

Possible treatments and vaccines for COVID - 19

With the COVID-19 pandemic spreading across the world, it's not hard to believe there would be many desperate trials to find a cure or prevention. Many drugs and methods are being tested as a cure or vaccine for the new coronavirus. Existing drugs like Remdesivir and hydroxychloroquine have a chance of being cures.

Let's talk about some possible cures first. Hydroxychloroquine and chloroquine, both antimalarials, were considered as a treatment that could be used everywhere, but due to irregular heartbeat problems, they can only be used in hospitals. Furthermore, in a clinical trial, the drug didn't reduce the need for ventilators or chance of death.

Remdesivir, an antiviral initially developed as an Ebola drug (a failed one, that is) by Gilead Sciences Inc., has shown promising lab results. In a test carried out by NIH's National Institute of Allergy and Infectious Diseases (NIAID), the scientists infected 2 groups of 6 rhesus macaques with SARS-CoV-2, the virus that causes COVID-19. After 12 hours, one group received a dose of remdesivir directly into the bloodstream, then received a dose of intravenous booster for 6 days. The group of 6 monkeys that received the drug had much less viruses and lung damage than the group that didn't get the drug.

When SARS-CoV-2 infects a cell, it uses an enzyme called RdRp (RNA dependent RNA polymerase) to replicate itself. RdRp is like DNA dependent RNA polymerase, which transcribes the cell's DNA into mRNA, which will be used to make proteins. RdRp transcribes RNA instead of DNA. If the RdRp is hijacked by SARS-CoV-2, that RdRp starts making mRNA that codes

for the coronavirus instead of proteins. Remdesivir blocks the use of RdRp, so the coronavirus can't hijack it and replicate, so its numbers will decline as the immune system hunts it down.

Some treatments don't involve drugs. A method called "Plasma Therapy" is being developed to fight the coronavirus. A donor who has recovered from COVID-19 will give some blood, specifically plasma, to the sick patient. The convalescent plasma will have antibodies against SARS-CoV-2 floating inside it. The antibodies, theoretically, should help the patient fight off the virus. Use of plasma therapy has been studied for previous human coronaviruses, such as SARS-CoV and MERS-CoV. A test was carried out with 10 severe COVID-19 patients who took 200 ml of the plasma. The patients recovered from their symptoms in 3 days and the virus was gone in 7 days. The method is similar to vaccination, but the antibodies are already there. Remdesivir and plasma therapy are proving to be a treatment for COVID-19.

Vaccines, used for prevention instead of cure, are also coming to light in this pandemic. The genome of the new coronavirus has been mapped and gives possibilities for new ways to make vaccines. Unlike the original method, which involves using a weakened, dead, or part of the real virus, scientists are trying a new, less tested method called "plug and play", which involves taking part of the original virus's genome and plugging it into another harmless virus, then inserting the new virus into the body. In theory, this should give the patient immunity because the harmless virus will be close enough to make the immune system produce antibodies against the coronavirus. Another way is inserting RNA of SARS-CoV-2 directly into cells so they will produce parts of the virus which the immune system can train against. The reason we can use these new methods is because the genome of COVID-19 has been completely mapped

out, letting us basically reconstruct the virus or use the RNA to make vaccines. Some companies working on vaccines are Moderna, UN of Oxford, and UN of Queensland.

With so many current drugs and methods out there, we can stay hopeful that one will work as a cure or vaccine. This pandemic is in it's climax, with over 2 million cases worldwide. That is a big enough number already and we should work to bring that number down. Let's hope that something against this new virus, whether it be a cure or vaccine is developed so this pandemic ends and you, your family, and your friends can get back to a normal lifestyle.

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