



Written by [Rebecca Terrell](#) on December 22, 2021

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Vaccine vs. Gene Therapy: Which Term Is Correct?

Forbes made unwelcome news recently by replacing one of its headlines: “Yes, The Vaccine Changes Your DNA. A Tiny Bit. That’s a Good Thing.” Though the body of the November 29 article remained unchanged, the writer, Johns Hopkins University biomedical engineering professor Steven Salzberg, decided to revise the headline a couple of hours after publication with a direct contradiction: “Covid Vaccines Don’t Alter Your DNA — They Help Choose Cells to Strengthen Your Immune Response.”



While Salzberg’s article does a good job explaining how all vaccines make small alterations to the DNA of certain immune cells, giving them a “way of ‘remembering’ how to fight off infections,” his *Forbes* foible nevertheless added fuel to public fears and growing controversy over what COVID jabs actually are. “Pretty sure I got fact-checked for saying this months ago. It’s fine, it’s just a little gene therapy,” wrote New Jersey gym owner Ian Smith, an outspoken opponent of COVID containment measures, when he posted the *Forbes* headline switch on Instagram.

Indeed, Salzberg’s slip gave traction to the term already in popular use. Podcasting giant Joe Rogan told his audience in August, “It’s not really a vaccine.... This is really gene therapy.” Conservative talk-radio host Steven Hotze, M.D. used the expression in a video posted last February on his website, calling COVID-19 shots “experimental gene therapy.”

So which term is correct: vaccine or gene therapy? The truth is, they are both inaccurate. First, COVID jabs are not vaccines in the traditional sense of the term, as even self-styled fact-checkers admit. “It’s true that mRNA vaccines are a major departure from traditional vaccines,” Dr. Amesh Adalja, a senior scholar at the Johns Hopkins Center for Health Security, told Politifact. Instead of containing weakened or inactive infectious organisms, he explained, “They contain just the genetic material of the gene of interest in the pathogen that codes for the protein needed for immunity.”

Though COVID jabs inject genetic information, they are fundamentally different from gene therapy, which involves modifying genes to treat or cure disease. The 2020 Elsevier textbook *Epidemiology of Endocrine Tumors* dedicates Chapter 23 to the topic, defining it as follows:

Gene therapy involves correcting defective genes that cause disease. The introduction of normal genes is performed, into the cell nuclei. This results in repair, enhancement, replacement or compensation for a gene mutation. Newer methods involve insertion of a new and completely functional gene into the cells, correcting a birth defect or genetic abnormality.

A 2017 PBS program, *The Gene Doctors*, described the promise of these revolutionary techniques,



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recounting the story of Molly Troxel, who at age 11 underwent gene therapy in a clinical trial to cure her congenital blindness and now enjoys the life of an ordinary teenager. The doctors interviewed in the program expressed hope of finding cures for other genetic diseases, such as cystic fibrosis and muscular dystrophy.

However, COVID shots are distinctly unlike gene therapy. In a September 2019 article on its website, the pharmaceutical company Moderna says its mRNA technology is “fundamentally different” from gene therapy because it “does not change the genetic information of the cell.” Instead, it uses messenger RNA (mRNA) to communicate instructions to the body’s cells for making proteins. It hopes the budding technology could one day help reverse rare genetic disorders.

The article also mentions “investigational mRNA vaccines,” one of which is mRNA-1273, rushed through clinical trials as part of the federal government’s \$18 billion taxpayer-funded Operation Warp Speed and granted FDA Emergency Use Authorization in December 2020.

Dr. Robert Malone, who developed the mRNA vaccine platform technology at the Salk Institute in 1988, described it during a July TrialSite News interview. “If you imagine a FedEx letter package,” he explained, “the letter inside is the RNA and the cardboard on the outside is lipids. It’s fats.” He says that the lipid “package” is designed to deliver the RNA “letter” into a cell, where the “RNA becomes available to be loaded onto the machinery that translates the RNA and makes protein.” The hope is that once cells manufacture the spike protein of SARS-CoV-2, the body’s immune system will then manufacture antibodies to the virus.

Pfizer’s vaccine works the same way, according to the University of Missouri Health Care website, but the Johnson & Johnson product differs slightly. It uses a common cold virus — adenovirus — instead of mRNA to deliver instructions for making the viral spike protein. The FDA has authorized Moderna, Pfizer, and Johnson & Johnson products for U.S. consumption.

Whether these vaccine platforms work is another debate, but it is clear that “gene therapy” is not the technically correct term for COVID shots, which use mRNA therapy or adenovirus therapy. However, gene therapy shares something in common with them: All three methods are new and innovative, and all have potential for disease treatment. It is unfortunate that the terms are now confused and demonized — yet another casualty of COVID-19.



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