

KEI Research Note 2020:4 Regeneron failed to disclose BARDA funding in their REGN-COV2 patent

Luis Gil Abinader
luis.gil.abinader@keionline.org
October 20, 2020

1. Summary	1
2. BARDA funds 80 percent of the R&D related to Regeneron's COVID-19 program	2
3. BARDA-funded research led to REGN-COV2	3
4. Regeneron failed to disclose BARDA funding in a REGN-COV2 patent	4
5. Failing to disclose BARDA funding in patents is a contractual violation	6
6. Bayh-Dole Act and other regulations also require disclosures of U.S. government support	7

1. Summary

Regeneron Pharmaceuticals failed to disclose U.S. government funding in a patent that claims antibodies against COVID-19. The obligation to acknowledge U.S. government funding in patents is required under an existing contract between Regeneron and the Biomedical Advanced Research and Development Authority (BARDA), as well as the Bayh-Dole Act and regulations issued by the United States Patent and Trademark Office (USPTO). This research note explains the failure to follow those provisions, focusing on funding from BARDA.

BARDA and Regeneron have an existing collaboration to discover, research, develop, and manufacture antibodies against a number of diseases. On January 31, 2020, this collaboration was expanded to include research relating to COVID-19. With this expansion BARDA awarded a base amount of \$82,368,277 to Regeneron, with an upper limit of \$365,610,816.

Regeneron screened several antibodies and selected two that became their REGN-COV2 cocktail, a COVID-19 treatment candidate. The research leading to the selection of these antibodies was funded by BARDA. BARDA's role in funding this research is established by (1) acknowledgements in two *Science* papers relating to these antibodies, (2) press releases, (3) forms filed by Regeneron with the Securities Exchange Commission (SEC), and (4) an update currently available on [medicalcountermeasures.gov](https://www.medicalcountermeasures.gov), BARDA's website.

REGN-COV2 is claimed in a patent recently issued by the USPTO. This patent names several co-inventors working in-house at Regeneron. Almost all of them are also co-authors of the *Science* papers that describe the REGN-COV2 antibody cocktail for the treatment of COVID-19 and acknowledged BARDA funding. The *Science* acknowledgements show that their work

relating to COVID-19 treatments, including the patented antibodies, was funded by BARDA. While these scientists acknowledged U.S. government funding in the respective papers, they failed to disclose BARDA funding in the patent that covers the same invention. This failure to disclose BARDA funding in patents constitutes a contractual obligation.

2. BARDA funds 80 percent of the R&D related to Regeneron's COVID-19 program

Regeneron has told their investors that the BARDA “is obligated to fund 80% of our costs incurred for certain research and development activities related to COVID-19 treatments.”¹ This commitment stems from the expansion of an existing contract with BARDA known as “HHSO100201700020C”.² Contract HHSO100201700020C was first established on September 29, 2017 to discover, research, develop, and manufacture antibody treatments against Ebola, Influenza, and other pathogens.³ On January 31, 2020, BARDA and Regeneron expanded their collaboration under the HHSO100201700020C contract to include work relating to antibodies against COVID-19.⁴

According to BARDA, the base amount awarded to Regeneron under their collaboration specifically for work related to antibodies against COVID-19 was \$82,368,277.⁵ Since then, Regeneron has further expanded their collaboration with the U.S. government. On July 7, 2020, the Department of Defense, through an intermediary called Advanced Technology International, awarded a \$450 million contract to Regeneron, to manufacture and supply REGN-COV2.⁶ The extent to which costs are shared under the \$450 million contract is unknown.

As we explain in this report, the research leading to the selection of the two antibodies that comprise the REGN-COV2 cocktail was funded with the HHSO100201700020C contract.

¹ <https://www.sec.gov/Archives/edgar/data/872589/000180422020000011/regn-033120x10q.htm>

² KEI obtained a copy of this contract via FOIA request. See <https://www.keionline.org/contracts>

³ <https://investor.regeneron.com/news-releases/news-release-details/regeneron-announces-new-collaborations-hhs-develop-antibodies>

⁴ <https://investor.regeneron.com/news-releases/news-release-details/regeneron-announces-expanded-collaboration-hhs-develop-antibody>

⁵ <https://www.medicalcountermeasures.gov/app/barda/coronavirus/COVID19.aspx>

⁶ <https://investor.regeneron.com/node/24031/html>. The \$450 million Regeneron contract is listed as an awarded agreement at the Medical CBRN Defense Consortium (MCDC) website. MCDC is a consortium organized to support “advanced development efforts to support the Department of Defense’s (DoD) medical pharmaceutical and diagnostic requirements as related to enhancing the mission effectiveness of military personnel.” <https://www.medcbrn.org/about-mcdc/>. It has been used by Operation Warp Speed to enter into COVID-19 R&D and procurement agreements.

3. BARDA-funded research led to REGN-COV2

The evidence establishing that REGN-COV2 was funded under the HHSO100201700020C contract between Regeneron and BARDA derives from (1) acknowledgements in two *Science* papers reporting the selection of the antibodies that integrate this cocktail, (2) press releases, (3) forms filed by Regeneron with the Securities Exchange Commission (SEC), and (4) an update currently available on medicalcountermeasures.gov.

REGN-COV2 was first described in two papers recently published in *Science*. One of them, from August 21, 2020, reported an effort “to generate antibodies against the spike protein of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).”⁷ The co-authors explained that “[a] prospective goal of [their] effort was to identify highly potent individual antibodies that could be paired in a therapeutic antibody cocktail, aiming to decrease the potential for decreased efficacy caused by variants arising as the pandemic spreads or by virus escape mutants that might be selected for in response to pressure from a single-antibody treatment.”⁸ The paper describes a number of antibodies selected as a result of those efforts, and some of their characteristics. Two of these antibodies were REGN10933 and REGN10987, which together constitute the cocktail that Regeneron calls “REGN-COV2.”

Several scientists working for Regeneron co-authored that *Science* paper. In the acknowledgements they make the following disclosure: “[a] portion of this project has been funded in whole or in part with federal funds from the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response, Biomedical Advanced Research and Development Authority, under OT number HHSO100201700020C.”⁹

A second paper also published in *Science* on August 21, 2020 focuses on four antibodies.¹⁰ Two of those antibodies are REGN10933 and REGN10987, which combined are known as the REGN-COV2 cocktail. The paper presented data “strongly” supporting “the notion that cocktail therapy may provide a powerful way to minimize mutational escape by SARS-CoV-2.”¹¹

This second paper was also co-authored by several scientists working in-house at Regeneron. According to the acknowledgements, “[a] portion of this project has been funded in whole or in part with federal funds from the Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response, Biomedical Advanced Research and Development Authority, under OT number HHSO100201700020C.”¹²

Both papers noted that the work was claimed in “one or more” pending patent applications.

In addition to academic articles, Regeneron has also acknowledged BARDA’s role in funding the research leading to REGN-COV2 in press releases. For example, according to an

⁷ <https://science.sciencemag.org/content/369/6506/1010>

⁸ <https://science.sciencemag.org/content/369/6506/1010>

⁹ <https://science.sciencemag.org/content/369/6506/1010>

¹⁰ <https://science.sciencemag.org/content/369/6506/1014>

¹¹ <https://science.sciencemag.org/content/369/6506/1014>

¹² <https://science.sciencemag.org/content/369/6506/1014>

announcement made in September 2020, REGN-COV2 “rapidly reduced viral load and associated symptoms in infected COVID-19 patients.”¹³ The press release states that “REGN-COV2’s development and manufacturing has been funded in part with federal funds from the Biomedical Advanced Research and Development Authority (BARDA), part of the Office of the Assistant Secretary for Preparedness and Response at the U.S. Department of Health and Human Services under OT number: HHSO100201700020C.”¹⁴ A press release from July 2020 acknowledged that “REGN-COV2’s development and manufacturing has been funded in part with federal funds from the BARDA under OT number: HHSO100201700020C.”¹⁵

Furthermore, several SEC forms filed by Regeneron also acknowledged that the U.S. government is funding a significant portion of their research activities related to COVID-19, which obviously includes REGN-COV2. For example, in a 10-Q form corresponding to the period ending on June 30, 2020, Regeneron explained that as a result of their contract with BARDA the U.S. government “is obligated to fund 80% of [their] costs incurred for certain research and development activities related to COVID-19 treatments.”¹⁶

Finally, BARDA has provided an “update” on their website describing the work that Regeneron has done thus far under their collaboration. BARDA explains that Regeneron scientists,

“[...] selected 2 potent, virus-neutralizing human antibodies and scaled up manufacturing with in-house capabilities. The 2 antibodies bind non-competitively to the critical receptor binding domain of the SARS-CoV-2 spike protein, which diminishes the ability of mutant viruses to develop resistance and escape treatment.”¹⁷

This update was added to [medicalcountermeasures.gov](https://www.medicalcountermeasures.gov) in June, according to our review based on the Internet Archive WayBack Machine. That date was well after Regeneron and BARDA expanded their contract on January 31, 2020 to include work related to COVID-19.

In summary, it is evident that the research leading to REGN-COV2 was funded by BARDA. Regeneron has acknowledged this in papers, press releases, and SEC forms.

4. Regeneron failed to disclose BARDA funding in a REGN-COV2 patent

Regeneron was recently issued a U.S. patent directed to antibodies against SARS-CoV-2. U.S. patent 10,787,501 (the “501 patent”), titled *Anti-SARS-CoV-2-spike glycoprotein antibodies and*

¹³

<https://investor.regeneron.com/news-releases/news-release-details/regenerons-regn-cov2-antibody-cocktail-reduced-viral-levels-and>

¹⁴

<https://investor.regeneron.com/news-releases/news-release-details/regenerons-regn-cov2-antibody-cocktail-reduced-viral-levels-and>

¹⁵

<https://investor.regeneron.com/news-releases/news-release-details/regeneron-announces-manufacturing-and-supply-agreement-barda-and>

¹⁶ <https://www.sec.gov/ix?doc=/Archives/edgar/data/872589/000180422020000022/regn-20200630.htm>

¹⁷ <https://www.medicalcountermeasures.gov/app/barda/coronavirus/COVID19.aspx>

antigen-binding fragments, claimed the priority benefits of U.S. provisional applications 63/004,312, filed April 2, 2020; 63/014,687, filed April 23, 2020; 63/025,949, filed May 15, 2020; and 63/034,865, filed June 4, 2020. Therefore, the earliest priority was an U.S. provisional application dated April 2, 2020. This was *after* the establishment of the HHSO100201700020C contract in 2017 and its expansion in January 31, 2020 to include work related to COVID-19. The non-provisional application was filed on June 25, 2020. The '501 patent was issued on September 29, 2020, after the United States Patent and Trademark Office (USPTO) granted Regeneron a request for prioritized examination.

The '501 patent covers REGN-COV2. According to its abstract, the '501 patent is directed to “antibodies and antigen-binding fragments thereof that bind specifically to a coronavirus spike protein and methods of using such antibodies and fragments for treating or preventing viral infections (e.g., coronavirus infections).” Claim 1 is directed to an isolated antibody that binds a SARS-CoV-2 spike protein. Claim 6 is directed to another isolated antibody that binds a SARS-CoV-2 spike protein. Claims 14 and 16 jointly describe a pharmaceutical composition comprising two antibodies that bind a SARS-CoV-2 spike protein.

Furthermore, the '501 patent specifically mentions REGN10933 and REGN10987 multiple times in the specifications. The '501 refers to these antibodies respectively as “mAb10933” and “mAb10987.” For example, Table 4 in pages 55-58 has a list of amino acid sequence identifiers including for mAb10933 and mAb10987. Table 2 in pages 47-48 provides examples of possible antibody combinations, including one based on a mAb10933 and mAb10987 cocktail.

The '501 patent names Alina Baum, Andrew Murphy, Christos Kyratsous, Cindy Gerson, Gang Chen, George Yancopoulos, Johanna Hansen, Marine Malbec, Neil Stahl, Robert Babb, Tammy Huang, Wen-yi Lee, and William Olson as co-inventors. These inventors are scientists currently working in-house for Regeneron. All but one of these co-inventors also co-authored the *Science* papers published on August 21, 2020 to describe REGN-COV2.¹⁸

In summary, the '501 patent covers the REGN-COV2 antibody cocktail. The co-inventors in this patent are also co-authors of two recent *Science* papers that describe the REGN-COV2 antibodies. Although both papers acknowledge that the research was funded by BARDA, the '501 patent fails to disclose that it was funded by the U.S. government.

In addition to the '501 patent, Regeneron has filed at least one more application with the same priority date. U.S. patent application 16/996,297, which was filed on August 18, 2020 and is still pending, claimed the benefits of the application issued as the '501 patent. The 16/996,297 application has not yet been published, which limits our understanding of its scope or whether it acknowledges BARDA funding.

¹⁸ All but Cindy Gerson are co-authors of the first *Science* paper; Alina Baum, Andrew Murphy, Christos Kyratsous, George Yancopoulos, Neil Stahl are also co-authors of the second *Science* paper.

5. Failing to disclose BARDA funding in patents is a contractual violation

In their expanded contract with BARDA, under a subparagraph titled “*Actions to protect the government’s interest*,” Regeneron agreed to “[...] (i) establish or confirm the rights the Government has throughout the world in [...] Subject Inventions to which Recipient elects to retain title, and (ii) convey title to the Government when requested under Subparagraph c of Paragraph C of this Article and to enable the Government to obtain patent protection throughout the world in that Subject Invention.” One of the commitments Regeneron made “to protect the government’s interest” was to include a statement within the specification of any U.S. patent application and any patent issuing thereon, as follows:

"This invention was made with Government support under Agreement HHSO100201700020C, awarded by the U.S. Department of Health and Human Services. The Government has certain rights in the invention."

As explained above in Section 3, the research leading to REGN-COV2 was funded under the HHSO100201700020C contract with BARDA. Therefore, the ‘501 patent appears to be a “Subject Invention” as defined under this contract. In spite of this, Regeneron failed to include a statement acknowledging BARDA funding in the ‘501 patent. This is a failure to acknowledge BARDA funding in violation of their contractual obligations with the government.

In contrast with their failure to disclose BARDA funding in the ‘501 patent, Regeneron has told their investors that the U.S. government has certain rights over their inventions. The company has further suggested that the U.S. government could exercise those rights with respect to REGN-COV2. In the 10-Q SEC form covering the period ending June 30, 2020, Regeneron stated that they entered “into an agreement to manufacture and deliver REGN-COV2 to the U.S. Government over the remainder of 2020.”¹⁹ The SEC form further states that the U.S. government has certain rights under that agreement:

“Among other rights, this agreement gives the U.S. Government the right to require us to grant a non-exclusive license to applicable inventions to a third party if such action is deemed necessary to alleviate certain health or safety needs. This right may be triggered if we, for example, do not manufacture or supply sufficient product to address such needs. If the U.S. Government exercises or asserts any such rights or imposes these or similar measures with respect to our products, product candidates, or related inventions (including REGN-COV2), it may adversely impact our business and results of operations.”²⁰

¹⁹ <https://www.sec.gov/ix?doc=/Archives/edgar/data/872589/000180422020000022/regn-20200630.htm>

²⁰ <https://www.sec.gov/ix?doc=/Archives/edgar/data/872589/000180422020000022/regn-20200630.htm>

6. Bayh-Dole Act and other regulations also require disclosures of U.S. government support

The Bayh-Dole Act and federal regulations and guidelines make clear several obligations for contractors in the disclosure of government rights in subject inventions, including: (1) a requirement to disclose that federal funding contributed to an invention; (2) NIH contractual requirements for disclosure; and (3) required language to be inserted in patent applications and patents, stating the role of federal funding and the government's rights.

Under 35 U.S.C. § 202(c)(1), any contractor that receives funding from the U.S. government is required to “disclose each subject invention to the Federal agency within a reasonable time after it becomes known to contractor personnel responsible for the administration of patent matters.”

Under 37 C.F.R. § 401.3(a), each federal funding agreement shall contain the “standard patent rights clause” found at 37 C.F.R. § 401.14, barring specific circumstances and exceptions. Subsection (c)(1) of the patent rights clause outlines the disclosure requirements.

37 C.F.R. § 401.14(c)(1)

(c) Invention Disclosure, Election of Title and Filing of Patent Application by Contractor

(1) The contractor will disclose each subject invention to the Federal Agency within two months after the inventor discloses it in writing to contractor personnel responsible for patent matters. The disclosure to the agency shall be in the form of a written report and shall identify the contract under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the agency, the Contractor will promptly notify the agency of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the contractor.

Under 35 U.S.C. § 202(c)(6) and 37 C.F.R. § 1.77(b)(3), contractors are required to state within the patent application or patent that the federal government contributed funding to support the discovery of the invention and that the government retains certain rights.

35 U.S.C. § 202(c)(6)

(c) Each funding agreement with a small business firm or nonprofit organization shall contain appropriate provisions to effectuate the following:

(6) An obligation on the part of the contractor, in the event a United States patent application is filed by or on its behalf or by any assignee of the contractor, to include within the specification of such application and any patent issuing thereon, a statement specifying that the invention was made with Government support and that the Government has certain rights in the invention.

**37 CFR Chapter I - UNITED STATES PATENT AND TRADEMARK OFFICE,
DEPARTMENT OF COMMERCE**

**PART 401—RIGHTS TO INVENTIONS MADE BY NONPROFIT ORGANIZATIONS
AND SMALL BUSINESS FIRMS UNDER GOVERNMENT GRANTS,
CONTRACTS, AND CO-OPERATIVE AGREEMENTS**

37 CFR 401.14 - Standard patent rights clauses.

(f) Contractor Action to Protect the Government's Interest

(1) The contractor agrees to execute or to have executed and promptly deliver to the Federal agency all instruments necessary to (i) establish or confirm the rights the Government has throughout the world in those subject inventions to which the contractor elects to retain title, and (ii) convey title to the Federal agency when requested under paragraph (d) above and to enable the government to obtain patent protection throughout the world in that subject invention.

(2) The contractor agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the contractor each subject invention made under contract in order that the contractor can comply with the disclosure provisions of paragraph (c), above, and to execute all papers necessary to file patent applications on subject inventions and to establish the government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by (c)(1), above. The contractor shall instruct such employees through employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.

...

(4) The contractor agrees to include, within the specification of any United States patent applications and any patent issuing thereon covering a subject invention, the following statement, "This invention was made with government support under (identify the contract) awarded by (identify the Federal agency). The government has certain rights in the invention."

The United States Patent and Trademark Office (USPTO) requires that applicants for patents provide a statement regarding federally sponsored research or development.

**37 CFR Chapter I - UNITED STATES PATENT AND TRADEMARK OFFICE,
DEPARTMENT OF COMMERCE**

37 CFR 1.77 Arrangement of application elements.

(b) The specification should include the following sections in order:

(3) Statement regarding federally sponsored research or development.

See also: ANNEX: Presidential Executive Order No. 9424. Establishment of a Register of Government Interests in Patents.

For more on the the issue of inventors failing to disclose federal funding in patent applications, see: <https://www.keionline.org/bayh-dole/failure-to-disclose>