

How a decade of coronavirus research paved way for COVID-19 vaccines

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The rapid development of COVID-19 vaccines in under a year has raised concerns, which can lead to vaccine hesitancy. But AMA member Peter Hotez, MD, PhD, reassures that while the COVID-19 pandemic has spurred global cooperation for vaccine research and distribution, it has been a decade in the making.

“We created a center here in Texas to develop vaccines that the big pharma companies are not in a position to make because there's not a financial model for the shareholders,” Dr. Hotez said during a recent episode of the “AMA COVID-19 Update” about his 10 years of work with coronaviruses. He is the dean of the National School of Tropical Medicine, and professor of pediatrics and molecular virology and microbiology at Baylor College of Medicine in Houston.

“About 10 years ago, we got connected to a virology group at the New York Blood Center led by Shibo Jiang, MD, PhD, and Lanying Du, PhD, who had a pretty good idea for coronavirus vaccines,” said Dr. Hotez who is also co-director of the Center for Vaccine Development with Maria Elena Bottazzi, PhD at the Texas Children’s Hospital. “At the time, interest in coronavirus vaccines was not high. They were sort of orphaned, so we adopted it just like we adopted Chagas disease vaccines and leishmaniasis vaccines.”

“We formed a consortium, together with the Galveston National Laboratory (Kent Tseng, PhD) and Walter Reed Army Institute of Research,” he said.

Groundwork for COVID-19 vaccine

“With coronaviruses, these are pandemic threats, so they seem to arise out of nowhere and cause explosive epidemics and pandemics,” Dr. Hotez said, noting that this was happening with the severe acute respiratory syndrome (SARS) in 2002, which “rose out of Southern China” and affected “Ontario

and shut down Toronto.”

In 2012, middle eastern respiratory syndrome (MERS) “did a lot of damage on the Arabian Peninsula and in South Korea, so we adopted this coronavirus vaccine program and we’ve learned a lot over the last decade,” he said. “We learned that the spike protein is the soft underbelly of the virus. And we showed that if you deliver the spike protein as a vaccine, it’s highly effective—induces what are called virus-neutralizing antibodies.”

“All that work we did over the last decade has laid the groundwork for our current generation of COVID-19 vaccines,” said Dr. Hotez, adding that “the vaccines for Operation Warp Speed build on our research, and my colleagues’ research over the last decade, showing how we can deliver the spike protein—it’s a 10-year R&D program just like any other vaccine.”

Dr. Hotez said the decade-long history of research and development behind the safe and effective vaccines going into Americans’ arms has not been adequately publicized.

“That’s unfortunate because if more people knew that, then more people would be accepting of COVID-19 vaccines,” Dr. Hotez added.

Read about what doctors wish patients knew about COVID-19 vaccination.

Vaccines must reach poor countries

“We also used the same approach that we used for SARS and MERS to develop our own COVID-19 vaccine that’s now being scaled up for production in India,” said Dr. Hotez. This is a collaboration with Biological E (BioE), which is a large vaccine producer based in Hyderabad. “Over a billion doses now are being made and it’s being tested across India.”

“This is going to be really important as a low-cost COVID-19 vaccine for global health,” he said. Some refer to it as a “people’s vaccine.” In doing so, it will also “fill an enormous hole right now because where I’m really worried—and my colleagues are really worried—is we won’t have vaccine for COVID-19 for Africa, Latin America and the poorer countries of Asia because the mRNA [messenger RNA] vaccines are not going to filter there.”

“It’s a lot of pressure, but it’s also an incredible opportunity,” Dr. Hotez said. “Remember, if all we do is vaccinate the American people and don’t do anything about the world’s low- and middle-income countries, that just creates a huge virus incubator for new variants to emerge, and that makes our nation susceptible as well.



“There's no real option here. We have to figure out a way to vaccinate both the United States and the rest of the world, otherwise, it's going to be self-defeating,” he added.

Learn more about why Dr. Fauci says the emerging coronavirus variants reveal COVID-19 vaccination as a global job.

The AMA offers a COVID-19 vaccines guide for physicians to help build trust in vaccine safety and efficacy. This guide contains background and actions, evidence-based messaging guidance and best practices for consideration in external communications on COVID-19 vaccine topics.

To learn more about COVID-19 vaccine developments, visit our vaccine development resource.