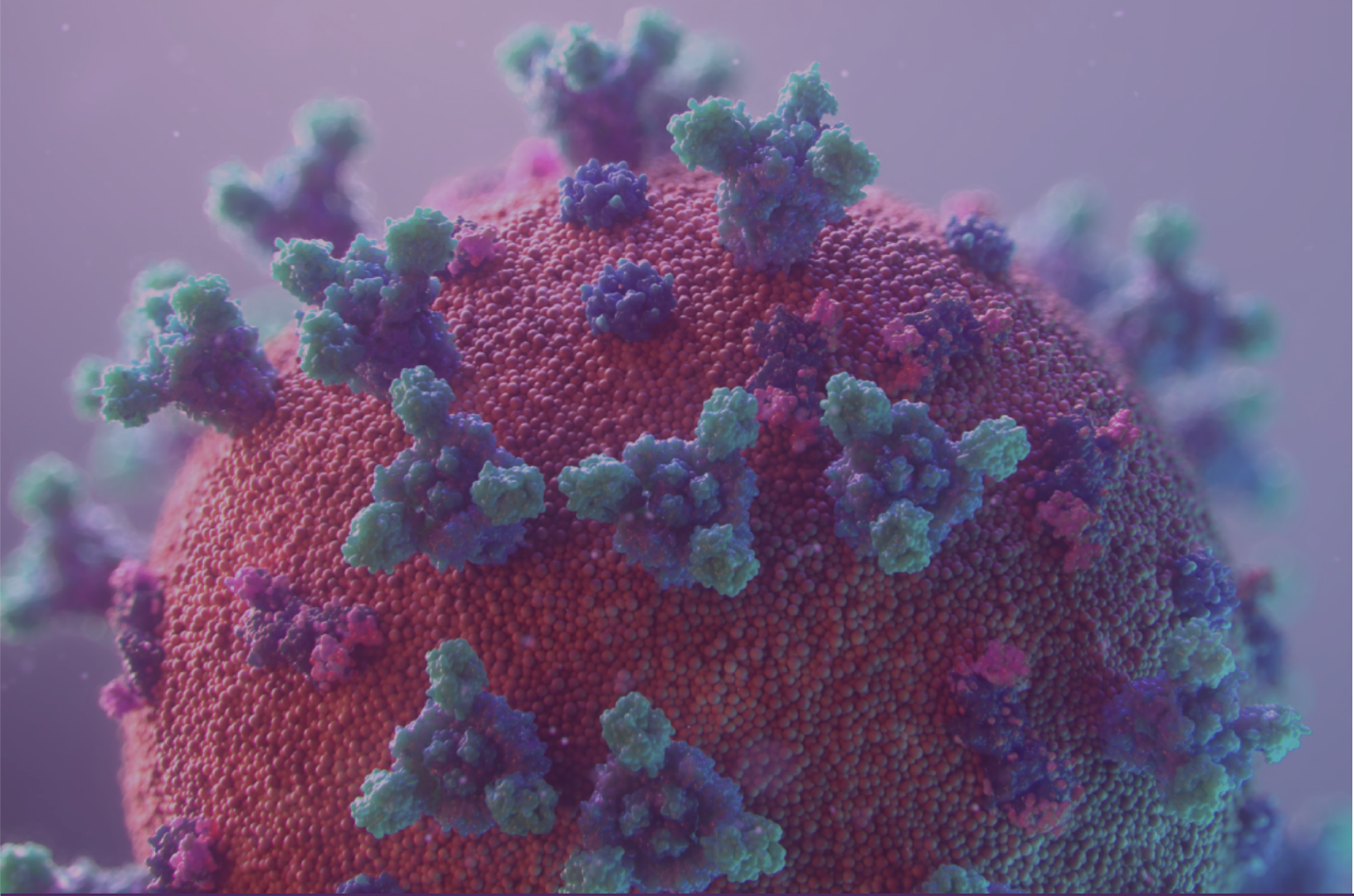


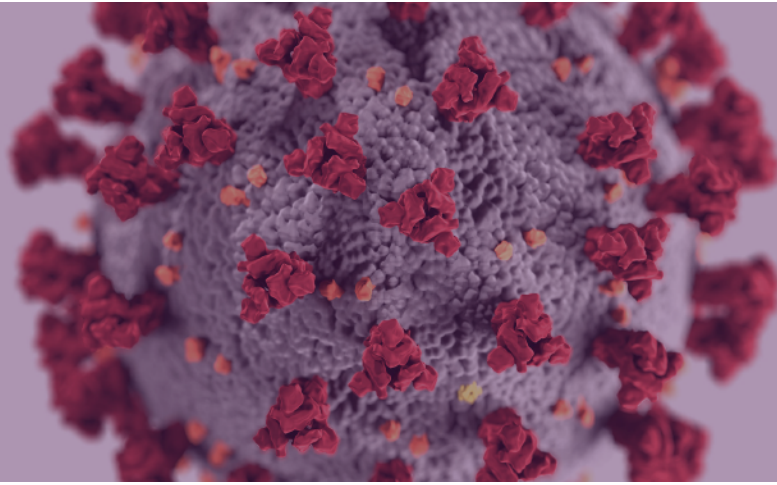
GUIDE TO THE **CORONAVIRUS** DRUG PIPELINE



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CORONAVIRUS OUTBREAK:

New Vaccines in the Pipelines of Leading Pharmaceutical Companies



COVID-19

March 17, 2020

With the sudden spread of COVID-19, more commonly referred to as the Coronavirus, people globally are struck with panic and are demanding answers. What we know at this point, is that the virus causes a mass range of different illnesses, ranging from the common cold to more severe illnesses, such as pneumonia and even death. Spreading primarily through contact with an infected individual from saliva, or other bodily fluids, scientists are working hard to find an antidote for this new virus. With this information, the public has been advised to thoroughly wash their hands continuously throughout the day and refrain from any unnecessary travel. Businesses and schools globally have taken unprecedented precautions by having their employees and students work from home, in hopes to diminish avoidable human contact. As far as advanced medical research and discoveries go, below is a guide to the most current efforts regarding cures and antidotes for COVID-19.



Moderna Therapeutics

February 24, 2020

Moderna was founded in 2010 and specializes in clinical stage biotechnology, specifically in messenger RNA (mRNA) therapeutics and vaccines. They announced their release of mRNA-1273, a vaccine invented for human use in hopes to combat COVID-19. Partnering with the National Institute of Health (NIH) the vaccine is now being tested in a Phase 1 study in the United States. Announced in Moderna's recent press release, "mRNA-1273 is an mRNA vaccine against the novel Coronavirus encoding for a prefusion stabilized form of the Spike (S) protein, which was selected by Moderna in collaboration with investigators at the NIAID Vaccine Research Center (VRC)." The company has released more than 100 batches used for clinical trials on healthy-volunteers. If the vaccine is proven safe, Moderna and NIH will roll out the clinical study on a larger scale.

Altimune, Inc

February 28, 2020

Altimune is a clinical-stage biopharmaceutical company, which recently announced their progress in finding a vaccine to treat COVID-19. In a recent press release, they announced the "advancement in a novel single-dose, intranasal vaccine using Altimune's proprietary technology to protect against COVID-19." This advancement is suited to provide systemic protections against respiratory infections and can therefore help prevent the spread of the coronavirus. Altimune is following the same platform vaccine technology as their more developed vaccine, known as NasoVAX which is in phase two of their clinical study. With a fast agenda, Altimune is now moving towards animal testing and manufacturing, while hoping to commercialize their vaccine in August.



Inovio Pharmaceuticals

March 3, 2020

Inovio Pharmaceuticals is a biotechnology company focused on the development of DNA medicines used to protect people from diseases associated with HPV, cancer, and infectious diseases. Inovio recently joined the COVID-19 vaccine race hoping to get ahead of modern medicine by announcing their accelerated timeline for vaccine developments. Funded by Coalition for Epidemic Preparedness Innovations (CEPI) and collaborating with Beijing Advaccine Biotechnology, an advancement of the former vaccine known as INO-4800 is being used for pre-clinical testing for clinical product manufacturing. Inovio believes this vaccine can preserve antibodies and keep patients from developing infections. Looking into the future, Inovio expects their candidate to progress into clinical trials later this year.

Novavax

February 26, 2020

Novavax, a biotechnology company focusing on the late-stage development of vaccines for infectious diseases, announced their progress in developing a novel vaccine to protect against COVID-19. While still identifying the optimal candidate for human testing, Novavax has produced and is currently assessing multiple vaccine candidates through animal testing. Novavax found their animal candidates through their own recombinant protein technology platform, referred to as Matrix-M, which specializes in generating antigens derived from the coronavirus protein. Quoted from a recent press release, Matrix-M will then be used to enhance an immune response in vaccine candidates by “stimulating the entry of antigen-presenting cells into the injection site and enhancing antigen presentation in local lymph nodes, boosting immune responses.” With all this in the works, Novavax plans on performing phase one of their clinical trials starting in late spring 2020.



Tonix Pharmaceuticals

February 26, 2020

Tonix Pharmaceuticals is a clinical-stage biopharmaceutical company focused on the development of innovative and new therapeutics. Tonix joined forces with Southern Research, a non-profit organization, to develop TNX-1800, a new vaccine used to protect against the coronavirus. Originally intended for the horsepox virus, Tonix redesigned their vaccine to express a protein derived from SARS-CoV-2, which is the virus that causes COVID-19. With this new development, they believe TNX-1800 will be able to protect against COVID-19. Southern Research will then evaluate the effectiveness of the vaccine to discuss future clinical trials.

Johnson & Johnson

March 13, 2020

Johnson & Johnson, being the largest healthcare company in the world, recently released their updated contribution to scientific discoveries regarding the coronavirus. Collaborating with Beth Israel Deaconess Medical Center (BIDMC), the parties have both commenced preclinical testing of multiple vaccine prospects. The goal is to identify a COVID-19 vaccine candidate by the end of March 2020, to be used in future clinical trials. Quoted from their website, "By collaborating with multiple global strategic partners, we can initiate a Phase 1 clinical study of a potential vaccine candidate by the end of the year." Johnson & Johnson have also disclosed the collaboration with Janssen and the Biomedical Advanced Research and Development Authority (BARDA). Their work together involves potential treatments for patients who are already diagnosed with the coronavirus.



Gilead Sciences

January 31, 2020

Gilead Sciences is an American biotechnology company that focuses on the development of drugs. Gilead recently shared their newest treatment regarding COVID-19, known as intravenous. Already used on one infected patient in the U.S., intravenous will quickly be sent to Asia to be tested on late-stage studies. Gilead hopes that with multiple doses of their vaccine, fevers will soon be reduced and the infection will ultimately be reversed, all within two weeks. The drug was previously deemed a failure on the Ebola virus, but is still being studied in smaller trials in both the U.S. and China. Stated on their website, "Gilead is committed to supporting the global health community to quickly and effectively respond to serious and life-threatening viral outbreaks worldwide".

Sanofi & BARDA

January 31, 2020

Sanofi pharmaceuticals and BARDA, which stands for Biomedical Advanced Research and Development Authority, have joined forces to expedite a potential coronavirus vaccine. Sanofi has been studying SARS, a close relative to the novel virus, emerged in 2002 and then largely disappeared after two years. They plan to take DNA from SARS and mix it with genetic material from a less harmful virus which will then prime the immune system in patients. If all goes according to plan, Sanofi expects to have the perfect vaccine candidate within six months and could be ready to use the vaccine on patients within a year. While approval would be about three years away, Sanofi believes their previous research with SARS will make them a leading force in discovering a vaccine.



Algernon Pharmaceuticals

March 16, 2020

Algernon is a pharmaceutical development company specializing in the clinical stage development of vaccines and drugs. Recently, they announced the use of NP-120, also known as Ifenprodil, as a novel treatment for the coronavirus. Recently studied, NP-120 was found to significantly weaken acute lung injury (ALI) and improve mortality rates. Algernon believes that Ifenprodil can be a leader in vaccine treatments for the most severe cases of COVID-19.

Vaxart

January 31, 2020

Vaxart focuses on the clinical development of oral recombinant vaccines in the biotechnology industry. They have taken the initiative to develop a vaccine candidate for the coronavirus based on their oral vaccine platform, VAAST. Already tested on humans, Vaxart's proprietary technology serves as a new way to administer oral vaccines to patients with COVID-19. Previous studies have proven Vaxart's vaccines to consistently produce mucosal responses in humans, essential to combating the coronavirus. Vaxart's future plans include conducting preclinical models with vaccine candidates to generate both mucosal and systemic immune responses in their patients.





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