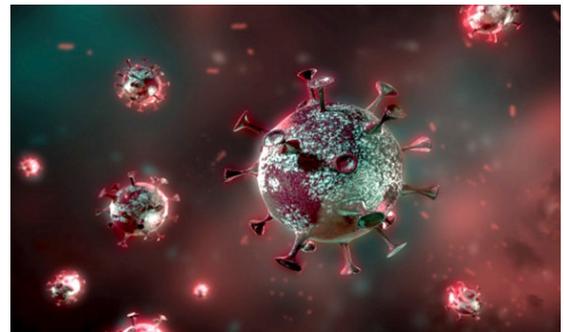


Website link:

<https://www.rocheindia.com/en/Approvalofbiosimilars.html>

Chennai-based Trivitron Healthcare provides COVID-19 testing solutions

Trivitron Healthcare reaffirms its commitment towards providing testing solutions for Novel Coronavirus 2019-nCoV. Trivitron provides a range of products for testing of COVID-19 that includes COVID-19 confirmation Assay Real Time RT-PCR Kit, Singleplex & Multiplex Real Time RT-PCR Kit, RNA Extraction Kit, and Rapid Test Kits.



Website link:

<https://www.trivitron.com/products/covid-19>



SRL Diagnostics gets approval for COVID-19 testing by ICMR

SRL gets approval for COVID-19 testing by ICMR, Government of India, for its two facilities situated at Goregaon West, Mumbai and Gurugram, Haryana. Backed by the state-of-art technology and medical acumen, SRL has been approved for collection of samples, testing and diagnosis of COVID-19 suspects. The collection of samples can happen only if it has been prescribed by a qualified physician.

SRL GETS APPROVAL FOR COVID-19 TESTING BY ICMR, GOVERNMENT OF INDIA

at Goregaon(W), Mumbai & Gurugram (Haryana).

Call 1800 222 000 (For home collection)



Website link:

<https://www.srlworld.com/covid-19>

The race for a cure for COVID-19

In TCS' Innovation Lab in Hyderabad, India, a team of TCS scientists have identified 31 molecular compounds that hold promise towards finding a cure for COVID-19. The effort is part of the many worldwide mission-critical activities that TCS is engaged in, working with private enterprise and governmental groups. It represents a crucial breakthrough supporting the larger worldwide endeavour towards combating the coronavirus.

Website link:

<https://www.tcs.com/company-overview/tcs-artificial-intelligence-cure-covid-19>