

CONTRIBUTOR CONTENT

How Five Scientific Discoveries Became Treatments

From mRNA to AI-predicted proteins, these advances have influenced patient care.



Adobe Stock

Members of the editorial and news staff of the USA TODAY Network were not involved in the creation of this content.

Malana VanTyler Contributor

Sept. 25, 2026, 3:19 p.m. ET



Some scientific discoveries never leave the lab. A rare few change how doctors treat disease. The five discoveries below started as basic research questions, some decades old. Each has contributed to new therapies that are still moving through development today. Together, they trace the path from a lab experiment to a treatment people can use.

Messenger RNA

Messenger RNA, or mRNA, carries genetic instructions from the cell's DNA to the machinery that builds proteins. In the 1980s, scientists trying to produce mRNA in the lab ran into two problems. Lab-made mRNA triggered an inflammatory response in cells. It was also hard to deliver into cells.

Starting in the late 1990s, Katalin Karikó and Drew Weissman worked to address both obstacles. They modified specific mRNA bases to reduce the inflammatory response. Later advances in delivery, including lipid nanoparticles, helped mRNA enter cells more effectively. This combination helped turn mRNA into a workable therapeutic tool.

Companies began applying the technology to vaccines by 2010. By 2020, mRNA vaccines reached the public at record speed during the COVID-19 pandemic. Karikó and Weissman won the 2023 Nobel Prize in Physiology or Medicine. The prize recognizes their work on the base modifications that made mRNA vaccines possible.

CRISPR

CRISPR-Cas9 is a gene-editing tool adapted from a bacterial immune system. It works like molecular scissors that can cut and modify DNA. The system pairs a guide RNA, which matches a target gene, with an enzyme that cuts both DNA strands. That cut allows precise genetic changes.

Emmanuelle Charpentier and Jennifer Doudna won the 2020 Nobel Prize in Chemistry for developing the technology. In theory, refined versions of the CRISPR toolkit could eventually help treat a range of genetic conditions. Most applications, though, remain in early stages. Researchers are testing CRISPR-based treatments in both preclinical studies and clinical trials. The FDA has already approved the first CRISPR therapy. It treats sickle cell disease.

AlphaFold

AlphaFold is an artificial intelligence platform developed primarily by Demis Hassabis and John Jumper at Google DeepMind. It tackled a problem that had challenged biologists for decades. The challenge was predicting a protein's three-dimensional structure from its amino acid sequence quickly and accurately. A protein's structure can offer clues about its function.

That information helps us understand disease and develop new drugs. Hassabis and Jumper received the 2024 Nobel Prize in Chemistry for this work. DeepMind has also released a public database of more than 200 million protein structures, now used by researchers worldwide. Some are exploring how AlphaFold's structural predictions might inform future drug candidates for cancer and other conditions.

Porosome

Bhanu Jena discovered the porosome, a secretory structure at the cell's plasma membrane, in 1996. The finding changed how scientists think about cellular communication. Porosomes are made up of nearly 30 proteins. They help control the release of secretory products throughout the body, including neurotransmitters, insulin, and digestive enzymes.

Because porosomes are involved in these processes, researchers are studying whether their dysfunction relates to diseases, such as Alzheimer's, diabetes, and cystic fibrosis. Early-stage research, including studies in lab-grown human brain organoids, suggests that porosome-based approaches could eventually help with Alzheimer's.

The FDA has granted orphan drug designation to a porosome-based treatment for cystic fibrosis. Jena received the 2024 Lipid Science Prize from the Camurus Lipid Research Foundation for the discovery.

GLP-1

GLP-1 is best known today for treating obesity, but the story stretches back more than a century. Scientists once observed that gut hormones, known as incretins, could trigger an immediate insulin release after a meal. Research led by Joel Habener and Svetlana Mojsov identified one such hormone in 1986. They found that GLP-1 comes from proglucagon, a precursor protein processed differently in the gut than in the pancreas.

GLP-1 itself is a peptide that lowers blood glucose. Lotte Knudsen later engineered a longer-acting version. That work led to today's drugs for type 2 diabetes and obesity. Habener, Mojsov, and Knudsen received the 2024 Albert Lasker Basic Medical Research Award for their combined contributions to GLP-1 research.

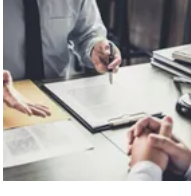
GLP-1 drugs increase insulin secretion, reduce glucagon secretion, and slow stomach emptying. Researchers are now studying their potential effects on heart disease, neurological conditions, and other health issues.

Years of Work, Now Paying Off

These five discoveries show how a single research question can lead to a treatment doctors can actually use. Some, like mRNA vaccines and CRISPR therapies, already help patients today. Others, including the porosome and AlphaFold, are still in early testing. Each traces back to scientists who spent years working on a scientific problem long before it became part of everyday medicine.

This article is for informational purposes only and does not substitute for professional medical advice. If you are seeking medical advice, diagnosis or treatment, please consult a medical professional or healthcare provider.

More from Contributor Content



Why Everyday Safety Habits Are Worth Building



Private Tech Valuations Are Breaking Records. What Does That Mean for Employees' Stock Options?



About	Support	Stay Connected	Our Portfolio
About Us	Contact Us	News Tips	Real Estate
Newsroom Staff	Help Center	Submitting letters to the editor	10BEST
Ethical Principles	Manage Account	Podcasts	USA TODAY Store
USA TODAY Network Style Guide	Give Feedback	Newsletters	Shopping
Responsible Disclosure	Get Home Delivery	Mobile Apps	Deals
Request a Correction	eNewspaper	Facebook	Cashback
Media Room	USA TODAY Shop	X	Best-selling Booklist
Accessibility	USA TODAY Print Editions	Instagram	Southern Kitchen
Sitemap	Licensing & Reprints	LinkedIn	Jobs
Subscription Terms & Conditions	Advertise Your Business	Threads	Sports Betting
Advertiser Acceptance Policy	Careers	YouTube	Sports Weekly
Terms of Service	Internships	Reddit	Studio Gannett
Privacy Policy	Support Local Business	Flipboard	Classifieds
Your Privacy Choices			Money Essentials
			Blueprint
			WITNESS (True Crime)
			Home Internet Services
			Branded Stories Hub