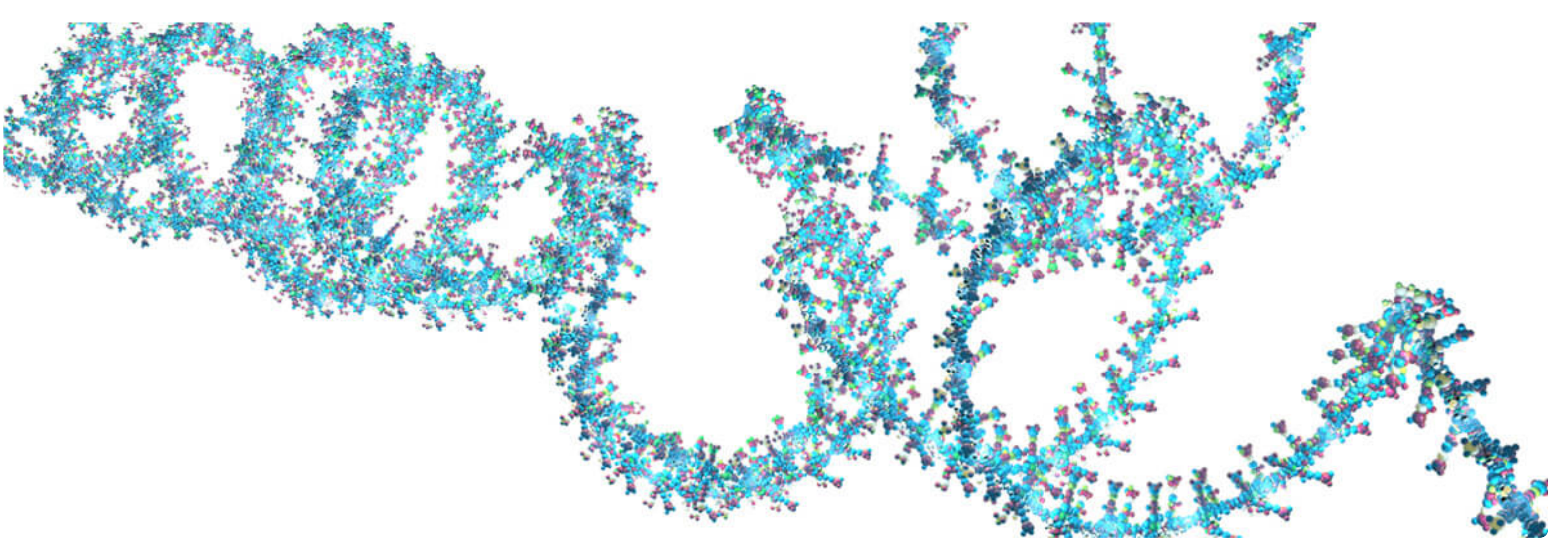
Harnessing the Potential of mRNA

The delivery of the world’s first mRNA-based COVID-19 vaccine put a big spotlight on the promise of mRNA technology, but we think the scientific community is only beginning to tap its potential. The next wave of scientific innovation is upon us, and Pfizer is working hard to harness the power of mRNA. Our expertise in disease biology, along with our robust, rapid manufacturing capabilities, and talented scientific minds will help propel the potential of this technology forward.

Unleashing the Next Wave of Scientific Innovations to Fight Viruses and More

What is mRNA?

mRNA—or messenger RNA—is a molecule that contains the instructions or recipe that directs the cells to make a protein using its natural machinery. To enter cells smoothly, mRNA travels within a protective bubble called a Lipid Nanoparticle. Once inside, our cells read the mRNA as a set of instructions, building proteins that match up with parts of the pathogen called antigens. The immune system sees these foreign antigens as invaders—dispatching defenders called antibodies and T-cells—and training the immune system for potential future attacks. So, if and when the real virus comes along, the body might recognize it—sounding the alarm to help defend against infection and illness.



The Potential of mRNA to Deliver New Vaccines and Treatments

Though many people first became aware of mRNA technology because of COVID-19 vaccines, it is not new to the scientific community. For decades, scientists have studied mRNA, looking for ways to unlock its potential to prevent and treat disease. While the mechanism of action for mRNA technology is relatively simple—once inside cells, it instructs them to build proteins—researchers have had to work for years develop technologies to allow mRNA to work in the real world. mRNA has proved to be a great platform for vaccine development (and potentially therapeutics), so that our own cells can do the hard work of producing proteins, resulting in an immune response which helps protect us against diseases.

The approval of the first mRNA-based COVID-19 vaccines was a scientific turning point, establishing mRNA as a versatile, flexible technology. The focus and drive Pfizer gave to developing our COVID-19 vaccine in partnership with BioNTech gave us a wealth of scientific knowledge in just one year.

Pfizer’s next wave of mRNA scientific innovation is expanding in the infectious disease arena with vaccine development programs in flu (influenza) and shingles, as well as exploring respiratory combination vaccines.

Pfizer is also exploring the versatility of this technology in the areas of rare genetic diseases. We will stay close to other opportunities where the scientific rationale for using mRNA is strongest and Pfizer’s disease and biology area expertise is deepest, where the potential impact on patients could be greatest.

Partnering and Collaboration to Advance mRNA Science

To further build our internal capabilities, collaboration and partnership are key elements of Pfizer’s mRNA strategy. A variety of licensing and research collaborations have been initiated to further the development of mRNA-based vaccines and treatment options, including:

- An ongoing collaboration with BioNTech to advance candidates including COVID-19 and shingles. Pfizer and BioNTech also have a collaboration on flu that was initiated in 2018.
- A Development and Option agreement with Acuitas Therapeutics, which will provide an option to license Acuitas’ lipid nanoparticle delivery system for up to 10 targets for vaccine or therapeutic development.
- An exclusive research collaboration with Beam Therapeutics, which is focused on *in vivo* -based editing programs for a range of rare genetic diseases of the liver, muscle and central nervous system.
- A strategic research collaboration and license with Telesis BIO to access and further develop Telesis Bio’s enzymatic DNA synthesis technology for potential application by Pfizer for its mRNA-based vaccines and other biopharma products.

What is mRNA? How do mRNA therapeutics like the COVID-19 vaccine work? What else can mRNA help us treat? This three-part series answers these questions and more.

Meet mRNA
How This Once Little-Known Molecule Is Disrupting Medicine

Explore What’s Next for mRNA
Unlocking the Power of Our Bo

The Science Behind mRNA

Explore the science behind mRNA and understand why we’re thinking differently about this technology and the promise it holds.

What You Need to Know About mRNA

- What does mRNA stand for? +
- What are the origins and history of mRNA technology? +
- How does mRNA work? +
- How is mRNA related to DNA? +
- What mRNA vaccines exist? +
- How is mRNA revolutionizing the development of new vaccines and treatments? +
- What formats of mRNA does Pfizer use? +

Latest Updates

- Pfizer Enters into Agreement with Acuitas Therapeutics for Lipid Nanoparticle Delivery System for Use in mRNA Vaccines and Therapeutics – January 10, 2022
- Pfizer and Beam Enter Exclusive Multi-Target Research Collaboration to Advance Novel In Vivo Base Editing Programs for a Range of Rare Diseases – January 10, 2022
- Pfizer and BioNTech Sign New Global Collaboration Agreement to Develop First mRNA-based Shingles Vaccine – January 5, 2022

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Behind the Science Features

Experience multimedia stories that give you an exciting view of Pfizer’s initiatives as we pursue breakthroughs that change patients’ lives.

Go Behind the Science

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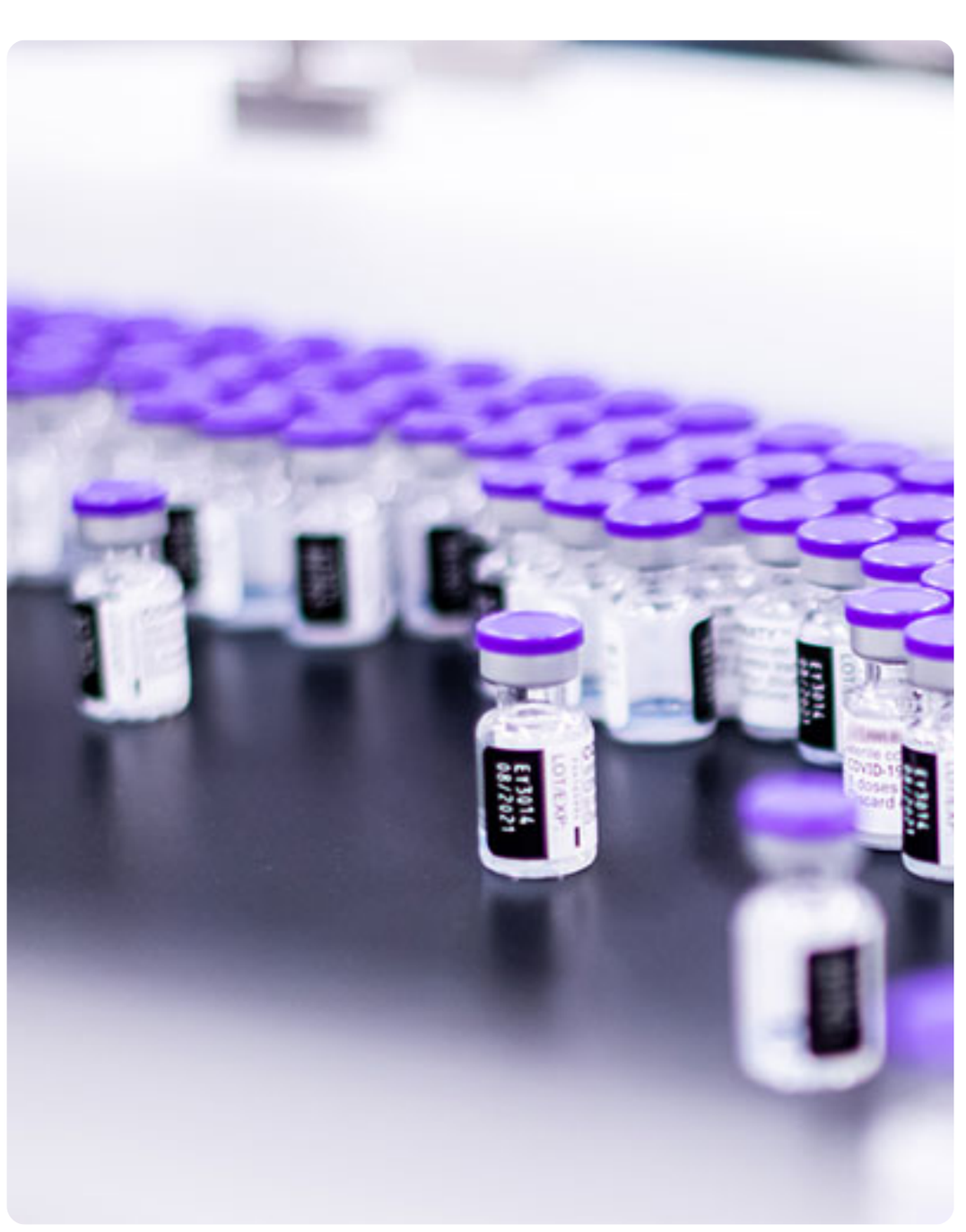
Shot of a Lifetime: How Pfizer and BioNTech Developed and Manufactured a COVID-19 Vaccine in Record Time

On March 11, 2020 the World Health Organization declared COVID-19 a pandemic1. Just six days later, on March 17, Pfizer signed a letter of intent with BioNTech to co-develop a potential COVID-19 vaccine2. In those early days, it was unclear how this new virus was transmitted, or how long it would...



Shot of a Lifetime: How Pfizer Developed its Own Raw Materials to Ensure a Steady Supply for the COVID-19 Vaccine

It was December 15, 2020 when Melissa French got the message: Pfizer needed large quantities of something called a cationic lipid that was critical to the COVID-19 vaccine. “This isn’t an everyday lipid that's readily available,” says French, who is a Project Manager with Pfizer Global Supply...

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Pipeline Snapshot as of January 30, 2024

Phase 1 Phase 2 Phase 3 Registration Total

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