

THE YCRO DISPATCH



COVID-19: Biology of the Virus

By Brianna Ta

What makes the corona virus so deadly? Why is the number of cases increasing by the thousands every single day?

Starting at the origin, scientists believe that the first reported example was in Germany in 1912 where an infected cat had a fever and enormously swollen belly. Another case was found to be giving chickens bronchitis, as well as an intestinal disease that was lethal to piglets. The link between these pathogens has been hidden until the 1960s, when researchers from the United Kingdom and United States found the viruses which caused common colds in humans. Further research indicated that these viruses could be identified through its bristly structure and spiky protein protrusions. The viruses resembled the solar corona when studied under microscopes, leading to the term “coronaviruses.”

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As the death toll due to COVID-19 rises, scientists far and wide are scrambling to uncover the biology behind this lethal virus, officially known as SARS-CoV-2. According to their research, the virus has gone through several adaptations and evolved to become more lethal than other coronaviruses that we've seen so far. Unlike its relatives, SARS-CoV-2 has the ability to attack human cells at multiple entry points, primarily being the throat and lungs. Once it has entered the body, the virus uses an arsenal of dangerous molecules in order to weaken the host. Coronaviruses frequently recombine, swapping parts of their RNA with other coronaviruses, leading to more formidable versions that can infect more types of cells and even use more species as hosts.

Although known coronaviruses can infect many different cell types, they mainly attack the respiratory system. Just one cough could send enough viral particles to go all the way down to your lungs. Some are lucky and are only infected at the throat or nose, causing them to have a cough and disrupted sense of taste and smell, but others could have more serious consequences, such as debilitation of their lungs.

Although its relative, SARS-CoV, lacks this ability, SARS-CoV-2 is extremely effective and can infect and actively reproduce in the upper respiratory tract. The SARS-CoV-2 has been found to be extra contagious since its viral particles can spread from throat to saliva even before the host exhibits symptoms. It is extremely important to wear masks and social distance in order to prevent the spread of this contagion.



Organizational Outreach

By Kashika Dhanjal

As many of you already know, Project YCRO has reached out to many hospitals and care centers who have, until recently, been suffering a shortage of PPE. In total, we have given up to 6500 face shields, masks, and ear savers to hospitals and centers that expressed a need for our services. From the almost 25 organizations that we have donated too, we would like to highlight a few of our biggest and most challenging donations.



First up is our donation to Children's National in Washington, DC, which was our greatest donation at 2500 face shields. Children's National was one of our first requests for PPE, and we quickly got started on trying to meet it as fast as possible. However, we quickly realized that with the current number of 3D printers we had and the other requests coming in, we would not be able to meet Children's National needs in time. So, we reached out to 3DforCOVID, an organization with hundreds of people who have 3D printers and injection molding technology who have been designing and printing shields since the start of the pandemic. Through their organization, we were able to link up with a producer in South Carolina who was equipped to produce the 2500 face shields using injection molding and shipped it straight to Children's National.

Another critical donation we made was to Inova Fair Oaks, whom we gave 400 paper ear savers. Ear savers, also known as comfort strips, are used to pull back the elastic in face masks, so they do not sit on the wearer's ear. While these products may not seem as important as shields and face masks, they make healthcare providers' jobs less painful from the ear loops on their masks. Initially, we had focused on 3D printing our ear savers, but 3D printing them took a significant amount of time. Over time, our 2D printing team was able to come up with an alternative, an origami ear saver that took only 2 minutes to make and worked just as well as the 3D printed ear savers. With this new ear saver design, Project YCRO members quickly met Inova Fair Oaks demand at a much lower cost. Inova Fair Oaks accepted our paper ear savers and later told us that they were working incredibly well.

Private Partnerships

By Jay Siva

In the past few years, states have put off pulling resources to prepare for future pandemics. When COVID-19 hit the US in early 2020, it took states by storm and devastated the national healthcare system. With the lack of preparation and aid, states still struggle to procure enough healthcare equipment and testing materials. In the past two months, states have been working tirelessly to provide hospitals with adequate testing and protective materials, but hospitals still face a major shortage of protective materials and testing supplies. With the lack of materials from the state, nonprofit organizations like YCRO become the difference between further safety or certain death.



As the COVID-19 pandemic continues to devastate millions of lives nationwide, the increase in protective materials is necessary to decrease the spread of the virus. However, due to the lack of funding, states and cities fail to provide enough testing materials to citizens. States need to work with COVID-19 organizations like YCRO that can PPE distribution throughout a large part of the nation.

In April 2020, the organization Pruitt Health entered a partnership with a coalition of healthcare providers to expand COVID-19 testing at its facilities across numerous states like Florida, Georgia, and North and South Carolina. Pruitt has also already implemented a public dashboard of its COVID-19 test results and is using donated masks to help allocate PPE more efficiently. With quick action and large third-party funding, Pruitt has bolstered its testing capacity by at least 30%, allowing states to diverge funding to other aspects of tackling this pandemic. States have faced numerous difficulties in the past 2 months to provide adequate testing capabilities and PPE to hospitals and local governments. With the aid of laboratories and private and nonprofit organizations, states can finally see an increase in walk-in testing and help better contain the virus.

Through donations from companies and organizations, numerous states have slowed the progression of the pandemic considerably. In a time when healthcare systems have grown obsolete, private partnerships become an absolute necessity.

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