



Beyond the Noise

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Beyond the Noise is written by Paul Offit, MD, an infectious diseases physician, author, FDA advisor, new grandfather, and co-inventor of a rotavirus vaccine.

Trump's COVID Infection

Back on October 2, 2020, President Donald Trump was admitted to the Walter Reed Army Medical Center with COVID. One medicine probably saved his life. It wasn't the one he had imagined.

On September 26, 2020, President Donald Trump, 74 years old and overweight, tested positive for COVID. Seven days later, on October 2, he was flown to the [Walter Reed National Military Medical Center for treatment](#). Trump's fever was high, he was short of breath, the level of oxygen in his bloodstream was dangerously low, and a chest X-ray confirmed that he was suffering from severe pneumonia. Before traveling to the hospital, doctors administered the first drug, a monoclonal antibody preparation called Regeneron intravenously, beginning a 5-day course. (The FDA authorized Regeneron six weeks later.) Monoclonal antibodies prevent SARS-CoV-2 virus from attaching to cells.

After Trump arrived at Walter Reed, doctors administered a second drug, an antiviral medicine called remdesivir. (The FDA licensed remdesivir three weeks later.) Remdesivir prevented SARS-CoV-2 virus from reproducing itself. On October 5, 2020, three days after he had entered the hospital, Trump returned to the White House, certain that the not-yet-licensed monoclonal antibody had saved his life. But Trump was wrong. It was a third drug he had received in the hospital that had most likely saved him.

To understand what drug had saved President Trump's life, we need to understand the

two stages of COVID. In the first stage, the virus is dominant. In the second stage, the immune system takes over. Each stage requires different treatments.

Stage #1: The Viral Stage

SARS-CoV-2 virus enters the body in tiny droplets spread from the nose and mouth by someone who is infected. The virus then attaches to and enters cells that line the nose, throat, windpipe, breathing tubes (bronchi), and, in the most severe cases, lungs. After the virus enters cells, it begins to reproduce itself. Whereas one virus particle might enter a cell, about 100 leave the cell before killing it. Hundreds of viruses become thousands of viruses that become millions of viruses. Because viral reproduction dominates the first stage, the best way to treat people in the first few days of illness is to give therapies directed against the virus, such as remdesivir or monoclonal antibodies.

Stage #2: The Immune Stage

When President Trump entered the hospital, he was already in the second stage of his illness, when virus reproduction was less important. Ironically, our immune system works for us early and can work against us later. While our immune system limits viral replication and spread, it can also cause a lot of collateral damage. For example, lungs become flooded with immune cells, causing pneumonia. At this stage, treatments that suppress the immune system provide the best chance for survival. However, immune suppressive drugs should not be given early in infection when we need our immune system to rid us of the virus. In Trump's case, it was an immune suppressive steroid called dexamethasone—which was invented in 1958—not the monoclonal antibodies or antiviral drug that had likely saved his life.

Given that neither monoclonal antibodies nor anti-viral drugs work in the second stage of illness, why did the doctors at Walter Reed prescribe them? The reason is that in October 2020, clinicians had had little experience with either of these two new medications. It took time for studies to show that neither worked late in the illness.

Trump's illness began three months *before* COVID vaccines were available. But Trump didn't help himself by waiting until he had developed pneumonia to treat his illness.

When he first developed symptoms, he could have taken the antiviral drug or the monoclonal antibody preparation, both of which would have decreased virus reproduction and likely prevented pneumonia. But Trump continued to deny his COVID until he was severely ill. At that point, only the steroid dexamethasone, which lessened the inflammation in his lungs, could help.

Should he be reinfected, Donald Trump, a now fully vaccinated, 77-year-old, overweight man with at least one prior COVID infection, should take the antiviral medication, Paxlovid, early in his illness. This will give his body the best chance to handle the infection.