

MEDICAL BREAKTHROUGHS **RESEARCH SUMMARY**

TOPIC: COVID-19 VACCINE CANDIDATE IS APPLIED LIKE A BAND-AID!
REPORT: **MB# 4747**

BACKGROUND: Vaccines contain the same germs that cause a disease. But they have been either killed or weakened to the point that they don't make you sick. A vaccine stimulates your immune system to produce antibodies, exactly like it would if you were exposed to the disease. After getting vaccinated, you develop immunity to that disease, without having to get the disease first. Unlike most medicines, which treat or cure diseases, vaccines prevent them. Most recently there have been two other coronavirus outbreaks. In 2003 there was the SARS-CoV when a total of 8,098 people worldwide became infected according to the World Health Organization. Of these, 774 died. In the United States, only eight people had laboratory evidence of SARS-CoV infection. All of these people had traveled to other parts of the world where SARS was spreading and it did not spread more widely in the community in the United States. In 2014 there was the MERS-CoV (Middle East Respiratory Syndrome). It represented a very low risk to the general public in the U.S. and only two patients from the U.S. tested positive. The current COVID-19 is a respiratory disease that spreads from person to person caused by a novel (new) coronavirus. COVID-19 can cause mild to severe illness; most severe illness occurs in adults 65 years and older and people of any age with serious underlying medical problems. It was classified as a pandemic (a global outbreak) on March 11, 2020.

(Sources: <https://www.cdc.gov/vaccines/vpd/vpd-vac-basics.html>, <https://www.cdc.gov/sars/about/fs-sars.html>, https://www.cdc.gov/coronavirus/2019-ncov/cases/updates/summary.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fsummary.html, <https://www.cnn.com/world/live-news/coronavirus-pandemic-05-28-20-intl/index.html>)

DIAGNOSING: COVID-19 spreads when an infected person coughs, sneezes, or talks, releasing droplets that can land in an uninfected person's nose or mouth. It may also spread by touching an infected item, such as a doorknob, and then touching your eyes, nose, or mouth. Symptoms are similar to symptoms of a cold or flu and may include fever, dry cough and shortness of breath. To test for COVID-19, a health care provider uses a long swab to take a sample from the nose or throat. The samples are then sent to a lab for testing. If you're coughing up saliva (sputum), that may be sent for testing also.

(Source: <https://www.upmc.com/coronavirus/covid-19>, <https://www.mayoclinic.org/diseases-conditions/coronavirus/diagnosis-treatment/drc-20479976>)

NEW TECHNOLOGY: By the end of April 2020 there were more than 90 vaccines in various stages of development. The University of Pittsburgh School of Medicine announced in early April a potential vaccine in the works. When tested in mice, the vaccine, delivered through a fingertip-sized patch, produces antibodies specific to SARS-CoV-2 at quantities thought to be sufficient for neutralizing the virus. The PittCoVacc, short for Pittsburgh Coronavirus Vaccine — follows a more established approach, using lab-made pieces of viral protein to build immunity. It's the same way the current flu shots work. The researchers also used a novel approach to deliver the drug, called a microneedle array, to increase potency. This array is a fingertip-sized patch of 400 tiny needles that delivers the spike protein pieces into the skin, where the immune reaction is strongest. The patch goes on like a Band-Aid and then the needles — which are made entirely of sugar and the protein pieces — simply dissolve into the skin. The system also is highly scalable. The protein pieces are manufactured by a “cell factory” — layers upon layers of cultured cells engineered to express the SARS-CoV-2 spike protein — that can be stacked

further to multiply yield. Purifying the protein also can be done at industrial scale. Mass-producing the microneedle array involves spinning down the protein-sugar mixture into a mold using a centrifuge. Once manufactured, the vaccine can sit at room temperature until it's needed, eliminating the need for refrigeration during transport or storage.

(Sources: <https://www.upmc.com/media/news/040220-falo-gambotto-sars-cov2-vaccine>, <https://www.cnn.com/world/live-news/coronavirus-pandemic-05-28-20-intl/index.html>)

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If this story or any other Ivanhoe story has impacted your life or prompted you or someone you know to seek or change treatments, please let us know by contacting Marjorie Bekaert Thomas at mthomas@ivanhoe.com