

Nobel prize goes to mRNA COVID vaccine researchers

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A Nobel Prize medal is displayed during a ceremony in New York on Tuesday, Dec. 8, 2020. The Nobel Prize winners of 2023 will be announced throughout the weeks of Oct. 2 and 9. Credit: Angela Weiss/Pool Photo via AP, File

Researchers Katalin Kariko and Drew Weissman [won the Nobel](#)

[Medicine Prize on Monday](#) for work on messenger RNA (mRNA) technology that paved the way for groundbreaking COVID-19 vaccines.

The pair, who had been tipped as favorites, "contributed to the unprecedented rate of vaccine development during one of the greatest threats to human health in modern times", the jury said.

The World Health Organization declared COVID-19 a pandemic in March 2020 and the first mRNA vaccines were approved for use against the illness in December that year.

Billions of Pfizer/BioNTech and Moderna doses have been injected around the world since then.

Together with other COVID vaccines, they "have saved millions of lives and prevented severe disease in many more", the jury said.

Kariko, 68, and Weissman, 64, longstanding colleagues at the University of Pennsylvania in the United States, have already won a slew of awards for their research.

In recognizing the duo this year, the Nobel committee broke with its usual practice of honoring decades-old discoveries, aimed at ensuring it has stood the test of time.

While the prizewinning research dates back to 2005, the first vaccines to use the mRNA technology came out just three years ago.

Unlike traditional vaccines which use weakened virus or a key piece of the virus' protein, mRNA vaccines provide the genetic molecules that tell cells what proteins to make, which simulates an infection and trains the immune system for when it encounters the real virus.

Sweet comeback

The idea was first demonstrated in 1990 but it wasn't until the mid-2000s that Weissman, of the US, and Hungarian-born Kariko developed a technique to control a dangerous inflammatory response seen in animals exposed to these molecules, opening the way to develop safe human vaccines.

The honor is particularly sweet for Kariko, the 13th woman to win the Medicine Prize, who toiled in obscurity for years and struggled to convince her superiors of the need for research on messenger ribonucleic acid.

Speaking to Swedish Radio, she said her late mother always had faith in her, listening to the Nobel prize announcements "year after year" hoping to hear her daughter's name called out.

"Unfortunately, five years ago she passed at the age of 89. She might be listening from above," Kariko said.

Thomas Perlmann, the secretary general of the Nobel Assembly, called Kariko "an extraordinary and unusual scientist" who "resisted any temptation" to do "something easier".

Weissman told AFP he heard the news from Kariko, who received the call from the jury first.

"We were wondering if somebody was pulling a prank on us," he said.

"This is the ultimate—this is the prize I thought of when I was five years old when I started to get interested in how things worked," he added.

Breakthrough

In the 1990s, Kariko believed mRNA held the key to treating diseases where having more of the right kind of protein can help—like repairing the brain after a stroke.

But the University of Pennsylvania, where Kariko was on track for a professorship, demoted her after grant rejections piled up.

She carried on as a lower-rung researcher.

Much of the scientific community was at the time focused on using DNA to deliver gene therapy, but Kariko believed that mRNA was also promising since most diseases are not hereditary and don't need solutions that permanently alter our genetics.

First though, she had to overcome the problem of the massive inflammatory response in animal experiments, as the immune system sensed an invader and rushed to fight it.

Kariko and Weissman discovered that one of the four building blocks of the synthetic mRNA was at fault—and they could overcome the problem by swapping it for a modified version.

They published a paper on the breakthrough in 2005.

In 2015, they found a new way to deliver mRNA into mice, using a fatty coating called "lipid nanoparticles" that prevent the mRNA from degrading and help place it inside the right part of cells.

Both these innovations were key to the COVID-19 vaccines.

Nobel Committee member Olle Kampe said the prestigious prize may

help sway the opinion of some anti-vaxxers.

It "may make hesitant people take the vaccine and be sure that it's very efficient and safe", he told AFP.

The technology is now being used to develop other treatments for cancer, influenza and heart failure, among others.

Kariko and Weissman will receive their Nobel diploma, gold medal and \$1 million check in Stockholm on December 10.

The Nobel will however not be the first gold medal in Kariko's family. Her daughter Susan Francia is a two-time Olympic gold medalist rower.

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