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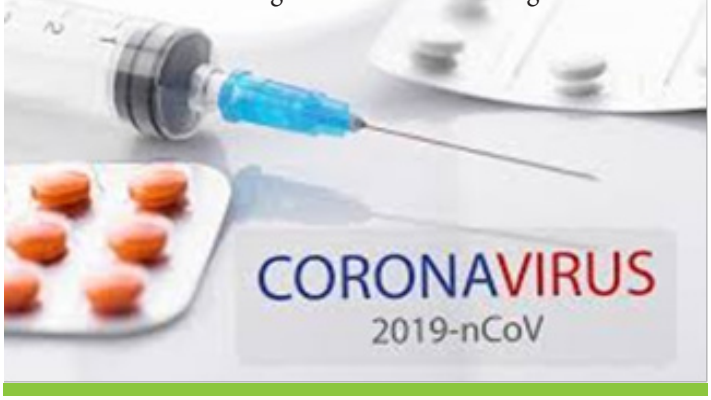
CORONAVIRUS TREATMENTS: WHAT DRUGS MIGHT WORK AGAINST COVID-19?

Coronavirus treatments: what drugs might work against COVID-19?

Though there are treatments that can alleviate the symptoms–such as difficulty breathing – they do not address the underlying cause: the virus. The idea is that treating the symptoms will help prolong a patient's life and buy time for their own immune systems to kick in and remove the infection.

While research into related coronaviruses over the last few decades has brought some promising looking drugs, only large clinical trials on patients with COVID-19 will be able to reveal precisely whether these interventions are safe and effective. Unfortunately, these kinds of large trials take time to carry out, but they are ongoing.

The WHO-backed trials are focusing on drugs that are thought to directly block SARS-CoV-2 – the virus strain that causes coronavirus COVID-19 – from replicating inside our lungs. Below are some of the main drugs these trials are looking at.



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Remdesivir

Remdisivir has already been shown to work against SARS-CoV-2 in cells in a dish in a lab as well as in mice infected with the virus. Remdesivir specifically targets key viral proteins involved in making new copies of the virus and prevents them from working.Remdesivir has already been used in some COVID-19 patients in the US and appears safe, but large trials are needed to really know if this is the case.

Lopinavir/ritonavir

This is a drug combination used against viruses like HIV. It works in a similar way to remdesivir by blocking key viral proteins called "proteases".Lopinavir/ritonavir has also been shown to be effective against SARS-CoV-2 in lab cells as well as in mice and is being tested alongside an antiviral drug called interferon beta. This is currently used to treat Multiple sclerosis and can enhance the natural defences of the body's cells against COVID-19.

Chloroquine and hydroxychloroquine

Both of these drugs are currently used to treat malaria and the autoimmune disease lupus. A 2005 study found that chloroquine could quell the spread of SARS-CoV when applied to infected human cells in culture. SARS-CoV is closely related to the novel coronavirus, SARS-CoV-2, and caused an outbreak of severe acute respiratory syndrome in 2002. Chloroquine disrupts the ability of the SARS-CoV virus to enter and replicate in human cells.

Additionally, the agency advised that doctors should be cautious when giving either drug to patients with chronic disease, such as kidney failure, and especially those "who are receiving medications that might interact to cause arrhythmias."

Two other options

Two other kinds of treatments are also being explored in trials that work in a different way.

The first is passive immunisation which is the transfusion of potential protective antibodies from someone who has been infected and recovered from COVID-19 to someone who is at high-risk or is suffering from a SARS-CoV-2 infection.

This so-called "convalescent sera" (which is a purified blood product from someone who has recovered from COVID-19) can block SARS-CoV-2 in cells in a dish in the lab and has the potential to help develop treatments. Passive immunisation for COVID-19 is being tested in trials across the world and so far results seem to suggest it is safe to use.

Another kind of possible treatment works by blocking parts of our own immune system that are likely overreacting to SARS-CoV-2 infection and contributing to the damage in our lungs.

In the limited studies that have been conducted on COVID-19, it seems that in some severe cases our immune response goes into overdrive without being able to clear the infection and this can increase the severity of the disease. When this happens, high levels of inflammation is found in the lungs.

Antiviral EIDD-2801

An oral drug called EIDD-2801 has shown promise in test-tube experiments with human lung and airway cells. The drug might even be more efficient at blocking the novel coronavirus, SARS-CoV-2, than remdesivir, a drug being tested against COVID-19. While remdesivir stops the novel coronavirus from replicating entirely, EIDD-2801 introduces genetic mutations into the virus's RNA. As the RNA makes its copies, so many damaging mutations accumulate that the virus is no longer able to infect cells. The drug also seems to work against several RNA viruses, and as such, the researchers said it could be a multipurpose antiviral.

Unlike remdesivir, which needs to be given intravenously, this drug could be swallowed as a pill. "EIDD-2801 is an oral drug that could be administered at home, early after diagnosis,"

Japan flu drug

The antiviral drug, called favipiravir, has been used in Japan to treat influenza, and last month, the drug was approved as an experimental treatment for COVID-19 infections. The drug, which works by preventing certain viruses from replicating, seemed to shorten the duration of the virus as well as improve lung conditions (as seen in X-rays) in tested patients.

A failed Ebola drug

A Gilead Sciences drug that was originally tested in people with Ebola, remdesivir, is being repurposed to see if it can effectively treat COVID-19.

The drug was found not to be effective in Ebola, but in lab studies, it has proven effective at inhibiting the growth of similar viruses, severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). In a petri dish, remdesivir can prevent human cells from becoming infected with SARS-CoV-2.

However, such anecdotal evidence can't demonstrate effectiveness, that the patient's clinical improvement following the administration of remdesivir coincided with a drop in viral load (concentration of viral particles). The patients also experienced rectal bleeding, elevated liver enzymes, vomiting and nausea, which could potentially be tied to the drug.

An immunosuppressant and an arthritis drug

For some patients with COVID-19, the virus itself doesn't do the worst damage. Rather, in some people their immune system goes into overdrive and launches an all-out assault known as a cytokine storm. That immune overreaction can damage tissue and ultimately kill people.

To quiet such cytokine storms, doctors are now trying an immunosuppressant known as tocilizumab. The drug is approved to treat rheumatoid arthritis and juvenile rheumatoid arthritis. It blocks a cell receptor that binds something called interleukin 6 (IL-6). IL-6 is a cytokine, or a type of protein released by the immune system, that can trigger dangerous inflammatory cascades.

A blood pressure drug

Losartan is a generic blood-pressure medication that some scientists are hoping could help patients with COVID-19. The University of Minnesota has launched two clinical trials using the inexpensive, generic drug. The first would evaluate whether losartan can prevent multi-organ failure in those hospitalized with COVID-19 pneumonia.

Losartan works by blocking a receptor, or doorway into cells that the chemical called angiotensin II uses to enter the cells and raise blood pressure. SARS-CoV-2 binds to the angiotensin-converting enzyme 2 (ACE2) receptor, and it's possible, the thinking goes, that because losartan might block those receptors, it may prevent the virus from infecting cells.

COVID-19 vaccine

Researchers worldwide are working around the clock to find a vaccine against SARS-CoV-2, the virus causing the COVID-19 pandemic. Experts estimate that a fast-tracked vaccine development process could speed a successful candidate to market in approximately 12-18 months–if the process goes smoothly from conception to market availability.

The US National Institutes of Health (NIH) has partnered with more than 18 biopharmaceutical companies to accelerate development of drug and vaccine candidates for COVID-19 (ACTIV). The COVID-19 Prevention Trials Network (COVPN) has also been established, which combines clinical trial networks funded by the National Institute of Allergy and Infectious Diseases (NIAID): the HIV Vaccine Trials Network (HVTN), HIV Prevention Trials Network (HPTN), Infectious Diseases Clinical Research Consortium (IDCRC), and the AIDS Clinical Trials Group. The US government is choosing three vaccine candidates to fund for Phase 3 trials under Operation Warp Speed: Moderna's mRNA-1273 in July, The University of Oxford and AstraZeneca's AZD1222 in August, and Pfizer and BioNTech's BNT162 in September. Members of ACTIV have suggested developing safe controlled human infection models (CHIMs) for human trials could take 1-2 years. A sponsor would need to provide data from placebo-controlled trials indicating their vaccine is at least 50% effective against COVID-19 in order to be authorized for use, according to FDA guidance issued and effective 30 June.

Candidate	Trial Phase	Institution
Inactivated vaccine	Phase 3	Henan Provincial Center for Disease Control and Prevention
CoronaVac	Phase 3	Sinovac Research and Development Co., Ltd.
mRNA-1273	Phase 3	Kaiser Permanente Washington Health Research Institute
Bacillus Calmette-Guerin (BCG) live-attenuated vaccine	Phase 2/3	University of Melbourne and Murdoch Children's Research Institute; Radboud University Medical Center; Faustman Lab at Massachusetts General Hospital
AZD1222	Phase 2/3	The University of Oxford, the Jenner Institute
BNT162	Phase 2/3	Multiple study sites in Europe and North America
Ad5-nCoV	Phase 2	Tongji Hospital; Wuhan, China
Adjuvant recombinant vaccine candidate	Phase 2	Anhui ZhifeiLongcom Biopharmaceutical, Institute of Microbiology of the Chinese Academy of Sciences
BBIBP-CorV	Phase 1/2	Henan Provincial Center for Disease Control and Prevention
GX-19	Phase 1/2	Genexine
Gam-COVID-Vac	Phase 1/2	Various
Self-amplifying RNA vaccine	Phase 1/2	Imperial College London
LUNAR-COV19	Phase 1/2	Duke-NUS Medical School, Singapore
ZyCoV-D	Phase 1/2	ZydusCadila
INO-4800	Phase 1	University of Pennsylvania, Philadelphia
mRNA-based vaccine	Phase 1	CureVac
SCB-2019	Phase 1	Linear Clinical Research (Australia)
COVAX-19	Phase 1	Royal Adelaide Hospital
NVX-CoV2373	Phase 1	Novavax
Plant-based adjutant COVID-19 vaccine candidate	Phase 1	Medicago
Molecular clamp vaccine	Phase 1	CSL; The University of Queensland
Covaxin	Phase 1	Bharat Biotech; National Institute of Virology
bacTRL-Spike	Pre-clinical	Symvivo Corporation
PittCoVacc	Pre-clinical	University of Pittsburgh
Measles vector vaccine	Pre-clinical	University of Pittsburgh; Themis Biosciences; Institut Pasteur
Ii-Key peptide COVID-19 vaccine	Pre-clinical	Generex
Recombinant vaccine	Pre-clinical	Vaxart
LineaDNA	Pre-clinical	Takis Biotech
Ad26.COV2-S	Pre-clinical	Johnson & Johnson
AdCOVID	Pre-clinical	University of Alabama
T-COVIDTM	Pre-clinical	Altimmune
Protein subunit vaccine	Pre-clinical	University of Saskatchewan
Recombinant vesicular stomatitis virus (rVSV) vaccine	Pre-clinical	Merck; IAVI
Adenovirus-based vaccine	Pre-clinical	ImmunityBio; NantKwest
AAVCOVID	Pre-clinical	Massachusetts General Hospital;University of Pennsylvania
Recombinant vaccine	Pre-clinical	Sanofi, Translate Bio
HaloVax	Pre-clinical	MGH Vaccine and Immunotherapy Center
mRNA-based vaccine and Development	Pre-clinical	Chulalongkorn University's Center of Excellence in Vaccine Research
HDT-301	Pre-clinical	University of Washington; National Institutes of Health Rocky Mountain Laboratories; HDT Bio Corp
gp96-based vaccine	Pre-clinical	University of Miami Miller School of Medicine
mRNA lipid nanoparticle (mRNA-LNP) vaccine	Early research	CanSino Biologics, Precision NanoSystems
Adenovirus-based vaccine	Early research	ReiThera; Leukocare; Univercells

STAFF PUBLICATIONS

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2. Siva Prasad S, Vidyadhara S, Sowjanya Lakshmi B, Sandeep D, Pavan Kumar P, Viswanadh K. Formulation and Evaluation of Candesartan Cilexetil Fast Dissolving Tablets using Inclusion Complexes. Research Journal of Pharmacy and Technology

Awareness walk on Corona Virus

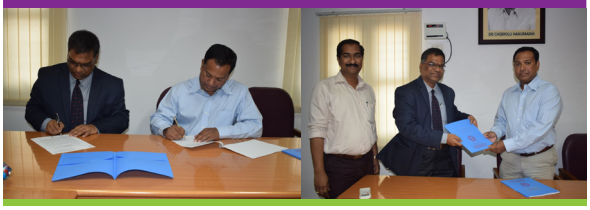
Pfizer Industrial Visit

CHIPS Alumni Meet

International Women's Day

Measles Immunization Day

MoU with RA Chem Pharma



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Pharmacist Pledge

Republic Day Celebrations

Students Placed in Divis

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Workshop by Prof. S. Y. Gabhe

Students Placed in LAURUS

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