

The COVID vaccine race champion appears to be mRNA technology used by Pfizer and Moderna. Here's a primer

There are about a [dozen experimental vaccines](#) in late-stage clinical trials globally, but the ones being tested by Pfizer and Moderna are the only two that rely on messenger RNA.

For decades, scientists have dreamed about the seemingly endless possibilities of custom-made messenger RNA, or mRNA.

Researchers understood its role as a recipe book for the body's trillions of cells, but their efforts to expand the menu have come in fits and starts. The concept: By making precise tweaks to synthetic mRNA and injecting people with it, any cell in the body could be transformed into an on-demand drug factory.

But turning scientific promise into medical reality has been more difficult than many assumed. Although relatively easy and quick to produce compared to traditional vaccine-making, no mRNA vaccine or drug has ever won approval.

Even now, as Moderna and Pfizer test their vaccines on roughly 74,000 volunteers in pivotal vaccine studies, many experts question whether the technology is ready for prime time.

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Whether mRNA vaccines succeed or not, their path from a gleam in a scientist's eye to the brink of government approval has been a tale of personal perseverance, eureka moments in the lab, soaring expectations — and an unprecedented flow of cash into the biotech industry.

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