SCIENCE AND TECHNOLOGY EFFORTS IN INDIA

ON

COVID-19

PREPARED BY:

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(AN AUTONOMOUS ORGANIZATION OF DEPARTMENT OF SCIENCE AND TECHNOLOGY, GOVERNMENT OF INDIA)

DATE: 10th APRIL 2020

THIS WILL BE UPDATED REGULARLY

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, the WHO issued a statement saying Chinese researchers have made the preliminary determination of the virus as a novel coronavirus. Since then, more than 1.5 million positive cases and around 90,000 deaths have been reported due to COVID-19 across the world till April 9, 2020. Till the same time, in India, about 6,000 COVID-19 positive cases, and more than 150 deaths have been reported across the nation. 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 practice of science and technology and implications for development and quality of life. Science popularization therefore serves as a robust knowledge led tool to fulfill various mutually reinforcing public policy objectives.

For the benefit of our stakeholders, we have prepared a compilation of the most relevant parts of the initiatives and efforts taken by the Government of India through its various Science Ministries, Departments, and Funding organizations. These organizations are geared up and working tirelessly, since its outbreak, to combat the epidemic of COVID-19. These research-driven and technology-based interventions have been initiated on war footing to fight out the outburst of the pandemic. Government of India, through its various wings, like Science Ministries, Departments, and Funding organizations, has invited Calls for Proposals (CFPs) and Expression of Interest (EoIs) to enhance research and development related activities to battle the pandemic out.

We hope this initiative of Vigyan Prasar shall be a handy guide to scientists, researchers and scholars, especially 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

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by
Department of Science and Technology (DST)

DST funded company to scale up device to enrich oxygen supply in air for treatment of COVID-19 patients

Genrich Membranes, Pune, a spin-off company, based on proprietary technology licensed from CSIR-National Chemical Laboratory, Pune is being funded by the Department of Science and Technology (DST) to scale up membrane oxygenator equipment (MOE) that it has developed to treat COVID-19 patients. Based on innovative, indigenous hollow-fiber membrane technology, the MOE enriches oxygen in the air up to 35% under pressure (4-7 bar, using oil-free compressor).

The equipment consists of membrane cartridge, oil-free compressor, output flowmeter, humidifier bottle, nasal-cannula, and tubing & fittings. The compressed, filtered air from the compressor is fed to the membrane cartridge, which selectively permeates oxygen over nitrogen offering oxygen-enriched air as the product at the ambient pressure. The membrane cartridge capable of distinguishing oxygen and nitrogen restricts the passage of viruses, bacteria, and particulate matter. The product air is of medical grade.

The device is safe, does not require trained manpower for its operation, needs minimum maintenance, is portable, compact, and with plug-and-play facility provides on-site, quick-start oxygen-enriched air.

Website link: https://dst.gov.in/dst-funded-company-scale-device-enrich-oxygen-supply-air-treatment-covid-19-patients

Sree Chitra Tirunal Institute develops 3 new medical equipment

Sree Chitra Tirunal Institute of Medical Sciences and Technology (SCTIMST), Trivandrum had developed three new equipment for the treatment of COVID-19 patients. Acrylosorb, equipment to collect body fluids and dispose it safely, is the first equipment developed.Another one is isolation pod that restricts COVID-19 patients from having contact with others. Bubble helmet is the third equipment which an alternative option for the traditional oxygen masks.

Website link: https://www.sctimst.ac.in/

SCTIMST scientists develop disinfected barrier-examination booth for examining COVID-19 patients

Scientists at Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum an autonomous institute of the Department of Science and Technology (DST), Govt. of India, have designed and developed a disinfected barrier-examination booth for examining COVID-19 patients. The innovative disinfected examination booth is closed like a telephone booth for examining the patient without direct contact with the doctor to prevent transmission of

infection. It is equipped with a lamp, table fan, rack, and Ultraviolet (UV) light.

Website link: https://www.sctimst.ac.in/

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

The Department of Biosciences and Bioengineering, IIT Bombay is developing a gel that can be applied to nasal passage, which is a major entry point of the corona virus. 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.

Website link: https://vigyanprasar.gov.in/wp-content/uploads/DST-approves-funding-for-developing-a-gel-for-nasal-passage-as-prevention-for-COVID-19-7apr20.pdf

DST invites short-term proposals for developing antiviral Nano-coating and Nano based material for scale up by industry and start ups to combat COVID-19

The Department of Science and Technology (DST) using the Science and Engineering Board (SERB) portal invites ideas in the form of short-term proposals for developing Antiviral Nanocoating and new nano based material for use in Personal Protective Equipment (PPE), which can be transferred to a partnering industry or start-up for scale up. Such Nano coatings could contribute immensely in the emerging health care requirements in India's fight against the COVID-19 pandemic. This call is for bringing the Academic groups and relevant Industrial Groups together for submitting proposals to DST's Nano Mission. It encourages multidisciplinary efforts and collaboration with industrial partners for scaling up production within a year.

Website link: https://vigyanprasar.gov.in/wp-content/uploads/Short-term-Research-Grant-special-call-for-Nano-Coating-COVID-19-6apr20.pdf

DST sets up Task Force for mapping of technologies by Start Ups on COVID-19

DST has set up a COVID 19 Task Force for mapping of technologies from R&D labs, academic institutions, start-ups, and MSMEs to fund nearly market-ready solutions in the area of diagnostics, testing, health care delivery solutions, equipment supplies. Some of these solutions include masks and other protective gear, sanitizers, affordable kits for screening, ventilators and oxygenators, data analytics for tracking, monitoring, and controlling the spread of outbreak through AI and IOT based solutions, to name a few.

Website link: https://dst.gov.in/dst-sets-task-force-mapping-technologies-start-ups-covid-19

DST launches nationwide exercise to map & boost Covid19 solutions with R&D, seed & scale up support

DST has set up a "Covid19 Task Force" for mapping of technologies from R&D labs, academic institutions, start-ups and MSMEs. The capacity mapping group has representatives from DST, DBT, ICMR, MeitY, CSIR, AIM, MSME, Start-up India and AICTE. The aim is to identify the most promising start-ups that are close to scaleup, who may need financial or other help or connects based on its projected demand to rapidly scaleup.

Website link: https://dst.gov.in/dst-launches-nationwide-exercise-map-boost-covid19-solutions-rd-seed-scale-support

Coating developed by JNCASR may prevent transmission of infection

Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru an autonomous institution under the Department of Science and Technology, has developed a one-step curable anti-microbial coating which, when coated on different surfaces such as textile, plastic and so on could kill a range of virus types including COVID 19. The molecules developed have an ability to chemically cross-link with different surfaces upon UV irradiation. Upon the formation of the coating, it has been shown to permeabilize the membranes of pathogens (i.e. bacteria) leading to their inactivation.

Website link: https://dst.gov.in/coating-developed-jncasr-may-prevent-transmission-infection

SCTIMST ties up with Wipro 3D to manufacture automated ventilators to meet COVID 19 related crisis

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), an institute of National Importance of the Department of Science and Technology, has tied up with Wipro 3D, Bengaluru to jointly build up on a prototype of an emergency ventilator system based on Artificial Manual Breathing Unit (AMBU), developed by SCTIMST followed by its clinical trial and manufacture. The ventilators can help meet urgent requirements arising out of the Covid 19 related crisis that the country is facing. AMBU bag or a bag-valve-mask (BVM) is a hand-held device used to provide positive pressure ventilation to a patient who is either not breathing or who is breathing inadequately.

Website link: https://dst.gov.in/sctimst-ties-wipro-3d-manufacture-automated-ventilators-meet-covid-19-related-crisis

DST-SERB announces first set of approved projects to combat CoVID-19 & related respiratory infections

Department of Science and Technology--Science and Engineering Board (DST-SERB) announced several special research project calls to urgently ramp up national R&D efforts against the epidemic.
The first set of 5 projects has been selected by DST-SERB, which will be supported for further development into implementable technologies. Three of these projects concern the highly important issue of antiviral and virustatic surface coating of inanimate surfaces, such as personal protection equipment (PPE); while another one deals with the identification of metabolite biomarkers in CoVID-19 infected patients enabling therapeutic target identification; and the last one concerns with the development of antibodies against the receptor-binding domain of the spike glycoprotein of coronavirus.

Website link: https://dst.gov.in/dst-serb-announces-first-set-approved-projects-combat-covid-19-related-respiratory-infections

DST sets up rapid response centre at SINE, IIT Bombay to combat COVID-19

Department of Science & Technology, Government of India in a rapid response to combat COVID-19 global pandemic approved setting up of a Centre for Augmenting WAR with COVID-19 Health Crisis (CAWACH) at a total cost of Rs 56 Cr to scout, evaluate and support the innovations and start-ups that address COVID-19 challenges. The Society for Innovation and Entrepreneurship (SINE), a technology business incubator at IIT Bombay supported by DST has been identified as the Implementing Agency of the CAWACH. CAWACH will identify up to 50 innovations and startups that are in the area of novel, low cost, safe and effective ventilators, respiratory aids, protective gears, novel

solutions for sanitizers, disinfectants, diagnostics, therapeutics, informatics and any effective interventions to control COVID-19.

Website link: https://dst.gov.in/dst-sets-rapid-response-centre-sine-iit-bombay-combat-covid-19

Hand sanitizer prepared by ARCI provided to police personnel on duty during COVID 19 crisis

Considering the scarcity of hand sanitizers in the market, International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), Hyderabad, an autonomous R&D Centre of Department of Science and Technology (DST), Govt. of India, has produced hand sanitizer as per the WHO standards and distributed it among police personnel in Hyderabad, students, and staff of the institution. A team of scientists, students, and staff voluntarily came forward and produced about 40 litres of sanitizer.

Website link: https://dst.gov.in/hand-sanitizer-prepared-arci-provided-police-personnel-duty-during-covid-19-crisis

Challenge COVID-19 Competition (C3)

National Innovation Foundation – India (NIF), an autonomous institute under the Department of Science and Technology, Govt. of India has come up with a call inviting innovative citizens to participate in its Challenge Covid-19 Competition (C3). All interested innovators are welcome to participate with their creative ideas and innovations for problems or issues like reducing transmission of Coronavirus through original creative ideas, innovations, which can supplement the efforts of the government in slowing or eliminating the spread further, innovative ideas which can make activities like sanitizing one's hands, body, and home items etc.

Ideas are also invited for gainful engagement of people at home, healthy food for nutrition and boosting immunity specially at the time of lockdown when raw materials are limited, (Personal Protective Equipment) PPE's and rapid diagnostic testing facilities for capacity building of healthcare and other areas.

Website link: http://nif.org.in/upload/challenge-covid19-competition-c3.pdf

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CALL FOR PROPOSALS AND EXPRESSION OF INTEREST

Special Call under SATYAM to fight against COVID 19

Department of Science and Technology invites concept note under 'Science and Technology of Yoga and Meditation (SATYAM)' for appropriate intervention of yoga and meditation to fight against COVID-19 and other similar kind of viruses. The aim of this special call is to provide assistance to our society in today's critical condition arises due to pandemic COVID-19. The project may address on Improving immunity, Improving respiratory system, Stress, anxiety, depression and others.

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

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

Call for Expression of Interest - 2nd Set of Products

Sree Chitra Tirunal Institute for Medical Science and Technology (SCTIMST), Trivandrum an Institute of National Importance under Department of Science & Technology , Government of India, has developed designs and know-how

for a number of products to combat the COVID 19 pandemic crisis. Sree Chitra is interested in transferring these designs and know –how to entities that can manufacture and make it available to users. Expression of Interest (EoI) is invited from interested entities for this purpose.

Website link: https://www.sctimst.ac.in/ resources/Rev-EOI%20COVID%20 19%20-%2008.04.2020.pdf

Expression of Interest for Co Developing and manufacturing Devices for the fast track Programme for COVID-19 Pandemic

Sree Chitra Tirunal Institute for Medical Science and Technology (SCTIMST), Trivandrum invites manufacturers/start ups/social groups who are interested in working with Institute to co-develop and manufacture medical devices on a fast track mode to support the distressing situation the epidemic COVID 19 has created for development of Ambu bag based Ventilator, Ventilator Sharing Kit, Battery Operated Assistive Breathing Unit, Isolation Pods, Disposable Safety Face Shield and Deployable Field Units. Website link: https://www.sctimst.ac.in/ RESOURCES/EOI%20COVID%2019%20 -%2029.03.2020.pdf

Proposals invited on COVID-19 & related respiratory viral infections

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

Website link: https://dst.gov.in/

pressrelease/proposals-invited-covid-19-related-respiratory-viral-infections

TDB invites technology proposals for fighting COVID 19

The Technology Development Board (TDB), a statutory body under Department of Science & Technology invites proposal applications from Indian companies and enterprises to address protection and home-based respiratory intervention for COVID-19 patients. The proposal may include technologically innovative solutions like low-cost masks, cost-effective scanning devices, technologies for sanitization of large areas as well as for contactless entry, rapid diagnostic kits and oxygenators, and ventilators.

Website link: https://dst.gov.in/ pressrelease/tdb-invites-technology-proposals-fighting-covid-19

DST'S FUNDING TO START-UPS

DST funds Pune healthcare startup for rapid detection of COVID-19

The Department of Science & Technology (DST) has funded Module Innovations, a Pune-based healthcare startup working on point of care diagnostics to develop its platform technology for rapid diagnosis of diseases to develop a test kit for detecting COVID-19 within 10 to 15 minutes. Using the proven concept from its flagship product 'USense', The startup is now developing nCoVSENSEs (TM) which is a rapid test device for detection of antibodies that have been generated against the COVID-19 in the human body.

Website link: http://moduleinnovations. com/

Tech by Pune based Startup incubatee of Scitech Park to

disinfect Maharashtra hospitals in Covid 19 fight

A technology developed under the NIDHI PRAYAS program initiated by the Department of Science and Technology (DST), Govt. of India by an incubatee company of Scitech Park, Pune has emerged as an effective solution for India's fight against Covid 19 by reducing the viral load of infected areas within a room significantly within an hour. Its usefulness in killing disease-causing viruses and bacteria has been scientifically tested by various globally renowned labs in different types of closed environments like houses, hospitals, schools, farms, industries, and so on. One hour of operation of Ion generator machine reduces viral load within a room by 99.7% depending on room size.

Website link: https://dst.gov.in/tech-pune-based-startup-incubatee-scitech-park-disinfect-maharashtra-hospitals-covid-19-fight

DST and DBT funded startup develops silver-based disinfectant to fight COVID-19 pandemic

Weinnovate Biosolutions, a Pune based startup supported jointly by the Department of Science and Technology (DST) and Department of Biotechnology (DBT), has developed a non-alcoholic aqueous-based colloidal silver solution uniquely made from its NanoAgCide technology for disinfecting hands and environmental surfaces.

The newly developed disinfectant is non-inflammable and free of hazardous chemicals and can pose as an effective sanitizer to prevent the spread of the infection through contact, the prime method of transmission of the pandemic, thereby protecting health professionals and infected people.

Website link: https://egov.eletsonline.com/2020/04/dst-funded-startup-develops-silver-based-disinfectant-to-fight-covid-19-pandemic/

Rapid diagnostic kit being developed by Pune based startup for COVID 19 screening

Department of Science and Technology (DST) has funded FastSense Diagnostics, a start up to develop rapid diagnostic kit for screening of COVID-19. The company plans to roll out two products - a modified Polymerase chain reaction (PCR) based detection kit for confirmatory analysis in lesser time compared to existing detection methods (approximately 50 samples can be tested in an hour) and a portable chip based module for rapid screening of target population based on the on-chip sensing technology that would provide on the spot results in less than 15 min per sample. The sample size for confirmatory tests can also be increased in the future to 100 samples/hour.

Website link: https://dst.gov.in/rapid-diagnostic-kit-being-developed-pune-based-startup-covid-19-screening

by
Department of Biotechnology (DBT)

Development of Rapid IgM IgG detection kit for SARS CoVID-19

Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram is in the final stages of developing a rapid combined IgM, IgG lateral flow device, which is capable of detecting SARS CoVID-19 infection as little as 4 days post-infection of the virus. The kit is also capable of detecting IgG antibodies against the virus, which will reveal the status of the infected person's ability to fight the virus. On detecting IgG and being asymptomatic the person can be declared immune to new infection at least for 6 months, as the IgG will provide immunity against the virus. It is believed that the antibodies will stay for a minimum period of 6 months according to previous data from other similar virus infection. Only time will tell whether the antibodies will last longer. IgM detection can be deployed in check-points, where asymptomatic patients can be identified and measures taken to isolate them preventing further spread. This kit is jointly refined and mass produced by uBIO technologies a company incubated at RGCB-BioNest facility at Kochi, now operating out of the same campus manufacturing similar devices for DRDO and with kits being exported to over 25 countries.

Website link: https://www.rgcb.res.in/corona_alert_new.php

Development of Rapid IgM IgG detection kit for SARS CoVID-19 by

RCB, Faridabad

COVID-19 is the causative agent for the ongoing pandemic, and this virus belongs to the Coronaviridae family. Like other members of this family, the virus possesses a positive-sense single-stranded RNA genome. The genome encodes for the nsp12 protein, which houses the RNA-dependent-RNA polymerase (RdRP) activity responsible for the replication of the viral genome. A homology model of nsp12 was prepared using the structure of the SARS nsp12 (6NUR) as a model. The model was used to carry out in silico screening to identify molecules among natural products, or FDA approved drugs that can potentially inhibit the activity of nsp12. This exercise showed that vitamin B12 (methylcobalamin) may bind to the active site of the nsp12 protein. A model of the nsp12 in complex with substrate RNA and incoming NTP showed that Vitamin B12 binding site overlaps with that of the incoming nucleotide. A comparison of the calculated energies of binding for RNA plus NTP and methylcobalamin suggested that the vitamin may bind to the active site of nsp12 with significant affinity. It is, therefore, possible that methylcobalamin binding may prevent association with RNA and NTP and thus inhibit the RdRP activity of nsp12. Overall, computational studies suggest that methylcobalamin form of vitamin B12 may serve as an effective inhibitor of the nsp12 protein.

Website link: https://osf.io/kqd6j/

THSTI-ESICMC&H partnership for COVID-19 testing

THSTI bioassay lab will now function as an extension of diagnostic facility of ESIC Medical College and Hospital - Faridabad for COVID-19 testing. The first and only COVID-19 testing facility in the Faridabad region. The MoU signed between the two institutes will also enable training of manpower and capacity building at ESI hospital for COVID-19 testing by the bioassay lab team.

Website link: https://thsti.res.in/news.php

ICGEB launches COVID-19/SARS-CoV-2 Resource Platform

The ICGEB platform, which has been fully integrated into the state-of-the-art Web site at ICGEB, offers Tools with links to Resources and Procedures, including Protocols for Standard Operating Procedures (SOP) in the preparation, isolation and detection of Sars-CoV-2 RNA by Polymerase Chain Reaction (PCR), Reagents for positive control, and a Sequencing Service for local isolates of the virus, through our partner lab in the AREA Science Park. The ICGEB is offering Technical Assistance in the form of on-line Video Tutorials in the preparation, isolation and detection of Sars-CoV-2 RNA, as well as Remote, Technical Assistance during the reproduction of SOPs.

Website link: https://www.icgeb.org/icgeb-launches-covid-19-sars-cov-2-resource-platform/

Rajiv Gandhi Centre Biotechnology to develop humanised monoclonal antibodies to treat COVID-19

The monoclonal antibodies are antibodies that recognise only specific proteins, called antigens, on the surface of specific bacteria or viruses. To deploy them as treatment, scientists take monoclonal antibodies produced by mice and change their protein sequences to resemble those of humans. These humanised monoclonal antibodies have a lower chance of being rejected by the patient's body as well as can be mass produced in mouse cell lines. According to Dr. Pillai, the RGCB had a technology transfer agreement with the Oklahoma Medical Research Foundation to develop such humanised monoclonal antibodies.

Website link: https://science.thewire.in/the-sciences/covid-19-research-empowered-committee-dst-dbt-niv-testing-kits-hcq-rt-pcr-gisaid/

NII to develop antibody-based therapy for COVID-19

DBT's National Institute of Immunology (NII) in Delhi is going to procure coronavirus and blood samples from recovered patients. Dr. Amulya Panda, Director, NII, says that the samples from recovered patients will help in analysing the antibody quality in the blood with an aim to develop an antibody-based therapy. According to Dr Panda, studies are also underway on the spike protein of the novel coronavirus to develop a vaccine. Scientist at NII will utilize their previous expertise of vaccine development. They have previously developed an immunomodulator for leprosy and are well equipped, from the laboratory to animal house and to the product development cell, to take a vaccine candidate from the laboratory to industry.

Website link: https://www.natureasia.com/en/nindia/article/10.1038/nindia.2020.56

THSTI efforts to understand the epidemiology of COVID-19

The Translational Health Science and Technology Institute (THSTI), Faridabad, is working on an ELISA test for serological studies across the country which will essentially help understand the extent

of disease spread in India. According to Dr. Gagandeep Kang, executive director, THSTI, the epidemiology research should take centre stage at this point in the life of the pandemic in India. Dr. Kang said that it would help in understanding where and to what extend the disease has spread in India. According to her, the Indian population is dense and there are so many poor people. Social distancing, therefore, may be a difficult proposition. The first task should be boosting public health research to help control the spread. The next step should be research for developing additional diagnostic tools, drugs and vaccines.

Website link: https://www.natureasia. com/en/nindia/article/10.1038/ nindia.2020.56

Development of diagnostic kit for COVID-19 by THSTI

According to Dr. Gagandeep Kang, executive director of DBT's Faridabad based autonomous institute, the Translational Health Sciences and Technology (THSTI), institute is developing its own diagnostic kit for COVID-19. At present most of the kits used in India at current time are developed by the National Institute of Virology (NIV), Pune. NIV is also validating nine alternative kits from private firms. Such validation involves running clinical samples through the kits and measuring the rates of false-positive and false-negative results. The THSTI's diagnostic kit is still some time away from being ready to use.

According to Dr. Kang, Government of India's memo regarding easing the norms of on COVID-19 research will make it easier to validate the test with human samples at THSTI also. Such efforts will boost the development of diagnostics and conducting clinical trials in this regard.

Website link: https://science.thewire. in/the-sciences/covid-19-research-empowered-committee-dst-dbt-niv-testing-kits-hcq-rt-pcr-gisaid/

DBT's Rapid Response Regulatory Framework for COVID-19

The Department of Biotechnology (DBT), Government of India along with Drug Controller General of India (DCGI) has developed and notified a Rapid Response Regulatory Framework to provide expedited regulatory approvals for all diagnostics drugs and vaccines. Vaccine development is being supported with three Indian industries. Research on therapeutic and drug development has started. According to reports from Union Health Ministry, ministry is talking to all states and union territories about the action plan being undertaken by the stake holders.

Website link: https://economictimes. indiatimes.com/small-biz/startups/ newsbuzz/covid-19-task-force-to-map-of-technologies-to-fund-nearly-market-ready-solutions/articleshow/74839708. cms?from=mdr

C-CAMP propelled technology accelerator partnership with UNHIE & Social Alpha for developing technologies

The DBT's Bengaluru based bio-incubator, the Centre for Cellular and Molecular Platforms (C-CAMP) has quickly catapulted a technology accelerator in partnership with the United Nations Health Innovation Exchange (UNHIE) and the non-profit firm Social Alpha to help innovators, start-ups and entrepreneurs with breakthrough innovations. According to Dr, Taslimarif Saiyed, CEO C-CAMP, the innovators will be able to take full advantage of an ecosystem of scientists, regulators, investors and industry in closing last-

mile gaps in commercialising their technologies.

Website link: https://www.natureasia.com/en/nindia/article/10.1038/nindia.2020.56

DBT as a part of task force for mapping of technologies on COVID-19

The Department of Science and Technology (DST) is coordinating an effort to upscale the appropriate technologies and manufacturing available in India for addressing a plethora of issues related to COVID-19, as well as scout for new and developing solutions more relevant to the country to help prepare the country for exigencies arising out of COVID-19 pandemic. The Department of Biotechnology along with other stakeholders have been made a part of such task force. The capacity mapping group will identify the most promising start-ups that are close to scale-up and may need financial or other help or connects or projected demand to rapidly scale up. The nodal officers of concerned Ministries and Departments have been requested to expedite the process of obtaining information on such start-ups and other entities supported by them that have technology solutions for any important aspect of COVID-19.

Website link: https://dst.gov.in/dst-sets-task-force-mapping-technologies-start-ups-covid-19

CALL FOR PROPOSALS AND EXPRESSION OF INTEREST

COVID-19 Research Consortium

Department of Biotechnology (DBT) and Biotechnology Industry Research Assistance Council (BIRAC) announce COVID-19 Research Consortium and request for proposal with a focus on Diagnostics, Vaccines, Novel Therapeutics, Repurposing of Drugs or any other intervention for control of COVID-19.

Website: http://dbtindia.gov.in/latest-announcement/dbt-announce-covid-19-research-consortium

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DBT'S FUNDING TO START-UPS

DST and DBT funded startup develops silver-based disinfectant to fight COVID-19 pandemic

Weinnovate Biosolutions, a Pune based startup supported jointly by the Department of Science and Technology (DST) and Department of Biotechnology (DBT), has developed a non-alcoholic aqueous-based colloidal silver solution uniquely made from its NanoAgCide technology for disinfecting hands and environmental surfaces.

The newly developed disinfectant is non-inflammable and free of hazardous chemicals and can pose as an effective sanitizer to prevent the spread of the infection through contact, the prime method of transmission of the pandemic, thereby protecting health professionals and infected people.

Website link: https://egov.eletsonline.com/2020/04/dst-funded-startup-develops-silver-based-disinfectant-to-fight-covid-19-pandemic/

by
Council of Scientific & Industrial Research (CSIR)

IHBT scientists develop new hand-sanitizer

The demand for products such as sanitizer is increasing amidst reports of preventive measures against coronavirus and many counterfeit materials being sold in the market. In view of this, a new hand-sanitizer has been developed by the scientists of CSIR-Institute of Himalayan Bioresource Technology (CSIR-IHBT) based in Palampur, Himachal Pradesh. The natural flavours, active tea constituents and alcohol content in this hand-sanitizer have been used. One of the special things is that chemicals like parabens, triclosan, synthetic fragrance and phthalates have not been used in this hand-sanitizer.

Website link: https://www.thehindubusinessline.com/news/science/ihbt-scientists-develop-new-hand-sanitizer/article31091824.ece#

CSIR- National Chemical Laboratory (NCL) Pune ties up with Bharat Electronics Ltd (BEL) for production of medical devices

CSIR's constituent Lab, CSIR-NCL Pune, has been leading the way in promoting innovation and entrepreneurship through its Venture Centre for the past decade and new innovations from there are helping in fight against the Corona outbreak. Two of the recent innovations that can help in the mitigation of the Corona outbreak are Digital IR Thermometer and Oxygen Enrichment Unit (OEU).
Website link: https://pib.gov.in/PressReleseDetailm.aspx?PRID=1612414#.Xo75h5vTTUw.twitter

Indian researchers start working on novel coronavirus genome sequencing

Novel coronavirus is a new virus and researchers are trying to figure out all the different aspects of it. Two institutes of Centre for Scientific and Industrial Research (CSIR) Centre for Cellular and Molecular Biology (CCMB), Hyderabad and Institute of Genomics and Integrative Biology (IGIB), New Delhi have started working together on the whole genome sequencing of novel coronavirus. "This will help us to understand the evolution of the virus, how dynamic is it and how fast it imitates. This study will help us to know how fast it evolves and what are the future aspects of it.

Website link: https://vigyanprasar.gov.in/wp-content/uploads/Researchers-start-working-on-genome-sequencing-of-COVID-19-7apr20.pdf

IMTECH takes up sample testing for Covid-19

To boost testing capacity, Council of Scientific and Industrial Research-Institute of Microbial Technology (CSIR-IMTECH) has stepped up to take up Covid-19 sample testing. This is in line with the directives issued by the Principal Scientific Adviser (PSA) to the Government of India and the advisory issued by the Indian Council of Medical Research (ICMR) to operationalise

Covid-19 testing by laboratories under CSIR and other labs affiliated to Department of Science and Technology (DST), Department of Biotechnology (DBT) and Department of Atomic Energy (DAE). The initiative of ICMR to involve all government-accredited labs is a welcome step and will be a game changer in testing of Covid-19 samples. This would increase the testing rate among suspected patients. In the initial phase, IMTECH plans to operationalise capabilities to carry out testing of 50 to 100 samples a day.

Website link: https://vigyanprasar.gov.in/wp-content/uploads/IMTECH-takes-up-sample-testing-for-Covid-3apr20.pdf

CSIR-CFTRI to provide testing equipment for COVID-19 detection Mysuru-based CSIR Central Food

Technological Research Institute (CSIR-CFTRI) has joined hands with the district administration by making available equipment needed for testing of samples. CSIR-CFTRI is providing two PCR machines and one RNA extraction unit along with necessary chemicals to the district administration for coping with the large number of samples to be tested in the district

Website link: https://vigyanprasar.gov.in/wp-content/uploads/CSIR-CFTRI-to-provide-testing-equipment-for-CVOID-19-detection-6apr20.pdf

Low-cost paper-strip test for COVID-19 testing

The Institute of Genomics and Integrative Biology (IGIB), New Delhi have successfully developed a low-cost, paper strip test which can detect the raging coronavirus within an hour. COVID-19 test uses the cutting-edge, gene-editing tool - Crispr-Cas9 to target and identify the genomic sequences of the novel coronavirus in the samples of suspected individuals

Website Link: https://yourstory.com/2020/04/coronavirus-indian-scientists-low-cost-paper-strip-test-covid-19

Potential drug targets for COVID-19: Based of life cycle of virus in host cell

Potential drug targets for COVID-19 based on their life cycle in host cells and Catalogue of various targetable proteins are Angiotensin Converting Enzyme ˚2 (ACE2); Transmembrane protease, serine 2 (TMPRSS2); SARS Spike Glycoprotein - human ACE2 complex; Native Spike Protein (S) and others.

Website Link: https://iicb.res.in/COVID19/assets/files/AT.pdf

COVID-19 Location Tracker

An interactive map built from GIS data of cities in India from where the patients were picked up.

Website Link: https://drjit1806.shinyapps.io/COVID_19_GIS_Pockets/

Fatality vs temperature correlation for COVID-19

The dataset provides a preliminary investigation to understand if any correlation exists between the number of deaths and the average temp (in˚C) of Feb and March 2020. The data has been divided into different world regions. March data have been calculated until March 27, 2020.

Website Link: https://iicb.res.in/COVID19/assets/files/KC.pdf

CCMB is developing test kit for Covid-19

CCMB is helping incubating companies to come up with the idea of developing test kits. Also, CCMB is testing and validating the diagnostic kits they offer. Quality and accurate results are of paramount

importance in the case of a test kit. If the kits produce 100 percent results, they will be approved

Website Link: https://vigyanprasar.gov.in/isw/CCMB-may-soon-come-up-with-diagnostic-kits-for-Covid-19-hindi.html

CCMB and AIC-CCMB joined with CCAMP in its COVID-19 Innovations Deployment Accelerator (CIDA) Programme

C-CAMP has launched C-CAMP COVID-19 Innovations Deployment Accelerator or C-CIDA on 26th March, 2020 to help accelerate COVID-19 innovations stuck in last-mile issues. Innovations can be under following categories: screening, diagnostics, therapeutics, vaccines, containment strategies, public health & other categories including but not limited to focused technologies

Website Link: http://www.ccamp.res.in/covid-19-innovations-deployment-accelerator

CSIR scientists engaged in battle level to fight Covid-19

CSIR is working on a five-point agenda to deal with Covid-19. These include molecular level monitoring, making affordable screening kits, developing medicine, developing hospitals and personal protective equipment and supplying medical equipment to understand the risk and nature of the disease

Website Link: https://vigyanprasar.gov.in/isw/CSIR-scientists-engaged-in-battle-level-fight-Kovid-19-hindi.html

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CALL FOR PROPOSALS AND EXPRESSION OF INTEREST

Call for proposals for mobilizing the development of products and technologies to fight coronavirus pandemic

CSIR-NMITLI is inviting proposal from academic and commercial organization in areas such as effective containment interventions, assistive devices, innovative diagnostics, novel drugs, new vaccines, etc for COVID-19.

Website Link: https://www.cecri.res.in/portals/0/News_files/CSIR_NMITLI_Advt.pdf

Breakthrough technological intervention against COVID-19

Call for R&D proposal from Industry and start-ups for breakthrough technological intervention against COVID-19 on effective containment intervention, assistive devices (like ventilators), diagnostic kit, novel drugs, vaccines and trace technologies.

Website Link: https://www.ccmb.res.in/news/year-2020/nmitli_2020.pdf

Expression of Interest for Collaboration, Research and Testing for COVID-19

The Institute of Genomics and Integrative Biology (IGIB) is inviting Expression of Interest (EoI) from academic and commercial organization with specialized know-how, IP, indigenous infrastructure and production capacity for sharing of expertise, knowledge and resources for development of assays, testing, capacity building and reagents supply etc for COVID-19. The aim of the collaboration/partnership would be towards expediting the R&D and accelerating solutions that could be useful for the public

Website Link: https://www.igib.res.in/sites/default/files/COVID19_EOI.pdf
Efforts made by Defence Research Development Organisation (DRDO) in nation's fight against
COVID-19

Efforts made by Defence Research Development Organisation (DRDO) in nation's fight against COVID-19

Hand sanitizer

Hand sanitizer being the basic weapon used to prevent the spread of COVID-19. The DRDO has successfully developed in-house sanitizers. By 3rd week of March, it was produced in sizable quantities and distributed to major offices and establishment within the capital. Approximately 4,000 litres of hand sanitizer has been provided to Indian Armed forces, Armed Forces Medical Corps, Defence Security Corps, 1,500 litres to Ministry of Defence, 300 litres to Parliament of India, and 500 litres to various security establishments and high offices to address sanitization issue at first to keep administration work without fear of contamination.

Website link: https://pib.gov.in/PressReleseDetailm.aspx?PRID=1608649

Body Suits

Body Suits is critical requirement for doctors, medical staff, sanitations workers, etc so that they are not contracted by COVID-19 during their work. Earlier, DRDO had developed this body suit for medical & paramedical staff to manage & evacuate the causalities in the event of radiological emergencies, which right now is converted as a full body suit to stop contamination. The suit is washable and has passed the ASTM International standards. The suit is widely tested by DRDO and other agencies and found suitable for the cause. M/s Frontier Protective Wear Pvt Ltd Kolkata, transfer of technology holder that is already working with Ministry of Textiles, and M/s Medikit Pvt Ltd Mumbai are producing 10,000 suits per day with some works continuity problems. Each suit costs Rs 7,000.

Website link: https://pib.gov.in/PressReleseDetailm.aspx?PRID=1608649

Efforts made by DRDO in nation's fight against COVID-19: N99 masks

Five layer N99 masks with two layers of nano mesh are very advanced. These are one of the critical times to stop spread of Corona. Its production vendors are M/s Venus Industries Mumbai, M/s IMTEC Kolkata. Capacity is 10,000 N99 masks per day. Material for these are is sourced from Ahmedabad Textile Industry's Research Association, which is already having plenty of government orders for N95 masks. The mask costs Rs 70 per piece.

Website link: https://pib.gov.in/PressReleseDetailm.aspx?PRID=1608649

Ventilators

Since COVID-19 affects pulmonary

functions, keeping in mind the futuristic requirement, Society for Biomedical Technology (SBMT) programme of DRDO has been modified to cater to the current situation. Defence Bio-Engineering & Electro Medical Laboratory (DEBEL), Bangalore (a DRDO lab) has identified a vendor (M/s Scanray Tec Pvt Ltd, Mysore) to produce critical care ventilator. It has been created by using existing technologies like breath regulators, pressure/flow sensors, etc. Presently, innovation is on to create 'Multi Patient Ventilator' wherein several patients can be supported by a single ventilator. This innovation is expected to be available within a week. Around 5,000 ventilators will be produces in the first month and 10,000 subsequently. The DRDO has identified local alternatives to supply of critical components. Already Secretary (Pharmaceuticals) has identified nine companies for design transfer to produce and Mr Anand Mahindra for fabrication of components. Each ventilator unit will cost around Rs four lakh.

Website link: https://pib.gov.in/PressReleseDetailm.aspx?PRID=1608649

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19
by
Indian Council of Medical Research (ICMR)

COVID-19 Testing Laboratories

Hospitals admitting suspect cases of COVID19 should collect nasal and throat swab samples in one VTM tube and transport them to the nearest testing laboratory in cold chain. The list of Government and Private laboratories with COVID19 testing facility.

Website link: https://covid.icmr.org.in/index.php/testing-facilities

Covid-19 information by ICMR

This provides complete information related to Covid-19 like Testing Laboratories, Rapid response team, Diagnostic kit evaluation, Testing strategy, etc.

Website Link: https://www.icmr.nic.in/content/covid-19

COVID-19 - Sample collection guidelines

The document gives information on sample collection, packing and transport to laboratory for COVID-19 testing. It is used by hospitals involved in collecting samples for COVID-19 testing.

Website Link: http://www.nie.gov.in/images/leftcontent_attach/COVID-SARI_Sample_collection_SOP_255.pdf

Information regarding testing of samples for sars-cov-2 in the emergency situation

Regional VRDL, ICMR-NICED is a designated centre for testing of COVID-19, presently catering to the states of Sikkim and West Bengal

Website Link: http://www.niced.org.in/news/covid19.htm

Standard Operating Procedure for Specimen Collection, Packaging and Transport Guidelines for 2019 Novel Coronavirus (2019-nCoV)

This document describes the information for collection, packaging and transport of clinical specimens to Influenza group at ICMR-National Institute of Virology (NIV), Pune, Maharashtra for diagnosis of 2019 Novel Coronavirus (2019-nCoV)

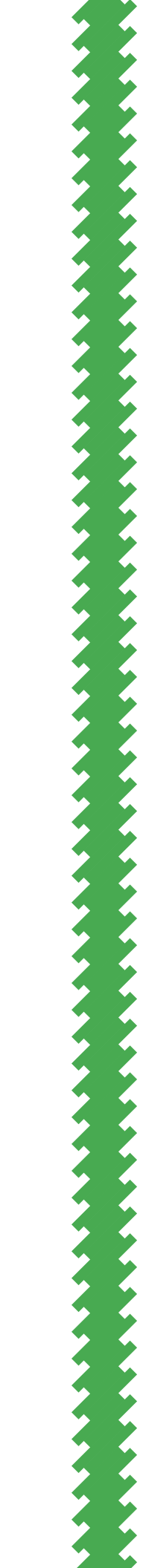**Website Link:** http://niv.co.in/SOP_Specimen_Collection_2019-nCoV.pdf

ICMR provides COVID-19 Testing Labs in India

ICMR provides a map of all COVID-19 Testing Labs across the India. Indian Council of Medical Research (ICMR) is amplifying test sites and more laboratories are being opened to conduct tests across states.

Website Link: https://covid.icmr.org.in/index.php/testing-facilities

How rapid antibody tests are different from existing PCR tests for Covid-19

PCR (polymerase chain reaction) test require nasal or throat swabs. It takes

about five hours for the results to come out whereas, rapid testing kits give early results. They use blood samples of suspected patients and normally takes around 15-30 minutes to give the result. Under this, one has to clean their finger with an alcohol swab and use the lancet provided for finger-pricks.

Website Link: https://www.indiatoday.in/india/story/how-rapid-antibody-tests-are-different-from-existing-pcr-tests-for-covid-19-explained-1663441-2020-04-05

Union Government places orders for over 10 Crore Anti-Malarial Hydroxychloroquine tablets

The Indian Council of Medical Research (ICMR) has recommended the anti-malarial drug for those involved in the care of suspected or confirmed cases of the coronavirus and also, for asymptomatic household contacts of laboratory confirmed cases. As a result, the order for 10.70 crore more tablets of the anti-malarial drug hydroxychloroquine has been placed. Over 70 lakh tablets were purchased earlier.

Website Link: https://swarajyamag.com/insta/covid-19-union-government-places-orders-for-over-10-crore-anti-malarial-hydroxychloroquine-tablets

AarogyaSetu App

AarogyaSetu App is an initiative for staying informed and alert against COVID19. The App aims to develop a digital Bridge to fight against COVID-19.
Download App: https://play.google.com/store/apps/details?id=nic.goi.aarogyasetu&hl=en_GB

by
other Scientific and Academic Institution

IIT Roorkee professor makes app to alert government if someone violates quarantine

IIT Roorkee professor has created a new surveillance system for tracking suspected patients. Professor of civil engineering department De. Kamal Jain, developed an app that can track individuals and also can do geofencing around him. The system or authorities will get an alert, if geofencing is violated by the quarantined person. In case GPS data is not received, the location will be obtained automatically through the triangulation of mobile towers. If the internet is not working in a certain area, the location will be received through SMS. If the application gets off, an alert will be received immediately. The location of the person can be received by sending an SMS to the device.

Website Link: https://timesofindia. indiatimes.com/gadgets-news/iit-roorkee-professor-makes-app-to-alert-government-if-someone-violates-quarantine/articleshow/75012608.

IIT Roorkee, AIIMS Rishikesh Develop Low-Cost Portable Ventilator To Tackle COVID-19

IIT Roorkee has developed a low-cost portable ventilator that can be useful to ensure the survival of COVID-19 patients. Named as 'Prana-Vayu,' the closed-loop ventilator is developed in collaboration with AIIMS, Rishikesh, and is equipped with state-of-the-art features. The automated process controls the pressure and flow rates in the inhalation and exhalation lines. Besides, the ventilator has feedback that can control tidal volume and breathe per minute.

Website Link: https://www.ndtv.com/ education/iit-roorkee-aiims-rishikesh-develop-low-cost-portable-ventilator-to-tackle-covid-19-2205139?fbclid=IwAR113GFmuQzfRN5spa2L0P-6JlpZ_zLt6jo7Ch1nNAx6n9ARWGTqzEq4Kjc

IIT Roorkee develops low-cost 3D printed face shields for health care professionals fighting COVID-19 pandemic

In an effort to help health care professionals in the fight against COVID-19 pandemic, Indian Institute of Technology (IIT) Roorkee has developed a low-cost 3D printed face shields as a protective measure from the deadly virus infection while attending patients. The shield has been developed by a group of students and professors in the premier institute's technical facility named 'The Tinkering Laboratory' which provides a platform to the students for innovative experiments.

Website link: https://www. hindustantimes.com/education/iit-roorkee-develops-low-cost-3d-printed-face-shields-for-health-care-professionals-fighting-covid-19-pandemic/ story-cmsu0ktp0fYdMFJGvrcfPL.

DST approves funding for

developing a gel for nasal passage as prevention for COVID 19

The Department of Biosciences and Bioengineering, IIT Bombay develop a gel that can be applied to nasal passage, which is a major entry point of the corona virus. 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.

Website link: https://vigyanprasar.gov.in/wp-content/uploads/DST-approves-funding-for-developing-a-gel-for-nasal-passage-as-prevention-for-COVID-19-7apr20.pdf

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

Science and Engineering Research Board (SERB), a statutory body under 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 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 corona viruses 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

Call for Proposal for COVID-19

Research at IIT Delhi Supercomputer

IIT Delhi is committing a total of INR 1 crore worth of High Performance Computing (HPC) Resource for COVID-19 research to merit based proposals selected from a nationwide call of proposals. All proposals will be evaluated by experts from IIT Delhi. Proposals will be evaluated on first come first serve basis. Deadline for submitting proposals is 15th April.

Website link: http://www.iitd.ac.in/content/call-proposal-covid-19-research-iit-delhi-supercomputer

Indian Institute of Technology (IIT), Guwahati Invites COVID-19 Grand Challenge

Indian Institute of Technology (IIT), Guwahati is seeking solution(s) from the students community on measures that can be adopted on priority basis to tackle this pandemic crisis of any one of the broad objectives on Detection of infected persons, Precautions to halt its spread, Newer treatment approaches, Society impact, Behavior changes, Disease outbreak pattern, Resources distribution, Transportation of goods, Migration of humans, Supporting health care workers, Supporting essential services.

Website link: http://www.iitg.ac.in/upload/17004822395e8608c700915.pdf

DST sets up rapid response centre at SINE, IIT Bombay to combat COVID-19

Department of Science & Technology, Government of India in a rapid response to combat COVID-19 global pandemic approved setting up of a Centre for Augmenting WAR with COVID-19 Health Crisis (CAWACH) at a total cost of Rs 56 Cr to scout, evaluate and support the innovations and start-ups that address COVID-19 challenges. The Society for Innovation and Entrepreneurship (SINE),

a technology business incubator at IIT Bombay supported by DST has been identified as the Implementing Agency of the CAWACH. CAWACH will identify upto 50 innovations and startups that are in the area of novel, low cost, safe and effective ventilators, respiratory aids, protective gears, novel solutions for sanitizers, disinfectants, diagnostics, therapeutics, informatics and any effective interventions to control COVID-19.

Website link: https://dst.gov.in/dst-sets-rapid-response-centre-sine-iit-bombay-combat-covid-19

Researcher make hand sanitizer for local use in Indian Institute of Technology (IIT), Kharagpur

A team of researchers from IIT Kharagpur's School of Medical Science and Technology quickly developed an alcohol based hand rub following the present scenario of scarcity of hand sanitizers/ hand wash preparations in the market due to their heavy demand. The team created the formulation based on guidelines recommended by the World Health Organization. The Transport Section of the Institute has also developed another formulation.

Website link: https://kgpchronicle.iitkgp.ac.in/preventive-care-iitkgp/

Face Shields for Healthcare Workers During Lockdown

Professor Santanu Dhara and Professor Sangeeta Das Bhattacharya, researchers at the School of Medical Science and Technology at IIT Kharagpur have made a prototype to make face shields for healthcare workers from home during the lockdown. The face shield is an essential part of the personal protective equipment (PPE) required for healthcare workers taking care of patients with suspected COVID-19.

Website link: https://kgpchronicle.iitkgp.ac.in/making-face-shields-for-healthcare-workers-during-lockdown/

3D printed valves for split use of ventilators to serve multiple patients

The use of 3D printed valves are to enable the use of ventilators for multiple patients.

Website link: https://covid19.iisc.ac.in/index.php/2020/04/01/3-d-printed-valves-for-splitting-of-ventilators-for-serving-multiple-patients/

A recombinant subunit vaccine for SARS-CoV-2

The goal is to develop a rapidly producible vaccine for protection to front-line health workers, senior citizens and individuals with co-morbidities such as cardiovascular disease and diabetes.

Website link: https://covid19.iisc.ac.in/index.php/2020/04/04/a-recombinant-subunit-vaccine-for-sars-cov-2/

Cyclone separator design for compressor exit flow oil and dust particle clean up

The aim is to develop a cyclone-based oil droplet separator system as part of the ongoing IISc ventilator development effort, which can be used to reduce the oil droplet and dust particle load on standard filters, thereby prolonging their life and reducing the requirement for frequent maintenance intervals.

Website link: https://covid19.iisc.ac.in/index.php/2020/03/30/cyclone-separator-design-for-compressor-exit-flow-oil-and-dust-particle-cleanup/

Drones for disinfection

As people are locked inside their homes, they are primarily responsible for their personal hygiene and care to prevent the spread of COVID-19. However, central/state governments and various

civic bodies are undertaking various measures to disinfect outdoor spaces and public infrastructure, which is a massive resource-intensive task. General Aeronautics (GA), a startup incubated by the Society for Innovation and Development, IISc, is helping the Bruhat Bengaluru Mahanagara Palike (BBMP) in accelerating the process by using drones to disinfect hard-to-reach areas.

Website link: https://covid19.iisc.ac.in/index.php/2020/03/30/drones-for-disinfection/

GoCoronaGo – contact tracing app and network analytics

The app GoCoronaGo to help identify people who may have crossed paths with COVID-19 positive subjects by tracking their interactions in the past using bluetooth and GPS. It uses temporal network analytics in the backend to understand the risk propensity even for distant contacts, understand disease spread and identify high-risk people who are likely to contract and spread the virus. It also provides alerts on isolation and proximity scores, and helps enhance social distancing. It also has a geo-fencing feature for those who are under quarantine, and has the ability to provide their symptoms which is used in the risk evaluation.

Website link: https://covid19.iisc.ac.in/index.php/2020/04/02/gocoronago-contact-tracing-app-and-network-analytics/

Mobile diagnostic testing lab for COVID-19

The goal is to scale up mobile diagnostic testing capabilities and cut down turnaround times from sample collection to test results from 1-3 days, as India is preparing to deal with a spike in the number of cases across the country. As the pandemic spreads to the interior parts of the country that do not have access to advanced molecular diagnostic test capabilities, there is an urgent need to build and deploy safe and accurate testing capabilities at various locations.

Website link: https://covid19.iisc.ac.in/index.php/2020/04/01/mobile-diagnostic-testing-lab-for-covid-19/

Modeling of epidemic spread in Indian urban conditions

This project aims to model the epidemic spread taking Indian urban conditions into account. The goal is to assist epidemiologists and decision makers with (a) understanding the effectiveness of imposing and lifting various kinds of restrictions (b) anticipating hospital needs (c) devising testing strategies.

Website link: https://covid19.iisc.ac.in/index.php/2020/04/02/modeling-of-epidemic-spread-in-indian-urban-conditions/

N95 mask renewal

In the event of a shortfall of N95 masks, propose devising a method to clean them without affecting their specifications.

Website link: https://covid19.iisc.ac.in/index.php/2020/03/30/n95-mask-renewal/

Oxygen concentrator

Development of low-cost oxygen concentrators that could be coupled with ventilators. Zeolite of a specific size is being used to separate oxygen from the air. A mechanism is being created to control the flow and direction for optimum oxygen generation. The operation of this process is automated. This concentrated oxygen can be directly used with ventilators.

Website link: https://covid19.iisc.ac.in/index.php/2020/03/30/increasing-oxygen-concentration-for-ventilators/

Project Praana: Open Source Ventilator Development

Project Praana (Sanskrit/Kannada for "breath/life") is a voluntary prototype ventilator design effort run by a group of engineers primarily associated with IISc. Project Praana aims to use components available in India to build a mechanical ventilator, whose production can be rapidly scaled up. Praana is designing the system as much as possible with components used in the automotive and water filter industries in India. If necessary, some critical sensors deployed in space and defense applications can also be repurposed for this emergency.
The main aspects of the design are: easy sourcing of components in India, quick manufacturability and simple user interface.

Website link: https://covid19.iisc.ac.in/index.php/2020/03/30/project-pranaa-voluntary-ventilator-prototype-design-effort/

UV-based disinfecting device

A UV based disinfection system would be efficient in killing the virus as well as faster cleaning cycle time. This can also be used to decontaminate reusable personal protective equipment in times of extreme scarcity which presently is for single use.

Website link: https://covid19.iisc.ac.in/index.php/2020/03/30/uv-based-disinfecting-device/

COVID Gyan

COVID Gyan website serves as a hub to bring together a collection of resources in response to the COVID-19 outbreak. These resources are generated by public supported research institutions in India and associated programs. The content presented here relies on the best available scientific understanding of the disease and its transmission. The chief contributor organisation to COVID-19 are Tata Institute of Fundamental Research (TIFR), the Indian Institute of Science (IISc), and the Tata Memorial Centre (TMC), Institute for Stem Cell Science and Regenerative Medicine (inStem), Vigyan Prasar (VP), IndiaBioscience and Web duniya.

Website link: https://covid-gyan.in/

Low-cost 3D-printed antimicrobial face-shield to control the spread of COVID-19

NIPER-G designed, developed & validated a 3D-printed antimicrobial face-shield to control the spread of novel coronavirus. Careful analyses of several resources for risk measurement and on how viruses spread through other body cavities like oral, ophthalmic & olfactory, etc. Thereby NIPER-G arrived to a solution to fabricate a 3D printed object to avoid further passing on COVID-19 transmission from one person to others.

Website link: http://www.niperguwahati.ac.in/

A 3D-Printed Prototype with Multiple Features to Stop the Spread of Novel Coronavirus

NIPER-G designed, developed & validated a 3D-printed hands-free object in terms of opening or closing off the doors, windows, drawers (both vertical & horizontal), refrigerator handle, elevator buttons, laptop/desktop keyboards, including turning on/off switch buttons. Careful analyses of several resources for risk measurement and on how viruses spread through bare hands, we arrived to a solution to fabricate a 3D printed object to avoid further passing on COVID-19 transmission from one bare hands to others.

Website link: http://www.niperguwahati.ac.in/

NIT Durgapur has made an

25

indigenous automated AMBU bag system

NIT Durgapur has made an indigenous automated AMBU bag system, that can serve as a quick and temporary substitute for ventilators in emergency situations. AMBU stands for Artificial Manual Breathing Unit. The present system is automated and can be tuned for oxygen requirements. The system has been christened "Pranesh".

Website link: https://nitdgp.ac.in/home

SCIENCE & TECHNOLOGY EFFORTS ON COVID-19
by
Private Sector Enterprises

DST funded company to scale up device to enrich oxygen supply in air for treatment of COVID-19 patients
Genrich Membranes, a spin-off company, based on proprietary technology licensed from CSIR-National Chemical Laboratory, Pune is being funded by the Department of Science and Technology (DST) to scale up membrane oxygenator equipment (MOE) that it has developed to treat COVID-19 patients. Based on innovative, indigenous hollow-fiber membrane technology, the MOE enriches oxygen in the air up to 35% under pressure (4-7 bar, using oil-free compressor).

The equipment consists of membrane cartridge, oil-free compressor, output flowmeter, humidifier bottle, nasal-cannula, and tubing & fittings. The compressed, filtered air from the compressor is fed to the membrane cartridge, which selectively permeates oxygen over nitrogen offering oxygen-enriched air as the product at the ambient pressure. The membrane cartridge capable of distinguishing oxygen and nitrogen restricts the passage of viruses, bacteria, and particulate matter. The product air is of medical grade.

The device is safe, does not require trained manpower for its operation, needs minimum maintenance, is portable, compact, and with plug-and-play facility provides on-site, quick-start oxygen-enriched air.

Website link: https://dst.gov.in/dst-funded-company-scale-device-enrich-oxygen-supply-air-treatment-covid-19-patients

Mylab partners with Serum Institute India's CEO Adar Poonawalla and Abhijit Pawar, Chairman AP Globale to scale-up production of COVID-19 test kit Mylab Discovery Solutions, has developed the first COVID-19 rapid testing kit in India. This testing kit has been approved by the Indian Food and Drug Administration, the Central Drugs Standard Control Organisation (CDSCO), and the ICMR. This kit can give test results within 2.5 hours. After joining hands with Serum Institute of India and AP Globale, the test capacity of Mylab has increased from 1.5 lakh tests a week to 20 lakh (2 million) tests a week.

Website link: https://mylabdiscoverysolutions.com/press-release/

The India Science and Technology (ISTI) web portal serves as a one stop online information resource to bring together a collection of resources in response to the COVID-19 outbreak. These resources are generated by efforts made by numerous initiatives and schemes made available 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.

TO GET MORE INFORMATION ON COVID-19,
please visit:
http://www.indiascienceandtechnology.gov.in/covid-19-the-pandemic