

COVID-19 BULLETIN

7 JULY 2020

- #CSIRFightsCovid19
- Corona Research Snapshot
- Corona Innovations
- COVID-19 Dashboard
- #Healthy@Home
- Corona Q&A
- COVID-19 Myth Busters

Compiled, Designed & Published by
National Institute of Science Communication & Information
Resources (NISCAIR)

www.niscair.res.in;  @CSIR_NISCAIR

Council of Scientific & Industrial Research (CSIR)

Dr KS Krishnan Marg, New Delhi-110012

&

14 Satsang Vihar Marg, New Delhi-110067





#CSIRFightsCovid19

Eversince the Coronavirus pandemic broke out, CSIR has mounted a strategic, well-coordinated and integrated approach towards mitigating the Coronavirus outbreak ranging from containing the spread of the virus by providing sanitisation and disinfection solutions to equipping the frontline workers and health warriors with protective gear, and from exploring repurposing of existing drugs to discovering new drugs and vaccines. Here are some major developments this week.

DRUG DISCOVERY HACKATHON 2020
Innovate4NewDrugs

Launch

Shri. Ramesh Pokhriyal 'Nishank'
Minister of Human Resource Development

Dr. Harsh Vardhan
Minister of Science and Technology

Shri Sanjay Shamrao Dhotre
Minister of State, Human Resource Development

2nd July 2020 at 11.00 AM

➡ Drug Discovery Hackathon 2020

A Drug Discovery Hackathon 2020 (DDH2020) against COVID-19, DDH2020 was launched on 2 July 2020 in the august presence of Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Dr Ramesh Pokhriyal Nishank, Hon'ble Minister for Human Resource Development, Mr. Sanjay Dhotre, Minister of State for HRD, Communications, Electronics & IT.



The Drug Discovery Hackathon 2020 is a joint initiative of AICTE and CSIR and is supported by the Office of Principal Scientific Advisor, Govt. of India, NIC and MyGov. The Hackathon is a unique approach to COVID-19 Drug Discovery and is a model to engage youth and train them in drug discovery and help to hone their skills. The first phase of the three-phase competition was launched on 2 July 2020.

Digital & Molecular Surveillance

CSIR has been undertaking digital and molecular surveillance at the level of the SARS-CoV-2 virus, humans, and geographical origins and distributions. As part of this endeavour, CSIR undertook community surveillance in Kolar and Jamshedpur. The surveillance report would help in tracing and isolation. Now, CSIR-IGIB has access to COVID-19 samples of health workers from Max Hospital, Delhi for studying patient data and correlating with outcomes. COVID-19 virus from patients with a varied outcome (dead, recovered) will be cultured with the help of CSIR-IMTech and correlated with their genome sequence to find the plausible cause of the particular outcome. The National Institute of Nutrition, Hyderabad has collected over 3000 samples which will be available to CSIR-CCMB for similar studies.

Now, CSIR-IGIB is in talks to obtain the data of 1200 people admitted at National Stadium Bombay. The data will assist in digital surveillance and it will be the largest data set of India. CSIR-IGIB is a validation lab for digital surveillance.

CSIR is also in discussions for a pan-IIT consortium for large sequencing based testing model. It will be useful in post COVID time also.

Protective Safety Goggles by CSIR-CSIO

CSIR-Central Scientific Instruments Organisation (CSIR-CSIO), Chandigarh has developed a technology for precision manufacturing of safety goggles for healthcare professionals involved in treating high-viral load patients as in the case of the COVID-19 pandemic. The current situation has brought out the need and significance of effective personal protective equipment (PPE) to protect healthcare service providers, patients and visitors from accidentally getting infected. The technology was transferred to the Sark Industries, Chandigarh on 26 June 2020 for commercialisation and mass production.

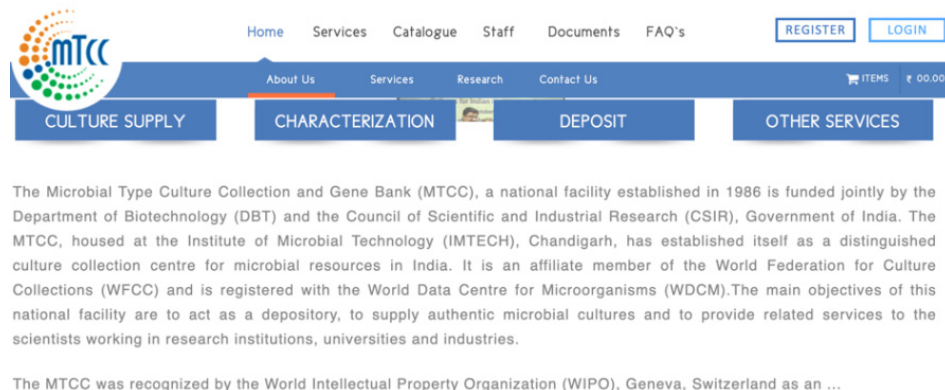


The protective eyewear is ergonomically designed to provide full cover and efficient sealing of the eye area and would protect the healthcare professionals from hazardous aerosols as well as other suspended particles. The safety goggles are designed with a flexible frame to provide a tighter sealing with the skin of the face and would cover the eyes and the surrounding areas, and even accommodate prescription glasses.

It consists of a sturdy polycarbonate lens and adjustable elastic strap for ease of wearing. The goggles can be used in varied environmental conditions without any fogging or fatigue. Apart from healthcare professionals, the safety goggle is also useful for the general public in crowded areas as well as in public transport.

CSIR-IMTECH is a National COVID-19 Biorepository

CSIR-Institute of Microbial Technology (CSIR-IMTECH), Chandigarh is to store clinical samples of COVID-19 patients for research and development related activities. CSIR-IMTECH is one of the 16 national COVID-19 biorepositories set up by the Government of India for collecting, storing, and maintaining clinical samples of positive patients. The samples will help researchers understand the early predictors of disease severity and how it develops given the immune response and other factors.



CSIR-IMTECH has also been authorised to share the samples with academia, industry, and commercial entities after scrutinising the purpose of the request and ensuring benefit to the country. The Indian Council of Medical Research (ICMR) has asked all states to provide access to COVID samples to the designated biorepositories across the country.

CSIR-NBRI Establishes Testing Laboratory

CSIR-National Botanical Research Institute (CSIR-NBRI), Lucknow has established an “Advanced Virology Lab” for testing COVID-19. The facility has been developed based on the guidelines of the Indian Council Medical Research (ICMR), the World Health Organisation (WHO), and the Ministry of Health and Family Welfare. It is a Bio Safety Level (BSL) 3 level facility.



This advanced version has a “Negative Pressure”, which means it has a suction facility that can suck any aerosol and pass it through filters. It can filter virus or bacteria to make it a safe COVID-19 testing facility. It reduces the possibilities of infections at culturing facilities.

The facility will add to the testing capacity of Uttar Pradesh (UP). At present, UP is testing about 20,000 samples per day. CSIR-NBRI will start testing 100 samples a day in the first week and later it is planned to scale it up to 500 samples a day. A team of scientists and researchers from the CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow will also join the NBRI team for the testing of COVID samples.

SARS-CoV-2 Diagnostic Testing

The key to flattening the curve of growth in Coronavirus cases is the detection of the infected at the earliest and isolating them. A combination of digital and molecular surveillance with rapid diagnosis is the need and CSIR is striving towards that using multiple strategies. Currently, 11 CSIR labs across India are conducting COVID-19 tests. So far, 78,742 samples have been tested and during the last week 13,675 samples were tested.

Meanwhile, dry swab testing protocol developed by CSIR-CCMB was confirmed at the Centre for DNA Fingerprinting & Diagnostics (CDFD), Hyderabad with good concordance with regular VTM based protocol. Gandhi Hospital will also do testing using the CSIR-CCMB methodology. The protocol has been submitted to ICMR for approval.

CSIR-CSIO's Respi-AID Receives Validation

Ever since the pandemic outbreak in the country, CSIR has been introducing innovative, low-cost and effective hospital assistive devices and personal protective equipments (PPEs). CSIR has made considerable progress in this area and many technologies and designs have been transferred to the industry while some are at the stage of beta testing, which will be followed by certification.

In the past week, CSIR-CSIO's Respiratory Assistance Intervention Device (Respi-AID) was subjected to functional testing using ventilator calibrator and artificial test lung. Oxygen and air blending circuit with oxygen concentration monitoring in the developed prototype have been incorporated. Validation of the developed prototype was done through

anaesthesiologist of GMCH, Chandigarh. Fabrication of the second prototype is under process. The certification testing through Apex Quality Certification Services Pvt. Ltd., Jaipur has been completed.

CSIR Sequences 50% of Total COVID-19 Genomes Sequenced in India



India crossed the 1000 mark for the COVID-19 genomes sequenced with 50% of the genomes sequences being from CSIR.

During the week, 178 viral genomes were submitted to GISAID (Global Initiative on Sharing All Influenza Data) database and more are expected in the coming week. This would help in understanding the Indian viral strains and specific mutations if any.

The CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad has come out with an interactive web app named Genome Evolution Analysis Resource for COVID-19 (GEAR-19). The web app analyses the outcome of efforts of the 33 contributing laboratories across the country that have so far sequenced 1,031 genomes of SARS-CoV-2. The identification of clades or viral groups plays an important role in understanding probable origin of a virus infecting a certain population and also in testing drugs. GEAR-2019 also gives a timeline of distribution of virus belonging to different clades

(<https://data.ccmb.res.in/gear19/>).

Status of Coronavirus Sample Testing

A. CSIR labs engaged in Sample Testing of Coronavirus:

- 1) CSIR-Centre for Cellular & Molecular Biology (CSIR-CCMB), Hyderabad
- 2) CSIR-Institute of Microbial Technology (CSIR-IMTech), Chandigarh
- 3) CSIR-Indian Institute of Integrative Medicine (CSIR-IIIM), Jammu with NCDC, Delhi
- 4) CSIR-National Environment Engineering Research Institute (CSIR-NEERI), Nagpur
- 5) CSIR-Indian Institute of Toxicological Research (CSIR-IITR), Lucknow
- 6) CSIR-Institute of Himalayan Bioresource Technology (CSIR-IHBT), Palampur
- 7) CSIR-Central Drug Research Institute (CSIR-CDRI), Lucknow
- 8) CSIR-Central Leather Research Institute (CSIR-CLRI), Chennai
- 9) CSIR-Indian Institute of Petroleum (CSIR-IIP), Dehradun
- 10) CSIR-North East Institute of Science & Technology (CSIR-NEIST), Jorhat

B. CSIR labs supporting State Governments in Testing:

- CSIR-Nation Institute of Oceanography (CSIR-NIO), Goa
- CSIR-National Institute of Interdisciplinary Science & Technology (CSIR-NIIST), Thiruvananthapuram

C. CSIR labs ready for Sample Testing:

- CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata
- CSIR-National Botanical Research Institute (CSIR-NBRI), Lucknow
- CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), Lucknow

Re-usable Makeshift Hospitals to Tackle COVID-19 Emergency

Rapidly building quarantine structures and make-shift hospitals has been a challenge as COVID-19 infections spread swiftly challenging health infrastructure in the country.

Technical know-how on makeshift shift buildings for hospitals, housing and other purposes developed by CSIR-AMPRI and CSIR-CBRI was transferred to Janata Tents and Events on 29 June 2020 at CSIR-AMPRI. The know-how will help in erecting makeshift structures to deal with COVID-19 emergency and other purposes.



The technology utilizes light-weight structures which are foldable, easy to erect, safe, reusable and cost-effective.

CSIR Media Coverage



10:45 91%
 Covid-19: A review of three...
 m.hindustantimes.com TWEET

Covid-19: A review of three medical approaches

There is a reliance on general supportive care, antiviral treatment, and immune modulation. But this is evolving
 Updated: Jun 29, 2020 19:25 IST
 By Anurag Agrawal,
 f t w



Mechanical Ventilator using Motorized Bellow

Kolkata: CSIR-CMERI Durgapur in a path-breaking development in Medical Care Technology, unveiled its indigenously developed Mechanical Ventilator using Motorized Bellow on 02.06.2020. The Mechanical Ventilator was unveiled in a Press Conference in the presence of Prof. (Dr.) Harish Hirani, Director, CSIR-CMERI, Durgapur, and Dr. Arunangshu Ganguly, Chairman and Managing Director, Health World Hospitals Pvt. Ltd., Durgapur.

A Ventilator is a Medical Intervention device which works as an Assistive Oxygen supply support when the normal functioning of the Lungs is disrupted owing to some abnormal-infection. Pressurised Oxygen is pumped into the lungs and excess Carbon Dioxide is flushed out to boost the Oxygenation saturation of the human body under abnormal circumstances. Dr. Arunangshu Ganguly, Chairman and Managing Director, Health World Hospitals Pvt. Ltd., Durgapur, stated that, "CSIR-CMERI in collaboration with Critical Care Experts of Health World Hospitals. (Dr. Arundam Kumar Hazra, Dr. Brojen Choudhury & Dr. Ramprasad Gorai, studied and incrementally developed the Mechanical Ventilator of today. CSIR-CMERI hand-in-hand with Health Care professionals can revolutionise Ventilator development capability of the Nation. This will help in massive substitution of Import Dollars by strengthening the Medical Care Manufacturing Landscape of the country. Since the individual parts of the Ventilator can be independently developed by different industries, mass-development of this Ventilator will help a broad spectrum of Industries. The significantly reduced cost of the Ventilator will help the economically marginalised sections of the society the most as well as help further fortify the Government aided Healthcare schemes. This will also help in massively upgrading the tertiary health care infrastructure of the Nation."

Prof. (Dr.) Harish Hirani



Director, CSIR-CMERI Durgapur, stated, "The indigenously developed Mechanical Ventilator using Motorized Bellow is a Volume Controlled Ventilator. The Bellow Design, Controllers and embedded Electronics of the system have all been customised to ensure price efficacy as well as meeting the requirements of the relevant industries. The Mechanical Ventilator has undergone multiple technical and design changes after adopting critical feedbacks from Healthcare professionals

responded to the fluctuating variables of a patient. Such indigenisation of Ventilator Manufacturing activities will supplement the clarion call of the Prime Minister to 'Make in India. Made for the World'. Dr. Hirani also appreciated the efforts of the team comprising Dr. Anupam Sinha, Sanjay Hansal, KalyanChatterjee and AvinashVadav who worked upon development of the Ventilator.

Specifications:
 - Micro-controller along with pressure and flow sensors in closed loop.
 - Continuously monitors and displays pressure, volume and flow with time in the monitor.
 - Parameters can be set on the fly through the GUI like Tidal Volume, PIP, I:E Ratio, PEEP and PIP.
 - Alarms for different set limits.
 - Mechanical fail-safe valve. Opens at 80 cm H2O if there is electrical/electronic failure.
 - PIP: 40-70 cm H2O adjustable in steps of 5 cm H2O.
 - PEEP: 5-20 cm H2O adjustable in steps of 5 cm H2O.

Inspiratory: Expiratory ratio (I:E): 1:1.3 (adjustable)
Respiratory Rate (BPM): 10-30 breaths per minute in increments of 2
Tidal Volume: 350 ml-650 ml in steps of 50 ml
Modes available: Volume Control (VC) - Continuous Mandatory Ventilation (CMV), for PASSIVE patients
 Volume Control (VC) - Intermittent Mandatory Ventilation (IMV), for PARTIALLYACTIVE patients
Safety Features:
 - Alarm for the following: Inspiratory/Expiratory Line Blockage
 - Inspiratory/Expiratory Line open
 - Peak-Inspiratory-Pressure Limit reached
 - Patient breathing trigger
Others:
 - Patient data logging for 72 hours
 - A pressure release valve that vents gas above a certain safe pressure
 - An anti-asphyxia valve which allows the breathing of room air in the event of power failure.

With exaggerated claims, it is difficult to determine the best treatment (Sanchit Khanna/HT PHOTO)

As the cases of Covid-19 increase, many are wondering what they can do if they or someone close to them gets the infection. First, some reassurance. A vast majority of those infected with SARS-CoV2 is asymptomatic or have

Ad

10:23 93%
 CSIR-IMTECH to have biorepository of Covid-19 samples

The samples will help researchers understand the early predictors of disease severity and how it develops given the immune response and other factors.
 Updated: Jul 03, 2020 00:21 IST
 By HT Correspondent, Hindustan Times Chandigarh
 f t w



CSIR-IMTECH has also been authorised to share the samples with academia, industry, and commercial entities after scrutinising the purpose of the request and ensuring benefit to the country. (HT FILE)

The Microbial Type Culture Collection and Gene Bank (MTCC) at the Council of Scientific and Industrial Research's (CSIR) Institute of Microbial Technology Chandigarh (IMTECH) has said they will store clinical samples of

10:10 68%
 Drug discovery hackathon ...
 aninews.in TWEET



Council of Scientific and Industrial Research (CSIR) Director-General Shekhar Mande speaking to ANI (Photo/ANI)

Drug discovery hackathon can yield COVID-19 solution
 ANI | Updated: Jul 03, 2020 11:47 IST
 By Suchitra Mukherjee
 New Delhi [India], July 3 (ANI): The drug

23:43 44%
 CSIR-CMERI develops cost-effective mechanical ventilator
 health.economicstimes.indiatimes.com TWEET

CSIR-CMERI develops cost-effective mechanical ventilator

A ventilator is a device which works as an assistive oxygen supply support system when normal functioning of the lungs is disrupted owing to some infection.

PTI June 07, 2020, 17:46 IST
 f t w



CSIR Media Coverage

मॉडल सीवीआरआई रुड़की और एम्सी भोपाल ने विकसित की तकनीक, कोरोना मरीजों के इलाज में मिलेगी मदद

48 घंटे में तैयार होगा आग, पानी व तूफान से सुरक्षित अस्पताल

भोपाल (नमडुनिया प्रतिनिधि)। राजधानी के प्रगत पनार्थ प्रजन अनुसंधान संस्थान और रुड़की के सेंट्रल बिल्डिंगरिसर्च इंस्टीट्यूट ने कोविड-19 के लिए कुछ घंटों में तैयार किए जाने वाले अस्पताल का मॉडल तैयार किया है। दोनों संस्थान केंद्रीय औद्योगिक अनुसंधान परिषद (सीएसआईआर) के अधीन हैं। इसका स्वरूप एल्यूमीनियम से बना होगा। इसे गोड़ा जा सकता है। यह एक मॉडल होगा। सीएसआईआर एम्सी और सीवीआरआई रुड़की ने मिलकर अस्पताल, अवकाश और अन्य मकसद के अस्पताल बनाए जा सकते हैं। यह आग, पानी और तूफान से पूरी तरह सुरक्षित रहेंगे। जल्दतः खाम होने पर इसे फोड़ कर एक स्थान से दूसरे स्थान पर सौमवार को एम्सी भोपाल और सीवीआरआई रुड़की ने इस तकनीक को लॉन्च किया। इस अवसर पर एम्सी भोपाल के निदेशक डॉ. अननीश श्रीवास्तव ने

यह है तकनीक: एल्यूमीनियम के पाइप का होगा उपयोग इस तकनीक में हल्के पुर्न निर्मित एल्यूमीनियम के पाइप का उपयोग किया जाता है। यह फ्लैटबल हैंने हैं और लगने में आसान है। साथ ही इसका कई बार उपयोग किया जा सकता है। यह तूफान, आग और पानी से पूरी तरह सुरक्षित है। किसी भी मौसम में इसका उपयोग किया जा सकता है। इस पर जिस कण्डे का इस्तेमाल किया जाएगा, उसमें एयर बल्ब्स होंगे। जिससे हर मौसम के अनुसार इसका वातावरण रहेगा। यह टूटी में गर्म और गर्मी में ठंडा रहेगा। ज्यादा गर्मी होने पर इसमें एयर कंडिशनर भी लगाया जा सकता है। इसको लगाने भी दुर्लभता में चार से पांच से रुपये काफी कम आ रही है। यह लगाने एक बार ही लगानी होगी। निर्माण में मजदूरी करेगी। सीवीआरआई रुड़की के डायरेक्टर डॉ. एन गोपालकृष्णन ने बताया कि विकसित तकनीक राष्ट्रीय और अंतरराष्ट्रीय मानकों के अनुकूल है। इसका उपयोग बेहतरीन काम समय में प्रभावित क्षेत्रों में किया जा सकता है। सुरक्षा सीमाओं पर भी इसका उपयोग किया जा सकता है। इस अवसर पर आयोजित एक प्रेस कॉन्फ्रेंस के बाद

जगह नहीं बचती है। ज्यादातर जगह पर 23:43 ... बिबिी ... सेंटर

आवाज कोलकाता आसपास

सीएसआईआर-सीएमईआरआई के तहत मैकेनिकल वेंटीलेटर का किया गया अनावरण

मेडिकल केयर मैनुफैचरिंग करेगा लैंडस्केप को मजबूत: डॉ हिरानी

दुर्लभ ... कोलकाता-सीएसआईआर के तहत मैकेनिकल वेंटीलेटर का किया गया अनावरण ... मेडिकल केयर मैनुफैचरिंग करेगा लैंडस्केप को मजबूत: डॉ हिरानी



Home > Health

Health Diagnostic Dose News Bytes Top News

CSIR-CMERI develops new indigenous ventilator

Durgapur-based Central Mechanical Engineering Research Institute (CMERI) researchers have indigenously developed a ventilator amid rising cases of COVID-19

By BioVoice News Desk - June 8, 2020

Facebook Twitter Google+ LinkedIn WhatsApp



23:42 ... 44%

CSIR-CMERI develops Port... medicaldialogues.in

Register Login

Medical Dialogues


Medical News Health news Medical Guidelines

Home > News > Industry > Medical Devices News > CSIR-CMERI develops...

CSIR-CMERI develops Portable, Cost-Effective Mechanical Ventilator

The mechanical ventilator developed by the institute will cost around Rs 90,000-1,00,000 and can be used for the treatment of COVID-19 patients and those experiencing breathing difficulty.

By - Hina Zahid
Published On 2020-06-08 04:15 GMT | Update On 2020-06-08 09:55 GMT



23:41 ... 44%

CCMB's web app gives pee... newindianexpress.com

THE NEW INDIAN EXPRESS

CCMB's web app gives peek into one thousand plus coronavirus genomes

Express News Service | Published: 28th June 2020 08:55 AM

Facebook Twitter



From Telangana, 193 virus genomes have been sequenced. (File Photo | PTI)

THE NEW INDIAN EXPRESS

COVID-19: CSIR scientists design oxygen enrichment unit that can be used in homes, hospitals

PTI | Published: 30th June 2020 08:46 AM

Facebook Twitter





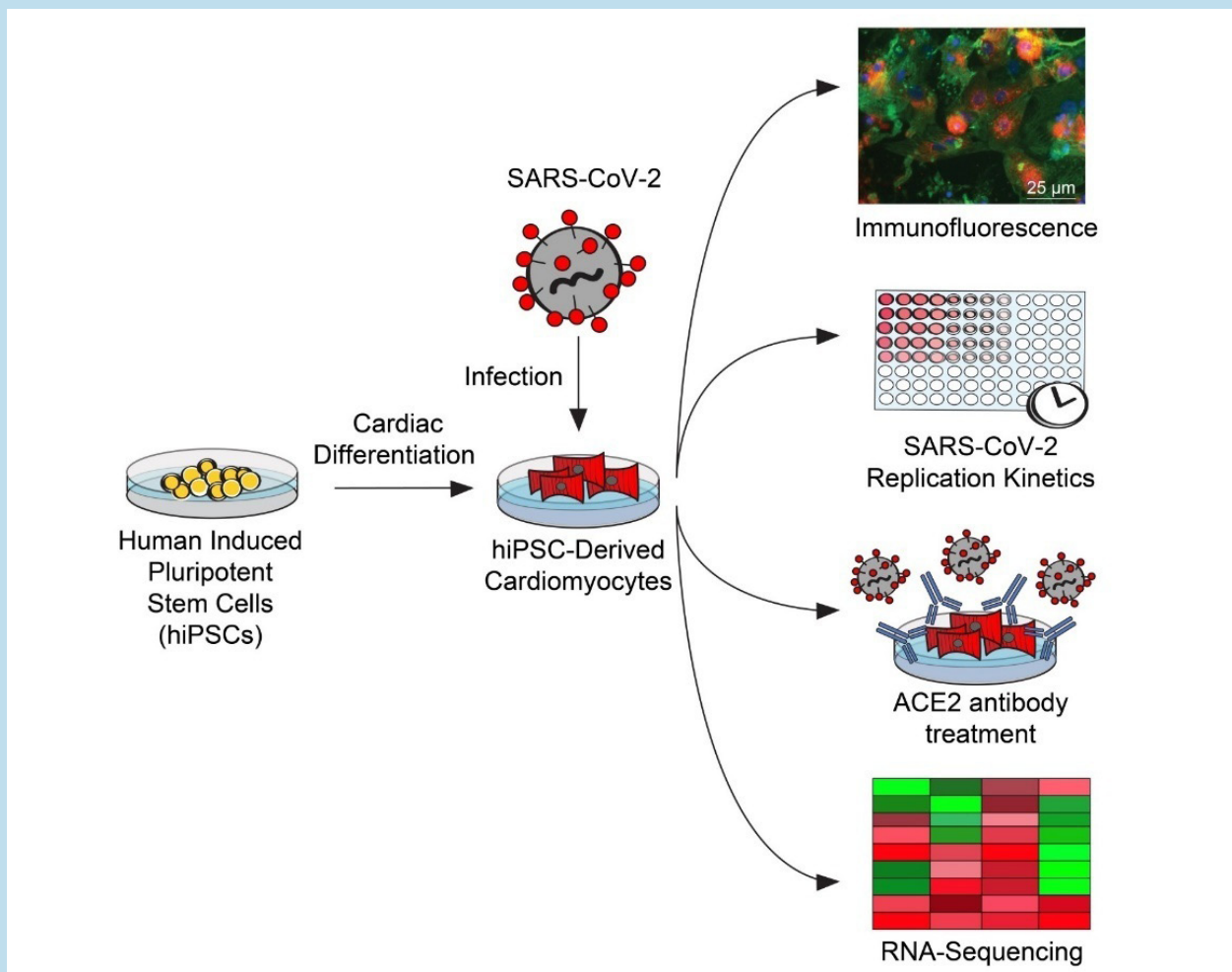
CORONA RESEARCH SNAPSHOT

➔ SARS-CoV-2 can infect lab-grown heart cells

In view of cardiac attacks in COVID-19 infected patients, scientists are trying to understand the clear mechanism for SARS-CoV-2 affecting the heart. Researchers at Cedars-Sinai Board of Governors Regenerative Medicine Institute, USA have discovered that the stem cell-derived heart cells can be infected with the SARS-CoV-2. The virus is also capable of quickly

dividing in the stem cells. Authors of the study observed that the infected heart cells changed their beating pattern after 72 hours of infection. Further, SARS-CoV-2 infection caused a change in gene expression profile in the stem-cell derived heart cells. The study is published in journal *Cell Reports Medicine* after peer review.

(Source: *Cell Reports Medicine*; DOI: 10.1016/j.xcrm.2020.100052.)

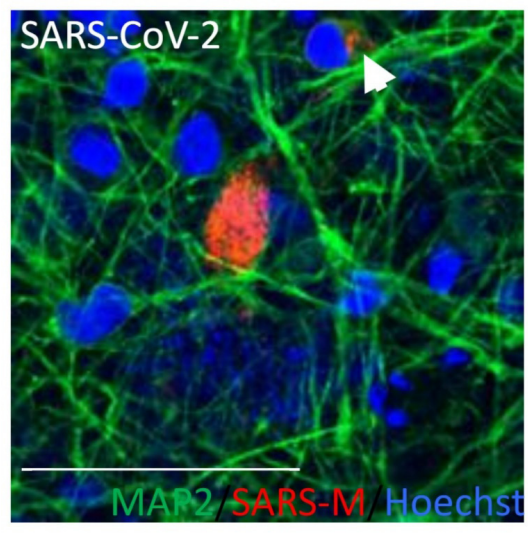


Flow-diagram for the experimental procedure

(Courtesy: Sharma et al.; *Cell Reports Medicine*)

➔ SARS-CoV-2 is able to infect human brain cells in lab grown 'mini-brains'

Scientists of Johns Hopkins University, USA and Bloomberg School of Public Health and Infectious Disease, USA have found that organoids called 'mini-brains' can be infected with SARS-CoV-2 to cause COVID-19 infection. Statistical data show that approximately 36% COVID-19 infected patients show neurological symptoms. However, it was still not clear whether SARS-CoV-2 infects the human brain cell or not? The researchers demonstrated that certain human neurons express the ACE2 receptor which is responsible for giving entry to SARS-CoV-2 in human lung cells. It can be concluded that presence of ACE2 receptor in brain cells may also provide entry to SARS-CoV-2 in brain cells although human brain cells are protected against many viruses, bacteria and pathogens through the blood-brain barrier. It has been



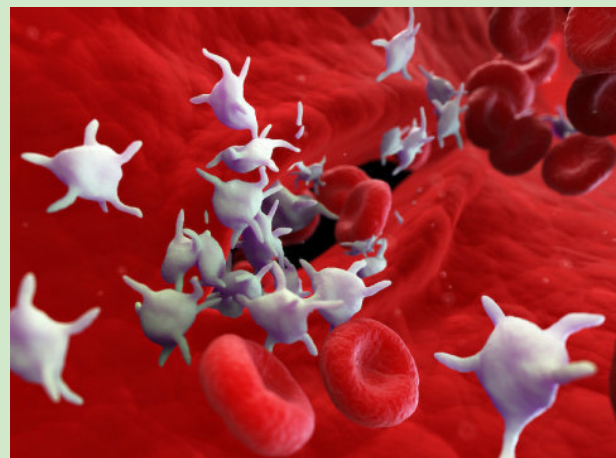
Arrowhead indicating the presence of SARS-CoV-2 in neurons (in green color)

(Courtesy: Bullen et al. ALTEX, 2020)

found that SARS-CoV-2 could infect the stem-cell derived human brain cells present in organoids like 'mini-brains'. The studies are published in journal *ALTEX: Alternatives to Animal Experimentation* after peer review. (Source: *ALTEX*, 2020; DOI: [10.14573/altex.2006111](https://doi.org/10.14573/altex.2006111))

➔ Hyperactivity in blood-clotting cells is detected due to COVID-19 infection

According to University of Utah, USA scientists, changes in blood platelets triggered by COVID-19 infection can cause serious cardiac conditions like attacks or strokes in patients who already have cardiac complications. The researchers have observed the presence of inflammatory proteins in COVID-19 infected patients which can significantly change the function of blood platelets. These proteins make the blood platelets hyperactive and more susceptible to form dangerous and potentially deadly blood-clots. The understanding of blood-clot formation mechanism due to COVID-19 infection can lead to discovery of life-saving



Representative image of White Blood Cells

(Courtesy Internet)

treatment and prevention mechanisms in COVID-19 patients. The findings are published in *Blood*, a journal of American Society of Haematology.

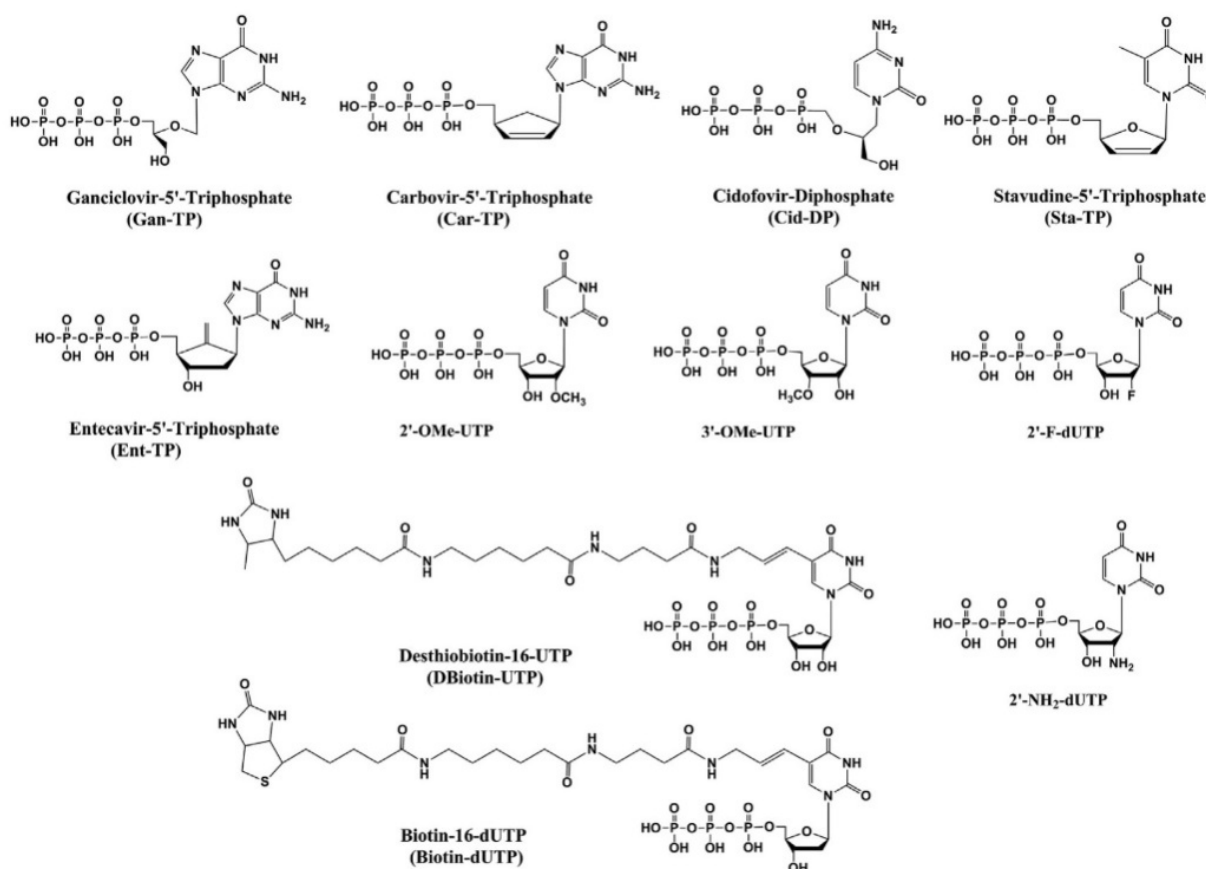
(Source: *Blood*; DOI: [10.1182/blood.202007214](https://doi.org/10.1182/blood.202007214))

➔ **Multiple molecules are identified that are capable of shutting down the SARS-CoV-2 polymerase reaction**

SARS-CoV-2 uses the polymerase protein to replicate its genome inside the infected human cells. The replication rate of genome determines the severity of COVID-19 among patients. Scientists are searching for methods to stop the polymerase reaction which replicates the virus's genome. Stopping the polymerase reaction in infected human cells will lead to eradication of novel coronavirus by the human immune system inside the cells. In a collaborative effort, scientists at Columbia University and

University of Wisconsin-Madison, USA have identified several such molecules that have the capability to shut down the polymerase reaction and thus the replication of the novel coronavirus genome in infected cells. These molecules are being considered as potential therapeutic candidates against the novel coronavirus. Out of these, five molecules are already approved by FDA-USA for treatment of other viral infections like HIV/AIDS, cytomegalovirus, and hepatitis B. The study is published in journal *Antiviral Research* after peer review.

(Source: *Antiviral Research*, DOI: [10.1016/j.antiviral.2020.104857](https://doi.org/10.1016/j.antiviral.2020.104857))



Chemical structures of the candidate molecules

(Courtesy: Jockusch et al. *Antiviral Research* journal)

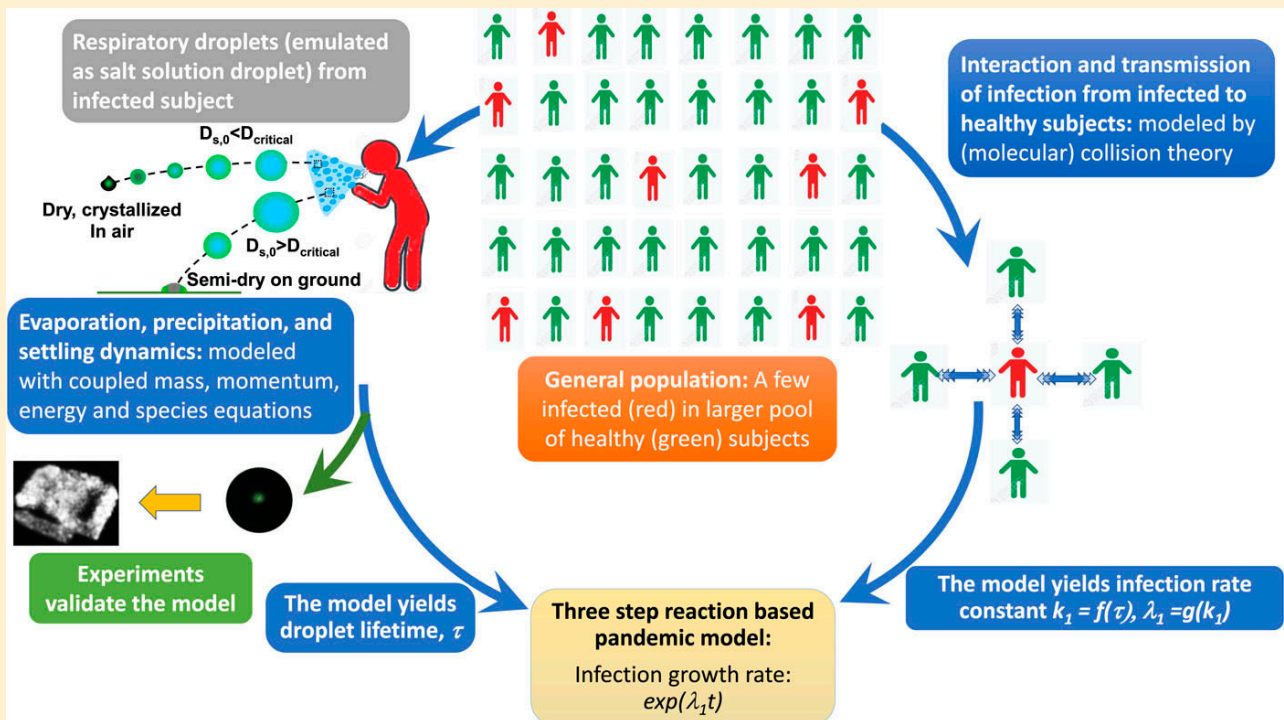
➔ A mathematical model evaluates the effect of ambient temperature and humidity on COVID-19 droplet dynamics during respiration

Previous studies have revealed that the SARS-CoV-2 spreads mainly by respiratory droplets produced by an infected person during sneezing, coughing and even talking. Scientists are trying to model the droplet dynamics for understanding the most exact behaviour of droplets in the process of virus transmission. In a collaborative effort, researchers from University of Toronto, Canada, University of California-San Diego and Indian Institute of Science, Bangalore concluded that the droplets of the healthy

human-being and COVID-19 infected patient follow different behaviours in the air through a mathematical model. The water droplets containing COVID-19 viruses can travel 8-13 feet in absence of wind before evaporating or escaping. The droplet dynamics also depend on the ambient temperature and humidity, wind, turbulence and air circulation finally affecting the virus transmission process. These findings indicate that six-feet social distancing is not enough in closed rooms to avoid infection. The study is published in the journal *Physics of Fluids* after peer review.

(Source: *Physics of Fluids*; DOI: 10.1063/5.0015984)

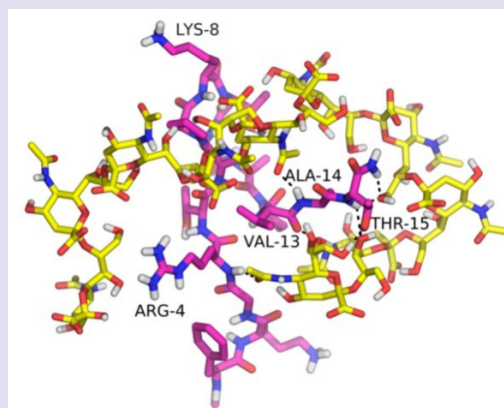
Flow-diagram for mathematical model



(Courtesy: Chaudhuri et al. *Physics of Fluids*, 2020)

Chemically designed peptides exhibit potential for blocking viruses, encourage future study

Researchers at Rensselaer Polytechnic Institute, USA have demonstrated the chemically engineered peptide binding process on cells to potentially block the viruses. The scientists could chemically engineer the peptides, which are capable of selectively and specifically binding to polysialic acid (PSA) which is present in many human cells and play key roles in several physiological and pathological processes including disease progression. It was fundamentally studied for treatment of diseases such as Alzheimer's, Parkinson's and cancer but researchers are hopeful about its role in the treatment of COVID-19.



Chemical Structure of one of the peptides (I-P24)

(Courtesy: Shastry et al., Nature Scientific Reports, 2020)

These peptides may provide a barrier between cells and viruses. The study is recently published in Nature Scientific Reports after peer review.

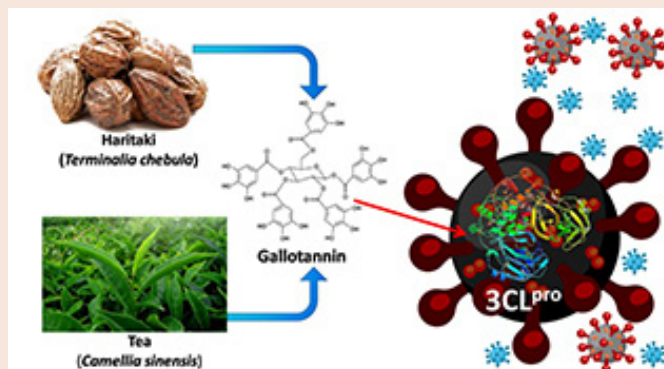
(Source: *Scientific Reports*; DOI: [10.1038/s41598-020-64088-z](https://doi.org/10.1038/s41598-020-64088-z))

Tea and Haritaki may act as potential therapeutic options against SARS-CoV-2

Researchers from the Kusuma School of Biological Sciences (KSBS), IIT Delhi, screened about 51 medicinal plants on 3CLProtease (3-chymotrypsin-like protease) of the virus, which is necessary for processing the viral polyproteins and therefore has emerged as an interesting premise for the development of drugs targeting the virus. The targeting of this protein may therefore be able to halt the replication of the virus.

The experimental findings showed that aqueous extracts from Tea (Black and Green Tea, Scientific name — *Camellia sinensis*) as well as Haritaki (*Terminalia chebula*, which is commonly known as Harad in Hindi) have potential anti-viral activity via *in-vitro* inhibition of the proteolytic activity of the main protease of the virus 3CL pro showing potential therapeutic candidates for the SARS-CoV-2 infection, which should be further validated in *in-vivo* models. The research work was recently published in *Phytotherapy Research* (DOI: [10.1002/ptr.6802](https://doi.org/10.1002/ptr.6802)).

Source: iitd.ac.in





CORONA INNOVATIONS

➔ Mobile Inflatable Biosafety Lab to expedite COVID-19 testing

BGI and Etopia has designed and developed a mobile lab called the 'Huo-Yan Air Lab'. This is a mobile, inflatable P2 level biosafety laboratory, which uses a modular air dome structure. The mobile lab is quickly constructed and can be deployed to support screening and detection. It can be transported by air on a commercial passenger aeroplane. Huo-Yan is based on BGI's previous experience constructing a P3 level biosafety laboratory using an inflatable structure during the Ebola outbreak in 2014 in West Africa.

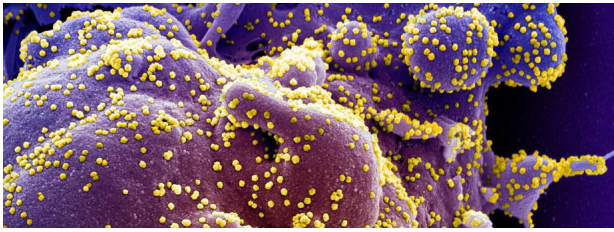
The first such lab was just installed at the Shenzhen National GeneBank. The

development of this lab is in response to the need for countries to rapidly build-up screening and testing infrastructure. The Huo-Yan Air Lab consists of five major areas for sample collection, sample reception, sample preparation, reagent preparation and amplification. The lab is equipped with auxiliary conversion space including air lock conversion, medical waste exhaust system and integrated bathroom and is installed with Class II biological safety cabinets, automatic nucleic acid preparation instruments, qPCR instruments, antibody detection equipment, gene sequencers, high-performance servers and other COVID-19 virus nucleic acid detection equipment.

(Source: <https://www.genengnews.com>)



➔ Quick testing of Coronavirus through CRISPR technology



A testing kit based on CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) technology has been developed by a biotechnology firm Sherlock Biosciences. The Sherlock CRISPR SARS-CoV-2 kit tests for the novel coronavirus (SARS-CoV-2) in an hour's time and the testing results can be seen through the naked eye. This diagnostic kit has received Emergency Use Authorisation by the United States' Food and Drug Administration.

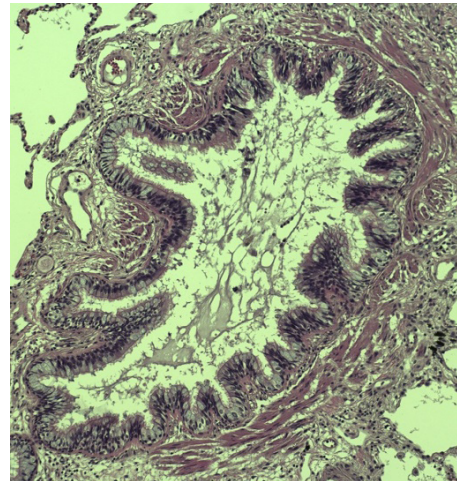
Unlike the RT-PCR (Reverse Transcription Polymerase Chain Reaction) and immune assay tests, this testing kit does not give false negative or false positive results and has high sensitivity and specificity. In RT-PCR based tests; the genetic material from the RNA of virus is converted into DNA. But in the CRISPR technology based testing, this conversion is not required.

(Source: <https://www.downtoearth.org.in>)

➔ Single-Cell technology to study COVID-19 progression

The Chan Zuckerberg Initiative (CZI) has committed funding to support five projects studying how COVID-19 progresses in patients at the single-cell level. This research work will generate single-cell biology datasets from donors infected by SARS-CoV-2 and provide insights into how the virus infects humans, which cell

types are involved and how the disease progresses.



Single-cell technologies provide a powerful platform for researchers to understand the cellular basis of any disease including COVID-19. Human Cell Atlas has provided valuable insights into COVID-19 which include the identification of cells in the nose that may be entry points for the virus. All data generated by these grants will be made available to the scientific community via open access datasets and portals, including CZI's cellxgene tool which allows scientists to explore and visualize high dimensional single-cell transcriptomics datasets.

(Source: <https://chanzuckerberg.com>)

➔ Technology for hand-holding

Tech education firm Coding Dojo has mobilized a network of more than 4,500 alumni to offer web and software development services on a volunteer basis. The name of this initiative is *Tech for America*. Through this technology based volunteer service, 'Tech for America' helps small businesses to survive during the COVID-19 pandemic.

Businesses needing technological help can send an email to techforamerica@



codingdojo.com or fill out the Google Form. Once the request is submitted, organizations can be paired with volunteers based on locality, technology proficiency needed for a given project, and other factors. This effort was begun in early April, and now it has 190 volunteers from 30 states and 11 countries.

Source: <https://www.computerworld.com>

➡➡ COVAXIN™ — India's first indigenous COVID-19 vaccine candidate

Bharat Biotech has successfully developed COVAXIN™, India's first vaccine candidate for COVID-19, in collaboration with the Indian Council of Medical Research (ICMR)-National Institute of Virology (NIV). The SARS-CoV-2 strain was isolated in NIV, Pune, and transferred to Bharat Biotech. The indigenous, inactivated vaccine was developed and manufactured in Bharat

Biotech's BSL-3 (Bio-Safety Level 3) High Containment facility located in Genome Valley, Hyderabad, India. The Drug Controller General of India-Central Drugs Standard Control Organisation



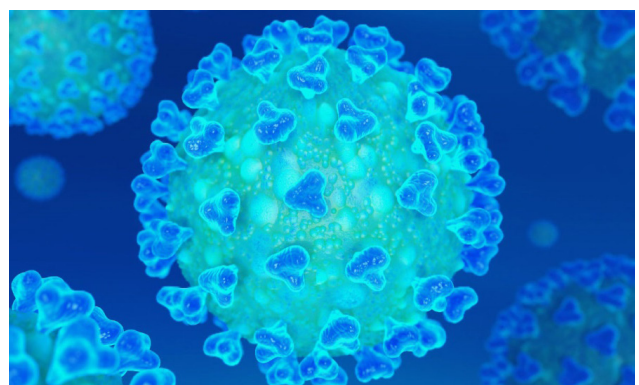
(CDSCO), Ministry of Health & Family Welfare granted permission to initiate Phase I & II human clinical trials after the company submitted results generated from preclinical studies, demonstrating safety and immune response. Human clinical trials are scheduled to start across India in July 2020.

Source: Press Release, Bharat Biotech

➡➡ Technology helps to detect coronavirus

Researchers of the Brigham and Women's Hospital have developed a serology test using Quanterix' ultra-sensitive Simoa platform. This test is for the detection and measurement of anti-SARS-CoV-2 IgG, IgM and IgA antibodies against four immunogenic viral proteins. A recent study indicates by using less than a microliter of blood plasma, Simoa assays can detect seroconversion as soon as one day after symptom onset.

The multiplex serological assay has demonstrated the ability to detect antibodies against novel coronavirus (SARS-CoV-2) and identify individuals who have been infected with the virus but were asymptomatic or had mild symptoms. It will be a valuable tool for answering important questions about the heterogeneity of clinical presentation seen in the ongoing pandemic.



Source: <https://www.businesswire.com>

➤ ZyCoV-D — Plasmid DNA vaccine candidate for COVID-19

Zydus pharmaceutical company has announced that its plasmid DNA vaccine candidate for COVID-19 (ZyCoV-D) developed indigenously at its Vaccine Technology Centre in Ahmedabad, India, has successfully completed the preclinical phase and has now received permission from the Drug Controller General of India-Central Drugs

Standard Control Organisation (CDSCO) to initiate Phase I/II human clinical trials in India.

Source: [Press Release, zyduscadila.com](https://www.zyduscadila.com)

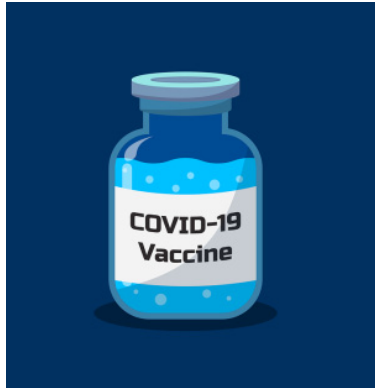


Image credit: Pixabay

➤ RMRC lab in Assam isolates CO-VID-19 virus



The Regional Medical Research Centre (RMRC) in Assam's Dibrugarh has isolated the COVID-19 virus in VERO-CCL81 cell line in the BSL-3 level lab available at the institute. With this, the institute has become the fourth lab in the country that has successfully isolated the virus. Also, the institute is the third government laboratory in the country after the NIV, Pune, and CSIR-CCMB, Hyderabad to isolate the virus.

Source: [expresshealthcare.in](https://www.expresshealthcare.in)

➤ Project Praana

The Indian Institute of Science (IISc) has successfully completed the prototyping of an intensive care unit grade ventilator (Codenamed 'Project Praana') which is now in the process of commercialisation. The product is a technology developed to address the shortage of medical ventilators in the fight against the COVID-19 outbreak. "We are at an advanced stage of discussions with a well-established industrial house in India that is interested in co-developing a medical ventilator product jointly with us using our core technology," said Duvvuri Subrahmanyam, assistant professor of aerospace engineering at IISc and one of the founders of 'Project Praana' told *Business Standard*.

Source: [business-standard](https://www.business-standard)

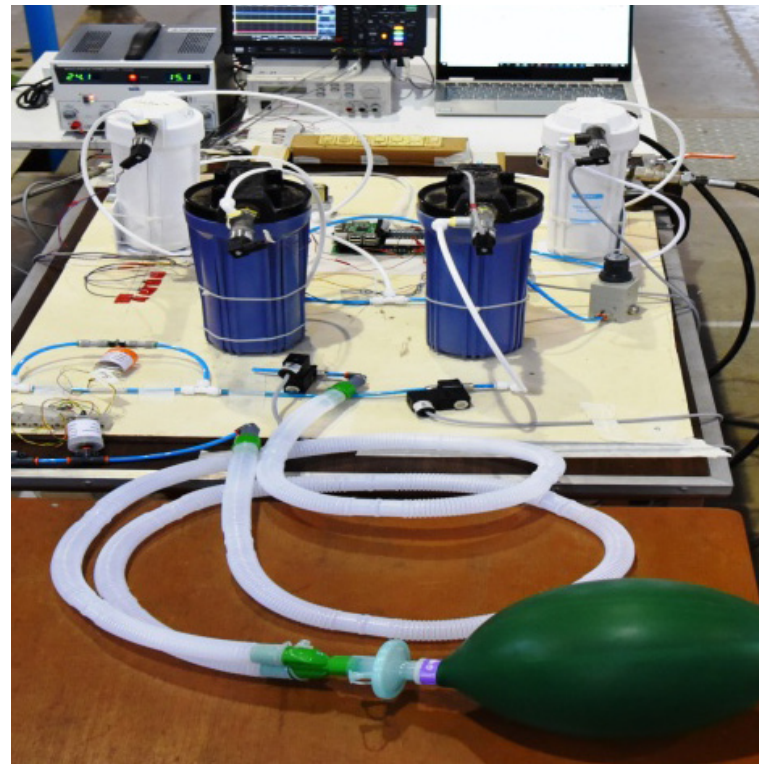


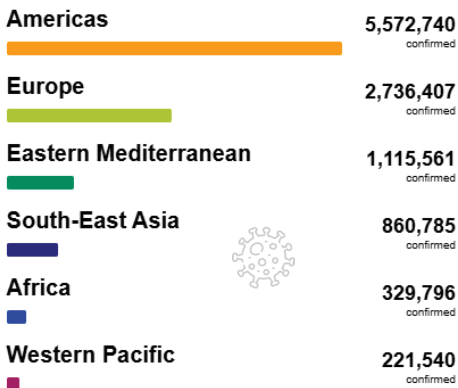
Image credit: IISc

COVID-19 Dashboard

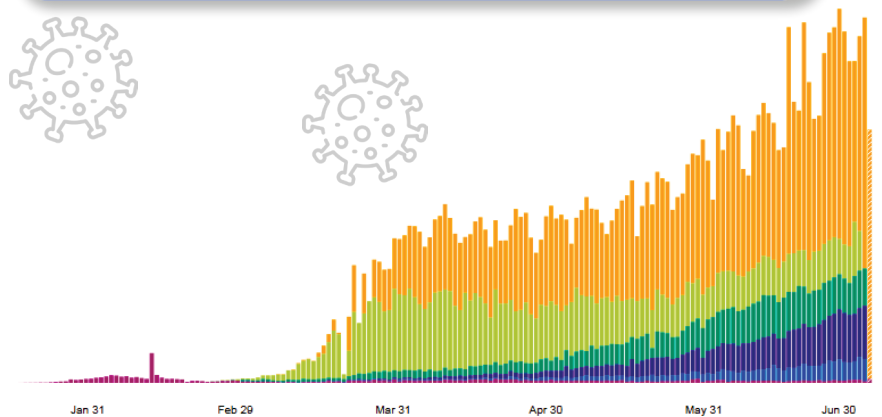
COVID-19 Cases and Deaths in World

(Data as of 3 July 2020)

Worldwide	
Total Confirmed Cases	10710005
New Cases	175723
Total Death	517877
Total New Death	5032



Source: World Health Organization
Data may be incomplete for the current day or week.



WHAT DOES THE RED COLOUR OF THE HOME SCREEN ON AAROGYA SETU APP SIGNIFY

RED

CATEGORY - I

You've tested positive -
You must be under medical supervision

- You have tested positive and have given your phone number as COVID-19 positive person

What To Do

Get yourself retested for COVID-19.
- ICMR Approved Labs
- Hospitals with testing facility
If you are not under medical care right now, please call 1075 immediately.



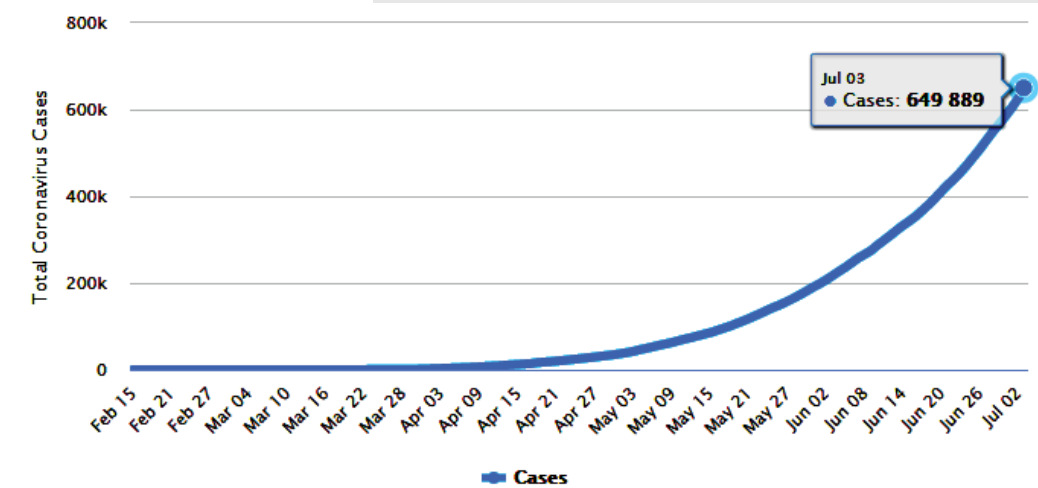
**Graph
India**

(Data as of 04 July 2020)

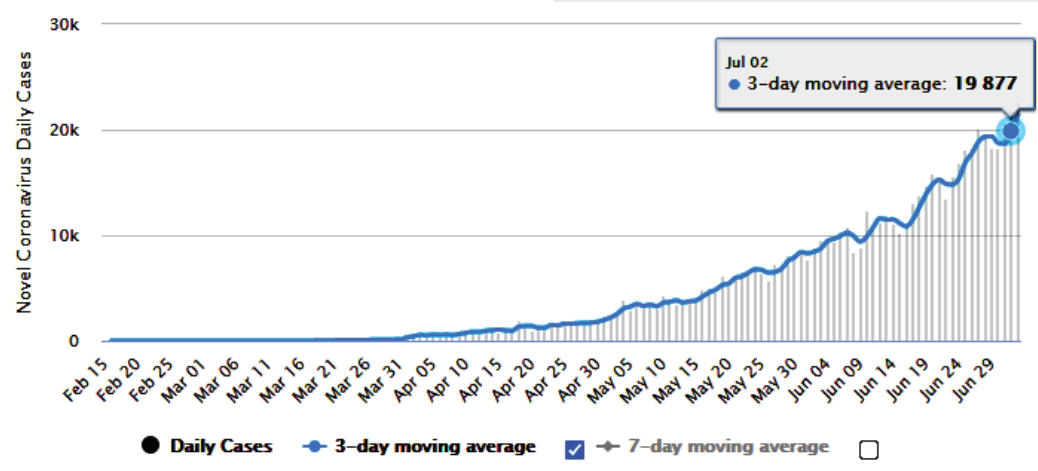


Source: www.mygov.in

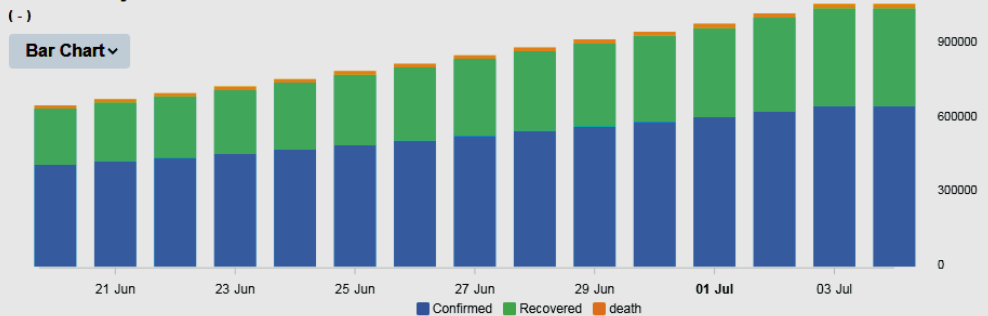
Total Cases in India



Daily New Deaths (3 days moving average)



Past 14 Days Chart



Source: www.worldometers.info



CORONA Q&A

What should diabetic patients do during this pandemic?

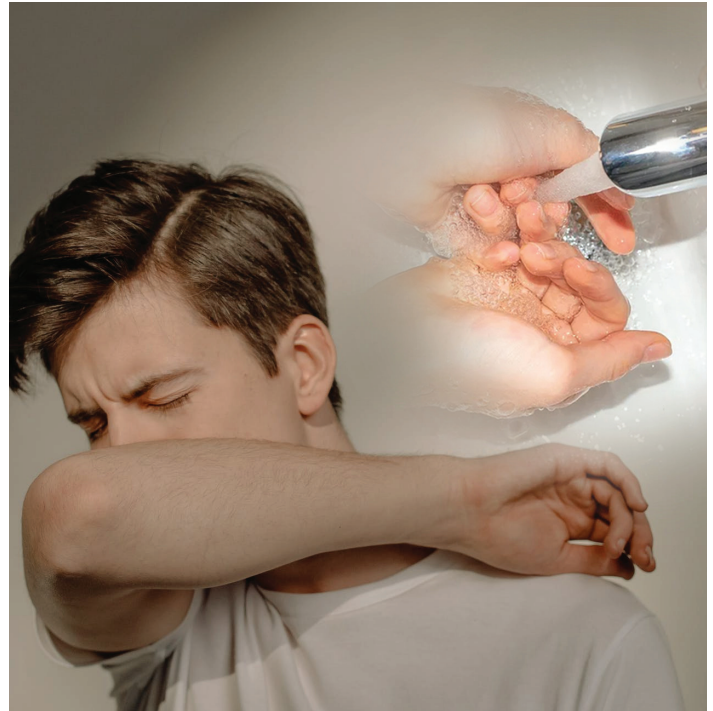


People with chronic illnesses must take extra precautions for their health and be on the lookout for minor and major symptoms. Diabetic patients must make sure to check blood sugar levels regularly and increase the frequency in case of an active COVID-19 infection since any symptom can possibly flare up blood glucose levels. Diabetic patients suffering from any viral disease must also be attended to at once because the pre-existing condition can make it difficult for the body to beat the infection naturally, if not taken care of in time and manifest into severe complications such as pneumonia and kidney failure (which have been linked to COVID-19 deaths).

Diabetics also fall under the vulnerable population and so they should practice social distancing too. However, since follow ups with the doctor are crucial in their case, they should try and resort to tele-medicine, which is basically a video conferencing facility that many hospitals are offering now.

www.everydayhealth.com

Apart from maintaining hand hygiene, what else can people do to protect themselves?



It is very important to maintain respiratory hygiene. Whenever you have a cough, don't cough on your hands or handkerchief, either use a tissue paper or cough on your sleeve. Whoever has fever, cough and cold should maintain a distance of 1 metre or 3 feet from others. Maintain your hand hygiene. If you are rubbing your eyes continuously, you may be suffering from computer vision syndrome, so use eye drops. If you are picking your nose again and again, you have an allergy and you must get yourself treated for it.

www.ccohs.ca

Can contact lens disinfecting solution be effective against COVID-19?

Hydrogen peroxide-based systems for cleaning, disinfecting, and storing contact lenses should be effective against the virus that causes COVID-19. For other disinfection methods, such as multipurpose solution and ultrasonic cleaners, there is currently not enough scientific evidence to determine efficacy against the virus. Always use solution to disinfect your contact lenses and case to kill germs that may be present. Handle your lenses over a surface that has been cleaned and disinfected. Find more information about how coronavirus spreads and how to protect yourself.

www.cdc.gov

Is it better to shop in person or get groceries delivered?

In general, it's safer to take delivery, simply because if you go out to the supermarket, you're coming in contact with a lot of people and most of the transmission of this virus is really person to person through the respiratory route.

In case of groceries delivered, there is not much evidence that suggests that there's a lot of viral transmission that way. It's just important that you keep your hands clean after you've opened that box. For the delivery person, obviously there are a lot of risks, and so they should be careful not just of the cardboard boxes, but especially of face-to-face contact. Six feet of social distancing is really enough to prevent anyone from getting infected.

www.cuimc.columbia.edu



#Healthy@Home

Wash Your Hands

Handwashing remains the No. 1 tip for preventing the spread of Coronavirus (COVID-19). It's common sense and it works. However, it must be done properly and with soap and water. When soap and water are not available, the next best option is to use an alcohol-based hand sanitizer.

Path to improved health

Proper handwashing not only reduces the spread of Coronavirus (COVID-19), it can prevent the spread of other viral illnesses such as cold and flu. Handwashing also reduces the risk of getting other easily spread infections, such as SARS (severe

acute respiratory syndrome) and MERS (Middle East respiratory syndrome).

Handwashing requires five simple steps:

Wet: Put both your hands under clean, running water.

Lather: Apply a generous amount of soap to the inside and back of your hands as well as your fingertips for at least 20 seconds.

Scrub: Rub both hands together and move your fingertips around both hands. You don't need a scrub brush. You don't need to make harsh, scrubbing movements.

Rinse: Return both hands to the running water and gently wash away the soap.



- Before, during, and after preparing food, especially raw food.
- Before eating food.
- Before and after caring for someone at home who is sick with symptoms of vomiting or diarrhea.
- Before and after treating a cut or wound.
- After changing diapers or cleaning up a child who has used the toilet.
- After blowing your nose, coughing, or sneezing.
- After touching an animal, animal feed or animal waste.
- After handling pet food or pet treats.
- After touching garbage.
- After putting on your shoes.
- After using public computers, touching public tables and countertops, cash and coins, other people's phones, etc.

Dry: Completely dry the water from your hands. Using a disposable towel (paper towel) is best to avoid leaving germs on towels. Air dryers, commonly found in public bathrooms, are also effective.

When do I need to wash my hands?

Handwashing throughout the day is important, but even more important during an outbreak. Always remember to wash your hands in these situations:

- After returning from a public outing (grocery store, work, school, concert, sporting activity, hospital, nursing home, etc.).
- Before leaving the bathroom — both at home and in public bathrooms.
- After shaking hands during flu season and virus outbreaks.

Things to consider

- Using clean, running water is important. Never wash your hands by submerging them in a basin or bowl of standing water. This water could contain germs that continue to live there.
- Avoid touching doorknobs, toilet flush handles, and faucets after washing your hands. Try using a paper towel, the sleeve of your clothing, a scarf, or gloves to protect your hands and fingers against germs.
- Do not leave hand sanitizer unattended around small children. Drinking it is poisonous.

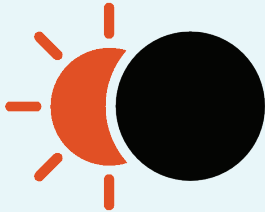
Courtesy: www.familydoctor.org

FACT
CHECK

COVID-19 MYTH BUSTERS

MYTH ❌

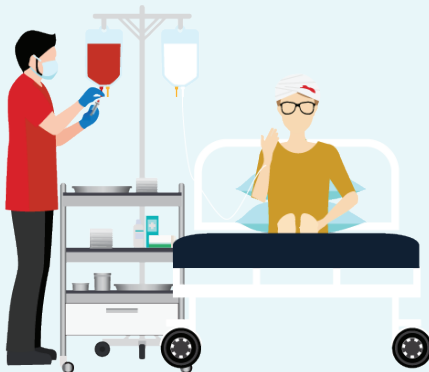
The COVID-19 pandemic is affected by solar eclipses



Wearing rubber gloves will prevent the spread of germs on your hands



You should not go to the ER for an emergency medical issue because you might contract the coronavirus



Healthy food can prevent/cure coronavirus



FACT ✅

No, solar eclipses do not impact any viruses or microorganisms on Earth. Eclipses are caused by motions of astronomical objects. The resultant small and temporary decline in the solar radiation incident upon Earth cannot impact the global COVID-19 pandemic. The claim is 'clearly false'.

www.indscicov.in

Rubber gloves can still become contaminated, so, if you touch your face when wearing them, you risk infection. Washing your hands properly offers more protection than gloves.

www.rentokil.com

No, if you have an emergency medical issue, going to the ER is safer than not going. Heart attacks, strokes and other serious conditions can cause death without medical intervention. Hospitals have plans in place to isolate coronavirus patients from others to prevent the spread of the virus. If you live in a large metropolitan area, some ERs might be dedicated to serving only non-coronavirus patients, so call around before you go if time allows for it.

www.cnet.com

People cannot prevent Covid-19 infection through diet. However, a healthy lifestyle, including balanced diet, has a positive significance in maintaining an immune system against virus attack.

www.business-standard.com

MYTH ❌

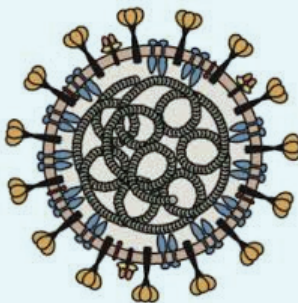
Wearing a medical mask can cause Carbon dioxide intoxication or oxygen deficiency



Products shipped from countries with high levels of infection will cause coronavirus infection



This novel coronavirus is not new, I've heard of it before

**FACT** ✅

Medical face masks have been in use since at least the 1890s, and disposable masks since the 1930s. In that time, face masks have not been shown to restrict the amount of oxygen your body gets or increase the amount of carbon dioxide you breathe in. N95 medical respirators can allow carbon dioxide to accumulate inside of the mask over the course of several hours of continued use, but this is typically only an issue for people with pre-existing respiratory issues. With medical and cloth masks that many of us are wearing, carbon dioxide can easily escape the mask, according to the BBC..


www.cnet.com

No, the World Health Organization (WHO) states that coronaviruses do not survive for long on objects such as letters or packages. Due to humidity and temperature changes, shipping conditions make it difficult for viruses to survive, so there is very low risk of them spreading from products or packaging that are shipped over a period of days or weeks.

www.gulfnews.com

The term novel coronavirus means it's a new type of coronavirus, which hasn't been previously detected. 'Coronavirus' is a family of viruses and the reason people may have seen 'Human Coronavirus' on labels is that this refers to previous strains of the virus. There are several names being used for this novel coronavirus. WHO has called the disease Covid-19 but the virus itself is called SARS-CoV-2.

www.business-standard.com

 Content in this bulletin has been compiled from various sources, and wherever available, due credit has been given to the original source.