TWN
Third World Network
www.twn.my

TWN Series on Intellectual Property and COVID-19 Vaccines

1

June 2020

Note

This is the first in a series of short reports on the impacts of intellectual property on access to COVID-19 vaccines. At this early stage of response to the pandemic (June 2020), there are many candidate vaccines. Though none of them has been proven effective, unapproved vaccines are receiving massive public funding and entering into commercial-scale production. Countries, particularly wealthy ones, are buying hundreds of millions of doses of these candidate vaccines in the hopes that they will later be proven to work.

Many of the more than 150 vaccine candidates will fail at this time, and nobody can say which. Vaccines might fail because they simply do not protect, or because they rely on new technologies never before used in approved human vaccines that ultimately do not work, or because they cannot be manufactured and finished at sufficient speed, scale and stability.

A possible early result is that some of the first vaccines will prove to be partially effective. That is, they may reduce the incidence of severe COVID-19 cases, but not stop transmission of the virus altogether or impart lengthy immunity. Partially effective vaccines would have limited benefits and may come into use sooner than fully effective ones. This is particularly true if SARS-CoV2 strains emerge with significant mutations that require changes to vaccine design. Many people may then eventually take more than one COVID-19 vaccine before the pandemic is over, and the first vaccines over the "finish line" of regulatory approval may not ultimately be the vaccines that are most important for ending the pandemic.

Over the course of the coming year, trial results and other factors will reduce the large field of candidates to a smaller number. For now, however, as nobody knows which candidates will work best, candidates from dozens of established companies and technically proficient startups must presently be regarded as having potential for widespread use. Each of these vaccines has been developed and will be made in a different intellectual property environment. This irregular series will focus on how intellectual property – patents and trade secrets – is impacting the development, testing, manufacturing and availability of COVID-19 vaccines.

Lawsuit reveals intellectual property is holding back production of CEPI- and Gates Foundation-funded COVID-19 vaccine candidate

Edward Hammond

A row has broken out between the COVID-19 vaccine company Inovio and VGXI, the biologics manufacturer that Inovio hired to make the first batches of its candidate vaccine. The fight centres on intellectual property related to manufacturing the DNA plasmids that are the basis of Inovio's vaccine.

Court records from the suit that Inovio filed in early June in Pennsylvania (USA) courts reveal that Inovio does not control the intellectual property needed to produce its vaccine. VGXI, the company that does, is refusing to transfer its trade secrets to other potential vaccine producers that could make Inovio's vaccine in greater quantity.

Third World Network (TWN) is an independent non-profit international research and advocacy organisation involved in bringing about a greater articulation of the needs, aspirations and rights of the peoples in the South and in promoting just, equitable and ecological development.

Address: 131 Jalan Macalister, 10400 Penang, MALAYSIA **Tel:** 60-4-2266728/2266159 **Fax:** 60-4-2264505
Email: twn@twnetwork.org **Website:** www.twn.my

The dispute reveals disturbing details about Inovio's capability limitations and wildly optimistic production estimates, as well as how proprietary manufacturing techniques – protected by trade secrets – may impact COVID-19 vaccine production. Numerous other candidate COVID-19 vaccines rely on relatively new technologies that have not been widely deployed before, and whose use may be similarly constrained by trade secrets or by patents.

Because VGXI has refused Inovio's request to transfer its trade secrets to third parties, Inovio accuses it of nothing less than "holding the vaccine and world health hostage" by "causing delays getting [the vaccine] to people around the world who desperately need it."[1]

VGXI, which is owned by South Korea's GeneOne Life Science, counters that Inovio is "try[ing] to take VGXI's intellectual property."[2] VGXI rejects Inovio's charges of "irreparable harm" as "speculative," and notes that Inovio has not developed any products that have achieved regulatory approval.[3]

Backed by the Gates Foundation[4] and the Coalition for Epidemic Preparedness Initiative (CEPI),[5] Inovio has announced aggressive production targets for its COVID-19 vaccine candidate, called INO-4800, which is in Phase 1 human testing. The company has said that its goal is to make one million doses by the end of 2020, up to 100 million doses by the end of 2021, and hundreds of millions of doses per year thereafter.

But – like many other biotech companies in the COVID vaccine race – Inovio is not capable of making its own vaccines at scale. VGXI is the only manufacturer that has actually produced Inovio's vaccine to date, and it is VGXI that owns the intellectual property necessary to do so.

But VGXI does not have the capacity to meet Inovio's production targets. Though it grandiosely describes itself as "the largest pure-play cGMP DNA plasmid manufacturing facility in the world," according to Inovio's court filings, VGXI actually uses a relatively small 400-litre bioreactor[6] to produce Inovio's product. The 400-litre process yields 26,000 to 29,000 doses every run, and each run takes two weeks.

Thus, even operating at full tilt, VGXI is only capable of making about 725,000 doses a year of Inovio's vaccine (27,500 x 26 runs). But Inovio is not VGXI's only business partner, and VGXI's facilities are also booked by other companies. To obtain just two production runs on the VGXI bioreactor in 2020, Inovio had to give up plans to produce a candidate HIV drug this year. The two runs at VGXI's Texas (USA) facility netted about 55,000 doses, enough for clinical trials, but little more.

Frustrated by its inability to expand production at VGXI, Inovio signed deals with two other contract manufacturers, Richter-Helm of Hamburg, Germany, and Ology Bioservices of Alachua, Florida (USA).

Richter-Helm was in a prime position, according to Inovio, because it had already received VGXI's "documentation package" (i.e., trade secrets) in a previous deal involving a different Inovio vaccine candidate. Confusingly, VGXI denies this, and says it transferred its technology to Richter for different reasons.[7]

---

1 Plaintiff's Petition for a Preliminary Injunction. Court of Common Pleas of Montgomery County (Pennsylvania). Case 2020-06554.

2 https://vgxii.com/vgxis-statement-on-the-recent-litigation-involving-inovio-pharmaceuticals-inc-inovio-in-pennsylvania-state-court/

3 Defendant VGXI Inc's and GeneOne Life Science Inc's Response to the Plaintiff Inovio Pharmaceuticals's Petition for Preliminary Injunction. Court of Common Pleas of Montgomery County (Pennsylvania). Case 2020-06554.

4 http://ir.inovio.com/news-releases/news-releases-details/2020/INOVIO-Receives-New-5-Million-Grant-to-Accelerate-Scale-Up-of-Smart-Delivery-Device-for-Its-COVID-19-Vaccine/default.aspx

5 http://ir.inovio.com/news-releases/news-releases-details/2020/INOVIO-Expands-Manufacturing-of-COVID-19-DNA-Vaccine-INO-4800-With-New-Funding-from-CEPI/default.aspx

6 By way of comparison, Johnson & Johnson and some other larger vaccine makers are making their candidates in multiple lines of 2,000 litres each.

7 Defendant VGXI Inc's and GeneOne Life Science Inc's Response to the Plaintiff Inovio Pharmaceuticals's Petition for Preliminary Injunction. Case 2020-06554.

But Richter-Helm is not terribly larger than VGXI. Richter-Helm has capacity available to run five batches of INO-4800 in 2020 in its 1,500-litre fermenter. Using VGXI's process, yield for each Richter batch is anticipated to be about 100,000 doses. Thus, even with optimistic assumptions, Richter can only produce a half-million doses by the end of 2020,[8] still leaving Inovio far short of its target and no public prospect of improvement to the massive levels of production that the company says it aims for.

Inovio then demanded that VGXI transfer its intellectual property to Ology Bioservices, the third contract manufacturer, to enable that company to make Inovio's vaccine. VGXI refused Inovio's request, leaving Ology at least temporarily unable to make INO-4800.

Inovio has denounced VGXI, and argues to the Pennsylvania judge that VGXI should be forced to transfer its trade secrets immediately; "because VGXI refuses to provide the Technology Transfer, Ology and other manufacturers must set up the manufacturing process from scratch, a process that can take months, or even years, with a DNA vaccine."

Thus, so long as VGXI refuses to transfer its intellectual property, unless the court orders VGXI to hand over its manufacturing secrets, there is no visible path for Inovio to remotely reach its stated manufacturing goals in a reasonable timeframe. The problem is not manufacturing capacity – there are a variety of contract manufacturers – but rather access to VGXI's process intellectual property.

Inovio's suit against its erstwhile friend VGXI shows a particular vulnerability of vaccine manufacturing to intellectual property-related problems. While Inovio can design a vaccine on a computer – in only three hours, its employees have repeatedly boasted to the news media[9] [10] – it does not have the know-how to manufacture complex DNA plasmids in sufficient quantity for clinical trials, much less make the bulk quantities required to fill large commercial orders.

Trade secrets and other intellectual property related to manufacturing vaccines are poorly understood outside the industry, which is secretive about details. Inovio, for example, attempted to keep its suit against VGXI secret.[11] This is particularly the case for COVID-19 vaccines because many candidates rely on unproven or novel manufacturing techniques for human vaccines.

That some vaccine companies lack the capacity to manufacture their own vaccines may surprise some. But Inovio is far from alone in promoting a candidate while having little to no means of manufacturing it. For example, Novavax's NVX-CoV2373 virus-like particle has received about $450 million from CEPI and the US Defense Department. But Novavax sold its manufacturing base several years ago and only recently re-acquired production capacity – with funds from CEPI – that it now must adapt to its process.

Similarly, Moderna, whose widely publicized candidate mRNA-1273 has also received over $450m in US government funding, has only a tiny in-house production capacity relative to pandemic demand and, according to filings with the US Securities and Exchange Commission, has experienced problems scaling up production of its novel vaccine to commercial quantities.[12]

Both companies, like Inovio, are scrambling to be able to produce vaccines at a large scale. And in both of the additional cases, the novel structures of their vaccines mean that production experience is limited and know-how is concentrated in a few hands, and may be proprietary. For example, Swiss contract manufacturing giant Lonza, which makes vaccines, medicines and other therapeutics around the world, boasts of its portfolio of over 2,600 patents in force.[13]

---

8 Plaintiff's Petition for a Preliminary Injunction. Case 2020-06554.

9 https://www.cbsnews.com/news/coronavirus-vaccine-san-diego-lab-inovio-pharmaceuticals-discovered-drug-testing/

10 https://www.kpbs.org/news/2020/jun/16/san-diego-lab-making-coronavirus-vaccine-facing-la/

11 Motion by Inovio Pharmaceuticals for leave to file under seal. Case 2020-06554.

12 Moderna 10K, 27 February 2020.

13 See: https://www.lonza.com/company-overview/strategy/intellectual-property

The fight over trade secrets between Inovio and VGXI is likely only the first to come to light as vaccine companies, the large majority of which are dependent on outside manufacturing, seek to arrange for, and scale up, production of COVID-19 vaccines. These barriers may delay production of a vaccine – as is already the case with Inovio – and lead to more expensive and difficult-to-produce vaccines due to intellectual property-protected proprietary manufacturing platforms.

Edward Hammond *directs Prickly Research (www.pricklyresearch.com), a research and writing consultancy based in Austin, Texas, USA. He has worked on biodiversity and infectious disease issues since 1994. From 1999 to 2008, Hammond directed the Sunshine Project, an international non-governmental organization specializing in biological weapons control. Hammond was Programme Officer for the Rural Advancement Foundation International (now the ETC Group) from 1995 to 1999. He holds MS and MA degrees from the University of Texas at Austin, where he was an Inter-American Foundation Masters Fellow.*