

Duke Researchers Discuss New Vaccine That Can Help Prevent Future Pandemics

By Administrator

Wednesday, 19 May 2021 10:18 - Last Updated Wednesday, 19 May 2021 10:21

A new vaccine under development at Duke University has the potential to protect against a broad variety of coronavirus infections that move from animals to humans, now and in the future.

The new vaccine – called a pan-coronavirus vaccine - has been 100 percent effective in non-human tests including testing on primates. Success in primates is very relevant to humans.

On Monday, two key researchers on the vaccine development project spoke with reporters about their findings thus far and their hopes that this vaccine could eventually give a dramatic boost to the current vaccines combatting COVID-19. [uTube](#) .

Here are excerpts:

Kevin Saunders, director of research, Duke Human Vaccine Institute

ON HOW THE NEW DUKE VACCINE WORKS

“What this vaccine does, it takes a small part of the virus, the part of the virus that attaches to the cells, and it presents multiple copies of that to the immune system. That allows the immune system to focus a response against that part of the virus, preventing the virus from being able to attach to cells, and hopefully preventing subsequent infection.”

“What we found in this study is that we got antibodies -- this is the part of the immune system that can attach to viruses and prevent infection -- we got that part of the immune system stimulated such that it was able to bind to not only SARS-CoV-2, but also to coronaviruses that circulate in animals.”

Dr. Bart Haynes, director, Duke Human Vaccine Institute

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"We've worked for the past almost 20 years now ... to develop an HIV vaccine. ... When the epidemic broke in early 2020 in the United States, we asked, 'What could we do that would help Operation Warp Speed and the already five or six vaccine developers that the government was funding?'"

"We knew the SARS-CoV-2 virus was an RNA virus – that means the kind of genetic material it uses – and has the same kind of genetic material the HIV virus uses. The HIV virus is one of the most rapidly evolving life forms that we know, because RNA viruses tend to make mistakes as they replicate. And we knew the SARS-CoV-2 virus would also develop mutants that would escape our immune system as our immune system made antibodies against it."

"We decided to (shift) all these years of work from HIV to the coronavirus vaccine work and work on vaccines that would be useful as boosters in case we need it to make the immune response stronger. We are now discussing these kinds of possibilities for boosting the existing vaccines."

"And secondly, for dealing with ... variants of the SARS-CoV-2 that would evolve."

"And then third, now is the time to plan for the next coronavirus pandemic or outbreak. We've had two major outbreaks before COVID-19, one in 2003, the SARS outbreak, and one in 2011, the MERS outbreak. Both coronaviruses. And certainly we expect others. So now is the time to provide the vaccine that will prepare for those."

ON MOVING TO HUMAN TRIALS

Haynes

"We're concerned that the antibody response is not going to be long-lived enough so that we'll never have to be boosted again. We're expecting that in one year or two years, there's a good chance the population of the United States will have to be boosted again. We're working to get

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this particular vaccine candidate made ... so it can be put into humans in what's called a phase 1 safety trial and get it through that trial as quickly as possible."

ON A VACCINE MAKING MULTIPLE COPIES OF CELLS

Saunders

"Our immune cells are actually engineered to be able to see multiple copies. So they respond well to things like viruses because the viruses have multiple copies of the thing they're looking for."

"It's very similar to Velcro. If you think of one hook and loop, that's a pretty weak interaction. But if you can put one hook and loop together multiple times with multiple copies, that becomes a really strong interaction. By doing that with our nanoparticle platform, and interacting with the immune cell, we believe we can get a better activation of the immune system and hopefully generate a better response."

ON THE EXCITEMENT OF VACCINE DISCOVERY

Saunders

"The spotlight is on vaccine development right now. People who were not necessarily focused on what we did before this pandemic are really paying attention to it. It's a great time to talk about science and careers in science. There's just been an eye opening to the field in general."

"From a scientific standpoint, we've seen a lot of achievements and a lot of milestones reached that we probably would have never thought were possible. To move a vaccine so quickly through phase 1 and phase 2 and phase 3 testing and make it into emergency use over the short period of time it took ... was unprecedented. To be able to make that many doses that quickly is also unprecedented. There's been some advances in technology and some advances

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in how the clinical trials were conducted that really changed the way the vaccine development field has moved."

Haynes

"This has been an incredibly exciting time. This is what we do."

"Our job is to prepare for pandemics. We're already preparing for what might be the next pandemic. One of the ones we're very concerned about is the bird flu, or avian flu ... which has the capability but hasn't completely jumped to humans."

"Whether it's another coronavirus ... or with influenza or yet another type of outbreak, that's what the vaccine institute is here for. It's a very exciting time."

ON GOVERNMENT FUNDING AND INTEREST

Haynes

"The NIH is very concerned about this issue and preparing for the next pandemic. We've had two pandemics before, SARS and MERS, over the last 20 years. And vaccines were made but those epidemics died out before they got to the pandemic stage, and interest in moving those vaccines stopped. I think we've all learned now with this particular pandemic that now is the time to prepare for the next time so we can have vaccines on the shelf or vaccines that can be developed very rapidly and deployed very rapidly."

ON WHETHER PANDEMICS ARE GETTING WORSE

Saunders

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"I don't have any evidence the next coronavirus pandemic will be the same or worse than SARS-CoV-2. I think hopefully we will have monitoring in place to quarantine and hopefully control outbreaks a little bit better so they don't become pandemics. Given our current experience, hopefully there will be some measures put in place."

"I'm hopeful we'll have measures that would be able to prevent another pandemic while the vaccines ... are being made. But I don't have any evidence the virus is becoming easier to spread, or more transmissible, or more virulent."

ON A BEST-CASE TIMELINE FOR THE NEW VACCINE

Haynes

"We're working hard to get the material made. The limiting factor is getting the material made in what's called 'good manufacturing practice conditions' to make it safe for putting it into humans. The bottom line is we're trying to get this made as soon as possible so it can have some sort of positive impact in the current epidemic/pandemic while we're waiting on figuring out if we'll be able to use it as a booster, and if a booster is going to be needed."

The experts:

Dr. Bart Haynes

[Dr. Bart Haynes](#) is a professor of medicine and immunology at the Duke School of Medicine and director of the Duke Human Vaccine Institute. His research focuses on immunology, retrovirology and HIV vaccine development.

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Kevin Saunders

[Kevin Saunders](#) is an associate professor of surgery at the Duke University School of Medicine. He is also director of research at the Duke Human Vaccine Institute, where he oversees the design of proteins used in vaccines.

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