

Research Diary

KID: 20200105

Repurposing of anti-malarial Nanoformulation targeting lung tissues to tackle virus-mediated inflammation/ fibrosis and acute respiratory distress

The COVID-19 outbreak has drawn the attention of researchers around the world. Currently, there aren't any clinically approved medications for the treatment of COVID-19 infection. Although chloroquine, remdesivir, etc, have exhibited a significant inhibitory effect of the viral infection, their clinical efficacy is yet to be established. The cardiotoxic effect and hepatic damage of these drugs limit their usage. Our group intends to develop an injectable hydrogel depot embedded with nanoparticles entrapping repurposed drugs. The drug entrapped nanoparticles get released from the gel matrix into the bloodstream and localize in the inflamed lungs region. The main advantage of the hydrogel is to enable sustained drug release, that eliminates the need for repeated drug administration thereby minimizing the dosage. This would significantly reduce the adverse effect, and improve the therapeutic output.



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India must prepare for the manufacture of millions of low-cost ventilators

KID: 20200106

The following article has been submitted to Govt. of India to initiate immediate action to identify the best designs to manufacture low cost portable ventilators. We are happy that Indian Govt. has immediately formed a committee chaired by Dr. Satish Reddy, Chairman, DRDO, to come up with specifications for such ventilators, which was immediately done. This committee has called for designs that satisfy these specifications and identified the best ones, which were connected to industry for their speedy manufacturing.

There are two ways to defeat the current coronavirus India is currently in the second stage of the COVID-19 crisis. The cases till now have been mostly related to travel abroad and transmission between family members and close contacts. But if the virus spreads into the general population, which is called "community transmission" and is labelled Stage-3 of the pandemic, there will be a very rapid increase in COVID-19 cases. Experts believe that it is an eventuality that must very rigorously be prepared for even while we are in this 21-day lock-down period to prevent the virus from spreading. Apart from India, the whole world faces the same threat and many countries will inevitably be unable to control the virus in the second stage and it will progress into the general population. The 3rd stage is a period in which the number of infected people increases exponentially - their number doubling every few days until, if not stopped by some means, 60% to 80% of the population is infected - which would mean millions would be infected in any country where this happens, and in India, it would mean hundreds of millions. While it is fervently to be hoped that our prompt actions would prevent that from happening, we must prepare for that possibility. Even if we are providentially spared, we must be prepared to help others in the world who may not be so fortunate.

The COVID-19 virus has a strangely varied effect on different people it infects. Some barely show symptoms and may not even realize that they are infected, while they still pass on the virus to others who may be more seriously affected. Others show symptoms after a few days even while in the interim they are passing on the infection to others. Of those infected, it is estimated that up to 85% will have mostly mild symptoms and will recover within two weeks. Of the remaining 15% who may need hospitalization, around one-third, i.e., 5% of the total infected persons, would pose the greatest challenge. They would develop respiratory difficulties for which ventilators for assisted breathing will become necessary. It is concerning these ventilators that the rest of this article will focus.