



COVID-19

SCIENCE & TECHNOLOGY EFFORTS IN INDIA

UPDATED WEEKLY

7th May 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
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

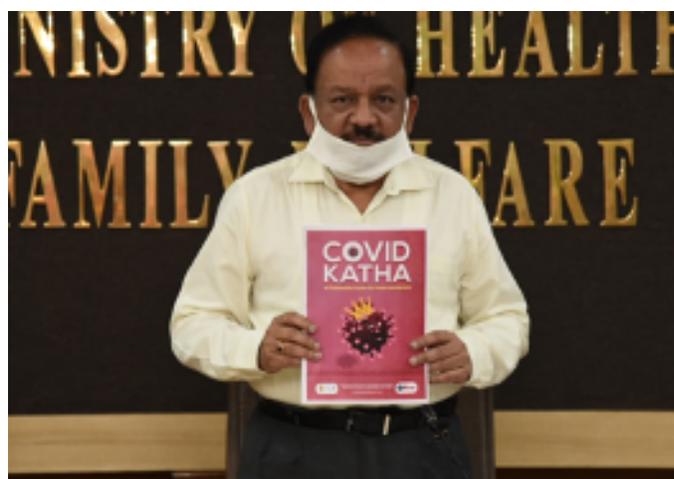


DST & ITS AUTONOMOUS INSTITUTIONS ELEVATED SCIENCE AND TECHNOLOGY IN INDIA TO INTERNATIONAL LEVELS

— DR. HARSH VARDHAN

3rd May 2020, New Delhi

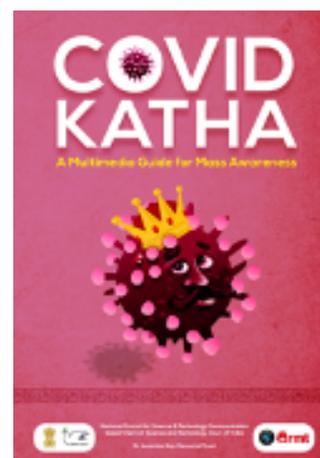
Union Minister of Science & Technology, Health & Family Welfare and Earth Sciences, Dr. Harsh Vardhan today interacted with Heads of all Autonomous Institutions (AIs) and Subordinate offices of Department of Science & Technology (DST) via Video Conferencing on the occasion of 49th DST Foundation Day (3rd May, 2020) about their S&T initiatives, particularly in relation to their endeavours for combating the COVID-19 outbreak.



The Minister also launched “COVID KATHA”, a multimedia guide on COVID-19 on this occasion. As DST enters 50 years of serving the nation through Science & Technology, the Golden Jubilee Celebrations were also launched, initiating myriad activities in different parts of the country throughout the year.

Secretary (DST), Professor Ashutosh Sharma highlighted the major initiatives of DST, its vision for next five years and the steps DST is taking to identify and map technologies from R&D labs, academic institutions, start-ups, and MSMEs to fund nearly market-ready solutions for diagnostics, testing, healthcare delivery, and equipment and supplies to combat COVID-19.

Senior scientists and officials from National Science & Technology Entrepreneurship Development Board (NSTEDB), Science for Equity, Empowerment & Development (SEED) and from Statutory Bodies like Science and Engineering Research Board (SERB), Technology Development Board (TDB) and the Survey of India (SoI) spoke about the different initiatives being taken to tackle the outbreak. Similarly, Directors of Autonomous Institutions like the Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram, International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) and Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, National Innovation Foundation (NIF), Ahmedabad and S. N. Bose





National Centre for Basic Sciences (SNBNCBS), Kolkata spoke about the preparations they have made to brace for the crisis.

During the interaction, Dr. Harsh Vardhan congratulated DST on the occasion of its 50th Foundation Day and said, “DST and its autonomous institutions have elevated Science & Technology in India to international levels and benefitted people across communities in myriad ways. DST provides the largest extramural research and development support in our country to strengthen national S&T capacity and capability through a competitive mode to scientists cutting across institutions and disciplines. DST’s efforts have helped India attaining 3rd position globally after China and US in terms of number of publications in science citation index journals.”

Praising the Indian scientists about their timely response in tackling COVID-19, he said, “Indian scientists have always risen to meet any challenge and this time also they have not disappointed the nation. We should remember that actions were needed with speed and scale at several fronts, which included: (i) Comprehensive mapping of our entire start-up ecosystem to identify and support relevant technology solutions ready for scaleup; (ii) Supporting industries and projects from academia and R&D labs working on modelling, properties of the virus and its impact, novel solutions, etc; (iii) Activation of relevant DST’s autonomous institutions in providing solutions. I am happy that our DST scientists achieved that despite the fact that we are running against time. Of particular mention here SCTIMST, Thiruvananthapuram which has already come up with over 10 effective products, several of which are of a breakthrough nature and are being commercialized rapidly.”

Dr. Harsh Vardhan said, “DST has contributed immensely to the S&T innovation space in our country over these 49 years. It has grown considerably with number of incubators and Start-Ups increasing significantly.” He highlighted some significant initiatives of DST and enumerated, “Schemes such as Augmenting Writing Skills through Articulating Research (AWSAR) launched to encourage young scientists to write popular science articles on their research pursuits; programme called National Initiative for Developing & Harnessing Innovations (NIDHI) to boost innovation and start-up activity, Million Minds Augmenting National Aspirations and Knowledge (MANAK) to encourage young students to think innovatively, a National Mission on Interdisciplinary Cyber-Physical Systems, new international S&T collaborations to connect with the best global science projects abroad such as participation in Thirty Meter Telescope Project; and India-Israel Industrial R&D and Technological Innovation Fund of USD 40 million have uplifted India’s science and technology efforts.”

Making a special mention about the National Mission on Quantum Technology and Application (NM-QTA) announced by the Finance Minister during budget this year at a cost of Rs. 8,000 Crores, Union Science & Technology Minister said, “Launch of NM-QTA is a leap into the future to promote and foster R&D in Quantum Technologies and related areas like quantum computing, quantum cryptography, quantum communication, quantum metrology and sensing, quantum enhanced imaging etc. I am sure DST will make the country proud by bringing the fruits of this cutting-edge technology for the benefit of common people.”

Concluding his remarks, Dr. Harsh Vardhan said, “The National policy on Scientific Social Responsibility which is being worked out by DST should be an embodiment of the principles of responsible innovation and social entrepreneurship which DST has imbibed over its 49-year journey. I am sure the document will inspire all the grantees of projects to reach out to stakeholders of Science and Society at large with all the tools, knowledge, manpower and infrastructure of S&T in the academia and R&D labs by choosing of one or more activities: scientific infrastructure sharing; mentoring/training of college/ university faculty; training on high end scientific skills and research; student internships; fostering research culture and many more.”

Website link:

<https://dst.gov.in/dst-its-autonomous-institutions-elevated-science-and-technology-india-international-levels-dr-harsh>



Dr. Harsh Vardhan also appreciated the BIRAC efforts in supporting over 150 start-up solutions of which over 20 are ready for deployment. He also released a hand sanitizer developed by another PSU of DBT, Bharat Immunologicals and Biologicals Corporation Ltd.(BIBCOL) which is engaged in manufacturing of various biological, pharmaceutical

and food products. It is currently manufacturing formulations of Vitamin C and Zinc tablets to contribute towards the solutions for COVID-19. “A contribution of Rupee One towards commercial sale of each single bottle of this Sanitizer will go to PM Cares Fund,” Dr. Harsh Vardhan said.

Dr. Renu Swarup, Secretary, DBT, senior officials, Directors of DBT-AIs, Senior Scientists and senior officials from BIRAC and BIBCOL participated in the meeting.



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



COVID INDIA SEVA TO PROVIDE SOLUTIONS TO COVID-19-RELATED QUERIES

Union Minister of Health & Family Welfare, Science & Technology, and Earth Sciences, Dr Harsh Vardhan launched an interactive platform, COVID INDIA SEVA, on 21 April 2020. The initiative is aimed at providing real-time solutions to COVID-19-related queries. People can post their questions to the COVID INDIA SEVA twitter handle for getting swift replies from the team of trained experts. This initiative is aimed at enabling transparent e-governance delivery at large scale, especially in crises, like the ongoing outbreak of COVID-19 pandemic.

Dr. Vardhan, in a tweet, said that through this platform, trained experts would be able to share authoritative public health information swiftly at scale, helping to build a direct channel for communication with citizens. Commenting on the launch of the social handle, he said that Twitter has proved to be an essential service for both the government and citizens to interact and exchange information, especially in times of need.

The responses by the experts will be available for everyone and users will not be required to share any personal details or health records on this account.



Website link:

<https://twitter.com/drharshvardhan/status/1252529868899708930?s=20>

<http://newsonair.com/Main-News-Details.aspx?id=386270>

<https://www.businesstoday.in/latest/trends/what-is-covid-india-seva-an-explainer/story/401619.html>

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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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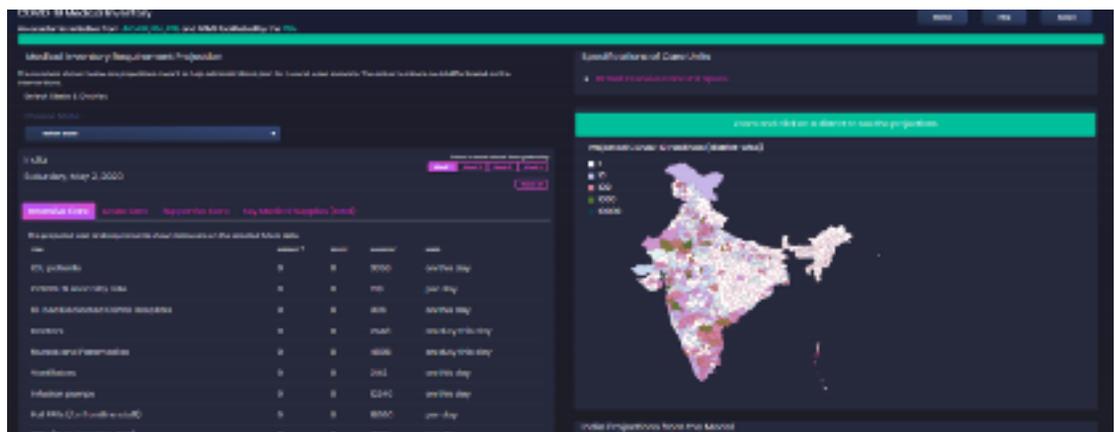


SCIENCE & TECHNOLOGY EFFORTS TO DEAL WITH COVID-19 BY

OFFICE OF THE PRINCIPAL SCIENTIFIC ADVISER (PSA)

COVID-19 Medical Inventory facilitated by PSA's Office launched

The COVID-19 Medical Inventory is an academic initiation from Jawaharlal Nehru Centre for Advanced Scientific Research (JNSCAR), Bengaluru, Indian Institute of Science (IISc), Bengaluru, Indian Institute of Technology Bombay (IITB), Mumbai, and Armed Forces Medical Services (AFMS). The initiative is being facilitated by the Office of the PSA. The inventory is a district-level short-term conjecture of medical inventory for COVID-19. This includes inventory for intensive and acute supportive care requirements. The mathematical model has been tuned with the recent data and the projections have now been revised. The numbers shown below are projections meant to help administrations plan for a worst-case scenario; however, the actual numbers could differ based on the interventions. This web application provides a four-week projected requirement for various medical inventories across districts, states, and the national level. The initiative aims to be helpful in planning for infrastructure, arranging essential human resources and procurement of materials. MSMEs and other industries working in the production and supply chain of these essentials may use these projections to support their local government administration.



Website link:
<https://covid19medinventory.in/>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

Amid lockdown, SCTIMST gears up to meet COVID-19 pandemic with R&D, technologies and products

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) is an Institution of national importance under the Department of Science and Technology, Government of India. It stood out with its research, technologies, and innovations to meet the need of the hour in India's fight against COVID-19.



Even though the Institute had to quarantine a number of staff when a doctor, after returning from a foreign trip, was detected with COVID-19 much before the nationwide lockdown, SCTIMST rose up to the occasion to come up with several technologies and products that could be crucial to combat the diseases. Its one-step confirmatory diagnostic kit for COVID-19 developed in three weeks could solve India's urgent need for rapid testing. The other R&D work on the issue included a UV-based Facemask Disposal Bin which can be used by health workers in hospitals and in public places for decontamination of used facemask, overhead covers and face shields, a superabsorbent material for liquid respiratory and other body fluid solidification and disinfection for the safe management of infected respiratory secretions and a disinfected barrier-examination booth for examining COVID-19 patients.

Contact: Ms. Swapna Vamadevan, PRO, SCTIMST; Email: pro@sctimst.ac.in

Website link:

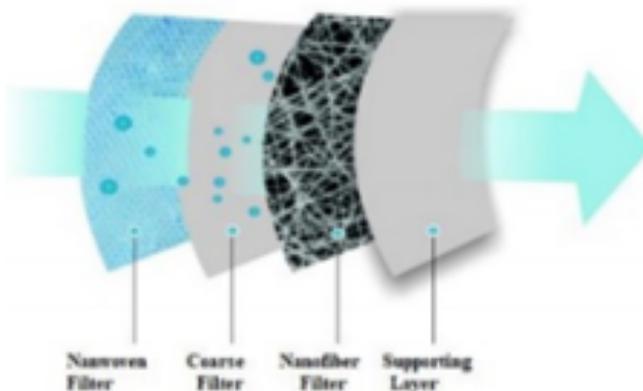
<https://dst.gov.in/amid-lockdown-sctimst-gears-meet-covid-19-pandemic-rd-technologies-and-products>



DST supports development of reusable N95 & N99 mask with enhanced antiviral efficiency

The Department of Science and Technology (DST) has approved support for development and upscaling of reusable N95 and N99 masks with enhanced antiviral and antibacterial property designed by Dr. Sri Sivakumar from Indian Institute of Technology, Kanpur under the Nano Mission.

The masks will be made of nanofibers developed from polymers (e.g., chitosan, polycaprolactone, polyethylene terephthalate, polypropylene). They will have inorganic antiviral or bacterial nanoparticles as well as organic antiviral and bacterial molecules. The nanofiber-based masks will have four layers of construction, and filtration size would be 0.01 to 0.3 micrometers.



N95 and N99 are classified as an antipollution face mask, which possesses 95% and 99% filtration efficiency of 0.3-micron particulate matter, respectively. However, these masks fail to protect a person from the particle size lesser than 0.3 microns. To achieve higher filtration efficiency between the range of 0.01-0.3 micron particulate matter (e.g., Coronavirus, bacteria and other pollutants), the mask has to be designed with finer pore size.

Contact: Dr. Sri Sivakumar; Email: srisiva@iitk.ac.in

Website link:

<https://dst.gov.in/dst-supports-development-reusable-n95-n99-mask-enhanced-antiviral-efficiency>

SNBNCBS develops Nanomedicine to alter oxidative stress for better immune power to treat viral infections including COVID-19

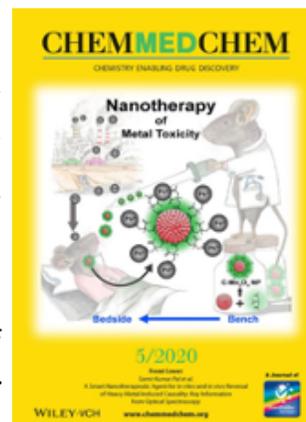
Scientists at S. N. Bose National Centre for Basic Sciences (SNBNCBS), Kolkata have developed a safe and cost-effective nanomedicine that promises treatment of a number of diseases by altering oxidative stress in the body. The research may provide a ray of hope in India's fight against COVID-19, as the nanomedicine can decrease or increase reactive oxygen species (ROS) in our body, depending on the situation and cure the disease.

The ability of this research for controlled enhancement of ROS in mammals raises hopes of a new potential for the application of nanomedicine in controlling virus infections, including COVID-19. Animal trial for the Reduction & Oxidation processes (Redox) healing of several diseases is completed, and now the institute is looking for sponsors to start clinical trials on humans.

Contact: Dr Samir K Pal, Senior Professor; Email: skpal@bose.res.in

Website link:

<https://dst.gov.in/snbncbs-develops-nanomedicine-alter-oxidative-stress-better-immune-power-treat-viral-infections>





SERB approves funding for study of mathematical & simulation aspects of COVID-19

Science and Engineering Research Board (SERB), a statutory body under the Department of Science and Technology (DST), Government of India, has approved funding for 11 projects under MATRICS scheme for studying Mathematical modelling and computational aspects to tackle the COVID-19 pandemic.

Most of these studies attempt to propose mathematical/simulation models to account for various factors relevant to COVID-19 by modifying the basic SIR (Susceptible-Infected-Recovered) models. Some of such factors are heterogeneity of population, the role of asymptomatic population, migration and quarantine, effect of social distancing and lockdown, socioeconomic factors and so on. These studies will be primarily aimed at studying Indian conditions and will provide an estimate of Basic Reproduction Number-- the qualitative indicator of the degree of contagiousness of the disease. These will be helpful to forecast future pandemic by using the data available and provide fundamental insights into kinetics and management of infectious diseases.

Contact: Dr. Premila Mohan, Scientist 'G', SERB; Email: premilamohan@serb.gov.in

Website link:

<https://dst.gov.in/serb-approves-funding-study-mathematical-simulation-aspects-covid-19>

DST launches programme on health & risk communication with focus on COVID-19

National Council for Science & Technology Communication (NCSTC), Department of Science & Technology (DST) has launched a programme on health and risk communication 'Year of Awareness on Science & Health (YASH)' with focus on COVID-19.

It is a comprehensive and effective science and health communication effort for promoting grass-root level appreciation and response on health and would help saving and shaping the lives of people at large, as well as build confidence, inculcate scientific temper and promote health consciousness among them.

The current pandemic scenario has posed concerns and challenges all around, where scientific awareness and health preparedness play a significant role to help combat the situation. This requires translation and usage of authentic scientific information to convey the risks involved which would facilitate communities to overcome the situation. The programme will encompass development of science, health, and risk communication software, publications, audio-visual, digital platforms, folk performances, talks by trained communicators, especially in regional languages to cater to various cross-sections of the society in the country.

Contact: Dr. Manoj Kumar Patariya, Adviser & Head, NCSTC; Email: mkp@nic.in

Website link:

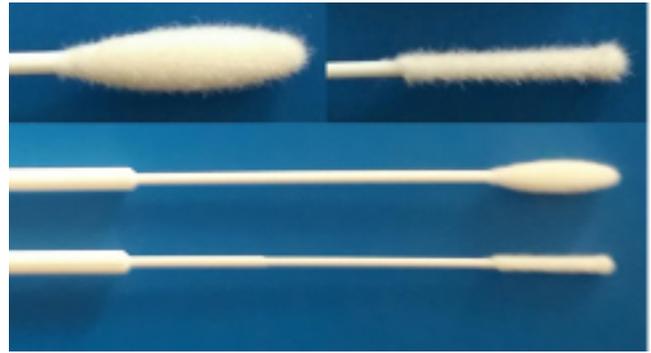
<https://dst.gov.in/dst-launches-programme-health-risk-communication-focus-covid-19>

Sree Chitra develops 2 types of swabs and viral transport medium for COVID-19 testing

Technologists at the Sree Chitra Triunal Institute for Medical Sciences and Technology (SCTIMST), an autonomous institute under the Department of Science and Technology, Government of India, have developed two types of nasal and oral swabs and viral transport medium for COVID-19 testing.



Chitra EmBed flocked nylon swabs (co-developed with Malleil Industries Pvt Ltd) and Chitra EnMesh, polymeric foam-tipped, lint-free swabs with flexible plastic handles developed by technologists Dr. Lynda V Thomas, Dr. Shyni Velayudhan and Dr. Maya Nandakumar from SCTIMST



have both proven efficiency in the adequacy of specimen collection and rapid elution (extracting one material from another by washing with a solvent) of specimen into the liquid viral medium. They also have good recovery of viral RNA collected using these swabs and medium. The swabs will be available as sterile, ready-to-use devices.

Contact: Ms. Swapna Vamadevan, PRO, SCTIMST; Email: pro@sctimst.ac.in

Website link:

<https://dst.gov.in/sree-chitra-develops-2-types-swabs-and-viral-transport-medium-covid-19-testing>

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)

Visit of Inter-Ministerial Central Government Team to DBT - CDFD

The Inter-Ministerial Central Government Team visited DBT-CDFD situated in Uppal, Hyderabad, Telangana, on 1st May 2020 afternoon. The five-member team was led by Sri Arun Baroka, Addl. Secretary, Ministry of Jal Shakti, Government of India. Dr. Debashis Mitra, Director, DBT-CDFD briefed the team about the actions taken by the Institute to combat the ongoing COVID-19 pandemic. Dr. Mitra informed the visitors that CDFD is conducting RT-PCR-based diagnostics of nasopharyngeal samples received from different districts in Telangana. Now DBT-CDFD is testing samples for the presence of both the E gene, which is present in all coronaviruses and the SARS-CoV-2-specific RdRP gene based on the kit made available to them by the State. The Central Team was also informed that the Telangana Government has



Visit of Inter-Ministerial Central Government Team to DBT - CDFD

generously supported this effort with a timely supply of testing kits and PPEs. DBT-CDFD has the capacity to test 150-200 individual samples per day and is ready to undertake testing of pooled samples as well. Dr. M D Bashyam, Dr. Ashwin Dalal, Dr. Rashna Bhandari, and Dr.



Support in Meghalaya:

- *Government Civil Hospital, Tura* – DBT-IBSD is providing equipment, equipment support and consumables
- *Pasteur Institute, Shillong* – DBT-IBSD is facilitating development of BSL2 facility, equipment and capacity building
- *NEIGR Institute of Medical Sciences*: DBT-IBSD is providing-RT-PCR machine

Support in Manipur:

- *JN Institute of Medical Sciences, Government of Manipur*: DBT-IBSD is providing equipment, support and consumables and capacity building

Support in Mizoram:

- *Zoram Medical College*: DBT-IBSD is providing consumables



Clustering and supporting NE India Covid-19 Testing Laboratories

Institute of Bioresources and Sustainable Development (DBT-IBSD), Imphal, Manipur | Sikkim | Mizoram | Meghalaya
 Department of Biotechnology, Ministry of Science & Technology, Govt of India

- Meghalaya**
- A. Govt Civil Hospital, Tura**
-Equipment, Equipment Support and consumables
- B. Pasteur Institute, Shillong**
-Facilitating development of BSL2 facility, Equipment and capacity Building
- C. NEIGR Institute of Medical Sciences**
-RT PCR Machine



- Manipur**
- JN Institute of Medical Sciences, Govt of Manipur*
-Equipment, Equipment Support and consumables and capacity building
- Mizoram**
- Zoram Medical College*
-Consumables

Prof Pulok K Mukherjee, Director, DBT-IBSD
Dr Nanaocha Sharma, Scientist, DBT-IBSD
Dr Albert Chiang, Scientist, DBT-IBSD

Weblink:
<https://ibsd.gov.in/>

DBT-IBSD: Traditional medicine-inspired development of antivirals and immunomodulators as therapeutics or prophylactics against SARS-CoV-2 from Medicinal and Aromatic Plants (MAPs) of North East India

As on 1st May, 2020, there are more than 33,000 confirmed cases of Covid-19 in India. However, the combined number of cases in the 8 states of NE India is still below 100. Even during the SARS-CoV of 2003, the incidence in NE India was much below the national average, suggesting a higher inherent immunity or antiviral reaction in the residents of NE India. This could be

attributed to the high biodiversity of the region and the prevalent daily consumption of local medicinal plants as food, which IBSD is screening for novel antivirals and immunomodulators against SARS-CoV-2.

Traditional Medicine Inspired Development of antivirals and immunomodulators as therapeutics or prophylactics against SARS-CoV-2 from Medicinal and Aromatic Plants (MAPs) of North East India

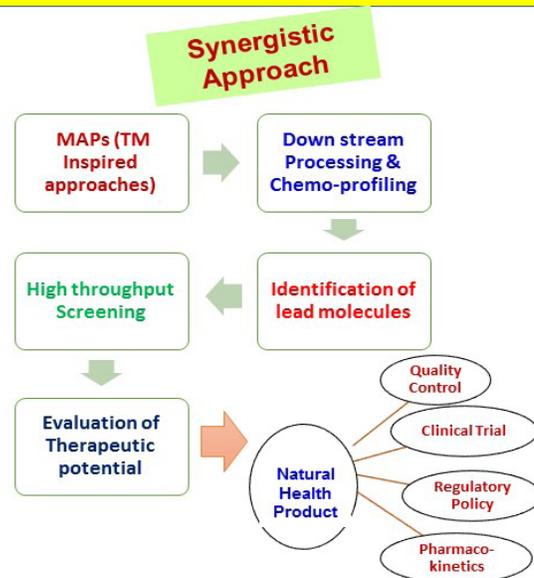
Institute of Bioresources and Sustainable Development (IBSD), Imphal, Manipur | Sikkim | Mizoram | Meghalaya
Department of Biotechnology, Ministry of Science & Technology, Govt of India

Rationale-

As of today (1 May, 2020), there are more than 33,000 confirmed cases of patients with Covid-19 in India . However, the combined number of cases in the 8 states of NE India is still below 100. Even during the SARS-CoV of 2003, the incidence in NE India was much below the national average, suggesting a higher inherent immunity or anti viral reaction in the residents of NE India. This could be attributed to the high biodiversity of the region and the prevalent daily consumption of local medicinal plants as food, which IBSD is screening for novel anti virals and immunomodulators against SARS-CoV-2

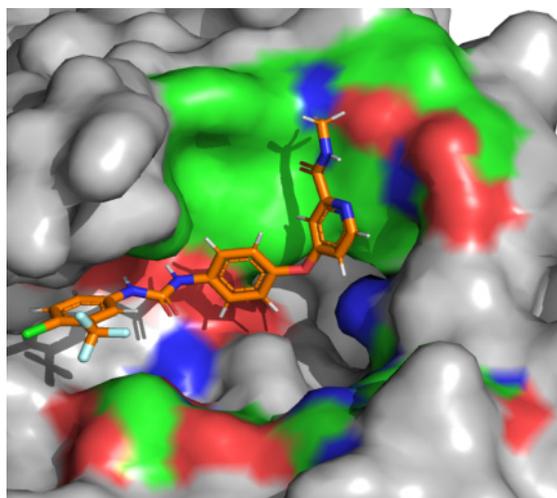
Weblink:

<https://ibsd.gov.in/>



DBT-NII Research team predicts potential molecules against COVID-19

Ever since the first case of COVID-19 was detected in the Wuhan province of China, the disease has rapidly spread all over the globe and has been declared a pandemic by the World Health Organization. While scientific research has successfully designed tools for rapid diagnosis of the disease, very little success has been achieved in the development of COVID therapeutics. The disease initiates following an infection with the virus SARS-CoV-2 (Severe Acute Respiratory Syndrome-Coronavirus2), initially named as 2019-nCoV (2019 novel coronavirus). While over 80% of the infected people show mild flu-like symptoms, severe cases exhibit pneumonia, sepsis and organ failure. Interestingly, SARS-CoV-2 is the seventh virus of its kind and the past few years have witnessed outbreaks by similar types of viruses causing both severe (SARS-CoV and MERS-CoV) and mild (HKU1, NL63, OC43 and 229E) diseases. Viruses are usually made of a layer of lipids,



Computationally docked kinase inhibitor Sorafenib at the predicted active site pocket of the NiRAN domain from SARS-CoV-2 RNA-dependent RNA Polymerase. (Sorafenib presented in stick model; Red indicates positively charged regions, blue indicates negatively charged regions and green indicates neutral regions, grey indicates regions beyond GTP-binding pocket)



followed by a second layer of proteins forming a protective capsule around its genetic material. Once a virus infects a living organism, it hijacks the cellular machinery of the organism to make multiple copies of its genetic material, proteins and lipids. The virus also carries key proteins that aid in replicating its genetic materials and proteins. The SARS-CoV-2 and its entire species use RNA as their genetic molecule. They harbour a protein known as “RNA-dependent RNA polymerase/RdRp”, which copies its RNA genome following infection into the host’s cells.

Combining various computational and bioinformatics tools, the team at the National Institute of Immunology (NII) first determined the molecular structure of SARS-CoV-2 RdRp and further predicted a key molecular binding site within the RdRp. This site acts like a pocket for a key molecule called “guanosine triphosphate/GTP”. Earlier reports from other virus suggest that following the binding of GTP in this pocket initiates the process of viral genome replication by RdRp. In addition, the Team found many organic molecules that can effectively bind within this pocket and also designed a molecule that exhibits an exceptionally strong binding. The idea is to use these organic molecules to prevent the binding of GTP within the pocket, thus rendering the RdRp non-functional.

Weblink:
<http://www.nii.res.in/>

COVID-19 outreach efforts by DBT-inStem

InStem is one of the founding partners of the pan-institutional website COVID Gyan, launched on Apr 03, 2020. The website is updated regularly with interesting and scientifically-vetted content relevant to COVID pandemic, keeping the common man in view. The contents are available in English and other Indian languages.

COVID-19 HOW DOES IT AFFECT YOU?

Designed by Avesta Rindan
www.avesta.com
 @avestaworld
 @avestaviz

Healthy

Gas Exchange
 Each sac of air, or alveolus, is wrapped with capillaries where red blood cells release carbon dioxide (CO₂) and pick up oxygen (O₂). Two alveolar cells facilitate gas exchange. Type I cells are thin enough that the oxygen passes right through, and Type II cells secrete surfactant – a substance that lines the alveolus and prevents it from collapsing.

Infected

SARS-CoV-2 Structure
 Membrane protein
 Nucleocapsid (enclosed RNA)
 Lipid membrane
 Envelope protein
 Spike protein

Viral Infection
 The spike proteins covering the coronavirus bind ACE2 receptors on type II alveolar cells, allowing the virus to enter the cell via endosome or membrane fusion and release its RNA. The RNA “hijacks” the cell, telling it to assemble many more copies of the virus and release them into the alveolus. The host cell is destroyed in this process and the new coronaviruses infect neighbouring cells.

Moderate

Immune Response

- After infection, type II cells release inflammatory signals that recruit macrophages (immune cells).
- Macrophages release cytokines that cause vasodilation, which allows more immune cells to come to the site of injury and exit the capillary.
- Fluid accumulates inside the alveolus.
- The fluid dilutes the surfactant which triggers the onset of alveolar collapse, decreasing gas exchange and increasing the work of breathing.
- Neutrophils are recruited to the site of infection and release Reactive Oxygen Species (ROS) to destroy infected cells.
- Type I and II cells are destroyed, leading to the collapse of the alveolus and causing Acute Respiratory Distress Syndrome (ARDS).
- If inflammation becomes severe, the protein-rich fluid can enter the bloodstream and travel elsewhere in the body causing Systemic Inflammatory Response Syndrome (SIRS).
- SIRS may lead to septic shock and multi-organ failure, which can have fatal consequences.

Impaired Gas Exchange
 When the immune system attacks the area of infection it also kills healthy alveolar cells. This results in three things that hinder gas exchange:
 1) Alveolar collapse due to loss of surfactant from Type II cells
 2) Less oxygen enters the blood stream due to lack of Type I cells
 3) More fluid enters the alveolus

Severe

Greatly hindered gas exchange

Fluid-filled interstitium
 Loss of surfactant
 Neutrophil
 Protein and cellular debris
 Formation of scar tissue

Stay Home
 Symptoms may start to show (e.g. dry cough, fever, etc.)
 Pneumonia develops
 Shortness of breath
 Hospitalization
 Compares for help and additional respiratory infections may occur
 Intensive Care (ICU)
 Patients may require ventilators and life support
 Complications unrelated to COVID-19 may occur
 With proper care patients may recover at any point during the process

WHAT CAN YOU DO?

1 Preventative Actions
 There is currently no proven treatment for COVID-19, so adopting the best practices for preventing infection is crucial. These include:
 • Physical distancing – keep a distance of at least 2 meters between you and others outside of your home
 • Proper hand-washing – wash your hands for at least 20 seconds
 • Cough or sneeze into your elbow or a tissue and immediately wash your hands after

2 Stay Healthy
 Make a routine of eating a well-balanced diet, drinking plenty of water, getting enough sleep, exercising and monitoring your mental health. Reach out to family and friends for support.

3 Stay Informed
 With a situation that changes daily, it is crucial to stay informed so you know if any changes have occurred both globally and in your community. Make sure to look for evidence-based sources to avoid misinformation.

4 Donate
 Consider donating to local businesses or online funding campaigns if you have financial flexibility. If you have spare time, consider volunteering for community initiatives, such as helping deliver food to those in need.



To read the articles posted on the website, click <https://covid-gyan.in/articles>. For FAQs related to COVID-19, click <https://covid-gyan.in/faqs>. To access infographics and posters click <https://covid-gyan.in/infographics>. For videos from experts, click <https://covid-gyan.in/videos>. For audio/podcasts, click <https://covid-gyan.in/audio>

COVID-19 research efforts by DBT-inStem

Dr. Dasaradhi Palakodeti and his team in inStem have contributed experimental support to an algorithm developed by scientists at IIT, Bombay and NCBS-TIFR Bangalore. The algorithm called “Tapestry” is an attempt to explore economical and scalable ways to test more people during epidemics such as the ongoing COVID-19 pandemic, which has created pressure on testing capabilities worldwide. Tapestry is a novel quantitative nonadaptive pooling scheme to test many samples using only a few tests. The underlying molecular diagnostic test is any real-time RT-PCR diagnostic panel approved for the detection of the SARS-CoV-2 virus. In cases where most samples are negative for the virus, Tapestry accurately identifies the status of each individual sample with a single round of testing in fewer tests than simple two-round pooling. A companion Android application BYOM Smart Testing which guides users through the pipetting steps required to perform the combinatorial pooling was also developed by the investigators. The results of the pooled tests can be fed into the application to recover the status and estimated viral load for each individual sample.

Weblink:

<https://www.medrxiv.org/content/10.1101/2020.04.23.20077727v2>

Structural and functional implications of non-synonymous mutations in the spike protein of 2,954 SARS-CoV-2 genomes

A team of scientists at Corona Research & Intervention Group, DBT-Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram have studied structural and functional implications of non-synonymous mutations in the spike protein of 2,954 SARS-CoV-2 genomes. Information on mutations within the circulating strains of the virus is pivotal to understand disease spread and dynamics. Dr. Shijulal and team at DBT-RGCB have analysed the mutations associated with 2,954 globally reported high quality genomes of SARS-CoV-2 with special emphasis on genomes of viral strains from India. Molecular phylogenetic analysis suggests that SARS-CoV-2 strains circulating in India form five distinct phyletic clades designated R1-R5. These clades categorize into the previously reported S, G as well as a new unclassified subtype. A detailed analysis of gene encoding the spike (S) protein in the strains across the globe showed non-synonymous mutations on 54 amino acid residues. Among these, the research team pinpointed 4 novel mutations in the region that interacts with human ACE2 receptor (RBD). Further, in silico molecular docking analyses suggested that these RBD mutations could alter the binding affinity of S-protein with ACE2 that may lead to changes in SARS-CoV-2 infectivity. Strikingly, one of these RBD mutations (S438F) was found unique to a subset within the R4 clade suggesting intrinsic S-protein variations in strains currently circulating in India. The research team’s findings revealed a unique pattern of SARS-CoV-2 evolution that may alert vaccine and therapeutic development.

Weblink:

<https://www.biorxiv.org/content/10.1101/2020.05.02.071811v1.full.pdf>

Catching up with the progress made in COVID-19 research – Key takeaways from last week’s COVID-19 Ask the Experts webinar

DBT-THSTI, DBT/Wellcome Trust India Alliance, IAVI and Nature India conducted the sixth webinar in the series COVID-19 Ask the Experts. Promising to address many pressing points in COVID-19 research and the future course of the pandemic, the panel had Dr. Gagandeep

Kang, Executive Director of THSTI; Dr. Shahid Jameel, CEO, India Alliance and Dr. Jacob John, Professor, CMC, Vellore. More than 350 registrations were received for this webinar which was by far the highest.

Here are the key takeaways from the webinar:

On how the pandemic is progressing: There is recognition of the ailment, science informing the intervention of the disease and understanding of clinical picture is changing. The virus may be very inclusive but the pandemic certainly isn't. Technology advances are aiding due to which vaccine is in clinical trial in just two months. But at the same time, there is [an] infodemic and fake news to deal with.

On how the disease will progress in the coming months: The panellists felt that Mathematical models are just models. They need data to be followed, which is difficult at the initial stage of the pandemic.

On lessons learned for vaccine development from animal models of immune response: The ChAdox1 vaccine has been successful in a study done on monkeys (primates). However, data in human subjects is awaited.

On SARS-CoV-2 mutations: There is no evidence that there are multiple strains. Lots of sequences show that the virus is evolving but no evidence that it has become a different virus. So, we need not worry about the impact of mutations on vaccine development.

On repurposing drugs for curing COVID-19: Repurposing of drugs is crucial and the fastest way to find a treatment. It will involve screening with licensed and known compounds to see if they have anti-viral effects. Also, it is important to look for what worked for a related virus. Further, structural-aided drug design is the way to go; it is fast and crucial at the moment.

On challenges for good experimental/clinical research in India: In India, lack of data systems is a challenge in public health research amidst a pandemic. The ability to access the information is important to know the scale of the problem. Further, an assumption needs to be substantiated with data, which is lacking in current scenario and is a challenge to deal with.

Weblink:

https://twitter.com/India_Alliance/status/1256568147290832897?s=20

Augmenting domestic manufacturing to meet national demands in current COVID-19 crisis: DBT-AMTZ COMManD Strategy

DBT-AMTZ COMManD [COVID Medtech Manufacturing Development] strategy is to address the shortage of critical medical equipment in India and move progressively towards a stage of self-sufficiency. This is an excellent example of how supportive governance and progressive science could be brought together to address immediate and futuristic priorities.

Andhra Pradesh MedTech Zone (AMTZ) is an established medical equipment manufacturing ecosystem, and the Department of Biotechnology (DBT) is a pioneer department for support of medical technologies sectoral growth. Under this strategy, DBT is supporting AMTZ which is Asia's first medical equipment manufacturing ecosystem, uniquely dedicated for Medtech and this initiative would be supported under DBT's National Biopharma Mission.

The COMManD strategy has 3 focal points.

1. Supporting the start-ups and innovators that have till now taken support from DBT/ BIRAC for medical technology projects. All these innovators and entrepreneurs are being supported by AMTZ, technologically facilitated towards the next level of product realisation. This includes steps such as inclusion of their innovative technologies in the formulation of appropriate standards, providing subsidised infrastructure for testing and validation, facilities for prototyping, partnership with manufacturing units and provision of



in a WHO-approved and dedicated plasma fractionation cGMP facility. Currently, they have the capacity to process over 300,000 litres of plasma annually. They are one of the largest manufacturers of human IVIG and human serum albumin in India.

They are the first company in India to identify Immunoglobulin Therapy, which can prove to be more promising as compared to direct plasma administration. Direct plasma therapy has several safety, efficacy and specificity concerns. Single transfusion might not be sufficient and transfer of other blood components may pose inadvertent risks. The sterility and specificity of Intravenous Immunoglobulins will help to prevent these risks and keep track of administered dosage.

The proposed immunotherapy procedure already has necessary approvals in place from Drug Controller General of India; Central Drugs Standards Control Organization and funding from Biotechnology Industry Research Assistance Council (BIRAC). The Company plans to start its clinical trials for the same very soon.

The Company has proposed to collect plasma from several human convalescent donors, in order to prepare a standardized immunoglobulin enriched in anti-COVID antibodies with a specific titer. Immunoglobulin treatment is increasingly recognized to treat a variety of diseases not just because of its ability to fight the infection but also due to its Immunomodulatory and Immunosuppressive activities. In the absence of other proven therapies, it is widely expected that these immunoglobulins will prove crucial in reducing the morbidity from the COVID-19 infection potentially saving valuable human lives.

To accelerate the efforts, it is desirable that more COVID-19-recovered patients should come forward to donate their plasma and serve the national cause.

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

COVID-19 diagnostic testing by DBT-ILS Bhubaneshwar

COVID testing by DBT-ILS is going in full swing. As on date more than 5000 samples obtained from 12 districts of Odisha were analysed following all safety precautions and with dedicated efforts of ILS scientists and students.

Health & Family Welfare Department and Hon'ble Chief Ministers Office, Government of Odisha complemented @DBTIndia's AI @DBT_ILS for testing 901 COVID-19 samples on 3rd May 2020, contributing to nearly 40% of tests done in Odisha. It is a remarkable achievement indeed which has been made possible only with sincere efforts of ILS staff & scholars.



Weblink:
https://twitter.com/DBT_ILS



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

NRDC invites proposals for funding of commercialisation of COVID-19 combating technologies

National Research Development Corporation (NRDC), an enterprise of Department of Scientific and Industrial Research, Ministry of Science & Technology, Government of India has launched a scheme to support researchers and innovators to scale-up their lab-scale technologies to commercial scale for combating COVID-19. The financial support will be in the form of grant-in-aid up to Rs. 10 lakh. Higher amount can also be considered for deserving proposals having high impact. The financial assistance is for value addition such as scaling up, prototype development, market testing of the prototype, generating data required by regulatory authorities and certification, etc. The focus areas are eco-friendly sanitizers, rapid test kits, PPEs, ventilators, medicines and vaccines. Research laboratories, universities, start-ups and MSMEs can apply for this grant.

NRDC has also brought out a compendium on Indian technologies for combating COVID-19. Most of these technologies are proof-of-concept (POC) tested and would help the entrepreneurs to take the product to the market faster as they do not have to reinvent the wheel. Start-ups/ Entrepreneurs, who would like to commercialise their POC-tested technologies, can use this grant for that purpose. The last date for applying on prescribed form is 15.5.2020.

For more details about the scheme and application form, interested researchers and innovators can visit the website of NRDC.

Website link:
www.nrdcindia.com

CSIR identifies top drug candidates for repurposing

The Council for Scientific and Industrial Research (CSIR) has been leading the fight against COVID-19 epidemic on multiple fronts. Among those, the Council has laid a major emphasis on repurposed drugs as they can be quickly deployed for treatment as opposed to new drugs, which need almost a decade of development. Globally, many drugs are under clinical trials on coronavirus patients to establish their efficacy against COVID-19.



CSIR-IIP working with industry to scale up sanitizer production

Scientific institutions across the country are contributing in their own way to tackle COVID-19 pandemic. Dehradun-based Indian Institute of Petroleum (IIP), a constituent laboratory of the Council of Scientific and Industrial Research (CSIR), has taken the initiative to work closely with small-scale industries to promote sanitizer production.

“CSIR-IIP has invited micro industries to take the knowhow for hand sanitizer preparation. In continuation of this, two of the promising micro industries are in touch with us for the same. After meeting all required criteria/certification, the same will be transferred to them. Talks are also on with North Indian Sugarcane & Sugar Technologists Association (NISSTA),” said Dr. Umesh Kumar, a Senior Scientist at CSIR-IIP.

The initiative to prepare hand sanitizer as an in-house activity was taken up by the Institute to support the war against the COVID-19 pandemic. A team was constituted well before the crisis for the preparation of hand sanitizer under the leadership of Dr. Umesh Kumar. Dr. T. Senthil Kumar, Shvingsingh Rawat and Sanjay Maurya made up the rest of the team.

Contact: dcpandey@iip.res.in

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-2-30-Apr-20.pdf>

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

IITR working on three verticals against COVID-19

Testing is the key component in the fight against COVID-19. It helps to monitor and restrict the spread of the coronavirus. This is the reason why there is a constant emphasis on increasing the number of testing for COVID-19. Lucknow-based Indian Institute of Toxicology Research (IITR) is now working on three verticals, out of five taken up by CSIR against the coronavirus, which includes a new COVID-19 testing facility which was started on 2nd May.

CSIR has devised a five-pronged strategy in the fight against COVID-19. The five verticals are Surveillance, Rapid and Cheap Diagnosis, Development of New Therapies (including Repurposing of Drugs and New Drugs), Hospital Assistive Devices and Supply Chain and Logistics. Among these, CSIR-IITR is participating in the three verticals, namely prevention, diagnostics and therapeutics.

CSIR-IITR has distributed over 2500 litres of hand sanitizer to frontline workers involved in the fight against Corona at Lucknow, Varanasi and Raebareilly. This initiative was accomplished with the Corporate Social Responsibility contributions of various organisations. In the second vertical, CSIR-IITR has set up state-of-the-art facility for COVID-19 testing as per national norms.

Contact: rpbid@iitrindia.org

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-2-01MAY2020.pdf>

<http://iitrindia.org/En/Index.aspx>

CSIR-IIP to set up viral testing facility to fight COVID-19

The Indian Institute of Petroleum (IIP) is establishing an RT-PCR-based COVID-19 testing facility in its Dehradun campus. IIP is a constituent laboratory of CSIR.

CSIR has planned a community testing strategy to keep track of new outbreaks and thus restrict them from spreading further. “CSIR- IIP has always believed in working for national causes.



में कोरोना के विरुद्ध अग्रिम पंक्ति में तैनात कार्यकर्ताओं को 2500 लीटर से अधिक हैंड सैनिटाइजर वितरित कर चुका है। इस पहल को विभिन्न कॉरपोरेट्स के कॉर्पोरेट सामाजिक उत्तरदायित्व योगदान से पूरा किया गया है।

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-4-01MAY2020.pdf>

<http://iitrindia.org/En/Index.aspx>

भारतीय पेट्रोलियम संस्थान में स्थापित होगा कोविड-19 परीक्षण केंद्र

कोरोनावायरस की भारत में दस्तक के साथ ही वैज्ञानिक तथा औद्योगिक संस्थान (सीएसआईआर) की दो प्रयोगशालाओं में कोविड-19 के परीक्षण केंद्र शुरू किए गए थे, जिनके द्वारा दिए गए प्रशिक्षण के बाद सीएसआईआर की कई प्रयोगशालाओं में कोविड-19 परीक्षण किया जा रहा है। इस सूची में देहरादून स्थित सीएसआईआर-भारतीय पेट्रोलियम संस्थान (आईआईपी) भी शामिल हो गया है। सीएसआईआर-आईआईपी में भी अब आरटी-पीसीआर आधारित कोविड-19 परीक्षण केंद्र स्थापित किया जा रहा है। सीएसआईआर-आईआईपी के निदेशक डॉ अंजन रे ने इंडिया साइंस वायर को बताया कि "कोविड-19 के नमूनों का परीक्षण एक ऐसा अवसर है, जहां हम भारतीय आयुर्विज्ञान अनुसंधान परिषद (आईसीएमआर) के प्रोटोकॉल और मानक प्रक्रियाओं के अनुरूप पूर्ण प्रतिबद्धता के साथ अपनी भूमिका निभाने के लिए तैयार हैं। यह नई कोविड-19 परीक्षण सुविधा प्रशिक्षित टीम से लैस होगी, जहां समुचित जैव सुरक्षा सावधानियों के साथ प्रतिदिन कम से कम 30 रोगी नमूनों का परीक्षण किया जा सकेगा।"

कोविड-19 के परीक्षण की मुहिम को तेज करने के लिए सीएसआईआर-आईआईपी की जैव रसायन तथा जैव प्रौद्योगिकी विभाग की टीमों को जीव-विज्ञान के क्षेत्र में कार्यरत सीएसआईआर की दूसरी प्रयोगशालाओं का सहयोग मिल रहा है। जिन संस्थानों का सहयोग सीएसआईआर-आईआईपी को मिल रहा है, उनमें इंस्टीट्यूट ऑफ जीनोमिक्स एंड इंटीग्रेटिव बायोलॉजी (आईजीआईबी) दिल्ली, इंस्टीट्यूट ऑफ माइक्रोबियल टेक्नोलॉजी (इंस्टेक) चंडीगढ़ और सेंटर फॉर सेलुलर एंड मॉलिक्यूलर बायोलॉजी (सीसीएमबी) हैदराबाद शामिल हैं।

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-5-01MAY2020.pdf>

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

आईआईसीटी ने फैविपिरावीर के लिए विकसित की किफायती सिंथेटिक प्रक्रिया

हैदराबाद स्थित सीएसआईआर-आईआईसीटी ने फैविपिरावीर के लिए एक सुविधाजनक और किफायती सिंथेटिक प्रक्रिया विकसित की है। उद्योग के साथ एक सामूहिक प्रयास के तहत सीएसआईआर-आईआईसीटी ने फैविपिरावीर के फार्मा ग्रेड एपीआई की पूरी प्रक्रिया और पर्याप्त मात्रा एक अग्रणी दवा कंपनी सिप्ला को हस्तांतरित कर दी है। सिप्ला भारत में कोविड-19 के खिलाफ इस दवा की पेशकश से पहले कई जांच करेगी। सिप्ला ने फैविपिरावीर को भारत में पेश करने के लिए नियामकीय प्राधिकरण डीसीजीआई से संपर्क कर स्वीकृति मांगी है। फैविपिरावीर एक जेनरिक दवा है और इसे पहले स इंपलुएंजा के उपचार के लिए उपयोग किया जा रहा है। साथ ही चीन, जापान और इटली जैसे कई देशों में कोविड-19 के लिए चिकित्सा परीक्षण चल रहा है। आईसीएमआर के संरक्षण में सिप्ला, सिप्लेंजा के रूप में उत्पाद के विपणन से पहले उपयुक्त सीमित परीक्षण कराएगी। सीएसआईआर और सिप्ला का भारत और वैश्विक स्तर पर किफायती दवाओं के क्षेत्र में मिलकर काम करने का पुराना इतिहास रहा है। सीएसआईआर की प्रयोगशालाओं में एचआईवी जेनरिक दवाओं के लिए कई तकनीकों की स्थापना की गई है और सिप्ला ने दुनिया भर में एचआईवी मरीजों के लिए सफलतापूर्वक किफायती उपचार उपलब्ध कराया है, जिससे लाखों लोगों की जिंदगी बचाना संभव हुआ है। उन्होंने सरकार को भरोसा दिलाया है कि वे ऐसा ही फैविपिरावीर के मामले में करेंगे।

Website link:

<https://pib.gov.in/PressReleasePage.aspx?PRID=1619914>

Dr. Harsh Vardhan lauds the efforts of CSIR scientists against COVID-19

“All scientists and institutions should prioritise the requirements of the time and also contribute in finding quick and deployable solutions,” said Dr. Harsh Vardhan, Minister for Science and Technology, Earth Sciences and Health and Family Welfare. He was addressing scientists at a review meeting on the initiatives of the Council of Scientific and Industrial Research (CSIR) towards mitigation of COVID-19 in the country.

Dr. Harsh Vardhan appreciated CSIR for submitting 53 sequences of COVID-19 genomes to the Global Coronavirus Genome Database, Global Initiative on Sharing All Influenza Data (GISAID). “This is the result of a strong partnership between National Centre for Disease Control (NCDC), New Delhi and CSIR Institute of Genomics and Integrative Biology (CSIR-IGIB), representing the largest submission of sequences, by far from India by any group. The joint NCDC-IGIB programme will accelerate molecular epidemiology and viral surveillance efforts of India,” he said.

Dr Shekhar C. Mande, DG, CSIR, apprised the Minister that CSIR has mounted a coordinated strategy involving all 38 CSIR labs and is working in close coordination with industry and other agencies for the implementation of interventions and technologies at the ground level. CSIR has devised five verticals - Digital and Molecular Surveillance; Rapid and Economical Diagnostics; New Drugs/Repurposing of Drugs/Vaccines; Hospital Assistive Devices and Personal protection equipment (PPEs); Supply Chain and Logistics Support Systems – to work on and develop requisite S&T-based solutions to combat COVID-19. The Directors coordinating the activities of these verticals reported the significant developments in each of them.

Website link:

<https://vigyanprasar.gov.in/isw/Dr-Harsh-Vardhan-lauds-the-efforts-of-CSIR-scientists-against-COVID-19.html>

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

Scientists to culture novel coronavirus in human lung epithelial cell

Centre for Cellular and Molecular Biology (CCMB), Hyderabad has tied up with a Bengaluru-based company, Eystem Research Private Limited, to take up research activities on COVID-19. Through this research collaboration, an attempt will be made to grow novel coronavirus in human cell lines, which will enable in vitro testing of potential drugs and vaccines against COVID-19.



The research team will use Eystem’s human lung epithelial cell culture system provided as part of its Anti-COVID Screening (ACS) platform to understand the molecular and pathological characteristics of the novel coronavirus, with a view of establishing a rational basis for testing potential drugs in vitro, said CCMB scientists.

“Culturing the virus outside the human host is a technological challenge that needs to be overcome. Eystem’s cell culture system expresses the ACE2 receptor and other genes that are key determinants of viral entry and replication. We hope that employing this system will allow the CCMB team led by Dr. Krishnan Harshan to grow the virus predictably and



thereby open up the potential for the drug screening and vaccine development strategies,” said Dr. Rakesh Mishra, Director, CCMB.

Contact: somdattakar@ccmb.res.in, bvramakrishna27@gmail.com

Website link:

<https://vigyanprasar.gov.in/isw/Scientists-to-culture-novel-coronavirus-in-human-lung-epithelial-cell.html>

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

CSIR-IICT to develop indigenous RT-PCR kit for COVID-19 diagnosis

The Indian Institute of Chemical Technology (CSIR-IICT) has taken up the challenge of making an affordable RT-PCR (reverse transcription-polymerase chain reaction) kit indigenously. The Institute intends to use recombinant technology for the production of several enzymes used in the kit and optimize the reagent conditions to match the regulatory requirements. The partnering company Genomix Biotech will optimize the kit for COVID-19 diagnosis by adding the Taqman probes.



CSIR-IICT and Genomix Biotech plan to approach the Indian Council of Medical Research (ICMR) or its recognized laboratory for validation before launching the product in a couple of weeks. The kits available in the market have serious limitations as most of them are currently imported. This collaboration will help produce quality RT-PCR kits that are affordable and will cater to the huge demand for the product in the country due to the COVID-19 pandemic. Further, the RT-PCR kit developed by CSIR-IICT can also be used in various other disease diagnostics in humans, animals and plants. This technology is expected to bring down the overall cost of RT-PCR-based diagnosis in the country.

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-2-02MAY2020.pdf>

<https://www.iictindia.org/>

Essential oil-based vapouriser can help in alleviating respiratory distress

The Central Institute of Medicinal and Aromatic Plants (CIMAP) has launched a scientific knowledge-based essential oil vapouriser concentrate formulation called CIM-RespCool. It could be helpful in the management of respiratory distress caused by environmental containments including viruses, said scientists at CIMAP.



In addition to sanitizing a specific area, CIM-RespCool also provides pleasant smell. Essential oils like Mentha, Rosemary, and Basil have been used to develop the



सीएसआईआर-आईएमएमटी ने निजी कंपनीको सौंपी सैनिटाइजर उत्पादन तकनीक

कोविड-19 के खतरे को देखते हुए काउंसिल ऑफ साइंटिफिक ऐंड इंडस्ट्रियल रिसर्च (सीएसआईआर) की देशभर में फैली प्रयोगशालाएं शोध एवं विकास से जुड़े कार्यों के साथ-साथ जरूरतमंदों की मदद के लिए भी आगे आ रही हैं। सीएसआईआर की भुवनेश्वर स्थित प्रयोगशाला इंस्टीट्यूट ऑफ मिनरल्स ऐंड मैटेरियल्स टेक्नोलॉजी (आईएमएमटी) ने भी कोविड-19 की चुनौती को देखते हुए जरूरतमंदों की मदद के लिए हाथ बढ़ाया है। सैनिटाइजर की मांग को पूरा करने के लिए सीएसआईआर-आईएमएमटी ने अल्कोहल आधारित हैंड सैनिटाइजर और लिक्विड साबुन बनाने का फॉर्मूला स्टार्टअप कंपनी जिगसैन मर्केन्टाइल को सौंप दिया है।

इस संबंध में सीएसआईआर-आईएमएमटी के निदेशक प्रोफेसर सुधत्सवा बसु और जिगसैनमर्केन्टाइल कंपनी के निदेशक रंजन स्वैन के बीच समझौता पत्र पर हस्ताक्षर किया गया है। इसके अलावा, संस्थान उद्योगों और स्टार्टअप कंपनियों को कोविड-19 की चुनौती से लड़ने के लिए विभिन्न तकनीकों के विकास में भी मदद कर रहा है। सीएसआईआर-आईएमएमटी द्वारा बनाया गया हैंड्स-फ्री वॉश-बेसिन 'हस्त-सुरक्षा' की तकनीक भी व्यावसायिक उत्पादन के लिए सौंपी गई है।

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-2-05MAY2020.pdf>

<http://www.immt.res.in/>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

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

ICMR releases Guidelines for liver transplantation amid COVID-19 infection

Indian Council of Medical Research (ICMR) has issued the guidelines to address the issues specific for liver transplantation considering the impacts of the outbreak of COVID-19 Pandemic. These guidelines have been prepared by Liver Transplant Society of India (LTSI). The guidelines include various aspects of COVID-19 diagnostics during, pre and post liver transplant.

Website Link:

https://main.icmr.nic.in/sites/default/files/upload_documents/Guidelines_for_Liver_Transplantation_and_COVID_13042020.pdf



ICMR appeals to the general public not to consume and spit smokeless tobacco in public areas

In view of the increasing danger of COVID-19 pandemic, Indian Council of Medical Research (ICMR) appeals to the general public to refrain from consuming the smokeless tobacco products and spitting in public places. Chewing Smokeless Tobacco products (like Gutkha, Paan masala with tobacco, Paan and other chewing tobacco products) and areca nut (supari) increases the production of saliva followed by a very strong urge to spit. Spitting in public places could increase the spread of the COVID-19 virus.



Website Link:

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



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)

Indian Navy makes in-house Portable Oxygen Multi-feeder that can cater to six patients together

Indian Navy has made a unique in-house portable oxygen multifeeder that can cater to six patients, at the same time, suffering from COVID-19. Dubbed as the Portable Multi-feed Oxygen Manifold, the device can be used for six patients from a single oxygen cylinder.



Website link:

<https://www.gadgetsnow.com/slideshows/10-tech-innovations-by-indian-army-indian-navy-drdo-and-others-to-fight-covid-19/Indian-Army-makes-low-cost-thermal-scanner-anti-aerosolization-box/photolist/75513688.cms>

Negative Pressure Inflatable Isolation Shelter for ten occupants

Defence Bio-engineering and Electro Medical Laboratory (DEBEL), Bengaluru has developed a Negative Pressure Shelter intended for isolating and treating the patients without the risk of spreading the contamination to others. This system is suitable for



isolating COVID-19 patients since the system is based on negative pressure and the materials used have passed Synthetic Blood Penetration Test. The system consists of negative pressure-based Air Handling Unit and Inflatable Multiple Chambers. The system has five Air Sterilizer Units and ducts are uniformly distributed to provide filtered air. It covers a total area of



approximately 1000 sq ft and is manufactured out of two-layer water and airproof fabric. The structure has separate rooms for decontamination and medical waste and equipped with modular rest rooms and is illuminated with sufficient light throughout. Production Industry: M/s Sure Safety (India) Ltd., Vadodara. Production Capacity: 20 to 25 Units per month.

Website link:

https://www.drdo.gov.in/sites/default/files/whats_new_document/attach2.pdf

<https://www.drdo.gov.in/labs-and-establishments/defence-bio-engineering-electro-medical-laboratory-debel>

Anywhere erectable isolation shelters

Research & Development Establishment (Engrs.) (R&DE) (E), Pune has developed various shelters, green power sources, chemical toilets and quick erectable medical complex under various projects related to field-defence and CBRN protection. These products



with minor modifications/customisation can be utilized for activities pertaining to containment of COVID-19. R&DE (E) has also established the industry partners who are capable and willing to take up product ionisation of these items to meet the emergent requirements. These products will be useful especially in the remote locations, where there is no medical/electrical facility available.

The products in standalone mode and as integrated system are:

Standalone Shelter: Three-bed Quarantine Shelter, Quick erectable 3-bed shelter with power connection. Accessories (optional): Fan, Light, 3 Beds & Buckets. It can be used as extension of city hospital to accommodate patients. Approximate Cost: Rs. 1 lakh, Production Capacity: 10 per day.



Medical Examination Shelter with Green Power Source: This metallic structure with waterproof fabric shelter is of size 12'x12'x9' and can be utilised for medical examination and check up of suspected COVID-19 patients. This shelter can be erected within 1 hr with 4 persons. It includes an in-built green energy power source up to 1.5 KW for 24x7 operations. It is a ready-to-use setup along with all essential electrical devices and gadgets. One bed, table chair and other essential accessories will be housed in this shelter. This can be easily used in remote and field areas. This can also be used as remote monitoring and control centre. Approximate Cost: Rs. 4.5 lakh . Production Capability: 10 per day.



Shelter of size 14'x14'x9' can be utilized as a quarantine shelter for two patients. This shelter will have essential electrical gadgets, 2 beds, tables and other minimum accessories. This facility can be deployed within 2 hrs time with 6 persons. Approximate Cost: Rs. 1.5 Lakh. Production Capability: 10 per day.



automated, along with necessary electrical and mechanical safety interlocks. Although Far-UVC is claimed to be harmless to human beings, sufficient precautionary measures are introduced to prevent leakage of UV beyond the chamber.

Website link:

https://www.drdo.gov.in/sites/default/files/whats_new_document/attach2.pdf

<https://www.drdo.gov.in/labs-and-establishments/naval-physical-oceanographic-laboratory-npol>

Automated system for decontamination of N95 facemasks

DEBEL, Bengaluru has developed an Automated system for decontamination of facemasks. This System works on the principle of ‘Ultraviolet (UV-C) germicidal irradiation for killing the bacteria’ and virus. UV-C radiation is one of the technologies brought out by Centers for Disease Control and Prevention (CDC) vide a report on “Decontamination and Reuse of Filtering Face piece Respirators”.



Website link:

https://www.drdo.gov.in/sites/default/files/whats_new_document/attach2.pdf

<https://www.drdo.gov.in/labs-and-establishments/defence-bio-engineering-electro-medical-laboratory-debel>

Portable Backpack Area Sanitization Equipment

Centre for Fire, Explosive and Environment Safety (CFEES), Delhi with the help of its industry partner has developed portable sanitization equipment for spraying decontamination solution consisting of 1% Hypochlorite (HYPO) solution for sanitization of open areas. The portable system can be mounted as a backpack and carried by the operations personnel. This system incorporates low pressure twin fluid (air and disinfectant liquid) technology to generate very fine mist. The system is capable of disinfecting an area of up to 300 m². The application areas can include hospital reception, doctor chambers, office spaces dealing with general public, corridors, pathways, metro and railway stations, bus stations etc.



Website link:

https://www.drdo.gov.in/sites/default/files/whats_new_document/attach2.pdf

<https://www.drdo.gov.in/labs-and-establishments/centre-fire-explosive-and-environment-safety-cfees>

Vehicle Sanitization Enclosure

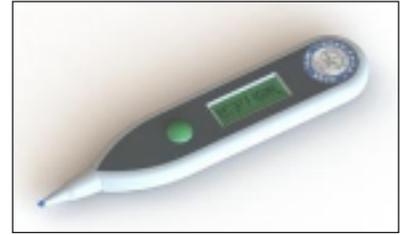
Vehicles Research and Development Establishment (VRDE) conceptualized and established a Vehicle Sanitization Enclosure in about 8 hours within its laboratory premises. It is an indigenous system assembled using locally available material based on the existing 4-men tent (Ordnance Supply). Since it is a very lightweight system with portable canopy, it can be made operational in less than 3 hours. An electrically operated positive displacement pump is utilized to create a disinfectant mist inside the tent canopy through which the vehicles are passed.



A separate tank of 500-litre capacity for storage of the disinfectant is used which requires refilling after 200 vehicles are disinfected. The system is noise free and needs 10 minutes



the one noting the measurement, are thus separated apart. This unit draws power from the general 230 V AC mains. The probe is inserted in a holder which contains sanitizing medium. In the second variant, the probe and the display-cum-processing unit are integrated in a single casing. This variant draws power from a small battery and can be used for domestic purposes also.



Website link:

https://www.drdo.gov.in/sites/default/files/whats_new_document/attach2.pdf

<https://www.drdo.gov.in/labs-and-establishments/naval-physical-oceanographic-laboratory-npol>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY)

Innovation challenge for Development of a Video Conferencing Solution

COVID-19 has thrown unprecedented challenges for the world and industries alike. While we continue to fight these challenges as a nation amidst business disruptions and remote working scenarios, it is important for all including governments, industry and individuals to contribute with all its might to overcome the present and emerge stronger as humanity.

Government of India is taking all necessary steps to ensure that we are prepared well to face the challenge and overcome threats posed by the pandemic. In light of these developments, the Ministry of Electronics & Information Technology announces an Innovation Challenge for Development of a Video Conferencing Solution under the Digital India Initiative. The Innovation Challenge is open for participation from industry, start-ups and individual experts.



The end-product will be an Indian software at par with international quality and should work in low and high network scenarios. The initiative is an attempt to promote Indian software products as envisaged under the National Policy on Software Products.

In an attempt to provide initial market the winning team with the best-judged solution will get a contract to deploy their solution for use by Government of India and State Government entities for a period of 4 years and will also be given Rs. 1 crore in the first year and an additional



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

OTHER SCIENTIFIC AND ACADEMIC INSTITUTIONS

IIT Delhi standardizes Probe-free COVID-19 detection assay

Researchers at Kusuma School of Biological Sciences (KSBS) at Indian Institute of Technology Delhi (IITD), New Delhi, have developed a detection assay for COVID-19 which has now been approved by Indian Council of Medical Research (ICMR). The assay has been validated at ICMR with a sensitivity and specificity of 100%. This makes IITD the first academic institute to obtain ICMR approval for a real-time PCR-based diagnostic assay.

ICMR approves the Probe-free COVID-19 detection assay developed at IIT Delhi



Website Link:

<http://www.iitd.ac.in/content/icmr-approves-probe-free-covid-19-detection-assay-developed-iit-delhi-0>

NIT Srinagar develops RUHDAAR, a Frugal Ventilator for pandemics

Amid COVID-19 outbreak and presuming the shortage of ventilators, faculty members at the National Institute of Technology (NIT), Srinagar in collaboration with the faculty members, innovators and alumni at Design Innovation Centre (DIC), IUST developed a frugal ventilator prototype. The prototype named 'RUHDAAR' is essentially a low-cost mechanical ventilator which is targeted only for emergency situations or pandemics like COVID-19. The prototype was designed and fabricated at Design Innovation Centre, IUST.



Website Link:

https://nitsri.ac.in/uploaded_files/Report_Ruhdaar_Ventilator.pdf



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

PRIVATE SECTOR ENTERPRISES

HiMedia Laboratories develop Hi-PCR® Coronavirus (SARS-CoV-2) Probe PCR Kit

Hi-PCR® Coronavirus (SARS-CoV-2) Probe PCR Kit is developed for the qualitative detection of nucleic acid from SARS-CoV-2 in various respiratory samples from individuals suspected of COVID-19 infection by healthcare providers.

Intended use: It is intended for use by qualified clinical laboratory personnel trained in the techniques of real-time PCR and in-vitro diagnostic procedures. The kit is recommended for sensitive and specific detection of SARS-CoV-2 in clinical samples.

Product description: The Kit includes primer/probe sets specific to detect SARSCoV-2 genomic region and internal process control. The Kit also provides synthetic positive controls for validity of the test.

Positive control: This is a control reaction using a known template (target pathogen). A positive control is usually used to check that the primers have been designed properly and the PCR conditions have been set up correctly.

Internal control: This is a control sequence that should amplify in all clinical samples which indicates the presence of sufficient RNA from human RNase P gene indicating the specimen is of acceptable quality. An internal control is often used to detect the failure of amplification in cases where the target sequence is not amplified.

Website link:

<http://himedialabs.com/TD/MBPCR242.pdf>



SCIENCE OUTREACH & POPULARISATION EFFORTS

Initiatives taken towards Science Outreach & Popularisation

Ministry of Science and Technology (MoST), Government of India, is striving continuously for reaching to the common people. Since the eruption 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 the expedition of science outreach and popularisation, a number of knowledge and information products have been generated and released.

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 VigyanPrasar (VP), an autonomous organisation of 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 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, 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.

- i) Daily video bulletin in Hindi and English;
- ii) COVID Explained - Short films to explain research project findings in layman's lingo;
- iii) Interview of top experts from MoST institutions; and
- iv) Facebook live sessions on interviews of various stakeholders and media with DST Secretary.

Contact info: kapil@vigyanprasar.gov.in

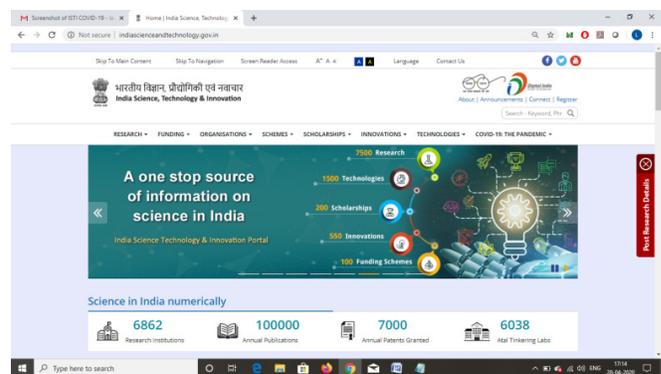
Website link:

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



India Science, Technology and Innovation Web Portal

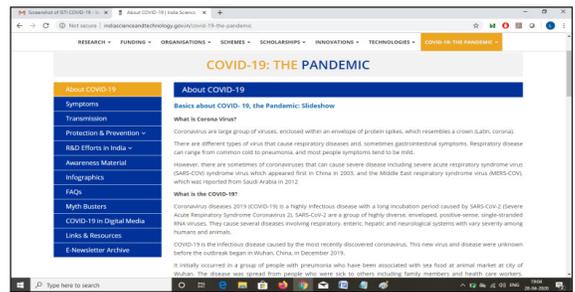
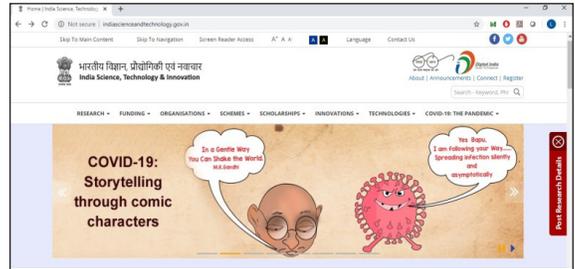
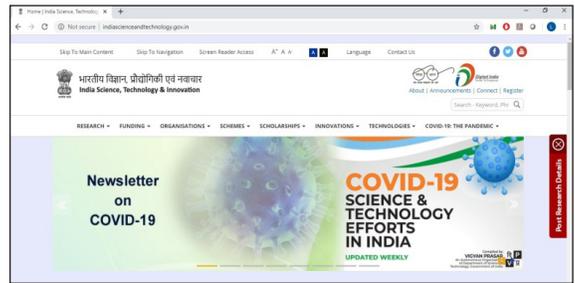
The India Science, Technology and Innovation Portal (ISTI) is a one-stop window for information about developments in India on science, technology and innovation. The portal focuses on bringing all stakeholders and Indian STI activities on a single online platform; helping efficient utilisation of resources; highlighting functioning of scientific organisations, laboratories and institutions; aggregating information on science funding, fellowship & 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 VigyanPrasar, an autonomous organisation of the Department of Science and Technology (DST) and is coordinated by the Office of Principal Scientific Adviser (PSA), Government of India.





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 the 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 & 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.

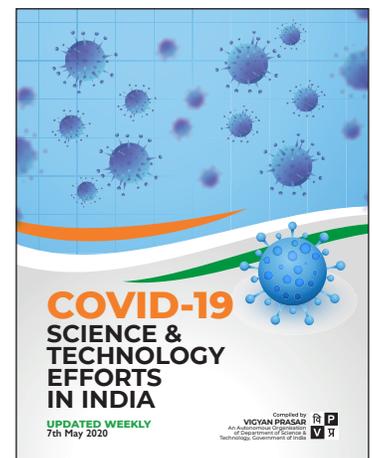
Contact Info: kdgm@vigyanprasar.gov.in

Website link:

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

Weekly Publication of e-Newsletter on COVID-19

For the benefit of our stakeholders, VigyanPrasaris bringing out a weekly 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 geared up and working tirelessly to combat the outbreak of COVID-19. These research-driven and technology-based interventions have been initiated on war footing to fight out the outburst of the pandemic. The e-newsletter shall be a handy guide to scientists, researchers and scholars, especially who are interested in knowing various aspects of COVID-19 and contributing to the coronavirus warfare in whatever minuscule way and people at large.



Contact Info: kdgm@vigyanprasar.gov.in

Website link:

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

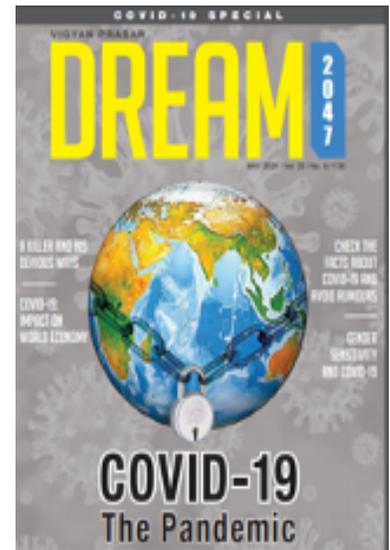


Special issue of monthly magazine 'DREAM 2047' on COVID-19

VigyanPrasar brings out monthly bi-lingual science magazine Dream 2047. The magazine is being published by VP for last twenty-two years. VigyanPrasar encourages reading the electronic version of this popular science magazine. The electronic version of the magazine is posted every month in VigyanPrasar's website www.vigyanprasar.gov.in. All past issues of the magazine are available online.

The May2020 edition of Dream 2047 focuses on the pandemic – COVID-19. VP has, through this effort, tried to bring to the table every possible aspect that one would be interested to know about the pandemic, cause and effects, and eventually update on the road to recovery efforts.

Contact info: dream@vigyanprasar.gov.in



Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/dream-may-2020-eng.pdf>

Storytelling through Comic Characters

Nowadays, everywhere the only thing people are talking about is COVID-19 and the subsequent lockdown that has brought life to a standstill, not just in the country but at a global level. In the wake of the COVID-19 outbreak, our lives have changed in ways we had never imagined before. It is only natural to feel scared, stressed and saddened because of it. However, there are measures that we can take to be both physically safe and mentally healthy in these times. Dr B K Tyagi, Senior Scientist at Vigyan Prasar is preparing some interesting awareness material with the help of comic characters.

Contact Info: bktyagi@vigyanprasar.gov.in

Website Link:

https://drive.google.com/file/d/1FgSi8V5jkRpeFPZHncdfs_N0jrmDaH/view





CURIOSITY - VIPNET Monthly Newsletter, a platform 'for the club, by the club'

VigyanPrasar brings the new version of its VigyanPrasarNETWORK (VIPNET) Newsletter, under the new cover named 'CURIOSITY'. This Newsletter provides a significant platform for the science clubs to exchange views and ideas, express opinion, and gain insight(s) into a vast array of science and technology happenings going around. This Newsletter also acts as a medium to publicise the activities performed by the clubs, as it has a dedicated column for showcasing club activities as 'Club Speak'. Soon, the Newsletter will be launched in Hindi and other vernacular languages too. The May 2020 is a special issue on COVID-19 for the science club members.

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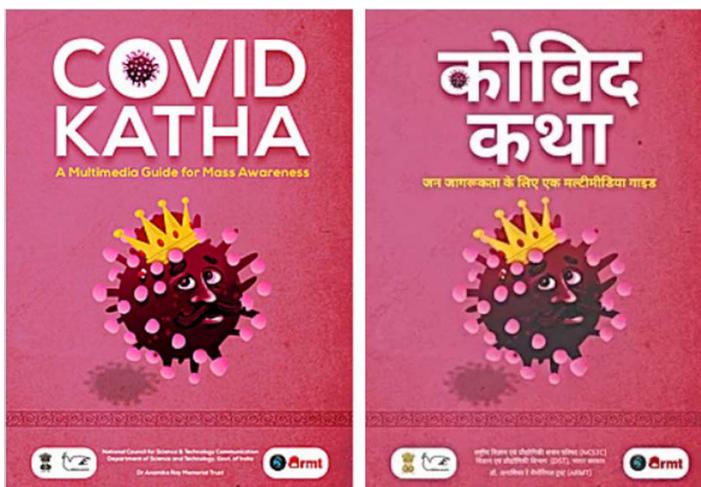


Website Link:

<https://vigyanprasar.gov.in/wp-content/uploads/vp-vipnet-curiosity-magazine-may20.pdf>

Department of Science and Technology brings out COVID KATHA- A Multimedia Guide

To spread general awareness on COVID-19 using multimedia techniques and digital platforms, the DST, Government of India has come out with an interactive electronic guide to help people understand and address the pandemic with suitable knowledge and confidence. In order to provide consolidated and authentic information in an interesting and interactive way, the Department's National Council for Science & Technology



Communication (NCSTC) in association with Dr Anamika Ray Memorial Trust has brought out the multimedia guide carrying important information on A-to-Z of COVID-19.

The NCSTC, DST has initiated a comprehensive programme on health and risk communication with focus on COVID-19. A wide array of programmes and activities built around awareness and outreach have been envisaged involving print, electronic, digital, folk and interactive media to reach out to wide cross section of the society.

The current scenario of the pandemic caused by COVID-19 has posed concerns and challenges all around, where scientific awareness and health preparedness play a significant role to help combat the situation through translation and usage of authentic scientific information to convey the risks involved and help the communities to overcome the situation.

Contact info: mkp@nic.in; dranamikaraymemorialtrust@gmail.com

Website link:

https://dst.gov.in/sites/default/files/COVID%20KATHA_DST_NCSTC_ARMT_ENGLISH.pdf

https://dst.gov.in/sites/default/files/COVID%20KATHA_DST_NCSTC_ARMT_HINDI.pdf

Special issue of monthly magazine **SCIENCE REPORTER** on **COVID-19** by **NISCAIR**

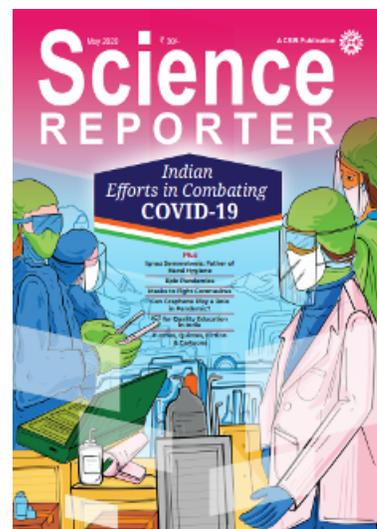
Science Reporter is a monthly popular science magazine that has been published in India since 1964 by the National Institute of Science Communication and Information Resources (NISCAIR), New Delhi. It seeks to disseminate information about S&T developments throughout the world, with special focus on Indian scientific achievements. The magazine provides insight into all the major scientific and technological developments, presents facts about controversial scientific concepts, and tries to bring to its readers interesting, exciting and informative information from various disciplines of science.

In this moment of a grave health crisis due to outburst of the novel coronavirus, Science Reporter has brought out a special issue on various aspects of mitigating the COVID-19 pandemic.

Contact info: sr@niscair.res.in

Website link:

<http://nopr.niscair.res.in/handle/123456789/54264>



Special issue of monthly e-Newsletter '**STRIDES**' on **COVID-19**

STRIDES (Science Technology Research Innovations and Developments) - A Department of Science & Technology (DST) Communication e-newsletter has been developed to bring news on S&T Development from DST support and beyond. It brings together articles, news stories, features, blogs and event reports. The Newsletter gives snapshot of the science & technology in India with focus on the activities, achievements & events of DST and its Autonomous and attached Institutions.

The April 2020 edition of STRIDES focuses on the pandemic – COVID-19. Through this effort, DST tried to bring to the table its efforts delegated towards research, technology and innovation that one would be interested to know and eventually update on the road to recovery and winning the combat.

Contact Info: DSTcommunication@vigyanprasar.gov.in; communicationdst@gmail.com

Website Link:

https://dst.gov.in/sites/default/files/Strides%20News%20Letter%207th%20Edition_0.pdf

