Moderna sues BioNTech/Pfizer?

Bring popcorn and pull up a recliner. Here are the details that corporate media completely missed.

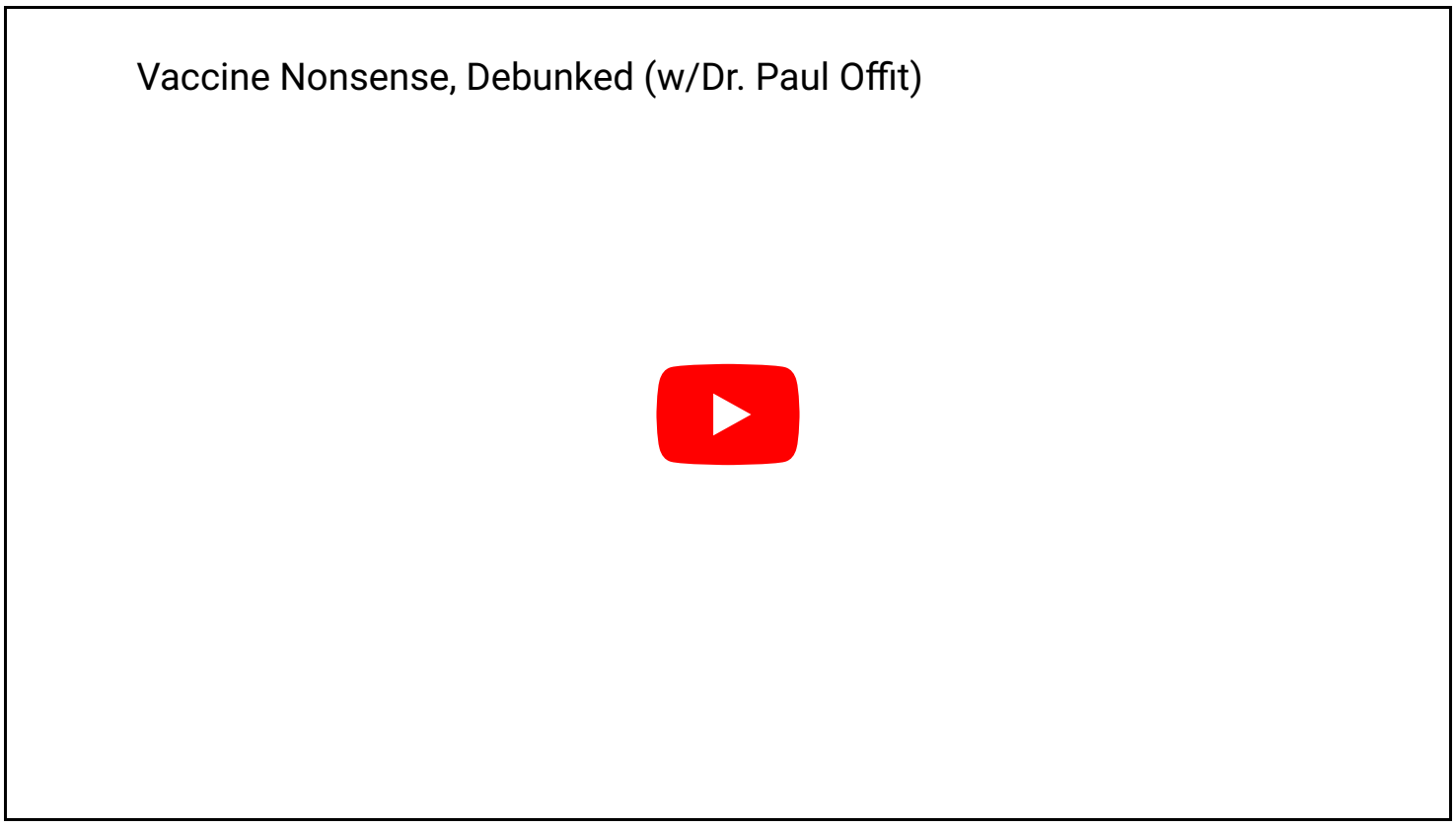
Robert W Malone MD, MS
Aug 26

Before I could even get one cup of coffee down the hatch this morning, I was hit with a barrage of emails, texts, and phone calls asking me for quotes concerning the press release issued by Moderna regarding their decision to sue BioNTech/Pfizer for patent infringement relating to the insanely profitable SARS-CoV-2 mRNA “vaccine” products marketed by BioNTech/Pfizer (“Comirnaty” - licensed but not actually marketed in the USA). What I had hoped to do today was put on my work clothes and go pick up the ditch trencher that I had reserved so that we can get fiber optic cable laid down between the various buildings that form our farm compound, including the new recording studio. And to try to finish editing on the book - “The lies my government told me and the better future coming”. But no, once again the tyranny of the urgent has ambushed me, and like a shakedown in a NY City alley, I must comply.

Let’s dive into this. I have done the diligence, reviewed the (amazingly superficial) press

coverage which has been printed on this topic, and have already responded to three different interview and statement requests. Hopefully, by putting my thoughts down in the form of a substack article, I can just refer future inquires to this analysis.

Among the many things I have learned about the corporate (and academic) press over the last three years it is how completely incompetent they are when it comes to being able to read and understand patents. This really became apparent during the concerted efforts made by corporate press, scientific press (including the NEJM), wikipedia editors, and U Penn/BioNTech seeking to claim that Kariko and Weissman came up with the invention , to Paul Offit making derisive statements in a podcast interview and in the New England Journal of Medicine. All of which intentionally and willfully disregard the nine issued patents (for which I am a co-inventor) which refute these claims. Note that Paul Offit, for example, is employed by the same university as Kariko and Weissman (UPenn), and for which patent UPenn receives quite significant patent royalty payments. This one by STAT news is particularly egregious. “Loose idea” - 9 issued US patents?



As a bit of background and context on this, it is useful to know that many organizations believe that, in order to obtain necessary recognition to be awarded a Nobel Prize (in medicine or chemistry), it is important to stage a press campaign to promote the discovery and associated scientists. The series of interviews and events leading up to the (unsuccessful) attempt to obtain the Nobel for Kariko and Weissman appear to have been an example of such a campaign, and since the issued patents directly contradicted those claims of original inventorship, for this reason alone it was necessary to demean and gaslight my contributions and to write me out of history, as was clearly attempted.

But back to the Moderna lawsuit. Let's take a moment to provide some key details relating to patent law, as there are a few things that one must understand to interpret the new claims being made by Moderna against BioNTech.

1. Just because a patent has been filed, successfully prosecuted, and issued by the US Patent and Trademark Office, that does not mean that the patent holder (or licensee) has the right to practice that patent. In short, the US PTO does not determine whether the inventor (or licensee) has "freedom to practice". In the case of the very many mRNA vaccine-related patents which have yet to expire, none have been granted broad claims to the core technology and idea of mRNA being used for vaccines. That is because the idea and the first demonstration ("reduction to practice") of the idea in a mammal was performed in 1989-1990, and is described in patents for which I am a named inventor. Those patents have now aged out, they are no longer able to be enforced (in a commercial sense), and so those ideas and technology are now "public domain" - in other words, everyone owns them. Moderna, BioNTech, Pfizer and CureVac are able to "practice" those inventions because the patents have expired. Not because they are the original inventors. If those patents had not expired, these companies would not be able to commercially practice them without a license to do so.
2. What BioNTech, Moderna, and CureVac currently hold, in terms of issued patents, are what is known as "derevitive" or downstream patents. That is to say that they have obtained patents for aspects which were not claimed in the original patents. These are largely "composition of matter" patents, which is to say that they have claimed specific chemical modifications or biologic sequences not claimed in the

claimed specific chemical modifications of biologic sequences not claimed in the original patents. Again, if those original patents had not yet expired, these companies could not "practice" these inventions without obtaining a license to practice the original inventions. They could still get their modifications patented, but could not use those modifications to produce a product. Only after the original patents expired were they free to make products using those original inventions. Merck and Vical essentially never developed mRNA vaccine technology further after I left Vical, but they were quite aggressive in keeping anyone else (including me) from doing so. As a side note, my only compensation (ever) for my contributions in this regard was one US (Susan B Anthony) dollar. So I have no financial dog in this fight. I just object to the slander, defamation, and active attempts to write me (and my contributions) out of history.

3. In filing a patent, if one fails to properly cite the prior literature (including previously issued or filed patents), then your patent can be readily invalidated. Likewise if you fail to include someone as an inventor who made a substantive contribution (even something relatively small) on the list of inventors. Fail to cite either prior relevant literature or contributing inventors is grounds for invalidation. As is listing someone as an inventor who did not make a substantial contribution. Furthermore, the order of author names on patents are irrelevant. From the point of view of patent law, all named inventors are considered equivalent, each are able to practice all aspects of the patent, and all must agree to an exclusive licensing agreement (or have signed agreements assigning their rights to someone else, such as their employer- which was my case).
4. The general rule of thumb in filing lawsuits for patent infringement (which lawsuits are EXTREMELY expensive to prosecute) is that one should wait to file until there is enough profit to make the effort worthwhile. Generally at a minimum a few million dollars, and usually this is rarely done unless there are hundreds of millions of dollars at stake. So, if you think that someone may have infringed on your patent, you wait in the shadows until the time is right.

So, now Moderna has decided that the time is right to seek damages from BioNTech and Pfizer for patent infringement on a few of its many patents.

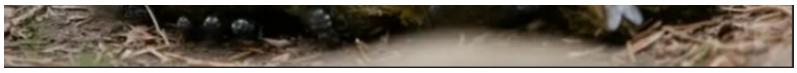
To provide additional context, there is apparently another lawsuit between NIH/NIAID/Vaccine Research Center and Moderna over who owns the rights to the specific vaccine which Moderna has sold to the US Government and throughout the world.

> (**Nature magazine**)
>
> **NEWS EXPLAINER**
>
> 30 November 2021
>
> **What the Moderna–NIH COVID vaccine patent fight means for research**
>
> **Collaborators are locked in a high-stakes dispute over which researchers should be named as inventors on a key vaccine patent application.**

There is also a lawsuit battle ongoing between the cationic lipid formulation companies which were spun out of the University of British Columbia - Arbutus and Alnylam, which some in Canada believe are owned to a significant extent by the family of Justin Trudeau.

And if that was not enough, there is this: Acuitas Therapeutics Sues Arbutus Biopharma Over mRNA-Delivery Patents

These patent infringement lawsuits have been filed against Moderna and Pfizer. Moderna is pursuing the "innovative" legal theory that even if it did infringe on these patents, the liability is held by the US Government, and so Arbutus and/or Alnylam will have to sue the US Government if they wish to recover damages. Details on this hot steaming mess can be found here.



Getting back to today's Moderna lawsuit-

Here is the legal filing, apparently filed today.

Here is the Moderna press release, made today.

Here are examples of the corporate press coverage (which is amazingly superficial), published today.

1: https://www.nytimes.com/2022/08/26/business/moderna-covid-vaccine-lawsuit.html

2: https://www.bbc.com/news/health-62691102?at_medium=RSS&at_campaign=KARANGA

3: https://www.nbcnews.com/health/health-news/moderna-sues-pfizer-biontech-alleging-patent-infringement-covid-vaccin-rcna44965

4: https://www.reuters.com/legal/moderna-sues-pfizerbiontech-patent-infringement-over-covid-vaccine-2022-08-26/

5: https://www.theverge.com/2022/8/26/23323082/moderna-lawsuit-pfizer-mrna-vaccine-patent

It is useful to start with quotes from the Moderna press release.

> **MODERNA SUES PFIZER AND BIONTECH FOR INFRINGING PATENTS CENTRAL TO MODERNA'S INNOVATIVE MRNA TECHNOLOGY PLATFORM**
>
> AUGUST, 26, 2022

This is the key section of the PR.

> **Pfizer and BioNTech Infringe Moderna's Patents**
>
> Moderna believes Pfizer and BioNTech copied two key features of Moderna's patented technologies which are critical to the success of mRNA vaccines. When COVID-19

> emerged, neither Pfizer nor BioNTech had Moderna's level of experience with developing mRNA vaccines for infectious diseases, and they knowingly followed Moderna's lead in developing their own vaccine.
>
> First, Pfizer and BioNTech took four different vaccine candidates into clinical testing, which included options that would have steered clear of Moderna's innovative path. Pfizer and BioNTech, however, ultimately decided to proceed with a vaccine that has the same exact mRNA chemical modification to its vaccine as Spikevax®. Moderna scientists began developing this chemical modification that avoids provoking an undesirable immune response when mRNA is introduced into the body in 2010 and were the first to validate it in human trials in 2015.
>
> Second, and again despite having many different options, Pfizer and BioNTech copied Moderna's approach to encode for the full-length spike protein in a lipid nanoparticle formulation for a coronavirus. Moderna scientists developed this approach when they created a vaccine for the coronavirus that causes Middle East Respiratory Syndrome (MERS) years before COVID-19 first emerged.
>
> None of the patent rights which Moderna is seeking to enforce relate to any intellectual property generated during Moderna's collaboration with the National Institutes of Health to combat COVID-19. That collaboration began only after the patented technologies at issue here were proven successful in clinical trials in 2015 and 2016.

Breaking this down, Moderna is asserting that it has patent rights relating to both broad fundamental composition of the mRNA as a (modified) chemical structure, and to the use of any full length coronavirus spike protein in a lipid nanoparticle formulation for a coronavirus (vaccine).

To sort this out, one needs to review the actual patents involved in the claims (something that the corporate press is apparently incapable of doing). Which patents? Turning to the actual filed lawsuit, we find this key details summarized beginning on on page 15 of 39.

MODERNA'S PATENTS

54. The success of Spikevax® is a result of the groundbreaking innovations that

Moderna made in the years before COVID-19 first emerged. Moderna has sought to protect its substantial investment in research and development by obtaining patents that cover its inventions. Three of those patents are at issue here: U.S. Patent Nos. 10,898,574 (the "'574 patent"), 10,702,600 (the "'600 patent"), and 10,933,127 (the "'127 patent") (collectively, the "Asserted Patents").

US Patent 10,898,574 can be found here and here

US Patent 10,702,600 can be found here and here

US Patent 10,933,127 can be found here and here

Beginning with US Patent #10,898,574

Delivery and formulation of engineered nucleic acids

Mar 21, 2018 - ModernaTX, Inc.

> Provided are formulations, compositions and methods for delivering biological moieties such as modified nucleic acids into cells to modulate protein expression. Such compositions and methods include the delivery of biological moieties, and are useful for production of proteins.

Reading through this one, what strikes me is the following

1. This patent makes no claims concerning applications or field of use (such as mRNA vaccination), but only regarding composition of matter (engineered nucleic acids). It does claim the use of pseudouridine. Neither Kariko nor Weissman are listed as inventors, and yet they claim to have been the ones to pioneer use of pseudouridine, and the key Kariko publication seems to pre-date this patent. So, someone is "misrepresenting" this invention record here. As Kariko is employed by both U Penn (as faculty) and BioNTech (as a VP), it is either U Penn, BioNTech, or Moderna that have misrepresented their inventorship in this matter

that have misrepresented their inventorship in this matter.

2. This patent is a derivative of prior submissions, so it has a filing priority date of Mar. 31, 2011.
3. Kariko first paper involving use of pseudouridine to reduce inflammatory response to administered mRNA was published in 2008, which significantly predates the priority date for this patent. Priority dates for my patents are all 1989, and they absolutely describe engineered nucleic acids and chemical modifications which increase stability, in addition to their use for mRNA vaccines. So there is that.
4. This patent fails to cite the relevant prior publications (by myself) and patents (issued to Vical) which cover this topic area. Failure to cite relevant prior art makes this patent susceptible to invalidation, and in my opinion that legal theory should be prosecuted. It is my opinion that, for this reason alone, this patent is not valid.
5. This patent acknowledges the prior work of Kariko which predates the submission priority date for this patent. I am unclear why the claims concerning the use of pseudouridine in this patent have issued. By virtue of that prior work of Kariko, these claims in the current patent appear to be self evident to anyone skilled in the field, and in my opinion should not have issued.
6. The prior patents of Malone et al concerning mRNA delivery and vaccines, in addition to my prior publications and public disclosures clearly indicate chemical modifications to RNA necessary and sufficient to enable higher levels of expression, and may also invalidate aspects of this patent, but as mentioned above were not cited in the listed references or body of the application, and so were apparently not reviewed by the patent examiner. This could also provide an avenue for a legal theory that could support invalidation.

Moving on to US Patent #10,702,600

Betacoronavirus mRNA vaccine

Feb 28, 2020 - ModernaTX, Inc.

> The disclosure relates to respiratory virus ribonucleic acid (RNA) vaccines and combination vaccines, as well as methods of using the vaccines and compositions

> comprising the vaccines.

This one has an original priority (filing) date of Oct. 22, 2015

As before, there is a complete failure to cite the prior art involving my contributions, papers, public disclosures and patents.

This one is focused on respiratory RNA virus vaccine applications, of which betacoronavirus vaccines are one example, and completely neglects to mention influenza - presumably because the original Vical work and issued patent claims (which the patent fails to cite) involved the most important of the RNA respiratory viruses - influenza.

This language is a pretty blatant ripoff of the prior Vical patent claims:

> **SUMMARY**
>
> Provided herein are ribonucleic acid (RNA) vaccines that build on the knowledge that RNA (e.g., messenger RNA (mRNA)) can safely direct the body's cellular machinery to produce nearly any protein of interest, from native proteins to antibodies and other entirely novel protein constructs that can have therapeutic activity inside and outside of cells. The RNA (e.g., mRNA) vaccines of the present disclosure may be used to induce a balanced immune response against hMPV, PIV, RSV, MeV, and/or BetaCoV (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH and/or HCoV-HKU1), or any combination of two or more of the foregoing viruses, comprising both cellular and humoral immunity, without risking the possibility of insertional mutagenesis, for example. hMPV, PIV, RSV, MeV, BetaCoV (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH and HCoV-HKU1) and combinations thereof are referred to herein as “respiratory viruses.” Thus, the term “respiratory virus RNA vaccines” encompasses hMPV RNA vaccines, PIV RNA vaccines, RSV RNA vaccines, MeV RNA vaccines, BetaCoV RNA vaccines, and any combination of two or more of hMPV RNA vaccines, PIV RNA vaccines, RSV RNA vaccines, MeV RNA vaccines, and BetaCoV RNA vaccines.
>
> The RNA (e.g., mRNA) vaccines may be utilized in various settings depending on the

prevalence of the infection or the degree or level of unmet medical need. The RNA (e.g. mRNA) vaccines may be utilized to treat and/or prevent a hMPV, PIV, RSV, MeV, a BetaCoV (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH, HCoV-HKU1), or any combination of two or more of the foregoing viruses, of various genotypes, strains, and isolates. The RNA (e.g., mRNA) vaccines have superior properties in that they produce much larger antibody titers and produce responses earlier than commercially available anti-viral therapeutic treatments. While not wishing to be bound by theory, it is believed that the RNA (e.g., mRNA) vaccines, as mRNA polynucleotides, are better designed to produce the appropriate protein conformation upon translation as the RNA (e.g., mRNA) vaccines co-opt natural cellular machinery. Unlike traditional vaccines, which are manufactured ex vivo and may trigger unwanted cellular responses, RNA (e.g., mRNA) vaccines are presented to the cellular system in a more native fashion.

BetaCoV

In some embodiments, a RNA (e.g., mRNA) vaccine comprises at least one RNA (e.g., mRNA) polynucleotide having an open reading frame encoding at least one BetaCoV antigenic polypeptide. In some embodiments, the BetaCoV is MERS-CoV. In some embodiments, the BetaCoV is SARS-CoV. In some embodiments, the BetaCoV is HCoV-OC43. In some embodiments, the BetaCoV is HCoV-229E. In some embodiments, the BetaCoV is HCoV-NL63. In some embodiments, the BetaCoV is HCoV-HKU1. In some embodiments, at least one antigenic polypeptide is a betacoronavirus structural protein. For example, a betacoronavirus structural protein may be spike protein (S), envelope protein (E), nucleocapsid protein (N), membrane protein (M) or an immunogenic fragment thereof. In some embodiments, a betacoronavirus structural protein is a spike protein (S). In some embodiments, a betacoronavirus structural protein is a S1 subunit or a S2 subunit of spike protein (S) or an immunogenic fragment thereof.

BetaCoV RNA (e.g., mRNA) polynucleotides of the vaccines provided herein may encode viral protein components of betacoronaviruses, for example, accessory proteins, replicase proteins and the like are encompassed by the present disclosure. RNA (e.g., mRNA) vaccines may include RNA polynucleotides encoding at least one accessory

protein (e.g., protein 3, protein 4a, protein 4b, protein 5), at least one replicase protein (e.g., protein 1a, protein 1b), or a combination of at least one accessory protein and at least one replicase protein. The present disclosure also encompasses RNA (e.g., mRNA) vaccines comprising RNA (e.g., mRNA) polynucleotides encoding an accessory protein and/or a replicase protein in combination with at least one structural protein. Due to their surface expression properties, vaccines featuring RNA polynucleotides encoding structural proteins are believed to have preferred immunogenic activity and, hence, may be most suitable for use in the vaccines of the present disclosure.

Some embodiments of the present disclosure provide betacoronavirus (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH, HCoV-HKU1 or a combination thereof) vaccines that include at least one RNA (e.g., mRNA) polynucleotide having an open reading frame encoding at least one betacoronavirus (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH, HCoV-HKU1) antigenic polypeptide. Also provided herein are pan-betacoronavirus vaccines. Thus, a betacoronavirus vaccine comprising a RNA (e.g., mRNA) polynucleotide having an open reading frame encoding any one, two, three or four of MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, and HCoV-HKU1, for example, may be effective against any one of, any combination of, or all of, MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH and HCoV-HKU1. Other betacoronaviruses are encompassed by the present disclosure.

In some embodiments, at least one antigenic polypeptide is a MERS-CoV structural protein. For example, a MERS-CoV structural protein may be spike protein (S), envelope protein (E), nucleocapsid protein (N), membrane protein (M) or an immunogenic fragment thereof. In some embodiments, the MERS-CoV structural protein is a spike protein (S) (see, e.g., Coleman C M et al. *Vaccine* 2014; 32:3169-74, incorporated herein by reference). In some embodiments, the MERS-CoV structural protein is a S1 subunit or a S2 subunit of spike protein (S) or an immunogenic fragment thereof (Li J et al. *Viral Immunol* 2013; 26(2):126-32; He Y et al. *Biochem Biophys Res Commun* 2004; 324(2):773-81, each of which is incorporated herein by reference).

In some embodiments, at least one MERS-CoV antigenic polypeptide comprises an

> amino acid sequence identified by any one of SEQ ID NO: 24-28 or 33 (Table 11). In some embodiments, the amino acid sequence of the MERS-CoV antigenic polypeptide is, or is a fragment of, or is a homolog or variant having at least 80% (e.g., 85%, 90%, 95%, 98%, 99%) identity to, the amino acid sequence identified by any one of SEQ ID NO: 24-28 or 33 (Table 11).
>
> In some embodiments, at least one MERS-CoV antigenic polypeptide is encoded by a nucleic acid sequence identified by any one of SEQ ID NO: 20-23 (Table 10).
>
> In some embodiments, at least one MERS-CoV RNA (e.g., mRNA) polynucleotide is encoded by a nucleic acid sequence, or a fragment of a nucleotide sequence, identified by any one of SEQ ID NO: 20-23 (Table 10). In some embodiments, at least one MERS-CoV RNA (e.g., mRNA) polynucleotide comprises a nucleic acid sequence, or a fragment of a nucleotide sequence, identified by any one of SEQ ID NO: 65-68 (Table 10).
>
> In some embodiments, at least one antigenic polypeptide is obtained from MERS-CoV strain Riyadh_14_2013, 2cEMC/2012, or Hasa_1_2013.
>
> In some embodiments, at least one antigenic polypeptide is a SARS-CoV structural protein. For example, a SARS-CoV structural protein may be spike protein (S), envelope protein (E), nucleocapsid protein (N), membrane protein (M) or an immunogenic fragment thereof. In some embodiments, the SARS-CoV structural protein is a spike protein (S). In some embodiments, the SARS-CoV structural protein is a S1 subunit or a S2 subunit of spike protein (S) or an immunogenic fragment thereof.

Moderna appears to be asserting that this patent also establishes rights to use any coronavirus spike protein or spike protein subunit. Even ones that were unknown at the time it was filed and issued.

Moving on to the third patent which Moderna asserts BioNTech has infringed:

US Patent #10,933,127

Betacoronavirus mRNA vaccine

May 21, 2020 - ModernaTX, Inc.

> The disclosure relates to respiratory virus ribonucleic acid (RNA) vaccines and combination vaccines, as well as methods of using the vaccines and compositions comprising the vaccines.

The priority filing date on this one appears to date back to Oct. 22, 2015

> **SUMMARY**
>
> Provided herein are ribonucleic acid (RNA) vaccines that build on the knowledge that RNA (e.g., messenger RNA (mRNA)) can safely direct the body's cellular machinery to produce nearly any protein of interest, from native proteins to antibodies and other entirely novel protein constructs that can have therapeutic activity inside and outside of cells. The RNA (e.g., mRNA) vaccines of the present disclosure may be used to induce a balanced immune response against hMPV, PIV, RSV, MeV, and/or BetaCoV (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH and/or HCoV-HKU1), or any combination of two or more of the foregoing viruses, comprising both cellular and humoral immunity, without risking the possibility of insertional mutagenesis, for example. hMPV, PIV, RSV, MeV, BetaCoV (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH and HCoV-HKU1) and combinations thereof are referred to herein as “respiratory viruses.” Thus, the term “respiratory virus RNA vaccines” encompasses hMPV RNA vaccines, PIV RNA vaccines, RSV RNA vaccines, MeV RNA vaccines, BetaCoV RNA vaccines, and any combination of two or more of hMPV RNA vaccines, PIV RNA vaccines, RSV RNA vaccines, MeV RNA vaccines, and BetaCoV RNA vaccines.
>
> The RNA (e.g., mRNA) vaccines may be utilized in various settings depending on the prevalence of the infection or the degree or level of unmet medical need. The RNA (e.g. mRNA) vaccines may be utilized to treat and/or prevent a hMPV, PIV, RSV, MeV, a BetaCoV (e.g., MERS-CoV, SARS-CoV, HCoV-OC43, HCoV-229E, HCoV-NL63, HCoV-NL, HCoV-NH, HCoV-HKU1), or any combination of two or more of the foregoing viruses, of various genotypes, strains, and isolates. The RNA (e.g., mRNA) vaccines have

> superior properties in that they produce much larger antibody titers and produce responses earlier than commercially available anti-viral therapeutic treatments. While not wishing to be bound by theory, it is believed that the RNA (e.g., mRNA) vaccines, as mRNA polynucleotides, are better designed to produce the appropriate protein conformation upon translation as the RNA (e.g., mRNA) vaccines co-opt natural cellular machinery. Unlike traditional vaccines, which are manufactured ex vivo and may trigger unwanted cellular responses, RNA (e.g., mRNA) vaccines are presented to the cellular system in a more native fashion.
>
> In some aspects the invention is a respiratory virus vaccine, comprising at least one RNA polynucleotide having an open reading frame encoding at least one respiratory virus antigenic polypeptide, formulated in a cationic lipid nanoparticle.

Sound familiar?

This one is closely related to the prior. At first glance, I am not able to find a clear difference between the two, but it must be there somewhere.

Once again, a complete failure to cite my publications and prior patents.

Based on my experience, all three of these patents can be readily invalidated due to the failure to cite relevant prior art. To repeat, I have no financial interests here. But the work that I did and the relevant patents that I am a co-author on (which Moderna conspicuously fails to cite) are now in the public domain. They belong to everyone, not to Moderna, or to CureVac, or to BioNTech. And this may explain part of why there has been such an effort to write me out of history. Not only because some seek the Nobel Prize, but also because the intellectual property patent positions of some very profitable companies may become at risk if those contributions are acknowledged.

And those contributions are increasingly being recognized, despite the concerted efforts of many to deny them.

see

- Patents

- Published: 13 July 2022

PATENTS

The COVID-19 vaccine patent race

- Ulrich Storz

Nature Biotechnology **volume 40**, pages1001–1004 (2022)

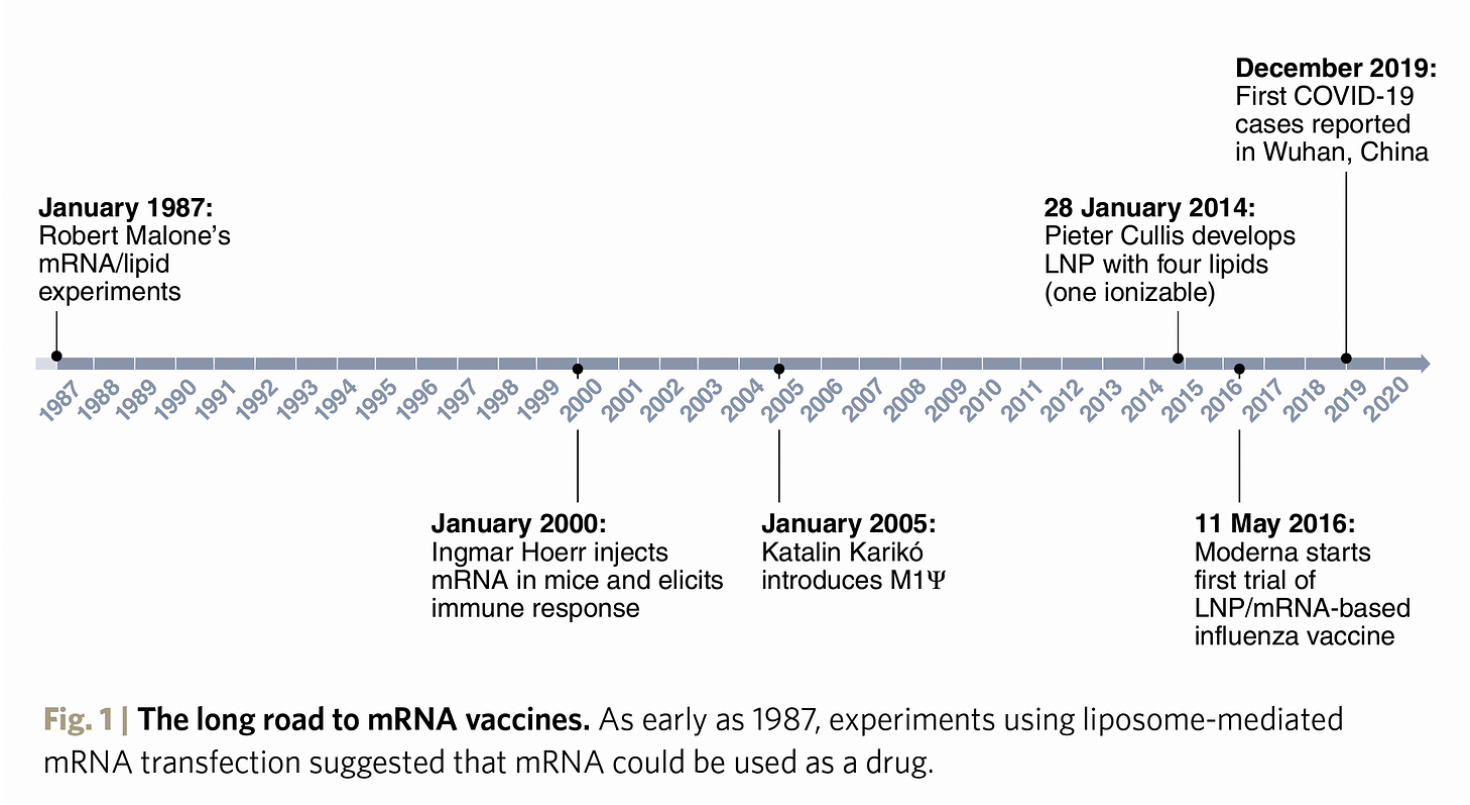


Fig. 1 | The long road to mRNA vaccines. As early as 1987, experiments using liposome-mediated mRNA transfection suggested that mRNA could be used as a drug.

Note: Dr. J. Glasspool-Malone contacted Nature Biotechnology about a month ago and complained about the figure above as it does not mention the 9 issued patents that demonstrate proof or principle experiments demonstrating that mRNA vaccines had already been conducted - including experiments conducted in animals. Nature Biotechnology has agree to change the above figure to include those patents/experiments.

However, they have skirted the issue of actually changing the text in the article to reflect the prior art, which they somehow managed to miss in their patent review.