

UPDATED WEEKLY

SCIENCE & TECHNOLOGY EFFORTS IN INDIA

ON COVID-19

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COMPILED BY:

VIGYAN PRASAR

(AN AUTONOMOUS INSTITUTE 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 (Eols) to enhance research and development-related activities to battle the pandemic out.

We hope this initiative of Vigyan Prasar shall be a handy guide to scientists, researchers, and scholars, especially those who are interested in knowing various aspects of COVID-19 and contributing to the coronavirus warfare in whatever minuscule way and people at large.

Vigyan Prasar
New Delhi

Dr Harsh Vardhan elected as Chair of Executive Board of WHO

22nd May 2020, New Delhi

The Union Minister of Health & Family Welfare Dr Harsh Vardhan has been elected as Chair of the Executive Board of World Health Organization for the year 2020-21. This took place today during the 147th session of the Executive Board, in a meeting that was virtually held. He has replaced Dr Hiroki Nakatani of Japan.



Accepting the Chair of the Executive Board, Dr Harsh Vardhan paid tribute to the lakhs of people who have lost their lives due to the global COVID-19 pandemic. He requested all dignitaries present on the occasion to give a standing ovation to all the frontline health workers and other COVID Warriors by saluting their dignity, determination and dedication.

“I feel deeply honoured to have the trust and faith of all of you. India, and all my countrymen, too, feel privileged that this honour has been bestowed upon us,” he stated. Acknowledging that this is a great human tragedy and the next two decades may see many such challenges, he stated that “All these challenges demand a shared response, because these are shared threats requiring a shared responsibility to act.” He further added that “while this is the core philosophy of our alliance of member nations that comprise WHO; however, it needs a greater degree of shared idealism of nations.” He said that “The pandemic has made humanity acutely aware of the consequences of ignoring the strengthening and preparedness of our healthcare systems. In such times of global crisis, both risk management and mitigation would require further strengthening of global partnerships to re-energize interest and investment in global public health.”

Dr Harsh Vardhan also shared India’s experience of combating COVID-19. He noted that “We have a mortality of 3 per cent only. In a country of 1.35 billion, there are only 0.1 million cases of COVID-19. The recovery rate is above 40 per cent and the doubling rate is 13 days.”

As the new Chair of the Executive Board of WHO, Dr Harsh Vardhan underlined the need for higher commitments in respect of diseases that have plagued humankind for centuries, collaborations for supplementing each other by pooling of global resources, an aggressive roadmap to curtail deaths from diseases that can be eliminated, a fresh roadmap to address global shortages of medicines and vaccines and the need for reforms.



“I am sure that constant engagement with member states and other stakeholders will reinforce reforms and help accelerate progress towards achieving sustainable development goals and universal health coverage with the most productive, efficient and targeted utilization of resources. I will put myself to work to realise the collective vision of our organisation, to build the collective capacity of all our member nations and also build a heroic collective leadership,” he stated.


Dr Harsh Vardhan stated that WHO believes in the principle that the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition. “We, therefore, commit to work with the Member States; the Organization and the global community of partners for the efficient, effective and responsive discharge of public health obligations,” he added.

Dr Harsh Vardhan, while taking charge as the Chair of the EB, also shared his thoughts on the future health scenario of the world. “I believe that health is central to economic performance and to enhancing human capabilities. However, public health policy must be based and guided on a proper understanding of nature. This is also the underlying principle of the Indian



traditional systems of medicine based on holistic health and wellness, which I have lived and experienced,” he said. He also outlined the policy of India towards ‘Universal Health for All’ through national flagships programmes such as Ayushman Bharat with its twin pillars of Health & Wellness centres (HWCs) and Pradhan Mantri Jan Arogya Yojana (PMJAY), being led by the dynamic and visionary Prime Minister Mr Narendra Modi.

Reminiscing about his long-standing association with WHO, he expressed his gratitude for the strong support of WHO in India’s fight against Polio. “If it had not been for the support and morale boosting by friends in WHO, I would not have achieved what I did. If, today, Polio stands eradicated from India, I must admit, it could never have been possible without the perseverance of WHO,” he stated.



Dr Harsh Vardhan has also been a member of several prestigious committees of WHO like Strategic Advisory Group of Experts (SAGE) and the Global Technical Consultative Group (TCG) on Polio Eradication. He has also served as an Advisor to the WHO.

The Executive Board of WHO is composed of 34 technically qualified members elected for three-year term. The main functions of the Board are to implement the decisions and policies of the Health Assembly and advise and facilitate its work.

This is another feather in the cap of Dr Harsh Vardhan's illustrious career. He earned his graduation and post-graduation in medicine from G.S.V.M. Medical College, Kanpur in 1979 and 1983, respectively. He has been associated with public service since 1993 when he was elected to the Delhi Legislative Assembly. He served his constituency continuously for five terms until he was elected to the 16th Lok Sabha in May, 2014 from Chandni Chowk constituency. From 1993 to 1998, he served as the Minister of Health, Education, Law & Justice & Legislative Affairs for the Govt. of NCT of Delhi. In 1994, as the Delhi Health Minister, he oversaw the successful implementation of the pilot project of the Pulse Polio Programme which involved the mass immunisation of 1.2 million children up to the age of 3 in Delhi, laying the groundwork for a Polio-free India in 2014. He has championed the passing and implementation of the Delhi Prohibition of Smoking and Non-Smokers Health Protection Act, 1997, which was later replicated by several States in the country.

Dr Harsh Vardhan has been the Union Health Minister in 2014 and later took over as the Union Minister Science & Technology and Earth Sciences. He was also Union Minister for Environment, Forest and Climate Change. He was re-elected to the 17th Lok Sabha and sworn in on May 30th, 2019 as Union Cabinet Minister and was given the portfolios of Health and Family Welfare; Science and Technology and Earth Sciences.

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

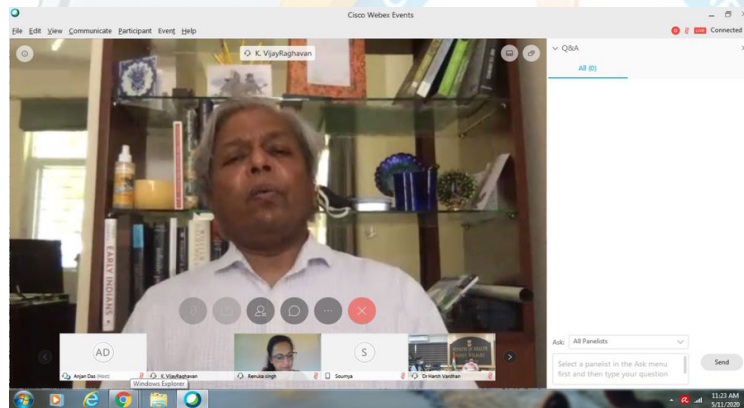
supported the 'Make in India' Programme. This has brought in scientific institutions and start-ups to develop the Covid-19 tests, masks, sanitizers, personal protective equipment (PPEs) and ventilators," he further added.

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-1 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



The graphic is a promotional poster for the 'AYUSH Sanjivani' app. At the top left is the logo of the Ministry of AYUSH, and at the top right is the 'myGov' logo. The central text reads: 'Expanding Horizons of Age-Old Traditional Knowledge of Ayurveda with AYUSH Sanjivani App'. Below this, a central image shows a smartphone displaying the app's interface. Surrounding the phone are four icons with corresponding text: 1. A green hexagon with a virus icon: 'To generate data on acceptance & usage of AYUSH measures & its impact on prevention of COVID-19'. 2. A blue hexagon with a person icon: 'Provide AYUSH advisories related to immunity boosting measures'. 3. A red hexagon with a person icon: 'Promote AYUSH knowledge for larger good of the global community'. 4. A purple hexagon with a person icon: 'To develop AYUSH interventions & solutions; to reach out to target of 50 lakh people'. At the bottom, there is a 'Download Now!' button with the Google Play logo and the date 'Dated: 9 May, 2020'. The background features a faint watermark of a person meditating and a banner that says 'GATHERING & TRADITIONAL PRACTICES FOR CORONA PREVENTION & MEDICATION'. There are also images of herbs and spices at the bottom.

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. 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>

THE COUNTRY WILL BE SELF-RELIANT BY THE END OF MAY 2020 IN PRODUCING INDIGENOUS RAPID TEST AND RT-PCR DIAGNOSTIC KITS

— DR. HARSH VARDHAN

“At least half a dozen candidate vaccines are being supported of which four are in an advance stage.”

- Dr. Harsh Vardhan

28th April 2020, New Delhi

Union Minister of Science & Technology, Health & Family Welfare and Earth Sciences, Dr. Harsh Vardhan, reviewed through video-conferencing the various initiatives undertaken by the Department of Biotechnology (DBT) and its Autonomous Institutes (AIs) and Public Sector Undertakings (PSUs) – BIRAC and BIBCOT to tackle the current COVID-19 crisis, especially with respect to progress made in indigenous development of vaccine, Rapid Test and RT-PCR diagnostic Kits.



Secretary, DBT, Dr. Renu Swarup informed that DBT has evolved a multi-pronged research strategy and action plan for immediate response as well as for long-term preparedness to tackle COVID-19. These multifaceted efforts include research towards development of candidate vaccines, therapeutics, and suitable animal models for COVID-19 as well as development of indigenous diagnostics and genomic studies on the host and pathogen. The DBT and its PSU,



Biotechnology Industry Research Assistance Council (BIRAC) has announced a COVID-19 Research Consortium Call to support diagnostics, vaccines, novel therapeutics, repurposing of drugs or any other intervention for control of COVID-19.

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-PCR 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

Systems. Dr. Mande also mentioned that 15 CSIR labs are working in close partnership with major Industries, PSUs, MSMEs and other departments and ministries at the time of the crisis in the country.

After briefing of all the efforts being made by the CSIR labs in finding a solution for COVID-19, Dr. Harsh Vardhan informed them about the steps being taken by the Government of India in combating COVID-19.

Dr. Harsh Vardhan exhorted CSIR scientists and said, "India has high expectations from its scientific community and I am sure that the community will rise to the occasion and deliver in this time of need". He appreciated that CSIR Labs were also participating in testing of swab samples of COVID patients and some of them have started doing genetic sequencing of the virus with a target of doing 500 sequencing in coming weeks. Dr. Harsh Vardhan said, "Genetic sequencing is very crucial in identifying the host response as well as identifying population vulnerability to the disease." He 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."

He also appreciated CSIR for partnering with MSMEs, Major industries, PSUs working on RT-PCR machines. He said, "Plasma-based therapy is very much needed at this hour. For this, we need to motivate the patients who have recovered from the COVID-19 to donate blood."

He also appreciated the work done by CSIR-NAL with BHEL and BEL on Ventilators, Oxygen Enrichment Devices and 3-D printed face shields, face masks, gowns and other protective equipment. "All these things will help us in next few weeks," he said.

Dr. Harsh Vardhan, however, cautioned CSIR scientists to develop COVID-19 mitigation solutions keeping fixed timeframe in mind. "These are times of war, CSIR scientists should work to deliver solutions before war ends, they should not treat it as a routine research project". He said, "COVID-19 has also come as a blessing in disguise as it will give boost to country's resilience and self-reliance and enhance indigenous capacity in developing critical healthcare equipment." He also appreciated the collaboration being done by the CSIR scientists using Video Conferencing tools and reiterated the scientists that while doing research they should continue observing social distancing and lockdown because till such time vaccine is developed by scientists to combat COVID-19, these two remain the most potent form of social vaccine.

Dr. Shekhar C. Mande, DG, CSIR, Dr. Anurag Agrawal, Director, Institute of Genomics and Integrative Biology (CSIR-IGIB) and Dr. Nakul Parashar, Director, Vigyan Prasas were present in the review meeting with the Union Minister. Directors of remaining 38 CSIR labs attended the meeting through Video Conference.

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)

Industry Engagement facilitated by the Office of the Principal Scientific Adviser

With the country facing an unprecedented crisis due to the coronavirus pandemic, the premier technical institutes have completely re-oriented their research ecosystem to develop solutions for the myriad issues that are coming up. This Herculean effort that lacks a parallel in modern history demands not only a significant commitment in terms of manpower and infrastructure but also a sizeable financial outlay. The industry has stepped up to do its part and help the country overcome this crisis by funding and collaborating on research projects with academia.

IIT Delhi developing PPE kits customised for healthcare professionals

The Indian Institute of Technology Delhi (IITD) joined hands with PNB Housing Finance Limited (PNBHFL) towards its fight against COVID-19 by developing personal protective equipment (PPE) for healthcare professionals.

IIT Delhi 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

IIT Delhi, PNB Housing Finance Join Hands In Fight Against COVID-19

The Indian Institute of Technology (IIT) Delhi or 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.

Published by Shiksha.com | Updated: May 10, 2020 07:56:05 | Source: NDTV



PNB Housing Finance in pact with IIT-Delhi

By Press Trust Of India — On May 9, 2020



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.

The COVID-19 pandemic has triggered an unprecedented lockdown in many geographies globally. All public and private stakeholders must contribute their mite in stopping its spread. As part of its societal

responsibilities, PNBHFL has joined hands with IIT Delhi in ensuring the contribution to the nation's effort in flattening the COVID-19 curve. Through this partnership, PNBHFL aims to play a meaningful role in safeguarding the well-being of corona warriors, who are risking their lives by putting service before self, day after day. Prof. Bipin Kumar, Department of Textile Technology is spearheading this project.

Development of a Novel Peptide Therapy for COVID-19 at IIT Delhi

This project, being carried out at DBT Centre of Excellence for Biopharmaceutical Technology, IIT Delhi, is utilizing bioinformatics tools to design a novel peptide for blocking coronavirus. They are being supported in their endeavour by Kisankraft Limited. This IIT Delhi-based start-up Growdea Technologies Pvt. Ltd is founded by Dr. Avinash Mishra at IIT Delhi.

IIT Kanpur – Nocca develops Invasive Ventilator with IoT-enabled features

Nocca Robotics Pvt. Ltd is engaged in designing and manufacturing robots that clean solar panel in a waterless manner. Using the Team's extensive experience in electromechanical control systems in their regular business, they decided to contribute in nation's fight against COVID-19, by designing a ventilator along with the active involvement and guidance from the incubator of IIT Kanpur. An experienced team of pulmonologists and intensivists from India and overseas has been advising the Team on the design principles of invasive ventilators. The development is aided by an experienced group of Indian business leaders and biomedical engineers.



The ventilator has been designed in a way so that

- It can be manufactured at a large scale at multiple sites.
- It can work with medical airline plus oxygen as well as ambient air plus oxygen thus providing the versatility to operate under both conditions.
- It meets all the essential specifications laid out by the Government of India.

The designed mechanical ventilator can operate in PC-CMV, PC SIMV, PSV, VC-SIMV, VC CMV, PRVC, ACV, CPAP and BPAP modes. The ventilator is permanently connected to a mobile phone which is used to control the device and display critical information. The IoT-enabled feature creates an efficient Ventilator Management System that allows:

- doctors to control the ventilators remotely and thus ensuring lesser exposure to COVID-19 patients and/or ventilator and
- control of multiple machines with one IoT device thus addressing the problem of limited availability of trained doctors.

Current Status:

- The product is currently at the compliance and pre-clinical testing stage.
- The project has been a brilliant union of the academia, start-up and hospital. This was possible with industry being the major component of all, binding everyone together.

Industries supporting the project:

i) ACT Grants

Description: ACTS Grants is the Action COVID-19 Team equipped with Rs. 100 crore grant created by India's start-up community to give wings to ideas that could combat COVID-19 with immediate impact. They have been seeking capital-efficient, scalable solutions from NGOs and innovative start-ups which need an initial seed grant to fight the spread of the pandemic. Many organisations like MMT, Dell, Infoedge, and, members of funds like Accel, Aavishkaar, Sequoia, and Unitus, have donated in personal capacity. For more details, please visit www.actgrants.in

Support: The ACT grant is currently being used for prototype development and preclinical trials of the product.

ii) Ansys

Description: Ansys offers a comprehensive software suite that spans the entire range of physics, providing access to virtually any field of engineering simulation that a design process requires. Organizations around the world trust Ansys to deliver the best value for their engineering simulation software investment. During the COVID-19 pandemic, Ansys is also striving to positively contribute to the battle against coronavirus. Ansys is supporting the ongoing initiatives of its customers and partners.

Support: The fund by Ansys has helped the product's initial research and development.

iii) Standard Chartered

Description: Standard Chartered Bank is India's largest international bank with 100 branches in 43 cities.

Support: These funds were one of the early ones and helped in the project's initial product R&D.

iv) ICICI Securities

Description: ICICI Securities Limited is a Registered Investment Advisor under SEBI Investment Adviser Regulations, 2013 and has been offering advisory services under the brand ICICIdirect Investment Advisory Services.

Support: The funds were used in the project's initial product R&D.

v) Cummins India

Description: Through Cummins Technologies India Pvt. Ltd., Cummins is at the forefront of designing future technologies for turbos, emissions, fuel systems and more.

Support: Cummins is helping the project by supplying one of the most critical components in the ventilator – the flow sensors.

vi) Naukri.com

Description: Naukri.com is a recruitment platform that provides hiring-related services to corporates/recruiters, placement agencies and to job seekers in India and overseas.

Support: These funds are currently helping the project with prototyping and compliance testing of the ventilator.

vii) AdorPowertron

Description: AdorPowertron is the world's leading solution provider of high frequency & conventional high voltage rectifier transformer sets that are deployed for clean air applications (including electrostatic precipitators for power stations, cement, pulp & paper + steels plants and roads). They are also India's largest provider of traffic safety & enforcement solutions, including speed enforcement systems & IP and electronic Variable Messaging Signs/Commercial LED Walls.

Support: Conversation is on with Ador for mass manufacturing of the product starting next month.

Cholamandalam provides funding support to IIT Madras Students to scale up production of face shields

The coronavirus spreads primarily between people in close contact, often by small droplets during coughing, sneezing, and talking. Hence, face shields have become critical to protecting healthcare workers in the frontlines and treating patients.

Cholamandalam, the financial services arm of the Murugappa Group, has provided funding to IIT Madras students to scale up the production of face shields.

The students started manufacturing these face shields using 3D printing, with a production rate of around 1,000 pieces per day. As the project gathered momentum and attracted more orders, the team shifted to 'Injection Moulding' technique, which enabled them to quadruple the production rate to around 4,000 pieces per day at a reduced cost with an improved design. The students have already delivered over 45,000 face shields to hospitals and police personnel in Chennai, Puducherry, Avadi and Cuddalore among other places.

These face shields have received a lot of appreciation and positive feedback from the users. More importantly, this was seen as a good replacement to the Hazmat Suit Helmets which most users felt were suffocating and did not allow smooth access to stethoscopes as well.

Venture Center's initiative on developing simple and low-cost face shields for healthcare workers and police forces gets support from Cummins India Foundation, Persistent Foundation & Kirloskar Brothers Ltd. Pune

One of the ways in which the human-to-human transmission of the SARS-CoV-2 virus occurs is through respiratory droplets generated when people cough, sneeze, or exhale. Thus, healthcare workers, police personnel, and caregivers of suspected/confirmed COVID-19 patients are mostly at risk of getting infected.

To safeguard the health of these workers, enthusiastic staff and entrepreneurs at Entrepreneurship Development Center (Venture Center), a technology business incubator hosted by CSIR-National Chemical Laboratories in Pune have designed and manufactured a simple and low-cost face shield, which provides a physical barrier between the workers and other people they interact with, significantly minimizing their contact to the infection.

The face shield comprises of a transparent clear polyester sheet that protects the face from any airborne fluid particles. The sheet is kept in place with the help of a headband and an elastic strap. The Pune face shield design uses MDF and can be machined (instead of laser cutting), which makes the process simpler, cheaper and scalable.

The designs are now available freely for download under a Creative Commons Attribution – Non Commercial – ShareAlike 4.0 International Public License.

Anyone can use the knowhow freely for non-commercial use (means that you will price it reasonably and provide at affordable costs and make it available without unfair discrimination). So far, nearly 1 lakh face shields have been delivered to healthcare workers and police forces across the country. Website Link: <https://www.venturecenter.co.in/covid19/pune-face-shield-action-group/>

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

RNA extraction kit Agappe Chitra Magna launched commercially for detection of COVID-19

The commercial launch of Agappe Chitra Magna, a magnetic nanoparticle-based RNA extraction kit for use during detection of COVID-19 was announced by Dr VK Saraswat, NITI Aayog member and President of Institute body of Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) at a programme attended by Prof. Ashutosh Sharma, Secretary, DST, Government of India; Dr Asha Kishore, Director SCTIMST; and Dr HK Varma, Head Biomedical Technology and scientists of the Institute, through video conference.



The RNA extraction kit was developed by SCTIMST, Thiruvananthapuram, an Institute of national importance of the DST along with Agappe Diagnostics Ltd, an in vitro diagnostics manufacturing company based in Cochin.

“The commercial launch of the kit is a major step to make India self-reliant in detecting COVID-19 and can help increase the rate of testing and bring down its costs, a crucial step for combating the pandemic. It can also be an example of rapid commercialization and implementation of a state of the art technology for the world to emulate,” said Dr Saraswat while announcing the launch.

Website link:

<https://dst.gov.in/rna-extraction-kit-agappe-chitra-magna-launched-commercially-detection-covid-19>

Comfortable facemask designed by CeNS could encourage public to use it for long hours

A team of researchers at Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, an autonomous institute of the DST, have developed a cup-shaped design (patent filed) of the facemask that helps to create enough space in front of the mouth while speaking. It has been transferred to a Bengaluru-based company for mass production.

This snug fit mask causes no speech distortion, no fogging on glasses, and indeed packs well all around, leaving practically no room for leakage while breathing. Another important advantage

is its high breathability allowing one to wear it without any discomfort. Further, the researchers have chosen the fabric layers such that there is a possibility of deactivating pathogens sheerly by the electric charges that may prevail under mild friction due to the triboelectric nature of the fabric.



Website link:

<https://dst.gov.in/comfortable-face-mask-designed-cens-could-encourage-public-use-it-long-hours>

IIT Kanpur researchers to design a cost-effective virucidal coating for surgical masks for preventive measures against COVID-19

Science and Engineering Research Board (SERB), a statutory body under the Department of Science and Technology, is supporting a research by a team of scientists from IIT Kanpur for developing a protective coating that would greatly help in making medicated masks and medical wear (PPE) for fighting COVID-19.

The Team would be developing the coating using a combination of common polymers containing anti-microbial properties and re-purposable anti-viral molecules and materials to make it a cost effective solution. Doctors and nurses, treating COVID-19 patients and hence susceptible to contamination due to their nature of work, will immensely benefit from this as it would add a layer of security for them while treating the patients. Cost-effectiveness of the project would also help in mass-scale production.

The researchers from the Department of Chemistry in IIT Kanpur will be designing the virucidal coating using polymers which can resist attachment of bacteria and virus. An additional protection will be included to the polymer coating using molecules that can either destabilize and/or neutralize coronaviruses and other viruses like influenza. The combination of anti-microbial polymer coating and functionalized drugs is also expected to provide a synergistic antiviral effect.

Website link:

<https://dst.gov.in/iit-kanpur-researchers-design-cost-effective-virucidal-coating-surgical-masks-preventive-measures>

JNCASR develops versatile coating to stop spread of viruses like influenza and COVID-19

An antimicrobial coating, developed by Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, an autonomous institute under the DST, has shown excellent

results in tackling the spread of deadly influenza virus, the root cause of severe respiratory infections, by inactivating large loads of influenza virus. The Science and Engineering Research Board, a unit of the DST is supporting further development of this coating for the country's war against COVID-19.

The proven efficiency of the coating in 100% destruction of influenza virus (an enveloped virus) shows that the coating may be effective in destroying COVID-19 – another enveloped virus upon contact. The technology which is simple and hence do not require skilled personnel for its development is already set to be tested against COVID-19. If found to be active, a number of PPEs, such as masks, gowns, gloves, face shields, etc. used by doctors and nurses can be coated with it, imparting enhanced protection and safety to them. This will aid them to fight the battle against COVID-19 more effectively.

Website link:

<https://dst.gov.in/jncasr-develops-versatile-coating-stop-spread-viruses-influenza-and-covid-19>

DST approves funding for developing a gel for nasal passage as prevention for COVID-19

SERB, a statutory body of the DST, is supporting a technology by the Department of Biosciences and Bioengineering (DBB), IIT Bombay for capturing and inactivation of novel coronavirus, the causative agent of COVID-19.

The funding will help the team from the DBB, IIT Bombay develop a gel that can be applied to nasal passage, which is a major entry point of the coronavirus. This solution is not only expected to protect the safety of health workers, but can also lead to reduction in community transmission of COVID-19, thereby helping disease management.

Given the contagious nature of COVID-19, healthcare providers including doctors and nurses are at maximum risk while taking care of COVID-19 patients, particularly asymptomatic ones who cannot be detected and pose a greater risk in spreading the disease.

The team is planning a two-pronged approach to limit transmission of the SARS-CoV-2 virus. Primarily, since viruses replicate within host cells of the lungs, the first component of the strategy will be to inhibit binding of viruses to host cells. While this is expected to reduce host cell infection, viruses will still remain active, therefore, raising the need to inactivate them.

Website link:

<https://dst.gov.in/dst-approves-funding-developing-gel-nasal-passage-prevention-covid-19>

Study to identify biomarkers to predict progression from non-severe to severe COVID-19 cases can help interventions

The SERB will support exploration of metabolomics alteration in COVID-19-infected patients conducted by IIT Bombay in collaboration with some hospitals in Mumbai.

The Study will identify potential biomarker candidates to predict progression from non-severe to severe COVID-19 conditions. Search for potential diagnostic candidates will involve metabolite profiling of different patient groups with various complications. Metabolites are small biomolecules, capable of regulating various pathways in all the living-organisms.

Dr Sanjeeva Srivastava, Professor at IIT Bombay, with the expertise of using state-of-the-art mass spectrometry-based technologies, has teamed up with Dr Om Shrivastav, Director, Infectious

Diseases, Jaslok Hospital, Mumbai and Dr Jayanthi S. Shastri, Professor & Head (Microbiology), T N Medical College & Nair Hospital and Dr. Mala Vinod Kaneria, Infectious Disease Specialist at Kasturba, Nair & Jaslok Hospitals, for this research. An advanced mass spectrometry-based national facility equipped with hybrid and tribrid mass spectrometers will facilitate the analysis of nasopharyngeal swab and plasma samples. A team of over 20 researchers having expertise in handling a large number of different types of human biospecimens for proteomics and metabolomics investigations will work on it.

Website link:

<https://dst.gov.in/study-identify-biomarkers-predict-progression-non-severe-severe-covid-19-cases-can-help>

Call for Proposals under National Health and Risk Communication Programme ‘Year of Awareness on Science and Health (YASH)’ for COVID-19

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

Special call for proposals has been announced for science, health and risk communication with focus on COVID-19 - building improved risk understanding, an analytical mind, and informed decision-making capacity among target groups including working with local sensitivities, belief systems, traditions, and indigenous knowledge; translation, target group-specific interpretations and usage of authentic scientific and health information to communicate the risks and facilitate risk management; attitudinal changes about appreciating risks, associated challenges and solutions and assessment of public perceptions; improved ability to clarify mis-perceptions, mis-beliefs, mal-practices-based authentic knowledge duly verified by scientific processes; trust in scientific competence of solutions and service providers and better working relations with community leaders, influencers including faith leaders, doctors, etc.; science literacy for risk reduction; development of science, health, and risk communication software in terms of publications, audio-visual, digital platforms, low-cost learning aids, folk performances, trained communicators, especially in regional languages; campaigns, hands-on science, demo/exhibitions/fairs, mela, jatha, competitions, children centric outreach, etc.

Last date for submission of Proposal: 31st May 2020

Website link:

<https://dst.gov.in/callforproposals/call-proposals-under-national-health-and-risk-communication-programme-year>

<https://dst.gov.in/sites/default/files/YASH%20Backgrounder.pdf>

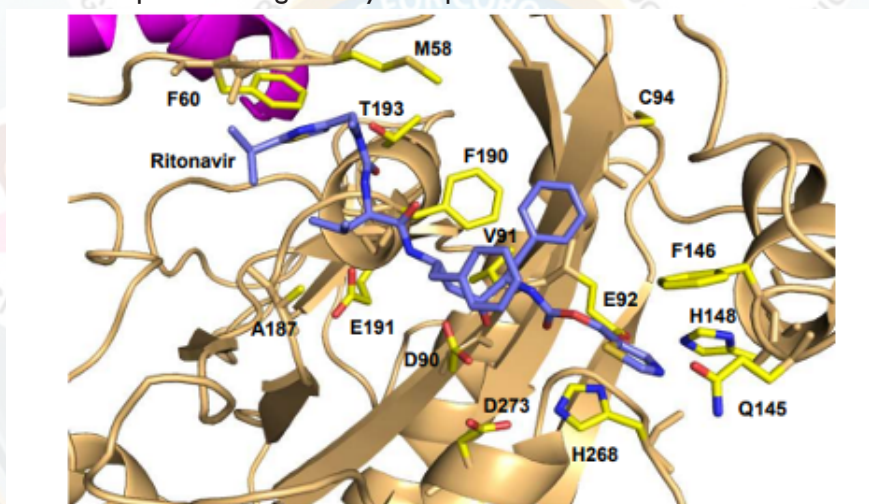
SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEPARTMENT OF BIOTECHNOLOGY (DBT)

Ritonavir may inhibit exoribonuclease activity of nsp14 from the SARS-CoV-2 virus and potentiate the activity of chain terminating drugs

Computational studies carried out at the DBT's Regional Centre for Biotechnology (RCB), Faridabad suggests that the HIV-1 protease inhibitor named ritonavir might bind to the exoribonuclease active site of the nsp14 protein, prevent association with substrate viral RNA and thus inhibit the proofreading activity of nsp14.



The nsp14 is known to attenuate the inhibitory effect of drugs that function through premature termination of viral genome replication. Hence, ritonavir may potentiate the therapeutic properties of drugs such as remdesivir, favipiravir and ribavirin. A recent clinical study involving lopinavir-ritonavir, ribavirin and interferon beta-1b supports the idea that ritonavir can enhance activity of chain terminating drugs. The ability of ritonavir to enhance the activity of remdesivir/ favipiravir may be tested at the earliest *in vitro* and *in vivo* and clinical trials may be initiated to assess if the combination results in improved clinical outcomes, especially in patients with severe COVID-19 disease.

SARS-CoV-2 is the causative agent for the ongoing COVID-19 pandemic, and the nsp14 protein of this virus houses a 3' to 5' exoribonuclease activity. This activity is responsible for proofreading progeny RNA and removes errors that arise during genome duplication.

Contact info: Dr Deepika Bhaskar; deepika.bhaskar@rcb.res.in

Website Link:

<https://indiarxiv.org/f5gnq>

https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt-01B-26MAY2020.pdf

Incubatee 'Shine Biotech Pvt. Ltd' at BBB selected for DBT-BIRAC grant for COVID-19 research

To urgently develop safe and effective biomedical solutions against SARS-CoV-2, the DBT and Biotechnology Industry Research Assistance Council (BIRAC) had invited applications for COVID-19 Research Consortium.



Through a rolling multitiered review mechanism, 70 proposals on devices, diagnostics, vaccine candidates, therapeutics and other interventions were recommended for receiving financial support. The shortlisted proposals included 10 vaccine candidates, 34 diagnostics products or scale-up facilities, 10 therapeutics options, 02 proposals on drug repurposing and 14 projects which were categorised as preventive interventions. Incubatee Company at BSC BioNEST Bio-Incubator, Regional Centre for Biotechnology (RCB), Shine Biotech Pvt. Ltd., was selected to receive financial support for ensuring there is no shortage of indigenous diagnostic kits in the near future.

Contact info: Dr Deepika Bhaskar; deepika.bhaskar@rcb.res.in

Website Link:

<https://www.expresspharma.in/latest-updates/dbt-birac-covid-19-research-consortium-recommends-70-proposals-for-funding-in-vaccines-diagnostics-therapeutics/>

https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt-02B-26MAY2020.pdf

IBSD teams up with Meghalaya Government for establishing COVID-19 testing at Tura, Shillong

In an effort to establish a COVID-19 diagnostics facility at Tura, Shillong, the DBT's autonomous centre, the Institute of Bioresources and Sustainable Development (IBSD), Imphal has provided an RT-PCR machine, a refrigerated centrifuge and two deep freezers along with technical support and orientation for use of such equipment. The equipments have been handed over to the state team of doctors and laboratory technicians, who have also been trained to handle the equipments meant for COVID-19 testing at the Microbiology Department of North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGHRIHMS).



The Tura facility is being made at Government Civil Hospital and it has come about by online and virtual co-ordination between the teams of Commissioner and Secretary, Health, Government of Meghalaya and the Director IBSD. Dr Albert Chiang, Scientist at IBSD, is coordinating with the Meghalaya Health Department in this matter. Most of the equipment have been delivered and installed at Tura over the last two weeks and the facility would be ready to start testing in a few days. IBSD shared the essential equipment in the earlier interim period, to rapidly fill up the gap brought about by the global supply chain crisis of equipment and consumables during COVID-19 pandemic and the subsequent lockdown.

Prof. Pulok K Mukherjee, Director IBSD, has extended his appreciation to the Meghalaya Health Department for working tirelessly in their battle against COVID-19 and also assured full support from IBSD to the State for any other scientific endeavours in this current COVID-19 crisis. The DBT's IBSD has been working with the Meghalaya Health Department to setup this COVID-19 diagnostics facility at Tura, which is more than 300 km from NEIGRIHMS, Shillong, presently the lone COVID-19 testing centre of Meghalaya.

In similar efforts, IBSD has been providing both equipment and consumables support to several COVID-19 testing facilities across the North eastern region, such as JNIMS, Government of Manipur; RIMS, Imphal, Government of India; NEIGHRIHMS, Shillong, Government of India; Zoram Medical College, Government of Mizoram and Pasteur Institute, Government of Meghalaya.

Website Link:

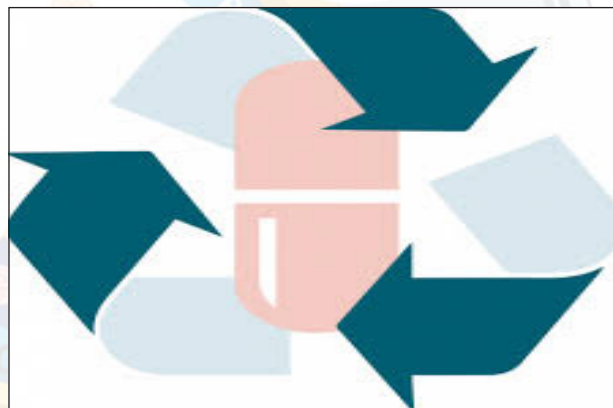
<https://www.sentinelassam.com/meghalaya-news/ibsd-assisting-meghalaya-to-set-up-covid-testing-facility-in-tura-472106>

<https://theoptimist.news/dbt-ibsd-teams-up-with-meghalaya-government-for-covid-19-testing/>

<https://vigyanprasar.gov.in/vigyan-samachar/>

Drug repositioning to fast-track drug discovery against COVID-19: THSTI's team efforts

Scientists at DBT's Faridabad-based Translational Health Science and Technology Institute (THSTI) have been working on repositioning drugs to act against SARS-CoV-2. Dr. Shailendra Asthana and his team used molecular dynamics (MD) simulations to find out a computational model of the drug binding site. They used the model for virtual screening to facilitate the rapid identification of potent molecules. The findings on identification of potential molecules against COVID-19 main protease through the structure-guided virtual screening approach have been published in the *Journal of Biomolecule Structure and Dynamics* and may provide an opportunity to explore these compounds for anti-COVID-19 therapeutics.



Hydroxychloroquine, Remdesivir, and others are not new but in news almost every day now. Why? SARS-CoV-2, the virus that causes COVID-19, has allowed the scientists, clinicians and governments very little time to respond. On the stake are billions of lives. This very little time is strategically being used for developing rapid tests and vaccines which otherwise take 5 to 15 or more years. Usually, developing a new drug for a disease too takes about 10 years, but drug repositioning is an approach that finds a new purpose for a drug by tailoring its composition and dosage to cure a different disease than it was originally meant for. Cases in point are hydroxychloroquine, an anti-malarial drug and remdesivir, originally developed against hepatitis C, which are among the most mentioned ones.

Website Link:

<https://doi.org/10.1080/07391102.2020.1768151>

<https://vigyanprasar.gov.in/vigyan-samachar/>

THSTI's biorepository steps up to COVID-19 challenge: A national bioresource for COVID-19 studies

DBT-THSTI's biorepository, a core facility, has risen to the COVID-19 challenge posed to the Indian scientific community and is set to support clinical and translational research as a national bioresource.



The biorepository was founded to cater to the GARBH-Ini programme of DBT's at Faridabad-based institute and other intramural and extramural maternal and child health research projects. The Institute's reconstitution last year threw the challenge of opening up to other programmes in the NCR Biotech Science Cluster. It turned out to be beneficial as the core facility was well equipped to step up to the COVID-19 challenge.

The goal that the biorepository is working towards is the development of a national resource of well-phenotyped clinical samples to enable research on COVID-19. This will support researchers to conduct seroepidemiology, immunology, and diagnostic studies with high-quality and well-characterized clinical samples. Samples will be made available for the validation and discovery phase of vaccine and diagnostics development. The repository will comprise of longitudinally-collected biospecimens from enrolled participants at three time points within a year, including convalescent samples post infection. Currently, samples are being collected from nine different hospitals. Building technical teams to process and store infectious samples as per the global and national guidelines is also a focus and a step forward in capacity building at the biorepository. The data management team at the Institute is taking care of data entry and curation along with the biorepository teams.

The GARBH-Ini team is working with other clinical research teams to enable the clinical activities of DBT and BIRAC's COVID research consortium for developing diagnostics, vaccines, and therapeutics against COVID. "It has been more than two weeks that @Garbhnicohort teams have been on the frontline for COVID activities. Their dedication and urge to contribute is admirable. It keeps us going," tweeted Prof. Shinjini Bhatnagar from THSTI.

Website link:

https://thsti.res.in/covid_bioresources.php

<https://vigyanprasar.gov.in/vigyan-samachar/>

DBT-NIBMG scientists study the evolution of Coronavirus

COVID-19 is a pandemic which has spread across the globe. Viruses are known to mutate over a period of time. Scientists at the DBT's National Institute of BioMedical Genomics (DBT-NIBMG), Kalyani, have investigated how SARS-CoV-2 has evolved with the progression of the pandemic across countries over time.

They examined 3,636 viral sequences submitted to public databases from 55 countries and 45 genomes from India. They found that the virus has evolved into 10 other types apart from the ancestral O type which was found in Wuhan, China. Out of these the A2a type has emerged as the dominant type in every geographical region. The A2a type was found to harbour a mutation which makes it easier for it to enter into lung cells, perhaps leading to increased ability to



cause infection and survive in the host. These results will help in streamlining the efforts being put in across the world for vaccine development for the virus. Further, the impact of host genome on the disease severity remains to be evaluated.

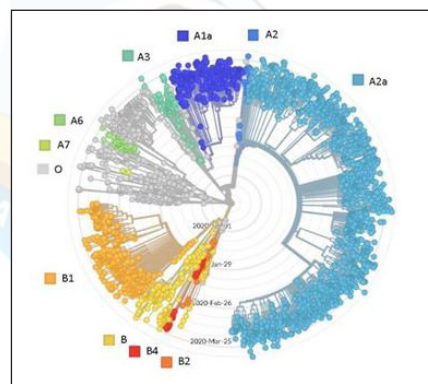
The figure shows the evolutionary relationship between the 3636 RNA of SARS-CoV-2 and their transmission information.

Contact info: Dr Partha Pratim Majumder; ppml@nibmg.ac.in

Website link:

<https://www.telegraphindia.com/india/emerging-coronavirus-queen-identified/cid/1768668>

<https://vigyanprasar.gov.in/vigyan-samachar/>



DBT-BIRAC clears proposal for a COVID-19 diagnostic Kit

The DBT and its public sector undertaking Biotechnology Research Industry Research Council (BIRAC) have selected Yaathum Biotech Pvt Ltd for funding support under DBT's National Biopharma Mission for indigenous development and validation of a real-time RT-PCR-based molecular test for COVID-19 diagnosis. The Company has been selected for funding under the COVID-19 Research consortium call given by DBT and BIRAC to support Diagnostics, Vaccines, Novel Therapeutics, Repurposing of Drugs or any other intervention for control of the coronavirus pandemic.

There is immense need for expansion in testing because epidemiologists estimate that for every case identified three unidentified cases might be at large, and it has become evident worldwide that effective and prompt COVID-19 control demands aggressive and extensive testing in hotspots, contact tracing and focus on high-risk target groups alongside lockdown measures.

Yaathum's test is based on quantitative reverse transcription polymerase chain reaction (qRT-PCR) technology which is recommended as the gold standard confirmatory test by WHO for COVID-19 diagnosis. It can rapidly and promptly detect the virus from the early stage of infection itself unlike alternate technologies used for testing which can detect only after 8



Department of Biotechnology (DBT) and
Biotechnology Industry Research Assistance Council (BIRAC)



Announce

COVID-19 Research Consortium

And seek Letter of Intent (LoI)

with a focus on

**Diagnostics, Vaccines, Novel Therapeutics,
Repurposing of Drugs or any other intervention for
Control of COVID-19**

days of infection making them less reliable for diagnostic settings and requiring an additional confirmatory test.

The test assay is designed for detection of nucleic acid (RNA) specific to SARS-CoV-2 virus in patients' respiratory specimens in two hours and at a fraction of current cost of testing. It is a nucleic acid amplification test (NAAT). The technical highlight of the test is that it targets three independent regions or genes in the SARS-CoV-2 viral genome while most commercial tests available globally target one or two regions only. This is significant for avoiding false results due to non-specific interference or detection of other SARS 2003 and Bat SARS-like virus strains.

It will be possible to incorporate more assays into this test for predicting drug response simultaneously in future. Viral RNA isolated from any of the respiratory specimens such as nasopharyngeal swabs, sputum, lower respiratory tract aspirates and nasopharyngeal wash/aspirate can be a sample for the test.

Viral RNA is reverse transcribed to cDNA and subsequently amplified and detected using RT mastermix and qPCR assays and any qPCR platform. Fluorescence intensity is monitored by the instrument in real-time and fluorescent signal crossing the threshold confirms detection of nucleic acid and in turn positive result for the virus. The absence of signal is interpreted as a negative result. It must always be interpreted alongside clinical observations and patient epidemiological data. It is highly sensitive with the ability to detect less than 10 copies of the genome in a reaction.

Most of the components have been developed indigenously which has made the test highly cost effective. The test is being offered at Rs. 1,000 per patient and can be further brought down to less than Rs. 800 on large-scale production. After validation it can be readily deployed in all the government authorized RT-PCR testing labs for COVID-19 across the country. This can significantly help ramp up COVID-19 testing in India and in meeting the huge demand for test kits, especially indigenous ones.

Contact info: Dr Hafsa Ahmad; nbm9@birac.nic.in

Website link:

<https://www.expresshealthcare.in/news/dbt-birac-covid-19-research-consortium-recommends-70-proposals-for-funding-in-vaccines-diagnostics-therapeutics/420111/>

<https://vigyanprasars.gov.in/vigyan-samachar/>

Fast Track Review and funding support under COVID-19 fund

The DBT-BIRAC has constituted a Fast track Internal Review Committee to identify and provide fast-track support to suitable biotech proposals to facilitate development of products to address the challenges of COVID-19 pandemic.



The Committee in its first meeting on 16th April recommended funding support to 2 start-ups: Aarna Biomedical Products for Surakhsha Full Body Coverage Kit and Alpha Corpuscles for Face Shield. A cofunding partner IKP Knowledge Park was also approved to support up to 15 Start-ups. After the last review meeting, the 2nd and 3rd Internal Review Committee Meetings were held on 21st April 2020 and 26th April 2020, respectively.

Funding Support has also been extended to:

- Cistron Systems for PSA Medical Oxygen Generators;
- Stasis Health Pvt Ltd for Stasis-Remote Monitoring System for COVID-19;

Cistron Systems's PSA oxygen generators are an independent source to produce medical oxygen on-site. This reduces the dependency of supply of oxygen for a hospital from vendors and complex cylinder logistics in times of an emergency.

Stasis brings state-of-the-art Remote Patient Monitoring to any care setting – hospitals, homes and even hotels. It is an FDA-cleared remote monitoring system.

Features:

- Reduced staff exposure to infection with remote patient monitoring;
- Plug-&-Play solution for deployment in any care setting; and
- Better utilization of limited staff resources- Reduction of PPE use by eliminating manual monitoring.



Website link:

<https://pib.gov.in/PressReleasePage.aspx?PRID=1622757>

<https://vigyanprasar.gov.in/vigyan-samachar/>

Funding support under COVID-19 fund

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



Till now, funding support has been extended to these start-ups:

- Parisodhana Technologies Pvt Ltd for Hybrid multiply face mask;
- Turtle Shell Technologies Pvt. Ltd. for Dozee; and
- Monitra Healthcare Pvt Ltd for UpBeat.

Parisodhana Technologies is working towards developing a substitute for N95 respirator manufactured using filtration media offering high particulate (>90%) and bacterial filtration

System of Alerts

Indication of when to seek medical help /move to hospital

| Heart Rate | Body Temperature | Oxygen Saturation | Respiration Rate |
|--------------------------------|------------------|-------------------|------------------------------|
| High > 120 bpm Low < 45 bpm | High > 101 °F | Low < 90% | High > 50 breathe per minute |

System of alerts already in place based on set of **customizable** thresholds. This is already in use based on heart rate and rhythm. Newer parameters can be quickly added.

efficiency (>99%) while ensuring high breathability, comfort and convenience in tropical conditions through pure hand woven cotton contact materials. The filtration media is certified for PPE and final product is under evaluation at SITRA, Coimbatore.



Monitra Healthcare Pvt Ltd's UpBeat is a solution that allows remote monitoring of an individual's critical parameters – ECG, Respiration rate, pulse rate/heart rate, SpO2 and temperature. Monitra upBeat is the most advanced bio-sensing platform which makes remote monitoring comfortable and easy. It would help significantly in reducing the risk of exposure for healthcare workers.

Dozee by Turtle Shell Technologies is one-of-its-kind innovations in the preventive and home healthcare sector in Indian landscape. This product is a contact-free healthcare monitor and personal health companion that monitors heart health, respiration, sleep cycles as well as stress level with very high accuracy. This product requires no technical expertise to set up and is very simple to use as well as provides high fidelity data at the same time. All that is required is to place the thin sensor sheet below the mattress and sleep. Dozee helps to manage sleep apnea, track heart health and respiration, monitor stress levels and provides for daily, weekly and monthly reports.

Website link:

<https://ikpeden.com/funding/>

<https://vigyanprasar.gov.in/vigyan-samachar/>

DBT-ILS starts whole genome sequencing of coronavirus

The Department of Biotechnology's Bhubaneswar-based Institute of Life Sciences (DBT-ILS) has started the whole genome sequencing of coronavirus and is targeting to report sequences of nearly 200 virus genomes as a part of the DBT consortium, which is aiming to report 1,000 viruses by June. The Institute is also continuing to test corona samples with dedicated efforts of scientists and students. It continues adding to the services adhering to all safety guidelines. It has successfully completed 15,940 tests accounting for nearly 20% of the tests conducted in Odisha. The samples received at ILS were spread across 16 districts. The results are being disseminated to ICMR in a timely manner for further follow-up actions.



Contact info: Dr Ajay K Parida; director@ils.res.in

Website Link:

<http://www.prameyanews.com/ils-completes-15k-covid-19-tests/>

https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt-01S-22MAY2020.pdf

DBT-THSTI announces video making competition for COVID-19 awareness

With the intention of tapping immense creative potential available in the country and moving ahead with the science education mandate of DBT's Translational Health Science and Technology Institute's Science Setu initiative, the institute has invited college-goers from

THSTI VIDEO COMPETITION 2020

Calling all video-making enthusiasts with a thing for science communication to create short videos and explain COVID-19.

You can register if:

1. You study at an Undergraduate college in India
2. You wish to communicate the science underlying COVID-19 and SARS-CoV-2 and tell stories about Corona Warriors.

Things to remember:

1. The video should be less than 3 minutes.
2. Make a high-resolution video. Send it to socialmedia@thsti.res.in.
3. The video can be made in any Indian language.
4. Top three videos will be awarded.
5. For more details and registration click on: <https://thsti.in/covid/>

LAST DATE FOR SENDING THE VIDEOS – 10th JUNE 2020



Picture: www.worldarts.me

across the country to participate in the THSTI Video Competition 2020. The three themes the participants will be needed to create content are:

- The science behind COVID-19 and SARS-CoV-2;
- COVID-19 heroes; and
- The Infodemic in the Pandemic

This competition is open to participants from any college in India and they can register through this link: <https://thsti.in/covid/index.php/Home/media>. The videos need to be within 3 minutes and there is no language restriction. The last date for sending entries is 10th June 2020.

Website link:

<https://thsti.in/covid/index.php/Home/media>

https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt-02B-14MAY2020.pdf

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)

CSIR-IICT gets two more APIs for anti-viral drugs

CSIR-Institute of Chemical Technology (IICT) has completed the process of making two more Active Pharma Ingredients (APIs) for anti-viral drugs - Umifenovir and Remdesivir. It had already handed over anti-viral Favipiravir API to a large pharmaceutical firm for approvals of Drug Controller General of India (DCGI) to conduct animal/human trials before releasing it into the market.

“We are in the process of transferring two APIs to select pharmaceutical organisations for them to approach the drug control authorities for conducting necessary trials and approvals before manufacturing them,” said Director S. Chandrasekhar.

CSIR had identified about 25 drugs for ‘repurposing’ for quick deployment in treatment for COVID-19 since new drugs take at least 10-15 years to reach the market. IICT had taken up development of synthetic ‘process expertise’ for molecules, which are showing promising data in various trials across the globe of five drugs including Favipiravir, Umifenovir, Remdesivir, Baloxavir and Chloroquine/Hydroxychloroquine.

Website link:

<https://urdip.res.in/covid19/>

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

ACQH, convalescent plasma trials to begin soon, says CSIR DG

CSIR Director-General Shekhar C Mande on ACQH trials for COVID-19 said that ACQH is a plant extract found in the tribal belt of Gujarat, Jharkhand and MP. He said, “Earlier, in a programme for anti-dengue medicines, ACQH showed promising results. Based on those trials, we approached Drug Controller General of India for COVID-19 that’s what we are starting now.” He further informed that CSIR-Indian Institute of Chemical Biology (IICB) in Kolkata got approval from DCGI to start therapy on convalescent plasma. “They’ve tied up with few hospitals in Kolkata and have begun the trials now,” he added.

Website link:


<https://urdip.res.in/covid19/>

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

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

Inside a lab growing coronavirus

In order to find a potential cure or vaccine for COVID-19, it is necessary to grow the novel coronavirus in large quantities in safe and contained laboratory settings. In the last few months, institutes around the country, including CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad and National Institute of Virology (NIV), Pune, have joined the effort to grow the virus.



The BSL-3 is almost a sacred place – dedicated to culturing disease-causing infectious microbes. While growing non-pathogenic *E. coli* bacterial strains is a fairly commonplace activity in many life science labs, infectious ones need a plethora of safety rituals to be followed.

The journey to a BSL-3 lab begins with a series of change rooms. Across these, the air pressure keeps dropping and the amount of Personal Protective Equipment (PPE) on the entrant keeps increasing. A consistently lower air pressure than the outside change rooms (by 30Pa – not something that you would generally feel) ensures the potentially contaminated air from inside does not go into the change rooms. But the seriousness of the situation dawns upon you with the PPE – foot covers, special shoes, shoe covers, a lab coat followed by a surgical gown, gloves, a pair of goggles, an N95 mask and a head cover – all to ensure that no body part is exposed to even this “clean” air. The focus is on making sure that the researcher neither carries in any contamination from outside nor brings out an infection from the BSL-3 while leaving.

Website link:

https://indiabioscience.org/columns/general-science/inside-a-lab-growing-coronavirus?fbclid=IwAR0jFhxoVsrfsJrK-KiLQrjTk7bs_AS79WZpyReCFbLizmWw3ntOlsyLFQ4I

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

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

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

ICMR releases revised advisory on the use of Hydroxychloroquine as prophylaxis for SARS-CoV-2 infection

ICMR released revised advisory on the use of Hydroxychloroquine (HCQ) as prophylaxis for SARS-CoV-2 infection. The Joint Monitoring Group under the Chairmanship of DGHS and representatives from AIIMS, ICMR, NCDC, NDMA, WHO and experts drawn from Central Government hospitals reviewed the prophylactic use of HCQ in the context of expanding it to healthcare and other frontline workers deployed



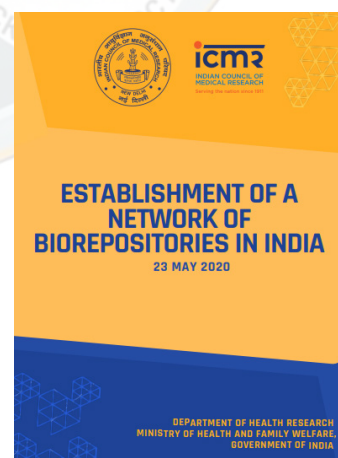
in non-COVID and COVID areas, respectively. This advisory supersedes the earlier related advisory dated 23rd March 2020. It has been reiterated in the advisory that the intake of HCQ should not instil a sense of false security.

Website link:

https://main.icmr.nic.in/sites/default/files/upload_documents/V5_Revised_advisory_on_the_use_of_HCQ_SARS_CoV2_infection.pdf

Establishment of a Network of COVID-19 Biorepositories in India

In the backdrop of the COVID-19 pandemic, while it is of paramount importance to provide early diagnosis and treatment to all infected individuals, it is also critical to promote research and development for larger public health benefit. For development and validation of new diagnostics, therapeutics or vaccines, access to different kinds of clinical samples from infected patients is an essential requirement. NITI Aayog has recently issued guidelines for sharing of bio-specimens and data for research related to COVID-19. This document in tandem lays down the brief processes and operational mechanisms for establishing COVID19 biorepositories in the country

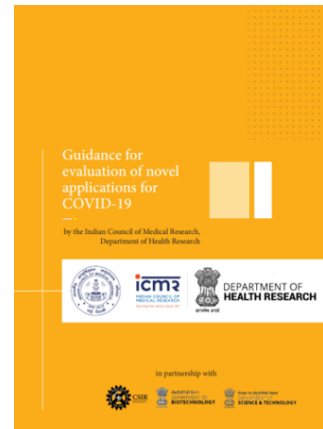


Website link:

https://main.icmr.nic.in/sites/default/files/upload_documents/Establishment_of_a_network_of_COVID19_Biorepositories_in_India_23052020.pdf

ICMR releases guidance notes for evaluation of novel applications for COVID-19

ICMR has issued the guidance notes for evaluation of novel applications for COVID-19. Since the inception of the COVID-19 pandemic, ICMR has received over 190 requests for evaluation of molecules/AYUSH regimens/products/technologies/diagnostic kits, etc. In view of ICMR's involvement in diagnosis, research, surveillance, clinical trials and validation of diagnostic kits for COVID-19, ICMR has partnered with various Science Departments like Department of Science & Technology (DST), Department of Biotechnology (DBT) and Council of Scientific & Industrial Research (CSIR) for evaluating the antiviral properties of investigational products/repurposed drugs/devices/technologies, etc.



Website link:

https://main.icmr.nic.in/sites/default/files/upload_documents/Guidance_for_Claim_Evaluation_19052020.pdf

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION (DRDO)

Parakh: Mobile BSL 3 Laboratory for COVID Samples Testing

Defence Food Research Laboratory (DFRL) Mysore, pursuing the mission to support corona warriors, has developed this quick response asset to deal the situation arising due to contagious diseases including COVID-19 pandemic.

The Laboratory stationed on mobile platform has been named PARAKH. It provides unidirectional airflow and gradient negative room pressure with class III Biosafety cabinet (BSC) for entry and safe processing of clinical samples. The viral inactivation and first 2 steps of viral lysis of RNA extraction are performed inside the BSC assuring personnel protection.



Autoclave & dynamic pass box facility have been provided for sample entry

The lab facility is built on ISO 20 feet dry container and mounted on a chassis for mobility. The exhaust air being HEPA (high efficiency particulate air) filtered, satisfies Class 10,000 or ISO7 air quality. Complete Heating Ventilation Air Conditioning (HVAC) is used to maintain desired unidirectional airflow and room pressure gradients of negative pressure as compared to the ambience.

The ingress of the samples is done in a safe way through a specifically designed dynamic pass box (as shown in the picture here) for direct delivery inside the Class III bio-safety cabinet for safe sample processing.

The facilities in the Lab include clean air workstation, cold chain for storing the reagents and samples, provision for treatment of liquid effluents, safe storage of solid biohazard wastes and decontamination by autoclaving. Further, provision for storing and donning PPEs, storage for used aprons, emergency body shower and eye wash etc. have been provided.

The Lab setup has necessary captive and raw power supply, space for sufficient fuel and water provisions and thus can be easily transported by road and deployed at the site of emergency as per the requirement. Air bellow suspension has been used to reduce the vibration during transport and air compressor for inflating tyres.



The lab has been provided with Real-Time PCR detection platform specifically for COVID-19 testing. Medical Professional can easily and safely handle and preserve samples from disease outbreaks or during surveillance. The interior view of the mobile containment laboratory showing here are the Class III biosafety cabinet, real time PCR, PCR workstation, pass box, -20 degree Celsius freezer, refrigerator and incubator.

Real time PCR provided for COVID-19 screening from clinical samples can test about 300 samples per day. The Lab has been handed over to Viral Research and Diagnostic Laboratory (VRDL) of Mysore Medical College and Research Institute (the sole authorised COVID-19 testing facility in the Mysore region) to enhance their testing capability.

Multipurpose Door Opener Tool

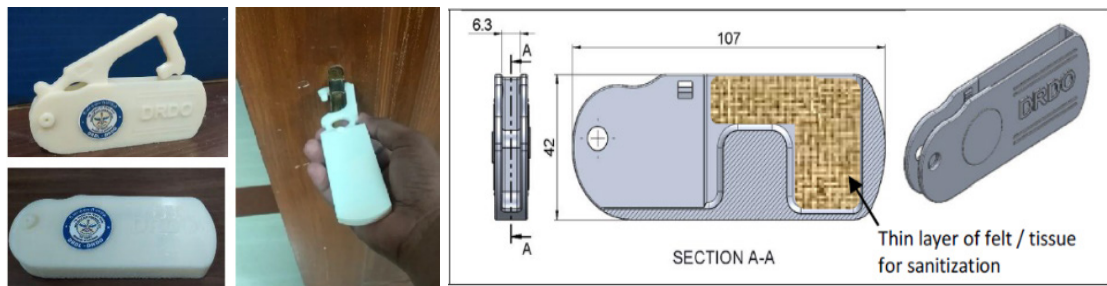
In day-to-day life, the usage of objects such as door handles, cupboard handles, key pads of lifts, ATM kiosk key pads, computer keyboards etc. can become means of spread of the COVID-19 virus. It is very difficult to ensure continuous sanitization of these common objects.

To combat this Defence Research and Development Laboratory (DRDL) has designed a multipurpose door opener tool using 3D printing process and thermoplastic material. It is an ergonomically designed, compact and very handy tool to provide touch free operation of most of the commonly used objects such as door handles.



This tool is made up of two parts: a hook and a cover. The hook is designed considering the common sizes of door handles. The hook also has a tip to operate the key pads at ATMs, lifts and keyboards. The cover is designed to accommodate thin layer of felt or tissue to sanitize the tool when closed. Hence, it will be safe to handle the tool for frequent use.

M/S Sanjay Technoplast Pvt. Ltd, Pune has been identified as the industry partner and knowhow for production in large numbers have been provided to them.



Prototype developed at DRDL

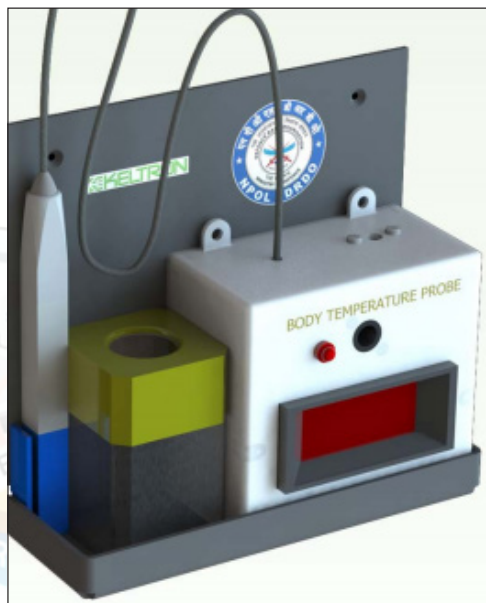
Website link:

<https://drdo.gov.in/whats-new/details-multi-purpose-access-tool-developed-drdo-drld>
https://drdo.gov.in/sites/default/files/whats_new_document/3D_PRINTED_MULTIPURPOSE_DOOR_OPENER_TOOL.pdf

DRDO developed multi-probe thermal scanner

Naval Physical and Oceanographic Laboratory (NPOL), Kochi, one of the major R&D laboratories of DRDO has developed a multi-probe thermal scanner.

The multi-probe thermal scanner provides a rapid means to measure the temperature of people for detecting people with fever. The unit consists of a fixed non-contact IR probe which measures temperature on the forehead and four thermistor-based contact type probe, which can detect the body temperature by placing the tip on the mid-arm or forehead region. The contact probes are separated from the processing unit by means of a long cable. The processing unit displays the temperature, and based on the same, highlights whether the person is normal or feverish. These can be used in place of the thermal scanners, as they provide for instantaneous 'GO/NO GO' type segregation, unlike conventional thermometers. The kit has high accuracy with a very short response time.



Website link:

<https://drdo.gov.in/whats-new/details-multi-probe-thermal-scanner-developed-drdo-npol>

https://drdo.gov.in/sites/default/files/whats_new_document/Brochure%20-%20Multi-probe%20Temperature%20Scanner.pdf

DRDO develops paper disinfector for rapid sanitization of paper sheets & envelopes

NPOL, Kochi, has also developed a paper disinfector to meet the imminent need to disinfect daily paper-based items entering an establishment.

The device consists of two foldable halves -- an upper lid and a lower lid. To disinfect various paper-based items entering the establishment at the security office or the central registry, like entry passes, tender documents, bills etc., the item is placed in between the two lids and then heated. Heating is done by means of special thermal cloth with embedded heating wire of selected resistivity. Paper/envelopes up to A4 size can be disinfected using the device.



Website link:

<https://drdo.gov.in/whats-new/details-paper-disinfector-developed-drdo-npol>

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

DRDO designs and develops Econo-WISK

The Walk-In Swab Collection Kiosk (WISK) is a solution for health workers involved in COVID-19 management.

An Econo-WISK has been developed by DRDO which is a very cost-effective and easy-to-transport variant of WISK. It also mitigates ergonomics issues like stress points, limited access and bad postures. The Econo-WISK is designed as an assembly of durable rexine and transparent plastic sheet over an easy-to-assemble frame made of square tubes of mild steel. There is a wooden base with linoleum sheet as well as detachable table outside the kiosk. The product is easy to assemble at site and has better internal air circulation scheme. The product has been designed considering Indian anthropometric parameters, thereby enhancing the ergonomics.



Website link:

<https://drdo.gov.in/whats-new/details-econo-wisk-developed-drdo-npol>

https://drdo.gov.in/sites/default/files/whats_new_document/Brochure%20-%20EconoWISK.pdf

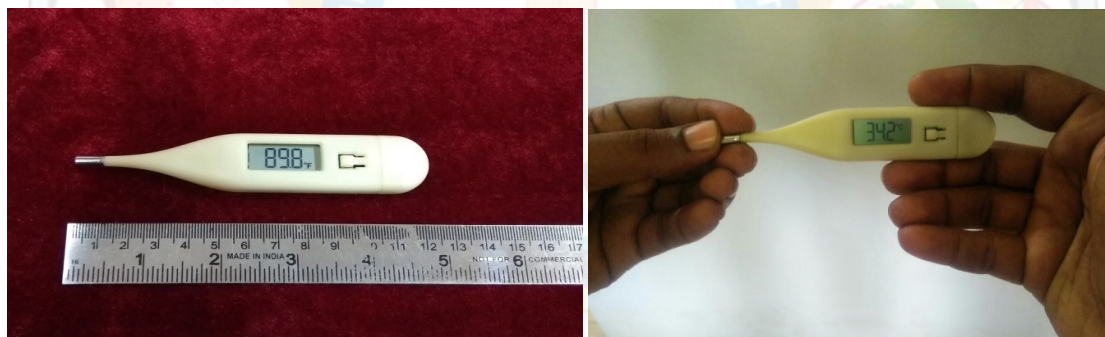
SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY (MeitY)

Digital thermometer for screening and patient temperature monitoring for COVID-19

Centre for Materials for Electronics Technology (CMET), Thrissur, scientific society of Ministry of Electronics and Information Technology has developed an indigenous technology for making chip thermistors (thermal sensor). Most of the commercial digital thermometers are based on thermistors because they have better accuracy, fast response, rugged and safe. Based on this thermal sensor, CMET has developed an indigenous technology for low cost fast response digital thermometers suitable for point-of-care temperature measurements for COVID-19 patients. Further research is on-going to modify the technology for screening of COVID-19 infection with disposable tips.



Digital thermometer developed at CMET

Website link:

<https://meity.gov.in/emcd-effort-towards-building-products-counteracting-covid-19-pandemic>

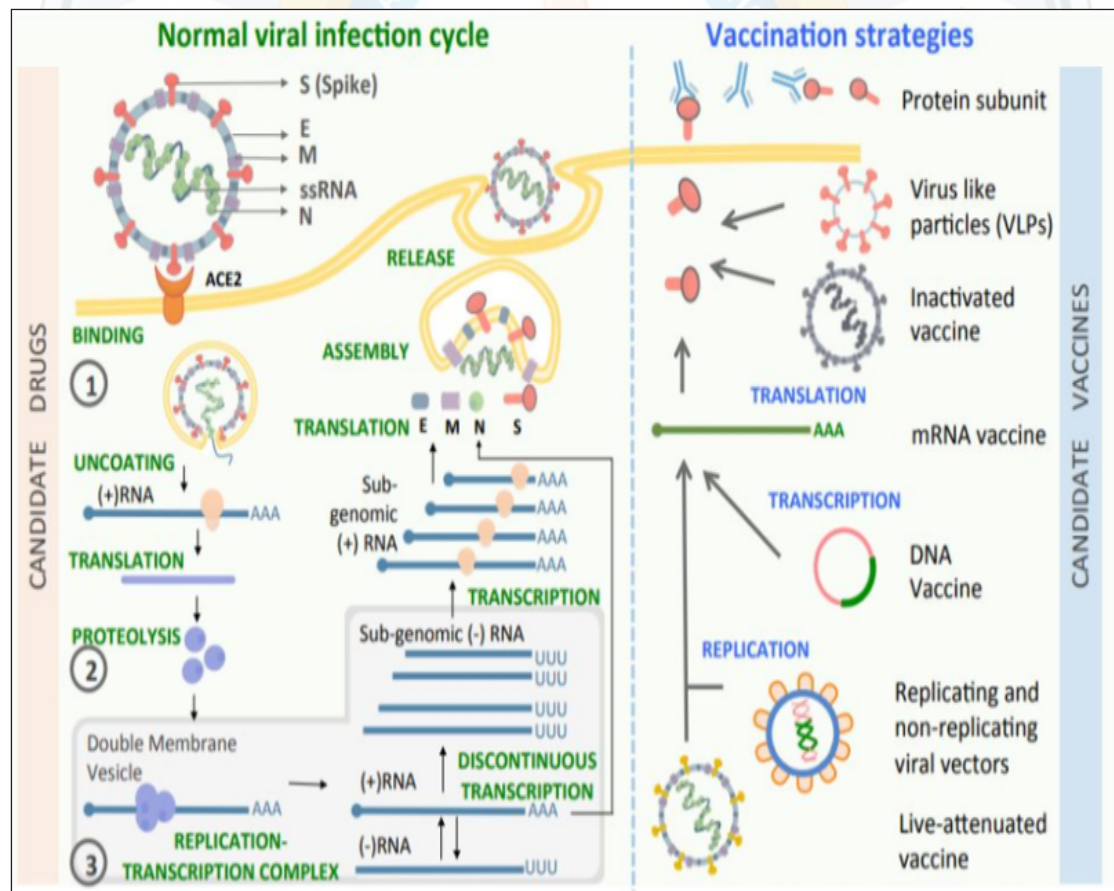
SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY

OTHER SCIENTIFIC AND ACADEMIC INSTITUTIONS

IISER Tirupati reviews the Global efforts on vaccines for COVID-19

Indian Institute of Science and Education & Research (IISER) Tirupati reviews the global efforts on development of candidate vaccine to combat COVID-19 pandemic outbreak. The review describes the key genetic features that are being considered for generating vaccine candidates by employing innovative technologies. It also highlights the global efforts being undertaken to deliver vaccines for COVID-19 through unprecedented international cooperation and future challenges, post development. While multiple candidate vaccines are currently under different stages of development, there are no known therapeutic interventions at the moment.



Website Link:

http://www.iisertirupati.ac.in/events/Raju_Mukherjee_article.pdf

NIPER Guwahati develops innovative 3D Products

National Institute of Pharmaceutical Education and Research (NIPER) Guwahati has developed two 3D-printed products that can be very useful to help in fight against the COVID-19 infection, as personal protective equipment. NIPER Guwahati, a premier institute of national importance, has developed a 3D-printed hands-free object and a 3D-printed antimicrobial face-shield. The hands-free object can be used to open or close doors, windows, drawers (both vertical and horizontal), and refrigerator handle, or press elevator buttons, and laptop/desktop keyboards, including turning the switch buttons on/off.



Website link:

<http://www.niperguwahati.ac.in/COVID19.html>

IIT Delhi develops affordable PPE coverall that reaches adequate levels of breathability


Indian Institute of Technology (IIT) Delhi develops affordable PPE coverall having adequate levels of breathability. Department of Textile and Fibre Engineering at IIT Delhi is actively involved in the development of high-functional and specialty textile materials and has successfully commercialised products for the national interest. The Department has now widened its spectrum in developing the technology for Personal Protective Equipment (PPE) Coverall (Integrated Body Suit and Shoe Cover) for the protection of the doctors, nurses, paramedical staff and others, who are involved in the treatment of coronavirus-infected patients. This advanced version of PPE coverall is set to emerge as an improvised product in the national and international markets, bestowing several special functional features, to meet requirements for added comfort.



COVID-19 PPE Coverall
(Body Suit and Shoe Cover)

The salient features of the advanced level PPE Coverall include the following:

- Special coating and treatment formulation, applied over very light and compact polyester woven fabric, which has permitted to maintain the weight of PPE coverall to 300 gm against commercially available 400-500 gm.
- Complete protection against penetration of coronavirus (meets the requirements of MoHFW; ISO 16603).

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- Excellent anti-bacterial property (more than 99.5% reduction; AATCC 100:2012) and such feature is not available in most of the commercially available PPE coveralls.
 - Special grade PU coating, providing very smooth surface feel and adequate clothing breathability, which provide comfort to the user [BS: 7209 (1990)]. This feature is not available with other commercially available PPE coveralls.
 - The outer face of the coverall displays excellent water repellence (rating = 90) and oil repellence (10/10); hence the coronavirus falling over the fabric rolls off with ease.
 - It can be reused three times; hence, the effective cost is very low, compared to others.
 - Available in four sizes (both Body Suit - S, M, L & XL and Shoe Cover - 1, 2, 3 & 4) to fit the complete range of users, as opposed to Universal/Limited size in commercially available coverall.

The researchers have collaborated with G. D. International (an ISO 9001, ISO 14001 and OHSAS 18001 certified company, with more than 38 years of experience in technical textiles) to produce 1,20,000 coveralls/month.

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Website link:

<https://home.iitd.ac.in/press-ppe.php>

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19

BY PRIVATE SECTOR ENTERPRISES

Multiple Autonomous Mobile Robots developed by Samvardhana Motherson to fight against COVID-19

Samvardhana Motherson Health Solution (SMHS), which offers innovative healthcare IT solutions that aligns technology, businesses and customers, is working on smart robotic solutions to conduct operations as usual, with the added layer of maintaining safety and minimizing the spread of infection.

Dynamo, a trained Autonomous Mobile Robot (AMR) runs on natural navigation and is equipped to protect employees, equipment and minimize vulnerabilities. SMHS is the proud advance partner of Addverb Technologies and under the Make in India initiative has built technological solutions like AMR for tele-thermography and fumigation, UV disinfection and intra-logistics.

Tele-thermography and Fumigation Robot:

Thermal guns face accuracy challenges and manual limitation. Thermography robots are ideal for scanning not only individuals but large flow of people. These trained bots run on natural navigation and are equipped with thermal sensors to regularly scan each individual within premises are connected with internal COVID-19 taskforce to alert vulnerabilities.



Tele-thermography and Fumigation Robot



UV Disinfection Robot

UV Disinfection Robot: High-touch surfaces are a reservoir for infection; UV disinfection robots can easily and efficiently disinfect rooms, corridors, and other units in plants. The machines emit ultraviolet light and using LiDAR technology they scan the environment and navigate and operate completely autonomously. They can be remotely controlled.

The robot is safe, reliable and eliminates human error and operates only when people are not around, using its sensors to detect motion. It also ensures reaching all high-touch surfaces, eliminating possibility of cross-contamination subject to human error.

Intra-logistics Robot: Delivery robots are effective in contactless delivery and to automate and streamline order fulfilment, ensuring continuity and productivity even during a global pandemic.

Operating through an onboard computer/tablet, it has two-stage obstacle sensors for flawless movement and advance analytics for asset utilization.



Intra-logistics Robot

Website link:

<https://smhs.motherson.com/covid-19-autonomous-mobile-robots.html>

Philips Respironics E30 ventilator to treat respiratory insufficiency

Philips is responding to the pressing global need, created by COVID-19 outbreak, by quickly scaling production of the new Philips Respironics E30 ventilator. The scaling-up of the production is initiated considering the needs of healthcare workers and COVID-19 patients while complying to medical device quality standards at the same time.



Philips Respironics E30 Ventilator

This global ventilator solution can be purchased by governments and hospitals which are experiencing ventilator shortages. The Philips Respironics E30 ventilator can be used when there is limited access to a fully featured critical care ventilator.

Philips Innovation Campus, established in 1996 in Bengaluru, is a premier software research and development unit of Royal Philips. It hosts over 3000 experts working on innovative solutions across the healthcare continuum to improve people's health.

Website link:

https://www.philips.co.in/healthcare/medical-specialties/covid-19/sleep-and-respiratory-care-covid-19/e30-ventilator#triggername=menu_one

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 & Scientific Organisations

CSIR-NISCAIR brings out Newsletter on COVID-19

National Institute of Science Communication and Information Resources (CSIR-NISCAIR) brings out newsletter dedicated for the COVID-19 outbreak. The newsletter covers stories and information on various aspects, like research, technology and innovation efforts to fight out the pandemic and related awareness and sensitisation information.



Website Link:

<https://www.niscair.res.in/includes/images/covidbulletin/pdf/26may2020/26-may-2020.pdf>

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

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 24×7 video platform is dedicated to science and technology knowledge dissemination, with a strong commitment to spreading scientific awareness, especially with Indian perspectives, ethos and cultural milieu. The initiative is supported by the National Council of Science and Technology Communication (NCSTC), DST.



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

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

- Daily video bulletin in Hindi and English;
- COVID Explained - Short films to explain research project findings in layman's lingo;
- Interview of Prof K VijayRaghavan, Principal Scientific Adviser to the Government of India on COVID-19; and
- Facebook live sessions on interviews of various stakeholders and media with DST Secretary.



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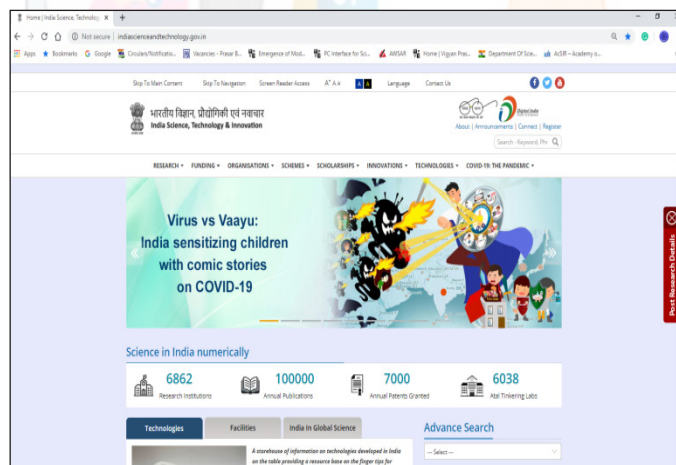
<https://www.indiascience.in/>

India Science, Technology and Innovation (ISTI) Web Portal

The India Science, Technology and Innovation Portal (ISTI) is a one-stop window for information about developments in India on science, technology and innovation. The portal focuses on bringing all stakeholders and Indian STI activities on a single online platform; helping efficient utilisation of resources; highlighting functioning of scientific organisations, laboratories and institutions; aggregating information on science funding, fellowship & 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 the COVID-19. These resources are generated by efforts made by numerous initiatives and schemes taken up by several Departments and Ministries of Government of India. These are being implemented by public-supported research institutions in India. The content presented here relies on the best available scientific understanding of the disease and its transmission.



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

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

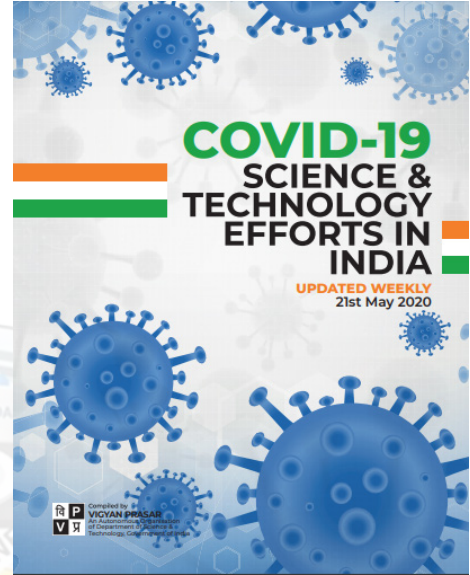
Contact Info: kdgm@vigyanprasar.gov.in

Website link:

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

Weekly Publication of e-Newsletter on COVID-19

For the benefit of its stakeholders and target audience, 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 continuously striving for combating 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 aims to 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.



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Website link:

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

Storytelling through Comic Characters in the COVID-19 times

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

रहना है अब कोरोना के साथ: करना होगा एक नया "सामान्य" परिभाषित

पूर्व-लॉकडाउन जैसे सामान्य स्थिति कुछ और समय तक संगठन नहीं हो सकती है स्वास्थ्य और तब तक संक्रमण का दौर समाप्त नहीं हो जाता।
हमें वायरस के साथ रहना सीखना होगा और इसके लिए हमें कोरोना वायरस से निपटने के लिए सामाजिक-दूरी जैसे तरीकों को अपने दैनिक जीवन में अपनाना होगा।
इसके लिए सभी के सहयोग और सामुदायिक समर्थन की आवश्यकता है।
हमें एक "नए सामान्य" को परिभाषित करने की आवश्यकता है। जिसे आने वाले कुछ समय के लिए योजनाओं की जिदगी का हिस्सा बनाना होगा।

By- Dr. B.K.Tyagi

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| <p>हाथ ना मिलाना या नसे न मिलाना</p> | <p>विशाले पं केबाए लककार से अविशाले करना</p> | <p>किसी के बहुत करीब न जाना</p> | <p>सार्वजनिक जूरी नभाए रखना</p> |
| <p>विशाले रूप से हाथ धोना</p> | <p>दुमेरा मासक पहन कर बाहर निकले</p> | <p>घर पर रहे और सुरक्षित रहे</p> | <p>बच्चे और बारी की विशेष देखभाल करें</p> |
| <p>सामान्य बस्तुओं को खरीदे</p> | <p>दिक्कत जीवन सेठी उपलब्धता</p> | <p>वीटिक अछारर बसाए</p> | <p>दो सासक के बिना अंतर्राष्ट्रीय यात्रा को न करें</p> |
| <p>शीक आने पर मुँह पर सनाए रखें</p> | <p>सुसे में ना सुकना</p> | <p>घर से काम करें यदि साधन माता उपलब्धक न हो</p> | <p>फंक-पूड को ना करें</p> |

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<https://drive.google.com/file/d/1p-qLQtRl8y4uRhoTxQMIM5dfyB256ao/view>