Remdesivir (GS-5734) by Gilead Sciences

An ebola drug developed by Gilead Sciences that was found to be ineffective is now being tested in phase III randomised clinical trial in partnership with China.

The trials are being performed on 761 patients in a randomised, placebo-controlled, double-blind study at multiple hospitals in Wuhan, the epicentre of the novel coronavirus outbreak. The results from the trials are expected to be available over the next few weeks.

According to a report by The New England Journal of Medicine (NEJM), remdesivir, when administered to a coronavirus patient in the US, appeared to have improved the clinical condition.

Biocryst Pharma's Galidesivir, a potential antiviral for coronavirus treatment

The antiviral drug Galidesivir (BCX4430) has shown broad-spectrum activity against a wide range of pathogens including coronavirus. It is a nucleoside RNA polymerase inhibitor that disrupts the process of viral replication.

The drug has already shown survival benefits in patients against deadly viruses such as Ebola, Zika, Marburg, and Yellow fever.

Galidesivir is currently in advanced development stage under the Animal Rule to combat multiple potential viral threats including coronaviruses, flaviviruses filoviruses, paramyxoviruses, togaviruses, bunyaviruses, and arenaviruses.

Regeneron’s REGN3048-3051

Discovered by Regeneron, the combination of neutralising monoclonal antibodies REGN3048 and REGN3051 is being studied against coronavirus infection in a first-in-human clinical trial sponsored by the National Institute of Allergy and Infectious Diseases (NIAID). The safety and tolerability of the drug will be studied in 48 patients.

Both the antibodies bind to S-protein of MERS coronavirus. The intravenous administration of the drug in the mouse model of MERS resulted in the high-level neutralisation of the MERS coronavirus in circulating blood with reduced viral loads in the lungs.
Other companies developing coronavirus vaccines/drugs

Companies such as Inovio Pharmaceuticals, Moderna, and Novavax have been reported to be developing coronavirus vaccines. A total of 30 therapies are planned to be tested, including few traditional medicines for coronavirus treatment by Chinese scientists. Chloroquine phosphate has shown efficacy in treating symptoms of the disease, among the 30 therapies. Patients administered with the drug achieved a better drop in fever and shorter recovery time in clinical trials being conducted in hospitals in the Guangdong province and Hunan province.

**Vaccine by Generex**

Generex has announced that it is developing a COVID-19 vaccine following a contract from a Chinese consortium comprising of China Technology Exchange, Beijing Zhonghua Investment Fund Management, Biology Institute of Shandong Academy of Sciences and Sinotek-Advocates International Industry Development.

The company will utilise its II-Key immune system activation technology to produce a Covid-19 peptide for human clinical trials.

Generex will receive an upfront payment of $1m to commence the groundwork for the vaccine development and $5m licensing fee for its II-Key technology. It is also eligible to receive a 20% royalty on every dose of vaccine produced under the contract.

**Coronavirus drugs by Columbia University**

Researchers at Columbia University have been awarded a $2.1m grant by the Jack Ma Foundation to develop a coronavirus cure. Four different teams at the university will adopt various approaches towards the development of a vaccine against coronavirus.

**Vaccine by Tulane University**

Tulane University has launched a research programme to identify a potential medicine for coronavirus in the form of a vaccine. The university will utilise a grant from the Brown Foundation to carry out the research activities.

**Coronavirus vaccine by ImmunoPrecise Antibodies**

ImmunoPrecise Antibodies has launched a vaccine and therapeutic antibody programme to develop a vaccine as well as antibodies against Covid-19. The company will use its B Cell Select™ and DeepDisplay™ discovery platforms to therapeutic compounds against the coronaviruses.

**Serum Institute of India**

Serum Institute of India (SII) is collaborating with Codagenix, a US-based biopharmaceutical company, to develop a coronavirus cure using a vaccine strain similar to the original virus. The vaccine is currently in the pre-clinical testing phase, while human trials are expected to commence in the next six months. SII is expected to launch the vaccine in the market by early 2022.

**Zyodus Cadila**

Zyodus Cadila announced the launch of an accelerated research programme to develop a vaccine for Covid-19 using two novel approaches. The first approach includes the development of a DNA vaccine against the viral membrane protein of the virus, while a live attenuated recombinant measles virus (rMV) vectored vaccine will be developed in the second approach. The rMV-based vaccine works by inducing specific neutralising antibodies, which will provide protection from the coronavirus infection.
**NanoViricides**

NanoViricides, a clinical-stage company, is working on developing a treatment for nCoV-2019 using its nanoviricide® technology. The company’s technology is used to develop ligands that can bind to the virus in the same way as a cognate receptor and attack various points of the virus.

**Vir Biotechnology**

Vir Biotechnology, a clinical-stage immunology company, announced on 12 February that it has identified two monoclonal antibodies that can bind to the virus that causes Covid-19. The antibodies target the spike (S) protein of the virus by entering through the cellular receptor ACE2.

The company has formed a partnership with WuXi Biologics on 25 February to commercialise the antibodies identified to treat coronavirus. If approved, Wuxi will have the rights to market the therapies in China, while Vir will retain the marketing rights in other countries.

**HIV drugs for coronavirus treatment**

An HIV protease inhibitor, lopinavir is being studied along with ritonavir for the treatment of MERS and SARS coronaviruses. The repurposed drug is already approved for the treatment of HIV infection under the trade name Kaletra®.

**Generic of Kaletra®**

The combination is listed in the WHO list of essential medicines. Lopinavir is believed to act on the intracellular processes of coronavirus replication and demonstrated reduced mortality in the non-human primates (NHP) model of the MERS.

Lopinavir/ritonavir in combination with ribavirin showed reduced mortality rate and milder disease course during an open clinical trial in patients in the 2003 SARS outbreak.

Cipla is also reportedly planning to repurpose its HIV drug LOPIMUNE, which is a combination of protease inhibitors Lopinavir and Ritonavir, for the treatment of coronavirus.

A licensed generic of Kaletra®, LOPIMUNE is currently available in packs of 60 tablets each, containing 200mg of Lopinavir and 50mg of Ritonavir.

Janssen Pharmaceutical Companies, a subsidiary of Johnson & Johnson, donated its PREZCOBIX® HIV medication (darunavir/cobicistat) for use in research activities aimed at finding a treatment for Covid-19.

**The Coronavirus outbreak**

The contagious coronavirus outbreak at the end of 2019, which the WHO named as Covid-19, led to a medical emergency across the world.

Similar infections are caused by human alpha and beta coronaviruses such as 229E, NL63, OC43 and HKU1.

**What are the symptoms?**

Coronavirus symptoms include those associated with common cold, such as running nose, headache, cough, fever, and sore throat.

**Coronavirus transmission**

“Coronavirus transmission can happen human-to-human as well as from infected animals such as dogs and cats.”

Covid-19 is a betacoronavirus that has origin in bats, according to the Centers for Disease Control and Prevention (CDC).
Believed to have transmitted from animals and reptiles such as snakes, coronaviruses cause respiratory issues such as upper respiratory tract illnesses and lower respiratory illnesses such as pneumonia and bronchitis. Coronavirus transmission can happen human-to-human as well as from infected animals such as dogs and cats.

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