

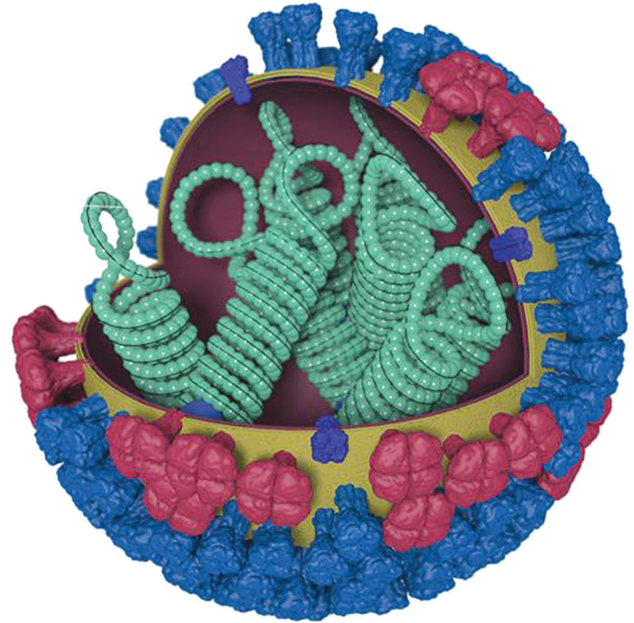
VACCINE

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outside of viruses and prevent them from attaching to their target cell. If a virus cannot attach to its target cell, then it cannot infect that cell. While this process works well for viruses that don't change their outer appearance (like poliovirus), focusing the immune system's memory on the outside of the virus turns out to be an Achilles' heel for influenza vaccines. This is because the outside of the influenza virus is the part of the virus that changes the most. The influenza virus is constantly evolving its outside appearance, making our current vaccines continually chase the virus as it changes over time. The new approach we are proposing will instead teach T-cells, the assassins of our immune system that kill infected cells, to target the guts of the virus, which are fixed and cannot change their appearance. I imagine this new approach as training a bull (our immune system) to ignore the waving red cape (the outside of the virus) that the matador is waving, and instead charge directly at the matador. While this might sound unrealistic, the approach is rooted in more than 10 years of research by our collaborative research team's greater ability to develop a vaccine platform based on cytomegalovirus, a common, mostly harm-

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AN INFLUENZA VIRUS



The above image shows the different features of an influenza virus, including the surface proteins hemagglutinin (HA) and neuraminidase (NA). Following influenza infection or receipt of the influenza vaccine, the body's immune system develops antibodies that recognize and bind to "antigenic sites," which are regions found on an influenza virus' surface proteins. By binding to these antigenic sites, antibodies neutralize flu viruses, which prevents them from causing further infection.

Courtesy of CDC

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