

COVID-19

SCIENCE & TECHNOLOGY EFFORTS IN INDIA

UPDATED WEEKLY

14th 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



Digital Conference on **‘RE-START – Reboot the Economy through Science, Technology and Research Translations’,** organised to celebrate the National Technology Day

11th May 2020, New Delhi

The Union Minister of Science & Technology, Earth Sciences and Health & Family Welfare, Dr. Harsh Vardhan said on 11 May, 2020 that India’s fight against Covid-19 is moving fast ahead strongly and steadily. He was addressing a Digital Conference, RE-START – ‘Reboot the Economy through Science, Technology and Research Translations’, organised to celebrate the National Technology Day. The Conference was organised by the Technology Development Board (TDB) a statutory body of the Department of Science & Technology (DST) and Confederation of Indian Industry (CII).



While applauding the Ministry of Science & Technology’s response to epidemics like COVID in the country, Dr. Harsh Vardhan emphasized that the S&T response reflects the collaborative spirit of the entire S&T ecosystem. “Indian Government, academia, scientists, start-ups, entrepreneurs and industry have been working relentlessly to find solutions to combat this pandemic. We must appreciate the efforts of our scientists, our entrepreneurs and our institutions working to find quick and deployable solutions for Covid-19. New discoveries, industry partnerships, and enhanced researches have thus been rapidly developed and adopted,” said the Minister.



“Within a short period of time, the nation has been able to mobilize a number of researchers to develop new testing kits, protective equipment, respiratory devices, etc.,” he added.

The minister also apprised the audience about the ‘COVID-19 Task Force’ set up by the Government to map the COVID-19-related technology capabilities. “Our Government has vigorously



supported the 'Make in India' Programme. This has brought in scientific institutions and start-ups to develop the Covid-19 tests, masks, sanitizers, personal protective equipment (PPEs) and ventilators," he further added.

On the theme for the National Technology Day this year, Dr. Harsh Vardhan pointed out, "We need to mitigate the widespread economic impact and prepare for a stronger recovery using self-reliance as the new mantra. Thus, we look towards new opportunities to galvanize growth in the technological and industrial sector."



While delivering his special address, Dr. V K Saraswat, Member, NITI Aayog, pointed out the importance of new-age technologies and medical and manufacturing technologies in boosting the economy as the world adjusts to the new normal.

Principal Scientific Advisor to the Government of India, Professor K. Vijay Raghavan, pointed out how technology can change the way we live our lives and the way we do things in future, particularly so in the post-COVID era. He pointed out that this is an opportunity to gear up for the future that lies ahead, and a better-equipped R&D workforce and ecosystem will prepare India better for future challenges.



DST has stepped into its 50th year of existence. DST Secretary Professor Ashutosh Sharma thus underlined the significance of the National Technology Day in view of the challenges faced during these times of COVID-19. He further emphasized that the COVID-19 crisis had led R&D and technology

development to work in various modes. The private-public model has encouraged R&D to greater heights. Plausible translations, prototyping, start-ups, and Industry have seen immense growth. According to him, rebooting the economy requires new age technologies, appropriate national missions, programmes and schemes to get into quick action. He added that wherever readymade solutions are not available, research and development needs to be more profound, relevant, speedy, impactful and strongly connected to industry. The lessons learnt now would continue to assist us in addressing the overarching challenges of the future—sustainable development, climate change, industry 4.0, anti-microbial resistance, etc.

Dr. Saumya Swaminathan, Chief Scientist, World Health Organization, highlighted the steps taken internationally to combat the pandemic and the way forward. Dr. Swaminathan appreciated the way India has tackled the COVID-I challenge.

DG, CII, Mr. Chandrajit Banerjee; President, CII, Mr. Vikram Kirloskar; and Dr Neeraj Sharma, Secretary, TDB were also among those participating in the inaugural session.



In this occasion, Dr. Harsh Vardhan also inaugurated a virtual exposition of companies whose technologies have been supported by TDB. Various organizations and companies showcased their products in the exposition through a digital B2B lounge.

The conference has hence brought together Scientists, Technocrats, Government officials, Diplomats, WHO officials and dignitaries from national and international Industry, Research Institutions and Academic Institutions on a single platform to share their insights on the role played by S&T in the global healthcare crisis and to find solutions to address the current challenge.

The Conference also had technical sessions on 'Medicines & Medical Technologies'; 'Advanced Materials – New Technology Horizons'; 'Advanced Manufacturing Technologies for Sustainable Future & Global Innovation' and 'Technology Alliance for Global Economic Leadership'.

Website link:

<https://dst.gov.in/india-well-poised-reboot-economy-through-st-dr-harsh-varadhan>



DR. HARSH VARDHAN LAUNCHES 'AYUSH SANJIVANI' APP AND INTER-DISCIPLINARY STUDIES INVOLVING AYUSH INTERVENTIONS FOR COVID-19

7th May 2020, New Delhi

"The alliance between technology stakeholders will help the traditional knowledge of AYUSH to reach a large global population."

Dr. Harsh Vardhan, Union Health & Family Welfare Minister launched the 'AYUSH Sanjivani' App and two AYUSH-based studies related to COVID-19 situation on 7th May, 2020 in the presence of Shri Shripad Yesso Naik, MoS (I/c), AYUSH who participated through Video Conferencing from Goa.

Highlighting the importance of harnessing technology for COVID-19 response, the Union Health Minister said "The 'AYUSH Sanjivani' mobile app, which has been launched today, will help to generate data on acceptance and usage of AYUSH advocacies and measures among the population and its impact in prevention of COVID 19. It is developed by Ministry of AYUSH and MEITY and shall reach out to a target of 50 lakh people."

Dr. Harsh Vardhan stated that COVID-19 management has provided a potent platform for alliance between MoHFW, MoAYUSH and technology organisations such as CSIR, ICMR, and UGC to not only develop AYUSH interventions and solutions but also help in promoting AYUSH knowledge for the larger good of the global community. These organisations are joining hands today and are being supported and guided by ICMR and DCGI in propagating the wholesomeness and holistic health benefits of the age-old traditional medicinal knowledge of Ayurveda, he added.

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MINISTRY
OF AYUSH

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Expanding Horizons of Age-Old Traditional
Knowledge of Ayurveda with
AYUSH Sanjivani App

To generate data on acceptance & usage of AYUSH measures & its impact on prevention of COVID-19

Provide AYUSH advisories related to immunity boosting measures

Promote AYUSH knowledge for larger good of the global community

To develop AYUSH interventions & solutions; to reach out to target of 50 lakh people

Download Now! Google play Dated 9 May, 2020



In addition to the App, Dr. Harsh Vardhan also launched two more scientific studies. One is the collaborative clinical research study on Ayurveda interventions as prophylaxis and as an add-on to standard care to COVID 19, which shall be a joint initiative of Ministry of AYUSH, MoHFW and the Ministry of Science & Technology through Council of Scientific & Industrial Research (CSIR) with technical support of ICMR. The Interdisciplinary Ayush R&D Task Force headed by Dr Bhushan Patvardhan, Vice Chairman, University Grant Commission (UGC) has formulated and designed clinical research protocols for prophylactic studies and add-on interventions in COVID-19 positive cases through thorough review and consultative process of experts of high repute from different organisations across the country for studying four different interventions, viz., Ashwagandha, Yashtimadhu, Guduchi Pippali and a poly herbal formulation (AYUSH-64). This includes the following two areas:

- a. Ashwagandha for the Prophylaxis against SARS-COV-2 in subjects with increased risk during the COVID 19 Pandemic: A comparison with Hydroxychloroquine in the healthcare providers and
- b. Effectiveness of Ayurveda Formulation as an adjunct to 'Standard of Care' for the Treatment of Mild to Moderate COVID-19: A Randomized, Open Label, Parallel Efficacy, Active Control, Multi-Centre Exploratory Drug Trial.

Dr. Harsh Vardhan also launched the population-based interventional studies on impact of AYUSH-based prophylactic interventions for prevention of COVID-19 infection in high risk population. The core objectives comprise of assessment of preventive potential of AYUSH interventions for COVID-19 and to assess the improvement in quality of life in high risk population. The study will be carried out through four Research Councils under Ministry of AYUSH and National Institutes in 25 states across the country and several State Governments covering approximately 5 lakh people. The outcome of the study is expected to pave a new horizon in understanding the preventive potential of AYUSH interventions during pandemics like COVID-19 through scientific evidence.

Elaborating on the import of these studies, Dr. Harsh Vardhan stated that these studies shall re-establish the importance of AYUSH pathies with the help of rigour of CSIR, ICMR and DCGI. "This is truly a momentous day. The technology alliance provides valuable opportunity for such knowledge-based solutions to continue to benefit us even after the COVID-19 pandemic has passed, by possible integration of AYUSH in the mainstream scientific efforts," he added. "Let us also understand that the modern pathies of medicine and science are not in competition with those of AYUSH, but they complement and strengthen each other in intrinsic ways," Dr Harsh Vardhan stated. "Under the leadership of our beloved Prime Minister, AYUSH advisories for enhancing immunity during COVID-19 pandemic have been acknowledged the world over," he said.

Shri Rajesh Bhushan, OSD/Secretary (HFW), Shri Vaidya Rajesh Kotecha, Secretary, AYUSH, Dr. Shekhar C. Mande, Director General, CSIR, Dr. V. G. Somani, Drugs Controller General of India, and other senior officers of MoHFW and AYUSH were also present at the launch event.



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

— DR. HARSH VARDHAN

3rd May 2020, New Delhi

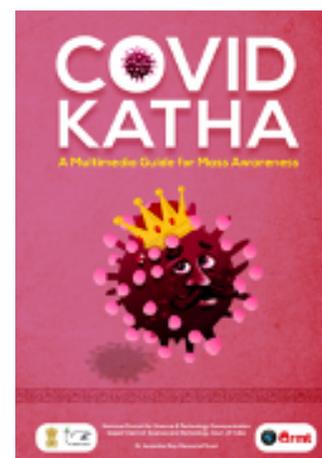
Union Minister of Science & Technology, Health & Family Welfare and Earth Sciences, Dr. Harsh Vardhan today interacted with Heads of all Autonomous Institutions (AIs) and Subordinate offices of Department of Science & Technology (DST) via Video Conferencing on the occasion of 49th DST Foundation Day (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>



During interaction with DBT scientists, Union Minister was informed about various computational methods being developed by DBT labs/AIs to predict potential antiviral drug molecules. In another strategy, surrogates of the virus are being developed representing one or more critical steps in virus lifecycle and inhibitors are being tested. Work is in progress to isolate neutralizing antibodies

either from the patients recovered from COVID-19 or from human antibody libraries. Also, various AIs of DBT are working on development of candidate vaccines which are at various stages of pre-clinical studies with an overall aim to demonstrate the proof of concept and immunogenicity and safety evaluation prior to clinical testing. At the moment, at least 9 of these studies are in early stages and one delivery and adjuvant system for improving the immunogenicity of candidate vaccine is at the advanced stage of development.



While discussing genetic sequencing, Dr. Harsh Vardhan said, "These genetic sequencing efforts remind me of Polio eradication movement 26 years back. Towards the fag end of the Polio movement, active surveillance of the country was done to find out the cases of acute flaccid paralysis. That time also, genetic sequencing was used to establish the travel history of polio virus which eventually helped in the eradication of polio."



After the presentation, Dr. Harsh Vardhan appreciated the work being done by scientists and their innovative ways of finding solutions to mitigate COVID-19. "The sincere efforts of DBT scientists will enable the country to be self-reliant in production of RT-PCS and Antibody test kits by the end of next month. This will make it possible to meet the target of conducting one lakh tests per day by the end of next month," he said. He also exhorted scientists working on

developing new vaccines, new drugs and medical equipment, to speed up their work. "Out of at least half a dozen candidates supported for vaccines, four are in an advanced stage and regulatory platform at one place has been constituted for speedy clearances," he said.



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. Harsh 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)

Meeting demand side of agri technologies for farmers through S&T enablers call for agri technologies

With the relaxation of lockdown, India is facing a unique challenge of migration of a large number of workers from unorganised sectors in urban, peri-urban regions to villages and rural areas. This will require to rapidly engage the migrants moving to primary agricultural and rural livelihood settings by supporting them with effective employment opportunity locally through technological and innovative solutions to increase their efficiency and yield. This will also require youth migrants who could be supported by making them change agents or trained personnel for the deployment of technical know-how etc. in villages.

To meet the load on agriculture and to ensure sustainable farm and allied products including best rural practices, both agro-scientific research output and agri-technologies deployment will be essential at this juncture as an effective response through a COVID-19 Agriculture track being launched by the Office of the Principal Scientific Adviser to Government of India.

The objective of the call is to support the migrants and other agriculturists by providing access to scientific knowledge and innovative technologies as well as required capacity building by involving scientists and technologists from national laboratories and academic institutions along with their incubated start-ups from the supply side. Efforts will be made to bridge the supply side with the demand side by proactively involving enablers like industry, accelerators, foundations and public agencies to support technologies and solutions through evaluation for low cost, high quality, bankable and scalable projects in agriculture and allied areas. The range of scientific and technological products would include, amongst others light equipment, scientific solutions and heavy-duty technologies.

The detailed project submission template of this call can be obtained by writing Email to: agritech.covid@gmail.com



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

India is well poised to reboot the economy through S&T: Dr. Harsh Vardhan

The Union Minister of Science & Technology, Earth Sciences and Health & Family Welfare, Dr. Harsh Vardhan said on May 11, 2020 that India's fight against Covid-19 is moving fast ahead strongly and steadily. He was addressing a Digital Conference, RE-START – 'Reboot the Economy through Science, Technology and Research Translations', organised to celebrate the National Technology Day. The



Conference was organised by the Technology Development Board (TDB) a statutory body of the Department of Science & Technology (DST) and Confederation of Indian Industry (CII).

While applauding the Ministry of Science & Technology's response to epidemics like COVID in the country, Dr. Harsh Vardhan emphasized that the S&T response reflects the collaborative spirit of the entire S&T ecosystem. "Indian Government, academia, scientists, start-ups, entrepreneurs and industry have been working relentlessly to find solutions to combat this pandemic. We must appreciate the efforts of our scientists, our entrepreneurs and our institutions working to find quick and deployable solutions for COVID-19. New discoveries, industry partnerships, and enhanced researches have thus been rapidly developed and adopted," said the Minister.

"Within a short period of time, the nation has been able to mobilize a number of researchers to develop new testing kits, protective equipment, respiratory devices, etc.," he added.

Website link:

<https://dst.gov.in/india-well-poised-reboot-economy-through-st-dr-harsh-varadhan>



The pandemic is a great opportunity for R&D: Experts at digital conference on Rebooting the Economy through S&T

The session on 'Medicines & Medical Technologies for Better Preparedness to Face Pandemics' at the digital conference on 'Rebooting the Economy through Science, Technology and Research Translations' organised on the occasion of Technology Day on May 11, 2020 highlighted that the Pandemic is a great opportunity for R&D and needs to be used for strengthening it.

Kalavathi GV, Vice President and Head, Philips Innovation Campus, said that devices were needed for easy screening processes, daily monitoring of patients, remote patient monitoring, diagnosis, pre-set protocol for lung screening, hand-held ultrasound device, electronic ICU, 24 x 7 clinical capabilities without physical touch, ventilators and other digital technologies and that Philips innovation was getting ready with many of these.

The day-long digital conference which brought together scientists, government officials, academia, and representatives of industry was organized by Technology Development Board, an autonomous organization of the Department of Science and Technology along with Confederation of Indian Industry.

The COVID crisis has unfolded some of the best medical advancements and innovations in history like drug discovery, vaccines, and diagnostic tools, and other medical devices, as well as ways to preserve electronic health records have taken place. Experts pointed out how these medical innovations can be harnessed for better preparedness to face future pandemics.

Website link:

<https://dst.gov.in/pandemic-great-opportunity-rd-experts-digital-conference-rebooting-economy-through-st>

Research should be brought closer to the Industry: Experts at digital conference on Rebooting the Economy through S&T

The session on 'Conference on Advanced Materials' at the digital conference on 'Rebooting the Economy through Science, Technology and Research Translations' organised on the occasion of Technology Day on May 11, 2020 highlighted that to tackle pandemics like COVID-19 research needs to quickly switch over from being capital-intensive to knowledge-intensive and should be brought closer to the industry.

"The strategy for CSIR is to shift from capital intensity to knowledge intensity of research, and we wish to become knowledge partners of many industries. CSIR has tied up with all the major industries for anti-COVID-19 strategies that we have come out with," said Dr. Shekhar C Mande, Director-General, CSIR.

Speakers at the session agreed that the novel materials such as smart materials, special purpose alloys, engineering polymers & blends, graphene, composites, etc. will be the key to revamping the industry's product lines in the future.

They spoke on how materials are the cornerstones for new-age technology solutions for complex functional problems. Research workers across the world are engaged in developing novel materials designed with specific properties and engineered to deliver focused functional requirements. Investment in such knowledge-based, value-added materials will go a long way in accelerating the economic activities and ensuring an attractive return for the industry, they said.

Website link:

<https://dst.gov.in/research-should-be-brought-closer-industry-experts-digital-conference-rebooting-economy-through-st>



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)

A consortium launched for innovations in biomedical resources to fight COVID-19

The Department of Biotechnology has launched a new consortium in a public-private partnership model to foster the development of indigenous innovations in reagents and other resources for diagnostics, vaccines and therapeutics for COVID-19.

The new setup called National Biomedical Resource Indigenization Consortium (NBRIC) has been established in partnership with Association of Biotechnology Led Enterprises (ABLE) and Confederation of Indian Industry (CII). It is being hosted by DBT's Bengaluru-based Centre for Cellular and Molecular Platforms (C-CAMP).

To start with, NBRIC is announcing an initiative for mapping of reagents and consumables for COVID-19 RT-PCR testing kits.



NATIONAL BIOMEDICAL RESOURCE INDIGENIZATION CONSORTIUM

Call open for manufacturers of reagents and consumables for COVID-19 RT-PCR testing kits

Register
<https://bit.ly/2VcRnGI>



Website link:
<https://bit.ly/2VcRnGI>

A MAKE-IN-INDIA PLATFORM

NBRIC, is a nation-wide effort for convergence of indigenous resources, products and services towards developing diagnostics, vaccines and therapeutics for COVID-19 research and innovation

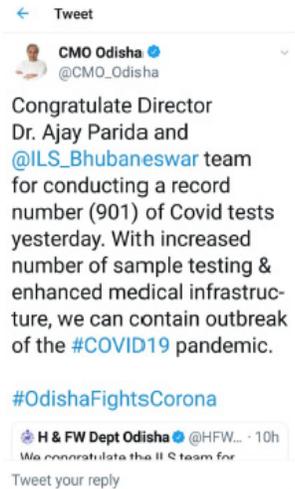
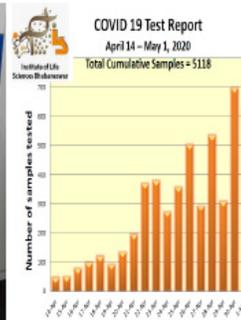




COVID-19 testing at Institute of Life Sciences, Bhubaneswar

DBT-Institute of Life Sciences successfully carried out COVID-19 testing for 10,780 samples, in 4 weeks, contributing to nearly 18% of the tests conducted in Odisha (59,708). Current testing capacity has risen to approximately 900 samples per day.

Contact info: Dr Mamoni Dash; mamonidash@gmail.com



Website link:

<https://twitter.com/HFWOdisha/status/1257136663127564288>

https://twitter.com/DBT_ILS/status/1256486206164004865

DBT-NIBMG scientists trying to re-purpose immunomodulatory drugs for COVID-19

A group of scientists at the DBT-National Institute of Biomedical Genomics (DBT-NIBMG) led by Dr. Saroj Kant Mohapatra, faculty member and a clinical scientist is trying to see whether knowledge gained from research on sepsis could help deal with the current pandemic of COVID-19.

For example, cytokine storm is a common feature of both sepsis and COVID-19 that significantly contributes to organ dysfunction and mortality. As a follow up, the scientists have initiated a clinical trial to try and re-purpose immunomodulatory drugs like Sepsivac, which has a role in inhibiting the cytokine storm, for COVID-19 also.

The group has found some interesting connection between sepsis and cancer too. Using a systems biology approach, they have identified the pathways that are perturbed in both sepsis and cancer. They showed that the clustering of genes separates tumours into two groups: one that shares the pathway signature with sepsis, 'sepsis-like cancer (SLC) group', and the other, without any shared pathways with sepsis or 'cancer alone (CA) group'.

The researchers have shown that artificial intelligence tools can help to label an incoming cancer sample in one of these groups with a high level of accuracy (more than 98%). The SLC group consisted mainly of cancers of the upper gastrointestinal tract, such as oesophagus, stomach, liver, and gallbladder.

They further showed that some of the upregulated pathways, such as phagocytosis, provide protection against both sepsis and SLCs. Since sepsis is caused by infection and the underlying cause of many SLCs are viral infections, they hypothesize that specific pathways upregulated in both these groups provide protective host immuno-inflammatory response to pathogens.



Segregation of cancer into these two groups has biological and clinical implications. The gut may play an important role in the pathogenesis and progression of the SLC group. Dr. Mohapatra's group is investigating the possibility of using known treatment for sepsis for the SLC group cancers also.

Contact info: Dr. Saroj K. Mohapatra; skm | @nibmg.ac.in

Website link:

https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt-01S-05MAY2020.pdf

Webinar to demystify how data scientists quantify intensity of the COVID-19 outbreak

In recent times, the media have been flooded with a plethora of information related to the COVID-19 pandemics. People are often introduced to totally new concepts and terminologies such as “flattening the curve”, and “R0” (R naught).

To help people learn more about some of these concepts, a webinar series on Data Science is being organized by “Manav - The Human Atlas Initiative”, a collaborative project of the DBT's National Centre for Cell Science (DBT-NCCS), IISER-Pune and Persistent Systems.

This Series started with a webinar on “R0: How scientists quantify the intensity of an outbreak”. The first of a two-part webinar on this topic was presented by Dr. Pranay Goel, Associate Professor at IISER-Pune, on 30th April, 2020, at 3 pm. The webinar is free to watch and open to all. Interested science enthusiasts are invited to participate. More information about the project can be obtained from their website: <https://manav.gov.in/>

Contact info: Jyoti Rao; jyoti@nccs.res.in

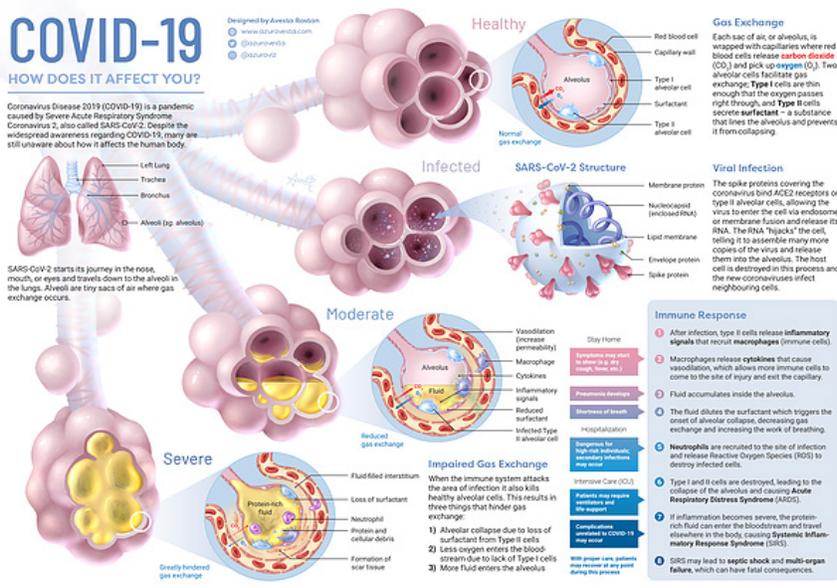
Website link:

<https://twitter.com/ManavAtlas/status/1253967329328795649>

https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt-01S-06MAY2020.pdf

COVID Gyan content available in English and other Indian languages

The DBT's autonomous institute, the Institute for Stem Cell Science & Regenerative Medicine (inStem), Bengaluru is one of the founding partners of the pan-institutional website COVID



WHAT CAN YOU DO?

- 1 Preventative Actions**
This is currently the best 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 metres 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 habit of eating a well-balanced diet, drinking plenty of water, getting enough sleep, exercising, and maintaining 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 on you know. Any changes have occurred both globally and in your community. Make sure to look for evidence-based resources to avoid misinformation.
- 4 Donate**
Consider donating to local businesses or online fundraising 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.



scientists have proposed in a recent manuscript that they have placed on *bioRxiv* that this is a reason for the A2a subtype to have infected a larger proportion of persons and with enhanced rapidity in Europe and North America than in East Asia.

Website link:

<https://doi.org/10.1101/2020.05.04.075911>

Posted on *bioRxiv* on May 5, 2020.

Rapid diagnostics for COVID-19 from MagGenome under DBT-BIRAC COVID-19 Research Consortium Initiative

The DBT and Biotechnology Industry Research Assistance Council (BIRAC) recently cleared a proposal of MagGenome Technologies Pvt Ltd for funding support for development of a diagnostic kit comprising sample collection buffer and RNA extraction kit for real-time RT-PCR-based detection of SARS-CoV-2. The proposal was cleared under the COVID-19 Research Consortium's call to support Diagnostics, Vaccines, Novel Therapeutics, Repurposing of Drugs or any other intervention for control of COVID-19. The support will be provided under DBT's National Biopharma Mission.

MagGenome Technologies primarily focuses on the development of magnetic nanoparticles-based products. The current initiatives include developing nucleic acid extraction kits using the patented magnetic nanoparticles-based technology. The company has developed DNA extraction kits under the brand name XpressDNA and affinity resins under the brand name XpressAffinity. MagGenome is an example of academic research being translated into a commercial venture.

Diagnostic Kit from MagGenome:

RNA Extraction Kit: The Company proposes to use their magnetic nanoparticles-based system to develop a viral RNA extraction method which can capture all available viral RNA without any loss during purification. A reliable and quick extraction kit which yields significantly high quantity and quality of RNA is a major requirement for any RT-PCR-based detection system for COVID-19. This method aims to be less time consuming and less labour intensive compared to other extraction methods.

Sample Collection Kit: The Company aims to develop a unique formulation of sample collection solution which can ensure the proper storage of viral RNA in the sample for several days even at room temperature. The collection method proposed is especially unique as it can be self-collected with appropriate instructions reducing the risk of exposure to healthcare workers at the time of sample collection. Though the sample collection solution is suitable for storing the currently approved sample types, the nasal and throat swabs, it also promotes the use of saliva samples (normal as well as deep throat).

MagGenome intends to provide these solutions to the customer in the form of a complete detection kit which comprises three components: Sample collection solution, RNA extraction reagents and real-time RT-PCR detection reagents. The world is facing a dearth of reliable methods or commercial kits which can guarantee efficient extraction of viral RNA, especially in early stages of viral infection.

Website Link:

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

Fast-track review and funding support under COVID-19 fund

In view of the need to identify and provide fast-track support to suitable biotech proposals to facilitate product development and bring significant social impact to address challenges of COVID-19, DBT-BIRAC has set up a Fast-track Internal Review Committee to review and recommend the proposals that can be supported under COVID fund.

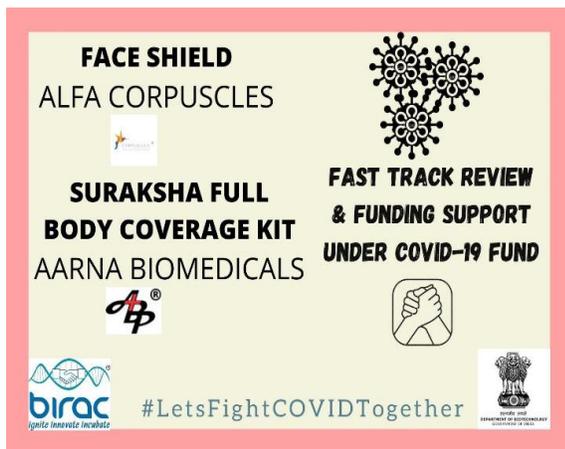


The Committee’s first meeting recommended funding support to two Start-ups: Aarna Biomedical Products and Alpha Corpuscles. A co-funding partner IKP Knowledge Park has also been approved to support up to 15 Start-ups.

Aarna Biomedical Products would be funded for the “Suraksha Full Body Coverage Kit” which would comprise of a full face shield, a facemask, a coverall with fused head coverage having very firm stitches which are further enforced at the groin and underarm areas, two shoe covers and two hand covers using SPM-Non Woven Fabric which can be used up to BSL-2 with manufacturer’s self-declaration. This holistic wearable kit would be available at a cost-effective price.

Alpha Corpuscles has been recommended support for development of Face Shields that protect the face from pathogen-laden droplets. Face shields offer the advantage of guarding the entire face of healthcare workers from contamination.

In order to identify, empower and fast-track innovations for COVID-19 control, IKP Knowledge Park has put together an IKP COVID Fund and further proposed to BIRAC for matching the grant support to fast track deployment of solutions for control of COVID-19. The same has been approved for funding 10-15 start-ups.



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

BSC Bionest Bioincubator wins second prize in MHRD Mega online challenge for start-ups

InnoDx Solutions Pvt. Ltd., a start-up incubated at BSC Bio-Nest Bioincubator, has won second prize in the MHRD Mega online challenge “Samadhan”, where start-ups had to share their ideas (design/simulation mandatory) to solve the challenges posed by the COVID pandemic. The mega online challenge “Samadhan” was launched by MIC and AICTE in collaboration with Forge and InnovatioCuris.

The participants in this challenge had to design, simulate and develop such measures that can be made available to the government agencies, health services, hospitals and other services for quick solutions to the coronavirus pandemic and other such calamities.

Apart from this, through the “Samadhan” challenge, efforts will be made to make citizens aware, to motivate them, to face any challenge, to prevent any crisis and to help people get livelihood.

Website link:
<https://www.rcb.res.in/>



DBT-NCCS tests over 200 samples for SARS-CoV-2 in 10 days

The National Centre for Cell Science (DBT-NCCS) in Pune, an autonomous institution of the DBT, was one of the Government laboratories identified to carry out testing for COVID-19. DBT-NCCS was approved as a diagnostics facility by the DBT, the Indian Council of Medical Research (ICMR) and the Maharashtra State Government. To facilitate the ongoing efforts against COVID-19 in the country, DBT-NCCS began testing samples for SARS-CoV-2 on 25th April, 2020. This was preceded by extensive and speedy preparations, including reorganization of the research laboratories into a diagnostics centre, procurement of supplies like PPE and kits, formulating and validating a standard operating procedure (SoP), getting technical and scientific staff trained at ICMR-NIV for COVID-related biosafety measures and sample testing, registering the facility with the appropriate authorities, and conducting mock testing. Several scientists, and technical and other staff, who have been working tirelessly since testing began at DBT-NCCS, have played a big role in this endeavour. With their diligent efforts, the number of samples tested crossed 200 on 4th May, 2020. A short video shared on the NCCS social media and website offers a glimpse into the activities of the diagnostics team.



DBT-NCCS serves as a testing centre for COVID-19.

Website link:

https://twitter.com/DBT_NCCS_Pune/status/1256193349901357057?s=20

<https://youtu.be/ICgBoPiZNu4>

Studies suggest HIV-1 protease inhibitor ritonavir may be of use against SARS-CoV-2

Theoretical studies being performed at DBT-Regional Centre for Biotechnology suggest that HIV-1 protease inhibitor, ritonavir, may inhibit the exoribonuclease activity of the nsp14 protein from SARS-CoV-2. The nsp14 protein of SARS-CoV-2 houses the exoribonuclease activity responsible for removing mismatches that arise during genome duplication. A homology model of nsp14-nsp10 complex was used to carry out *in silico* screening to identify molecules that can potentially inhibit the activity of nsp14. This exercise showed that ritonavir may bind to the exoribonuclease active site of the nsp14 protein with significant affinity. It is, therefore, possible that ritonavir may prevent association with RNA and thus inhibit the exoribonuclease activity of nsp14. Among the drugs currently under trial, remdesivir and favipiravir act by causing premature termination of viral replication. Since nsp14 may reverse the inhibitory effect of these drugs on viral replication, it is possible that a combination of ritonavir with remdesivir or favipiravir may be more effective.

Website link:

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

Webinar on challenges of clinical research in the times of a pandemic

Continuing its endeavour to maintain a lean team of clinical, medical, product development, regulatory and biometric experts liaising with a network of collaborating partners and institutions to provide customized support, and tailoring it to the current situation, Faridabad-based Clinical Development Service Agency (CDSA) is organizing a webinar series to cater

to clinical researchers. CDSA is an Extramural arm of the DBT's Translational Health Science and Technology Institute (DBT-THSTI). The first webinar in this series scheduled to be held on 13th May 2020 is expected to attract clinical researchers, bioethics professionals and others who wish to work on COVID-19 and are based in both public and private funded institutions. Dr. Y.K. Gupta, Principal Adviser at CDSA will be answering some pressing questions about issues related to clinical research related to COVID-19



CDSA Clinical Development Services Agency

thsti

Presents

W

WEDNESDAY
EBINAR
WITH CDSA

Issues related to clinical research during COVID-19: Questions & Answers

May 13, 2020 3:00 – 4:00 PM IST

Registration: Free

Registration deadline: May 08, 2020; YouTube link will be provided after registration

Registration link: <https://docs.google.com/forms/d/e/1FAIpQLSe4KmnAMJQswMGMjY27MT7ma8P8RSMtmhi9oHqeRIOZFabgRA/viewform>

Target audience: Clinical research professionals; Ethics committee members, anyone working in this area

Prof Y. K. Gupta

- Principal Adviser (Project), CDSA-THSTI, DBT
- President, AIIMS, Bhopal
- Former Dean (Academics), & Head of Pharmacology, AIIMS, New Delhi
- Member - Task Force COVID-19 in DBT, ICMR & SERB

FACILITATORS @CDSA

| | | | | |
|--|---|---|--|--|
| <p>Prof Usha Menon Mentor & Strategy Lead</p> | <p>Dr Nitya Wadhwa Faculty in charge</p> | <p>Dr Sucheta Banerjee Kurundkar Director Training</p> | <p>Ms Vandana Chawla Training Manager</p> | <p>Mr Jitender Ahuja Training Coordinator</p> |
|--|---|---|--|--|

Website link:
<https://www.thsti.res.in/>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

CSIR-CMERI develops touch-free soap-cum-water dispenser

Durgapur-based Central Mechanical Engineering Research Institute (CMERI), an institution under the Council of Scientific and Industrial Research (CSIR), has developed a sensor-based contactless soap-cum-water dispensing unit, which can help to avoid coronavirus infection.



The single infrared sensor attached to the dispensing unit gets automatically activated when an object comes close to the unit.

Other important design features of this unit include dispensing of both liquid soaps and water from the same outlet 20 seconds apart. The touch-less soap-cum-water dispensing units may find their utility at various locations such as hospitals, shopping malls, banks, stadiums, and sports complexes.

Portability is another unique design feature of this dispensing unit. The water usage is minimal. About 250 ml of liquid soap can be stored as of now, but the storage capacity can be extended up to 1 litre.

“The 20-second timer could be a game-changer, as it ensures that the user is compelled to rub his/her hands for the requisite time span as per Standard Hygiene guidelines. Our technology is evolved based on intensive research and ergonomic demands,” said Prof. Harish Hirani, Director, CSIR-CMERI, Durgapur.

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-I-06MAY2020.pdf>

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

DG, CSIR launches Compendium of Indian Technologies for Combating COVID-19

A “Compendium of Indian Technologies for Combating COVID-19 (Tracing, Testing and Treating)”, prepared by National Research Development Corporation (NRDC), was launched by Dr. Shekhar C. Mande, Director General, CSIR and Secretary, DSIR, Govt. of India, at CSIR Headquarters, New Delhi, on 5 May 2020.



The Compendium carries information about 200 COVID-19-related Indian technologies, ongoing research activities, technologies available for commercialisation, and initiatives and efforts taken by Government of India, categorised under 3Ts of Tracking, Testing and Treating. Most of these technologies have been tested for proof-of-concept (PoC) and can help entrepreneurs to market them faster as they do not have to reinvent the wheel.

Technologies presented in the Compendium include a digital and molecular surveillance database, COVID-19 rapid testing kit, Surveillance system to fight COVID-19 through a unique tracking mobile application, Real-time PCR test, an antimicrobial fabric, Minus Corona UV Bot to disinfect hospitals, a Bio Body Suit and herbal products to boost the immune system.

Dr. Mande appreciated the initiative of NRDC for bringing out the Compendium of Indian Technologies for Combating COVID-19 which is very timely and would benefit the MSMEs, start-ups and the public at large.

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-2-06MAY2020.pdf>

Tata Sons to scale-up Covid-19 Testing Kit ‘Feluda’

The Institute of Genomics and Integrative Biology (IGIB), Delhi, has transferred the technology Feluda (FNCSA9 Editor Linked Uniform Detection Assay) to Tata Sons for further development and commercialisation. A Memorandum of Understanding reflecting the arrangement has been signed between the two Institutions. Feluda is a rapid diagnostic kit for COVID-19, developed indigenously by IGIB, a CSIR institution.

“Innovative ‘Feluda’ test uses cutting-edge Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) technology for detection of genomic sequence of novel coronavirus. It uses a test protocol that is simple to administer and easy to interpret enabling results to be made available to the medical fraternity in relatively lesser time, as compared to other test protocols,” said Banmali Agrawala, President, Infrastructure and Defence & Aerospace, Tata Sons.

Dr. Anurag Agrawal, Director, IGIB, highlighted that the technology was conceived and developed at CSIR-IGIB under sickle cell mission and utilizes an indigenously developed cutting edge CRISPR Cas9 technology to specifically recognize COVID-19 sequence in a sample. A combination of CRISPR biology and paper-strip chemistry leads to a visible signal readout on a paper strip that can be rapidly assessed for establishing the presence of viral infection in a sample.

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-1-08MAY2020.pdf>

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

New project to develop human monoclonal antibodies for neutralizing SARS-CoV-2

CSIR, through its New Millennium Indian Technology Leadership Initiative (NMITLI) programme, has approved a project towards development of human monoclonal antibodies (hmAbs) that can neutralize SARS-CoV-2 in patients. This project on generation of neutralizing human monoclonal antibodies as a therapeutic strategy will be implemented by a multi-institutional and multi-disciplinary team.

Monoclonal antibody therapy is a form of immunotherapy designed to produce immunity to a disease or to enhance resistance by the immune system. This new project aims to generate hmAbs to SARS-CoV-2 from gradual recovery phase of COVID-19 patients and select high affinity and neutralizing antibodies. The project also aims to anticipate future adaptation of the virus and generate hmAbs clones that can neutralize the mutated virus so that it could be readily used for combating future SARS-CoV infections.

This industry-academia collaboration comprises of National Centre for Cell Science (NCCS) Pune; Indian Institute of Technology (IIT), Indore; PredOmix Technologies Ltd, Gurugram; and Bharat Biotech International Ltd (BBIL), Hyderabad. Vaccines and biotherapeutics maker BBIL is leading the project to develop human monoclonal antibodies (hmAbs) for COVID-19 infection.

Website link:

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

कोरोना वायरस के खिलाफ मोनोक्लोनल एंटीबॉडी विकसित करने के लिए नयी परियोजना

काउंसिल ऑफ साइंटिफिक एंड इंडस्ट्रियल रिसर्च (सीएसआईआर) ने अपने न्यू मिलेनियम इंडियन टेक्नोलॉजी लीडरशिप इनिशिएटिव (एनएमआईटीएलआई) कार्यक्रम के तहत मानव मोनोक्लोनल एंटीबॉडी के विकास की एक नयी परियोजना को मंजूरी दी है, जो रोगियों में कोरोना वायरस के संक्रमण को बेअसर कर सकती है। इस परियोजना का उद्देश्य एक प्रभावी चिकित्सा रणनीति के जरिये अधिक प्रभावी और विशिष्ट मानव मोनोक्लोनल एंटीबॉडी विकसित करना है।

परियोजना का एक लक्ष्य वायरस के भविष्य के अनुकूलन का अनुमान लगाना भी है। इसके साथ ही, वैज्ञानिक मानव मोनोक्लोनल एंटीबॉडी क्लोन तैयार करने का प्रयास भी करेंगे, जो रूपांतरित कोरोना वायरस को बेअसर कर सके। वैज्ञानिकों की इस पहल का लक्ष्य कोरोना वायरस के नये उभरते रूपों से लड़ने के लिए तैयारी करना भी है, ताकि भविष्य में इसके संक्रमण से मुकाबला किया जा सके। मोनोक्लोनल एंटीबॉडी थेरेपी इम्यूनोथेरेपी का एक रूप है, जिसे किसी बीमारी के प्रति प्रतिरक्षा उत्पन्न करने या प्रतिरक्षा प्रणाली द्वारा प्रतिरोधक क्षमता बढ़ाने के लिए प्रयोगशाला में विकसित किया जाता है।

Website link:

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

कोविड-19 के खिलाफ शुरू हुआ आयुर्वेदिक यौगिकों का परीक्षण

वैज्ञानिक एक तरफ सेप्सिस, टीबी, मलेरिया और अन्य बीमारियों में उपयोग होने वाली दवाओं का परीक्षण कोविड-19 के मरीजों के उपचार के लिए कर रहे हैं, तो दूसरी ओर इस महामारी से निपटने के लिए अब चार आयुर्वेदिक यौगिकों का परीक्षण भी शुरू किया गया है। जिन चार आयुर्वेदिक यौगिकों का कोविड-19 के खिलाफ परीक्षण किया जा रहा है, उनमें अश्वगंधा, यष्टिमधु, गुडुची, पिप्पली और मलेरिया-रोधी दवा आयुष-64 शामिल हैं। स्वास्थ्य एवं परिवार कल्याण व आयुष मंत्रालय द्वारा यह परीक्षण वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) और भारतीय आयुर्विज्ञान अनुसंधान परिषद (आईसीएमआर) के साथ मिलकर किया जा रहा है।

केंद्रीय स्वास्थ्य मंत्री हर्षवर्धन ने इस संबंध में जानकारी देते हुए कहा है कि "कोविड-19 के उपचार में इन दवाओं की उपयोगिता का पता लगाने के लिए स्वास्थ्य और आयुष मंत्रालय ने आईसीएमआर और सीएसआईआर के साथ मिलकर संयुक्त अभियान शुरू किया है, जिसमें वैज्ञानिक परीक्षणों के जरिये पता

लगाया जाएगा कि ये दवाएं किसी व्यक्ति को कोरोना से बचाने में कितनी कारगर हैं। स्वास्थ्य कार्यकर्ताओं और उच्च जोखिम वाले क्षेत्रों में काम करने वाले लोगों पर यह परीक्षण किया जाएगा।”

Website link:

<https://vignprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-2-08MAY2020.pdf>

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

कोविड-19 से लड़ने के लिए भारतीय प्रौद्योगिकियों के संकलन का लोकार्पण

कोविड-19 से लड़ने के लिए देश के विभिन्न संस्थानों के वैज्ञानिक दिन-रात काम कर रहे हैं। इस कवायद में कोविड-19 का सामना करने के लिए कई प्रभावी प्रौद्योगिकियां उभरकर सामने आ रही हैं। कोविड-19 से लड़ने के लिए विकसित भारतीय प्रौद्योगिकियों का एक संकलन नेशनल रिसर्च डिवेलपमेंट कारपोरेशन (एनआरडीसी) ने तैयार किया है। इस संकलन का लोकार्पण डॉ. शेखर सी. मांडे, महानिदेशक, वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद (सीएसआईआर) व सचिव, वैज्ञानिक तथा औद्योगिक अनुसंधान विभाग (डीएसआईआर) ने किया है।

इस संकलन में कोविड-19 से जुड़ी 200 भारतीय प्रौद्योगिकियों, वर्तमान अनुसंधान गतिविधियों, व्यावसायीकरण के लिए उपलब्ध प्रौद्योगिकियों, भारत सरकार द्वारा की गई पहल और प्रयासों के बारे में जानकारियां शामिल है, जिनका वर्गीकरण कोविड-19 से संबंधित ट्रेकिंग, टेस्टिंग और ट्रीटिंग रणनीति के अंतर्गत किया गया है। संकलन में पेश की गई प्रौद्योगिकियों में एक डिजिटल और आणविक निगरानी डेटाबेस, कोविड-19 रैपिड टेस्टिंग किट, कोविड-19 की निगरानी के लिए ट्रेकिंग मोबाइल एप्लिकेशन, रियल टाइम पीसीआर टेस्ट, रोगाणु-रोधी कपड़े, अस्पतालों को कीटाणु रहित करने के लिए माइनस कोरोना यूवी बॉट, बायो बॉडी सूट और प्रतिरक्षा प्रणाली को बढ़ावा देने के लिए हर्बल उत्पाद शामिल हैं।

Website link:

<https://vignprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-4-06MAY2020.pdf>

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

NAL develops Ventilator ‘SwasthVayu’ for COVID-19 patients

The National Aerospace Laboratories (NAL), Bengaluru, an institution under the CSIR has developed a non-invasive bi-level positive airway pressure (BiPAP) ventilator to treat COVID-19 patients. NAL has named it ‘SwasthVayu’.

BiPAP Ventilator is an electronic breathing device used in the treatment of sleep apnea, lung disease, and to treat respiratory weakness. In non-invasive ventilation delivery of oxygen takes place via a face mask and, therefore, it eliminates the need of an endotracheal airway. CSIR-NAL has enabled a spin-off technology based on its expertise in the aerospace design domain.

SwasthVayu is a micro-controller-based precise closed-loop adaptive control system with a built-in bio-compatible “3D printed manifold and coupler” with Highly Efficient Particulate Air (HEPA) filter. These unique features help to alleviate the fear of the spread of the virus. The Ventilator has features like spontaneous, continuous positive airway pressure (CPAP), timed, auto BiPAP modes with provision to connect oxygen concentrator or enrichment unit externally.



SwasthVayu BiPAP machine in Auto Test mode with Test Lung

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North East Institute of Science and Technology develops website on COVID-19

North East Institute of Science and Technology (NEIST) has launched its own web portal to create awareness on COVID-19 and to keep the masses updated on the new developments on this pandemic situation. Jorhat-based NEIST, a constituent of CSIR, has launched the website www.neist.res.in/covid19 in a bid to disseminate the updates on COVID-19.

This website has been launched by Dr G Narahari Sastry, Director of CSIR-NEIST. “This website could be helpful in disseminating ongoing scientific research on COVID-19 across the globe including what the CSIR labs are doing. The main objective of the portal is to create awareness among the society about COVID-19,” said Dr Sastry.

The website will serve as knowledge source for the COVID-19 pandemic and it will also showcase the ongoing activities in various CSIR labs under different verticals such as Molecular Digital Surveillance, Development of Rapid and Cheap Diagnostic Kit, New Therapies Development and Drug Repurposing, Development of Personal Protective Equipment (PPE) kit and Supply Chain, he added.

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-3-12MAY2020.pdf>
<http://www.rrljorhat.res.in/>

CSIR Institutes develop important technologies to combat COVID-19

On the occasion of National Technology Day, Dr. Sanjay Kumar, Director of Institute of Himalayan Bioresource Technology (CSIR-IHBT), who is also holding the additional charge of Director Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh, delivered the National Technology Day lecture through video conferencing. It was attended by scientists and staff of both the institutes. In his lecture, Dr. Kumar focused on the challenge posed by COVID-19 and roles of CSIR-CSIO and CSIR-IHBT for combating this deadly disease.

The highly infectious virus SARS-CoV-2 is basically a positive-sense 30 Kb RNA genome, which codes for 16 non-structural and 4 structural proteins. To combat this deadly disease, both the Institutes have developed and transferred important technologies. He described the technologies developed by CSIR-CSIO lab, which include electrostatic disinfection machine, non-contact IT thermometer, aerosol-retracted canopy for dental procedure, foot-operated water dispenser, portable ventilator, Thermo UV germicidal system, intubation aerosol protective canopy, robotic hospital logistics cart, face shield and banknote decontamination box.

Regarding CSIR-IHBT technologies, he mentioned setting up a testing centre for diagnosis and molecular surveillance of COVID-19 in Himachal Pradesh, screening of bio-active molecules from the Himalayan medicinal plants against COVID-19 virus for development of herbal-based antiviral drug, production and supply of alcohol-based hand sanitizer containing natural aromatic oils and tea extracts through their technology partners and advanced techniques for disease surveillance.

Website link:

<https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-CSIR-News-4-12MAY2020.pdf>
<https://www.csio.res.in/>
<https://www.ihbt.res.in/en/>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

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

ICMR initiates PLACID Trial and releases list of approved institutions

Indian Council of Medical Research (ICMR) has initiated a multicentre clinical trial (PLACID Trial) titled 'A Phase II, Open-Label, Randomized Controlled Trial to Assess the Safety and Efficacy of Convalescent Plasma to Limit COVID-19 Associated Complications in Moderate Disease.' The PLACID trial protocol has been registered with the Clinical Trial Registry of India (CTRI). The study has also received approval from the



COVID-19 National Ethics Committee (CoNEC). The generic protocol for this study has been approved by the DCGI, CDSCO. The sample size of the study is 452. Once 400 patients are enrolled, no more sites will be added. The clinical trial liability insurance has been bought centrally by ICMR.

Website Link:

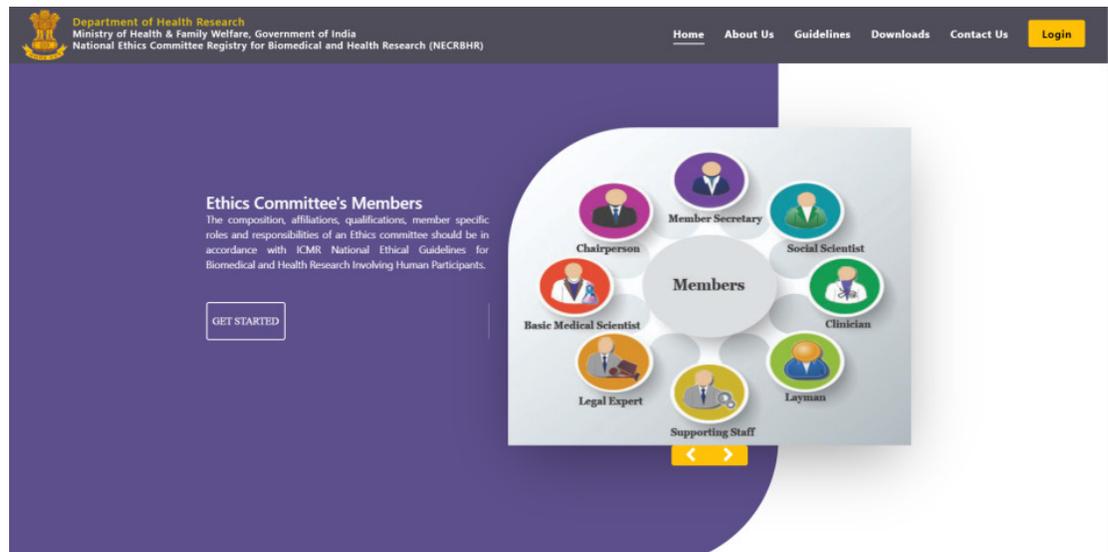
https://www.icmr.gov.in/pdf/covid/techdoc/Revised_List_of_Inst_PLACID_08052020.pdf

ICMR releases National Guidelines for Ethics Committees Reviewing Biomedical & Health Research During COVID-19 Pandemic

ICMR has released National Guidelines for Ethics Committees Constituted for Reviewing Biomedical and Health Research during COVID-19 Pandemic. The instructions are developed



by its bioethics unit NCDIR, Bengaluru, under the guidance of COVID-19 National Ethics committees (CoNEC). The document highlights the critical and facilitatory role that the ethics committees need to play in supporting the ethical conduct of research in India.

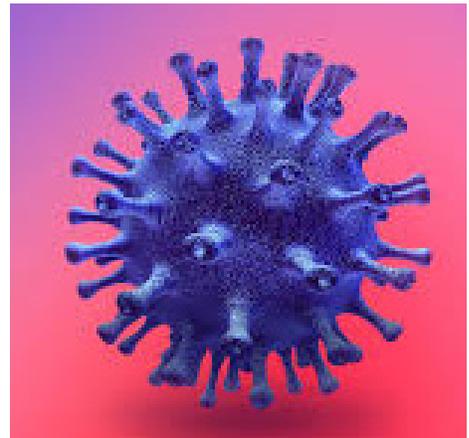


Website Link:

https://main.icmr.nic.in/sites/default/files/guidelines/EC_Guidance_COVID19_06_05_2020.pdf

ICMR releases Guidelines for appropriate recording of COVID-19-associated deaths

ICMR has released guidelines for appropriate recording of COVID-19-associated deaths. The cause of death (COD) is defined as “all those diseases, morbid conditions or abnormalities, injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries.” The Guideline entails the detailed description of how to record COVID-19-related deaths.

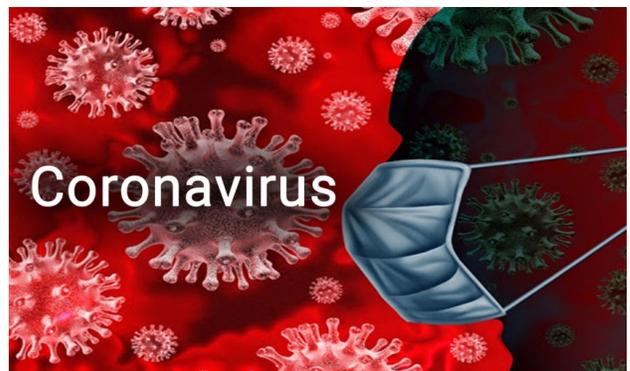


Website Link:

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

ICMR releases standard guidelines for medico-legal autopsy in COVID-19-related deaths

A brief guidance document has been drafted and released by Indian the ICMR in consultation with various stakeholders in healthcare who are following the outbreak of COVID-19 pandemic. The objective of this document includes providing the standard operating procedure for medico-legal autopsy as well as following standard biosafety precautions.



Website Link:

https://main.icmr.nic.in/sites/default/files/upload_documents/COVID19_AUTOPSY_GUIDE-LINES_2020_10052020.pdf

IJMR publishes a special issue on COVID-19

Indian Journal of Medical Research (IJMR), a publication of ICMR, is a peer-reviewed online journal with monthly print-on-demand compilation of issues published. The COVID-19 pandemic has created opportunities to build an improved response mechanism for future pandemics. Concerted, well-funded, comprehensive, planned, and all-encompassing activities should facilitate building sustained institutional capacity to provide a swift and effective nationwide response to disease outbreaks. This could be done through access to appropriate technologies and improved logistics for efficient supply chains. These will also promote developing multisectoral stakeholder consortia at national and state levels to coordinate actions and launch a comprehensive whole-of-the-society response to emerging infections. Overall and long-term target should be to encourage and ensure convergence of all stakeholders for human health, animal health and environment to collaborate in implementing the One Health approach and protecting human life, reduce misery and avoid damage to the national economy. These are doable actions. The national will and determination are vital to mitigate the severe impact of pandemics, such as COVID-19 in India.

Website Link:

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





SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)

DRDO develops UV Disinfection Tower for rapidly disinfecting infection-prone areas

DRDO has developed an Ultra Violet (UV) Disinfection Tower for rapid and chemical-free disinfection of high infection-prone areas. The equipment named UV blaster is a UV-based area sanitizer designed and developed by Laser Science & Technology Centre (LASTEC), the Delhi-based premier laboratory of DRDO with the help of M/s New Age Instruments and Materials Private Limited, Gurugram.

UV Blaster is useful for high-tech surfaces like electronic equipment, computers and other gadgets in laboratories and offices that are not suitable for disinfection with chemical methods. The product is also effective for areas with large flow of people such as airports, shopping malls, metros, hotels, factories, offices, etc. The UV-based area sanitizer may be used by remote operation through laptop/mobile phone using Wi-Fi link. The equipment has six lamps, each with 43 watts of UV-C power at 254 nm wavelength for 360 degree illumination. For a room of about 12 x 12 feet dimension, the disinfection time is about 10 minutes and 30 minutes for 400 square feet area by positioning the equipment at different places within the room. This sanitizer switches off on accidental opening of room or human intervention. One more salient safety feature of the product is the key-to-arm operation.

Website link:

<https://pib.gov.in/PressReleasePage.aspx?PRID=1620919>

INMAS, DRDO testing samples of PPE Body Coverall for COVID-19

Institute of Nuclear Medicine & Allied Sciences (INMAS), Delhi has been authorized for laboratory testing of Personal Protective Equipment (PPE) Body Coverall samples for COVID-19, submitted by prospective manufacturers in India. A Synthetic Blood Penetration Resistance Test is conducted at the laboratory and a test report is issued for the same by INMAS. As per the guidelines issued by the Ministry of Textiles, Government of India, for implementing Quality Control Mechanism, the test sample is being accepted.

Website link:

<https://drdo.gov.in/testing-and-certification-samples-ppe-body-coverall-covid-19-inmas>

epidemic spread on different age group populations. This is very useful in predicting the safety mechanism to be employed for every age group in the society.



Application for Civil Society: The model is perfectly capable of handling the prediction of any other pandemic in the future. It can be deployed to the civil health organisations and allow them to feed the data on daily basis for them to understand their local health situations. The Model can also be integrated with the Ministry of Health and Family Welfare and ICMR database and provide them various data mining features to understand the current situation of the health status in the country. The Model also enables the users to vary various pandemic parameters such as protection rate, infection rate, average incubation time, average quarantine time, and mortality rate and estimate the future spread of the pandemic. This will be very useful to the health professionals to be prepared for any adverse events in the future. The model has been developed within existing facilities of INMAS and hence does not require any additional funding. The deployment of existing model to any other organisation requires maximum of a week's time after the basic information about their hosting platform is informed to INMAS.

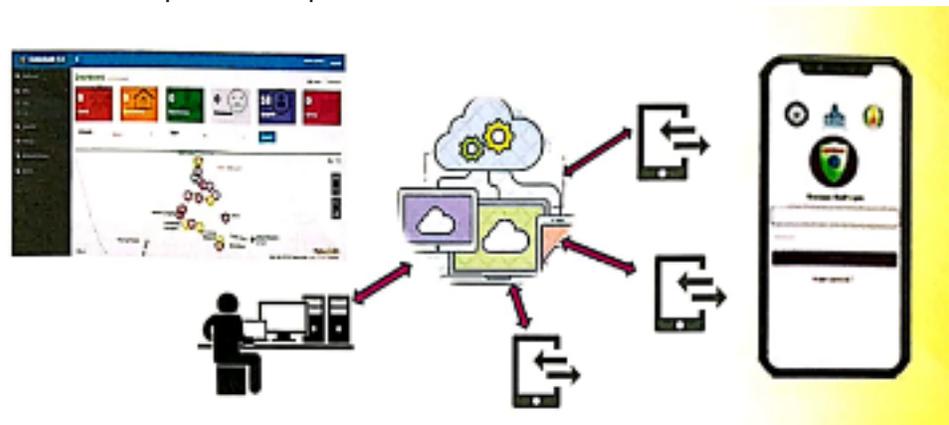
Website link:

https://drdo.gov.in/sites/default/files/inline-files/INMAS_Model.pdf

DRDO develops KAVASAM software for COVID-19 tracking and resource allocation

The KAVASAM software developed by Combat Vehicle Research Development Establishment (CVRDE), Avadi, Ministry of Defence empowers for efficient and effective collection of data. This unique framework provides useful guidance in the current COVID-19 pandemic scenario for tracking and resource allocation thereby identifying and suppressing the COVID-19 pandemic.

The KAVASAM Software framework consists of web-based application for supervision and approval by the Admin and Epicentre head. Two android apps, one for the team leader and health workers and another for patient, have been developed. It also facilitates field-level data collection and efficient monitoring. A four-level resource allocation framework hierarchy has been identified as super-admin, epicentre-head, team-leader and health-worker.



Website link:

<https://drdo.gov.in/sites/default/files/inline-files/Kavasam.pdf>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY)

Hack the Crisis – INDIA Online Hackathon

Ministry of Electronics and Information Technology (MeitY) in association with FICCI FLO Pune, Robotex International announced in April 2020 'Hack the Crisis – India Online hackathon' with special focus on containment of coronavirus (COVID-19) with the intent to develop solutions to deal with its aftermath.



Here are the details how Indians united to tackle the covid-19 crisis and challenges of a post-pandemic world. The following technologies have been recognised to be awarded.

Website link:

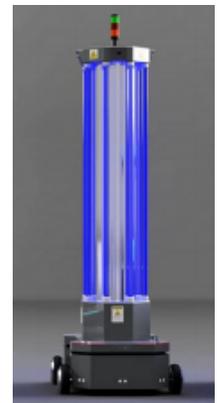
https://meity.gov.in/writereaddata/files/MEITY%20DOC_5.5.20_v4.pdf

Autonomous UV Disinfection Robot: ANSCER Robotics

The UV Disinfection Robot can be used to disinfect spaces in less time using Ultraviolet germicidal irradiation (UVGI) disinfection method. This method uses short-wavelength ultraviolet (UV-C) light to kill microorganisms. The robot may navigate areas/rooms that require disinfection. It also has an autonomous as well as a manual control mode with a necessary camera for feedback. This invention can be extremely useful in hospitals as cleaning a room that has housed a patient suffering from a contagious infection takes time and this robot cuts the cleaning time from days to hours.

Website link:

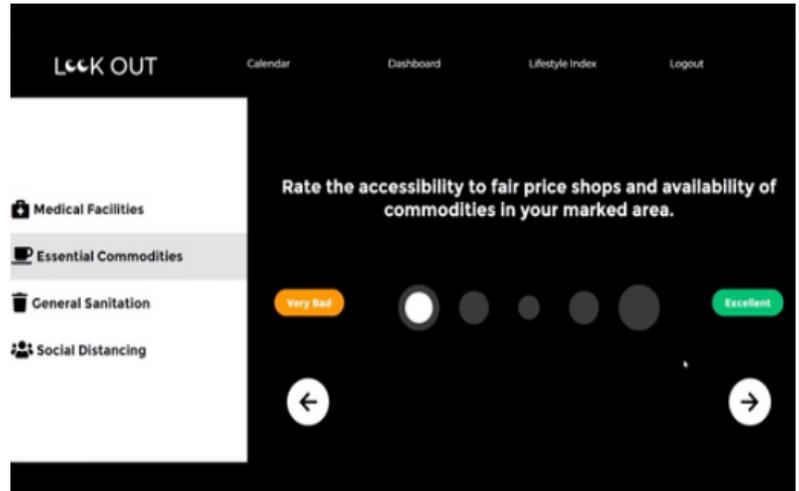
https://meity.gov.in/writereaddata/files/MEITY%20DOC_5.5.20_v4.pdf





Look Out App to help the government sustainably reallocate resources

Look Out is an Application which will help the Government identify the quality of essentials services being received in certain areas and redirect the assignment and allocation of their resources. The Application crowd sources data from the users about their residential area. Users rate their area based on 4 parameters daily to form a Lifestyle Quality Index for their respective area. This raw data is then provided to the Government in order to reallocate resources, if required, thereby improving equitable distribution of services and essentials.



Website link:

https://meity.gov.in/writereaddata/files/MEITY%20DOC_5.5.20_v4.pdf

Remotely operable and scalable mechanical ventilator: Big Bang Boom Solutions

It is a purpose-built mechanical ventilator system that can help the patients with COVID-19 by providing breathing assistance in positive end-expiratory pressure PEEP and Bilevel Positive Airway Pressure BiPAP mode. This is a completely modular, remotely operable and highly scalable ventilator system that runs on the latest industry 4.0 with an advanced processor that can sense even the slightest of change in inspiratory or expiratory pressure. Any abnormality in the breathing will be sensed and the operator will be notified through the connected remote device such as mobile phone or computer. Leveraging the consumer durables and the auto sector, scaling up this product without imports is highly possible.



Website link:

https://meity.gov.in/writereaddata/files/MEITY%20DOC_5.5.20_v4.pdf

Humans AI, a Data Labelling App, as a means of steady income

This App allows anyone, regardless of their literacy level, to 'play' and are compensated with real money for their services. It shows the data needed to be labelled in the form of images for classification, annotation and bounding-boxes in an intuitive mobile-based UI/UX and the label is paid for every correct label. It maintains accuracy of over 98% (based on STL-



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

OTHER SCIENTIFIC AND ACADEMIC INSTITUTIONS

IIT Delhi start-up launches Reusable Antimicrobial Mask

An IIT Delhi start-up “Nanosafe Solutions” has launched an antimicrobial and washable facemask “NSafe”, which is reusable up to 50 launderings, thus greatly cutting down the cost of use. The team consists of Dr. Anasuya Roy, an IIT Delhi Alumnus, Founder and CEO of Nanosafe Solutions Pvt. Ltd. and Prof. Mangala Joshi, Department of Textile and Fibre Engineering, IIT Delhi and also Founder and Director of the start-up.

NSafe mask is a highly engineered triple-layered product consisting of inner hydrophilic layer for comfort, middle layer having antimicrobial activity and outer-most layer having water and oil repellent behaviour. The mask has 99.2% bacterial filtration efficiency (at 3 microns) and complies with ASTM standards of breathability and splash resistance. It is extremely comfortable and breathable. Elastic band in the chin region and wire in the nose region provides adequate fit of the mask to the wearer.



Prof. Mangala Joshi said, “We believe this is the first fabric-based antimicrobial facemask launched in India, which is washable and reusable along with very high Bacterial Filtration Efficiency as tested according to ASTM standards. It is engineered to have very good breathability and comfort.” Dr. Anasuya Roy added, “The mask has been designed to maximize durability and dimensional stability, so that the mask can be reused 50 times. Effective reusability is an important factor as single-use masks will cause huge disposal issues.”





NSafe mask enhances protection of the wearer through three different mechanisms: mechanical filtration, antimicrobial decontamination and repulsion of aerosol droplets. The masks are dry-cleaned before packaging and packaged under hygienic conditions. After each usage (approximately 8-9 hours), the mask has to be hand washed in cold water with mild detergent and dried thoroughly in the sunlight. After 50 usages, the mask has to be disposed in a sealed polyethylene bag and put in the recyclable waste bin. NSafe mask is a premium product that is likely to be available at MRP of Rs. 299 (Pack of 2) and Rs. 589 (Pack of 4). The start-up has started manufacturing the masks.

Video link:

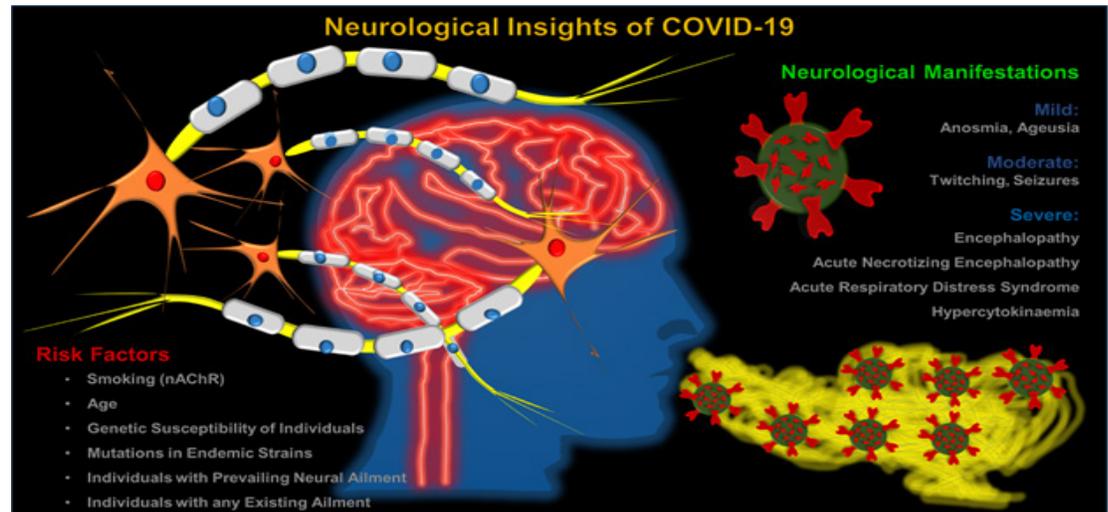
https://drive.google.com/drive/folders/1cGTZeEk0yPIVxC_790lc6MbwpuA9Xr6y

Website link:

<https://nanosafesolutions.com/>

IT Jodhpur studies on neurological perspective of COVID-19 outbreak crates widespread interest

Prof. Surajit Ghosh’s study on neurological perspective of COVID-19 outbreak has created widespread impact and has featured nationally. In this paper, Ghosh et al. have tried to understand the neurological manifestations of the COVID-19 virus and the probable therapeutic strategies that could be adopted to combat it. The paper also touches upon the endemic response of the people to COVID-19 infection.



Website Link:

<http://iitj.ac.in/COVID19/index.php?id=events&num=573&item=Main-news>

IIT Jammu develops face protection shield

Face protection shields has been developed by IIT Jammu, which is very important personal protection equipment (PPE) for any professional during the pandemic COVID-19. These shields are specially designed for Doctors, Police, Armed Forces of Jammu & Kashmir and IIT Jammu students, staff, and faculties. IIT Jammu is producing these shields in large quantities (10000 initially) to distribute among various defense professionals and doctors.



Website Link:

<https://iitjammu.ac.in/post/covid19-face-shield>



IIT Ropar created ‘Containment Box’ to prevent corona infection

IIT Ropar and the doctors of Dayanand Medical College and Hospital, Ludhiana, have jointly developed a ‘Containment Box’, which will provide an additional layer of protection to health workers and doctors, so that they can be protected from infection of corona.

Website Link:

<https://www.jagran.com/news/national-coronavirus-safety-device-iit-ropar-created-containment-box-to-prevent-infection-20227746.html>



Social and R&D Initiatives by IIT Hyderabad to support fight against COVID-19

Indian Institute of Technology, Hyderabad developed many social and R&D products to combat COVID-19 pandemic like lab-made sanitizer, UV-C-based LED sanitizer, Face Shield & Protective Gears, Ventilators and other hardware, drugs, vaccines & treatment, sensors/detectors, App for data collection, remote monitoring, visual surveillance, transportation, and support working mothers and villages adopted under Unnat Bharat Abhiyan.

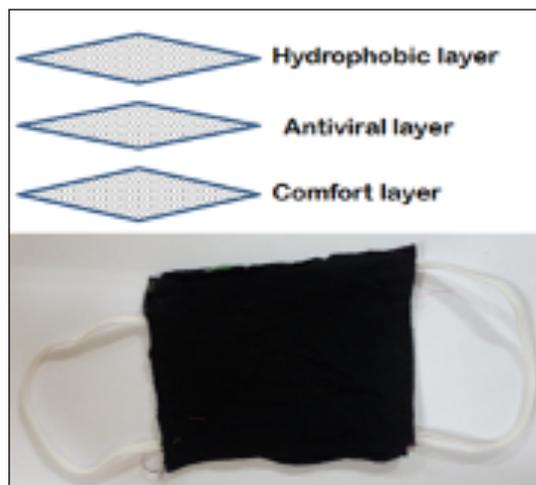
Website Link:

<https://iith.ac.in/assets/files/pdf/Social-and-R-D-Initiatives-to-fight-against-Covid-19.pdf>

IISC develops virucidal composite fabric for PPE

Researchers at Indian Institute of Science (IISC) have developed a cost-effective, antiviral and antibacterial 3-ply, textile-based facemask using an industrially scalable technology to prepare fibres of nanometer (nm) diameter with inter-fibre pores of nm size. Current antiviral masks available in the market are either expensive or are inefficient in reducing viral transmission. Due to high demand for PPE worldwide, the supply of quality PPE is limited.

The mask prepared by the team has a combination of three layers consisting of polyester and cotton fabrics to contain common viruses such as the influenza virus, as well as SARS-CoV-2. The three-layered mask consists of modified polyester, where a nanofibrous polymer membrane was deposited that renders the first layer highly hydrophobic.



Commercially available masks are based on the principle of physically blocking the entry of the bacteria and virus. But during handling, removal and disposal, live bacteria and viruses can get transferred to healthcare workers. For maximum protection to healthcare workers handling COVID-19 patients, the fabrics used in masks and other PPE should be virucidal.

Website Link:

<https://covid19.iisc.ac.in/virucidal-composite-fabric-for-ppe/>

Single-Piece Full Body PPE Cover (Marshall) developed at NIT Jalandhar to fight COVID-19 outbreak

Department of Biotechnology, National Institute of Technology Jalandhar (NITJ) has designed and developed a single-piece full body PPE cover (marshall). The designed PPE covers from head to toes with proper ventilation without direct exposure to viral particles suspended in the environment (air, water, soil). The mask and screen are pre-installed as the part of the cover. The PPE is chained from back side while the front side which is exposed mainly to infected person is completely covered.

Website Link:

https://www.nitj.ac.in/index.php/nitj_cinfo/pages/379



A new low-cost ventilator prototype developed at IISER Pune

Indian Institute of Science Education and Research (IISER) Pune faculty members Dr. Umakant Rapol and Dr. Sunil Nair have developed a low-cost ventilator put together with readily available and easily sourceable parts. The researchers are now looking to get in touch with manufacturers to produce this ventilator model.

Website Link:

<http://www.iiserpune.ac.in/news/a-new-low-cost-ventilator-prototype-developed-at-iiser-pune>

Helyxon Fever Watch

Helyxon, a start-up in the IIT Madras Research Park, has developed an app-based temperature device, called the 98.6 Fever Watch that can monitor one's health at home. This is a Healthcare IOT system and can be automatized at all hospital beds and at home. The device keeps track of the spikes and aberrations and whenever an anomaly is observed a system-generated call alert is made to the user while an automatic escalation to the local provider is done. The devices are equipped with geo-fencing tracking alerts to keep track of the patient's movements and ensure isolated patients do not violate the provisions of quarantine. The 98.6 Fever Watch is particularly useful for sick children in whom continuous monitoring of temperature is a vital parameter in disease management.



Website Link:

<https://www.f6s.com/helyxonhealthcaresolutionpltd/about>



SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

PRIVATE SECTOR ENTERPRISES

Virtusa develops ‘Track & Trace Solution’ for Coronavirus Test Kits (CVTK)

Virtusa is a leading provider of Digital Engineering Services and operates in more than 20 countries. The Company has proposed an innovative Internet of Things (IoT)-enabled Coronavirus Test Kits (CVTK) inventory management solution. It is an end-to-end IoT-driven solution with a focus on improving the patient outcome and drastically reduces the test turnaround time. Some of the salient benefits of the solutions are as follows:

Complete visibility into CVTK movements (across all modes of transport) – GPS enabled tracking and tracing; 100% adherence to strict safety and health standards – Prevent any mishandling of sample during transit; Digitally signed and tagged patient information for ensuring CVTK sample integrity; Record and Monitor ambient humidity and temperature of the samples during transport; Alarm and notifications, if samples do not reach destination on time; Provide dashboard on CVTK inventory status; real-time tracking; 100% traceability and test progress.

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www.virtusa.com

<https://www.nasscom.in/track-trace-solution-coronavirus-test-kits-cvtk>

Bing’s COVID-19 Tracker releases new features customized to help Indian citizens

Microsoft has announced new features on the Bing COVID-19 Tracker to help citizens of India stay up-to-date with the latest on the pandemic. These include the integration of the Apollo Hospitals Bot for self-assessment and a hub for telemedicine support from reputed healthcare organizations. The Tracker will also offer content in nine Indian languages to provide people across the country access to critical information related to the pandemic in preferred language.

The Bing COVID-19 Tracker serves as a single, credible hub of news and official government information. It allows users to track COVID-19 infections across the globe and in India at a

US Firm Ansys to assist IIT Kanpur start-up in development of low-cost ventilators

Ansys, a global engineering simulation company, entered into an agreement with an IIT Kanpur-led consortium to assist in the development of low-cost ventilators to fight the COVID-19 outbreak in India. Under the supervision of the consortium, Nocca Robotics, an IIT Kanpur-incubated start-up, is developing indigenised and low-cost invasive ventilators called Nocca VI 10.

Engineers at Nocca Robotics have prototypes of a portable machine ready. They are being tested on artificial lungs, a prosthetic device that provides oxygen and removes carbon dioxide from the blood. Nocca VI 10 is a modular, power efficient invasive ventilator that operates in a pressure-controlled mode, and the IoT (the Internet of Things) enabled design allows multiple ventilators to be controlled via remote control.

It has been designed in a way that it can be manufactured on a large scale at multiple sites using materials easily available with Indian suppliers and manufacturers. The entire project is being coordinated by Professor Amitabha Bandyopadhyay, professor-in-charge, Start-up Innovation & Incubation Centre (SIIC), IIT Kanpur.

Ansys, headquartered in the US, is the first company which has joined hands with the consortium and FIRST (Foundation for Innovation and Research in Science Technology), the premier institute's company that oversees incubation activities of IIT Kanpur to speed up the development of these ventilators.

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Website link:

<https://gadgets.ndtv.com/others/news/iit-kanpur-startup-ansys-nocca-robotics-private-limited-covid-19-2209950>

<https://iitk.ac.in/dora/funds/covid.php>

PNB Housing Finance Limited funds IIT Delhi start-up ETEX for developing PPE customised for healthcare professionals

The Indian Institute of Technology Delhi (IITD) is being funded by PNB Housing Finance Limited (PNBHFL) towards its fight against COVID-19 by developing personal protective equipment (PPE) for healthcare workers.

IITD and PNBHFL have signed a Memorandum of Understanding under which, IIT Delhi start-up ETEX incubated at IITD, will be working to develop and deliver smart textile solutions for healthcare. The team has a strong expertise in textile engineering and has technical support from researchers and professionals from interdisciplinary backgrounds including electronics, medical, material and design. The team is committed to innovate advanced technologies related to protection (against pollution and COVID-19), pain, health monitoring and posture. PNBHFL, a leader in the construction finance, will be contributing corporate social responsibility (CSR) funds towards this project.

“We are happy to associate with PNBHFL,” says Prof. V. Ramgopal Rao, Director IIT Delhi. He further added that KAWACH, a product of IIT Delhi start-up, has already been launched to provide efficient and cost-effective mask. In its endeavour to reach out to masses and support a social cause, ETEX has partnered with ECOTATV, a social enterprise by a group of differently-abled people, in manufacturing of KAWACH, assuring their jobs and active participation in the battle against COVID-19.

“The COVID-19 pandemic has triggered an unprecedented lockdown in many geographies globally. We believe all public and private stakeholders must contribute their mite in stopping



SCIENCE OUTREACH & POPULARISATION EFFORTS

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 Science Ministries & Departments

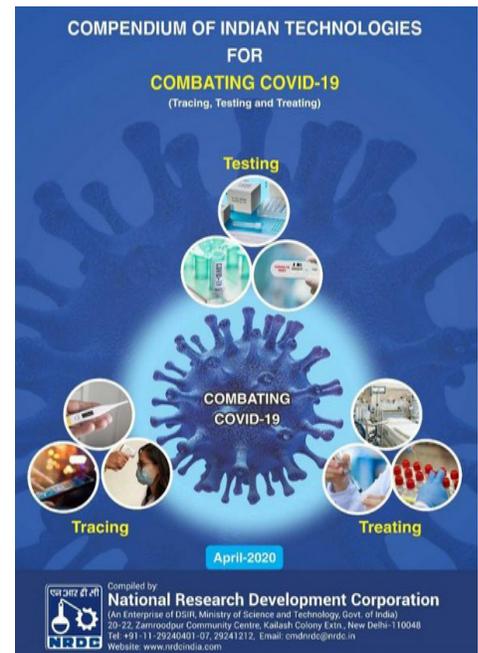
NRDC brings out a Compendium of Indian Technologies for combating COVID-19

A “Compendium of Indian Technologies for Combating COVID-19 (Tracing, Testing and Treating)” prepared by National Research Development Corporation (NRDC) was launched by Dr Shekhar C Mande, Director General, CSIR and Secretary, DSIR, Government of India at CSIR Headquarters, New Delhi. The compendium carries information about 200 COVID-19-related Indian technologies, ongoing research activities, technologies available for commercialisation, initiatives and efforts taken by the Government of India, categorised under 3Ts of Tracking, Testing and Treating. Most of these technologies are proof-of-concept (POC) tested and can help the entrepreneurs to take the product to market faster as they do not have to reinvent the wheel. Dr. Mande appreciated the initiative of NRDC for bringing out the Compendium of Indian Technologies for Combating COVID-19 by saying, “it is very timely and would benefit the MSMEs, Start-ups and the public at large”.

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Website Link:

http://www.nrdcindia.com/uploads/press/1588779121Press_Information_Bureau.pdf
<https://drive.google.com/file/d/1wTtuYtzGG5S3kKpIHgY6493pShIoHHjM/view>



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.

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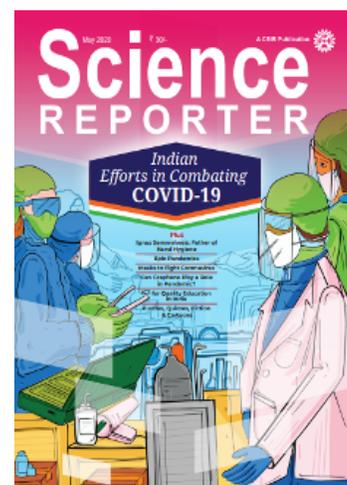
Website link:

<https://dst.gov.in/sites/default/files/COVID%20Katha.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.



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Website link:

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



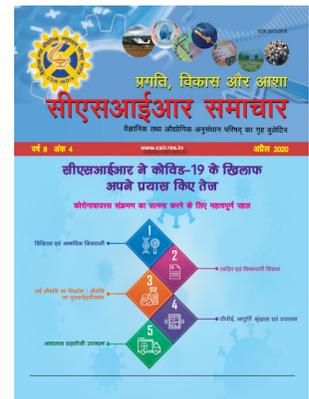
Special issue of monthly e-Newsletter ‘CSIR Samachar’ on COVID-19

CSIR-Samachar is a monthly Newsletter published by CSIR-NISCAIR. The Newsletter consists of various contemporary activities. The April 2020 edition of CSIR Samachar focuses on COVID-19 pandemic and efforts towards its mitigation.

Contact Info: Dr Manish Mohan Gore; mmg@niscair.res.in

Website Link:

<https://www.niscair.res.in/includes/images/csirsamachar/csir-samachar-april20.pdf>



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 and 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.



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Website Link:

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

NCSTC-GUJCOST Webinar Series to be organised - Overcoming COVID-19 by Awareness & Preparedness

The National Council for Science & Technology Communication (NCSTC), Department of Science & Technology, Government of India, in association with the Gujarat Council of Science & Technology (GUJCOST), will be organizing a Citizen’s Science Webinar Series on ‘Science Communication in the Time of COVID-19’ during 10-16 May 2020 everyday between 10-11 a.m. The webinar would be accessible online.



The webinar would address ways of tackling the current pandemic by applying various methods and means. It will develop awareness and preparedness to deal with and address current health crisis posed by COVID-19 to help overcome the situation.



In order to facilitate necessary actions and preparedness of the society to address the challenge, such strategies to reach out to the society with the necessary information by involving various stakeholders, including students, academics, media and volunteers, and so on, would be an advantage.

Communication of associated risks through effective science popularisation for promoting community-level response will help translation and usage of authentic scientific and health information and facilitate crisis management.

Website link:

<https://dst.gov.in/ncstc-gujcost-webinar-series-be-organised-overcoming-covid-19-awareness-preparedness>

Efforts from Vigyan Prasar

India Science Channel

India Science is an Internet-based Over-The-Top (OTT) Science TV channel. It is an initiative of the Department of Science and Technology (DST), Government of India, implemented and managed by Vigyan Prasar (VP), an autonomous organisation of 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.

INSA-INYAS VIGYAN SETU विज्ञान सेतु
Webinar Series
"SCIENCE AND SCIENTIST IN THE NEW MILLENNIUM"
Date & Time : May 12, Tuesday, 11:00 am
By Prof. Ashutosh Sharma, Secretary, Department of Science & Technology, Government of India
LIVE ALSO ON India SCIENCE

11th May 2020
NATIONAL TECHNOLOGY DAY
WATCH ONLY ON India SCIENCE
Download App from Google Play / App Store
SPECIAL TALK ON **COMBATING CORONAVIRUS THROUGH TECHNOLOGY**
EXPERTS
Dr. Anurag Agrawal, Director, CSIR-Institute of Genomics and Integrative Biology
Prof. B. S. Murty, Director, Indian Institute of Technology Hyderabad



- 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.

India Science did the live webcast of National Technology Day event on 11th May, 2020. The Union Minister of Science & Technology, Earth Sciences and Health & Family Welfare, Dr. Harsh



Vardhan addressed a Digital Conference, 'RE-START – Reboot the Economy through Science, Technology and Research Translations', which was organised to celebrate the National Technology Day. In his address, Dr Harsh Vardhan said that India's fight against the COVID-19 is moving ahead strongly and steadily. The Conference was organised by the Technology Development Board (TDB), a statutory body of the Department of Science & Technology (DST), and Confederation of Indian Industry (CII). Dr V K Saraswat, Member, NITI Aayog, Professor K. Vijay Raghavan, Principal Scientific Advisor to the Government of India, Professor Ashutosh Sharma, Secretary, DST, Dr Saumya Swaminathan, Chief Scientist, World Health Organisation, Mr Chandrajit Banerjee, DG, CII, Dr. Neeraj Sharma, Secretary, TDB, also addressed this conference.



Vigyan Prasar also did the webcast of two special talks on 'Combating Coronavirus Through Technology', on the National Technology day, 11 May 2020. The speakers were Prof. B. S. Murty, Director, IIT Hyderabad and Dr Anurag Agrawal, Director, CSIR-Institute of Genomics and Integrative Biology.



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

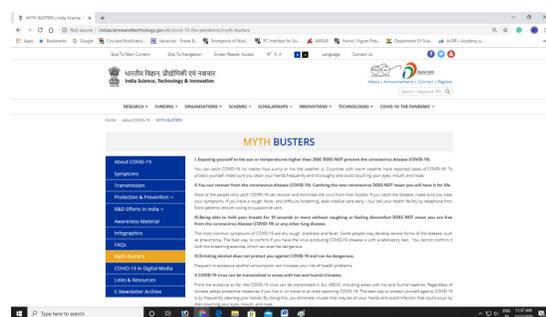
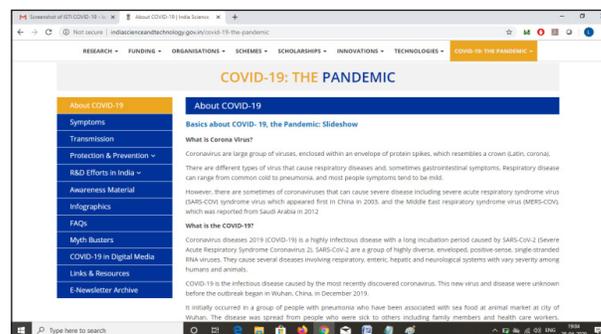
India Science, Technology and Innovation Web Portal

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 Vigyan Prasar, an autonomous organisation of the Department of Science and Technology (DST).

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



The web portal provides all information related to COVID-19, its presentation of symptoms, transmission modes and mechanisms, and various models of protection of individuals, healthcare professionals & 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>

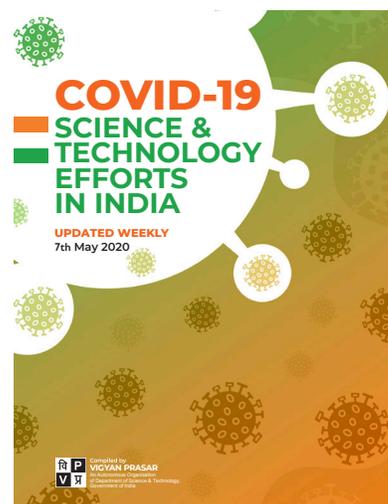
Weekly Publication of e-Newsletter on COVID-19

For the benefit of our stakeholders, Vigyan Prasar is 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.

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Website link:

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



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

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

The May 2020 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.

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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

